The future of the Sierra Madre: responding to social and ecological changes

Ploeg, J. van der; Masipiqueña, A.B.

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Proceedings of the fifth regional conference on environment and development

Trees in agricultural landscapes: smallholder tree growing for sustainable rural development and environmental conservation and rehabilitation

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Modeling land use transitions in the Cagayan Valley

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CVPED 2005

Cover design: Samuel P. Telan and Madeline G. Mabazza. Cover photos: (1) the vice-chairman of people's organization in sitio San Isidro, Mr. Carlito Preligana, plants a jackfruit tree in the buffer zone of the Northern Sierra Madre Natural Park (van der Ploeg 2004); (2) Mr. Nonie de la Peña releases a Green Turtle in barangay Dimasalansan in the Northern Sierra Madre Natural Park (van der Ploeg 2002); (3) a farmer in barangay Buyasan, San Mariano, assesses the damage caused by a flashflood after typhoon Harurot (van der Ploeg 2003); (4) a farmer in barangay Del Pilar compares his carabao with a tractor (van der Ploeg 2004). Back photos: (1) opening of the fifth international conference in Callao cave, Peñablanca (Persoon 2005); (2) participants of the panel on forestry education (CVARRD 2005); (3) the president of Isabela State University, Dr. Romeo R. Quilang, presents a plaque of appreciation to the director of the Institute of Environmental Sciences of Leiden University, Dr. Helias Udo de Haes, during the opening of the conference (CVARRD 2005).

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MESSAGE

THE WINNING TURNED OUT TO BE THE EASIEST PART

Grace C.M. Padaca

Welcome to Isabela! We are meeting here today in the context of some sad and alarming developments that threaten the Sierra Madre: the controversial issue on the logging ban, the Supreme Court turnaround on the Mining Act, and the sudden pullout of the Dutch government support for the Northern Sierra Madre Natural Park. When I won as Governor of the Province of Isabela, in an amazing way some people say, many people's hopes were raised to high heavens; not just those of Isabelinos but also of many other Filipinos from all over the country. It may not be everyday that seemingly insurmountable odds can be overcome. I hope that in view of the grim scenario that confronts us, we will never forget that as long as we do not give up doing what needs to be done and share the responsibility with each other, we can still do amazing things for our amazing world.

The protection and management of our natural resources is a key element of the sustainable development of our province. I have formed the anti-logging taskforce with the objective of curbing the abuse of our forest resources. For the past four decades, illegal logging operated unabatedly; sadly with top government officials at the lead. I have seen for myself the traffic of logs in Abuan River which prompted me to meet with the DENR regional director and key officers to bring it to their attention. I have also restricted and regulated the issuance of quarrying permits that have (again) not be checked for decades and are causing riverbank erosion in many parts of the province and have bred corruption in the collection of fees. When I learned of the activities of an application for a quarrying permit in Dinapigue near the Northern Sierra Madre Natural Park, I immediately dispatched the Provincial Environment and Natural Resources Officer (PENRO) to personally go there, meet with the people and make them know that this new leadership in Isabela will not be part of any moneymaking venture that will mean the wanton destruction of our natural resources.

I convened the ecological solid waste summit to enforce and implement Republic Act 9003 known as the Solid Waste Management Act of 2000. I visited the CROC project in San Mariano that aims to conserve the Philippine crocodile (*Crocodylus mindorensis*). I have also learned of the conservation efforts of the Malasi Lakes wildlife sanctuary in Cabagan, which is home to nine duck species, including the very rare Greater Scaup (*Aythya marila*). We have also started working with the Asian Council for People's Culture to put up a school of indigenous knowledge and traditions (*sikat*) that will benefit the Agta in the coastal towns of Isabela, specifically Palanan. The indigenous peoples truly deserve our attention and efforts as they play an important role in the conservation and protection of our forests.

I'm working together with different health groups addressing the problems on malaria and tuberculosis. We know that these diseases are directly related to the state of our environment. Pollutants have caused upper respiratory diseases. Breeding grounds for mosquitoes have contributed to the increase of malaria cases.

In all my meetings with farmers and barangay officials, I get sob stories on the losses they have incurred as victims of fierce typhoons and merciless droughts. I always explain that these extreme conditions are a result of the way we have been abusing our environment. I hope I am not preaching to these people with empty stomachs; how can they care for their future if they cannot even provide for the here and now?

This brings me to the big issue that is hanging over my head as a neophyte Governor who only wants to do the right thing but is confronted with urgent priorities: the coal mining issue. It is believed to be one of the reasons that caused the downfall of my predecessor: he did not listen to everyone who would be affected by the project. The Philippine National Oil Company (PNOC) is proposing the construction of an integrated mine-mouth coal fired power plant following the discovery of lignite coal deposits covering an area of 9,000 ha and estimated to contain 28.3 million metric tons. The Isabela anti-coal mining alliance has raised various issues and opposes this project. I do not want to make the same mistake as the former administration; not so much for purposes of re-election but simply for democracy. After all, giving respect to all concerned was my main reason for fighting in the first place.

In my first few months in office, we conducted several separate meetings between the two groups and finally a dialogue was held where I listened to both sides as they clarified, discussed and debated the pros and cons of the coal mining project. We are still considering the positive and negative effects of the mine. It is not an easy task considering my position as Governor: I have to listen to all sides, weigh everything in order to arrive at a decision and bear the consequences. I know that whatever I say will turn out to be unpopular depending on whose side one stands.

Yes, I am at the forefront of environmental issues and concerns. Let me assure you that I am a person who believes in protecting, conserving and utilizing our resources well. But let me just ask you one thing: *alalayan niyo ako*. Please be with me every step of the way. There is so much we have to do. And as Governor, I am deluged with so many other concerns; the environment is just one issue. I have to deal with problems on corruption, peace and order, illegal gambling (*jueteng*), a billion-peso debt left by those who came before me, health problems, lack of classrooms and teachers… Add to this the wrong image that I am a superwoman. People concluded that I can make things happen overnight just because I beat a giant. But, as I have always said, the winning turned out to be the easiest part. One is down… one thousand to go.

But let me emphasize that as Governor, I truly and sincerely care for our people and for our land and environment. I consider it as God's gift. We have to take care of it very well, thankfully and lovingly, as good stewards. So if there are times when you see that I am not giving enough attention and action to what our partnership needs: come to me and tell me. It is because of the sheer number of other concerns that I have to attend to. I am accountable for the next generation of Isabelinos. For this reason, I appeal to you for help, proposals and recommendations. Work with me and the present leaders of this province and be our partners in harnessing and sourcing resources to ensure that our environment is well protected and properly conserved.

KEYNOTE

ENVIRONMENTAL GOVERNANCE IN A POSTMODERN WORLD: CHALLENGES AND OPPORTUNITIES FOR SCIENCE AND POLITICS

Antonio P. Contreras

THE POSTMODERN WORLD

We live in a postmodern world. This is a declaration that many of you here today would probably doubt, particularly in the context of the usual association of being modern with the notion of being developed. Indeed, to claim that we live in a postmodern world would fall flat in the face of someone who sees poverty, poor infrastructures, corruption, and in the context of our gathering today, environmental destruction. Our dominant imagination of being modern showers us with images of affluence and plenty, of good quality of life, a clean environment, and of good governance.

Allow me however to impose on you something that on some occasions might be interpreted as wild imaginations of a professor who has lost touch with reality. On the contrary, I am presenting to you something that pervades our reality. Being postmodern does not imply that we have achieved modernity and is now in the phase where we are beyond it. Being postmodern, in fact, is an epistemological outlook; that is, a way of looking at the world, where the constructs of modernity are being problematized and are now seen in a different analytical lens.

What are the features of our world that many of us in the social sciences, particularly in my brand of social science now see as evidence that we are in a postmodern world? There are many. However, before discussing with you these features, let me first reveal to you the context within which this view emerge. The image of a postmodern world emerges as a challenge to the ideas of the Enlightenment and of Science that there are grand theories and totalizing explanations about our reality, and that much of these are derived from empirical positivist science where knowledge is established only through the scientific method of inquiry.

This view has been effectively challenged in a postmodern world, a world wherein the grand theories and totalizing explanations about reality crumble from the homogenizing effects of globalization and the pluralizing effects of localization. In a complex domain wherein commodities and culture are traded in the world market, a different kind of politics and way of thinking emerged to unsettle what appears to be settled. Here, the idea of epistemological and moral unity of science has been challenged. It is in this era when Einstein becomes as important as indigenous knowledge; where science becomes just another way of looking at the world; and where you and I become the locus of our own liberation, even as we also are the bearers of our own oppression.

The dominant social sciences are now critiqued as trying hard copycats of the natural sciences. Drawn mainly from the Enlightenment, the social sciences wanted to liberate us from the darkness of ignorance and poverty. However, instead of bringing in discourses of liberation, the social sciences, like the natural sciences whose methods and precepts they imitated, has brought a totalizing discourse that led to the exclusion and

disempowerment of many forms of knowledge, and consequently, their bearers. Thus, the sciences became avenues for knowledge that do not liberate but instead control. Together with this, history, as the field of knowledge that defines our past, was written from the point of view of the victors. Not surprisingly, history became a narrative that privileged the views of men, of white people, and of elites.

Consequently, development sciences, as children of modernity and Enlightenment, have failed to solve the problems of underdevelopment and poverty. In fact, instead of solving underdevelopment, our social sciences and their attendant development practices have only managed underdevelopment to a point that the need for expertise is sustained as a profession that feeds on the misery of others. This is the natural consequence of a science and a worldview that is structured in the language that is an exclusive domain of the learned and the pedigreed. Here in this world, you have to earn a PhD. or an equivalent academic credential before you can have the right to talk about poverty and prescribe a cure to it.

It is indeed ironic that the Enlightenment project that led to the modern worldview and the scientific dogmas that it brought to bear has contradicted the meaning of its name: far from enlightening, it has become an avenue to at best muddle, at worst darken the discourses of hope and liberation. The irony of it all is that this muddling and darkening enables us to continue to flourish as a profession. As development professionals, we need poverty and corruption in the same way that doctors need people to get sick so that they continue to be needed.

Postmodernism, as a phase in the social imagination of reality, confronts these shortcomings of modernity and the Enlightenment project. It is critical of the idea that there is only one story, one grand narrative, and one great scientific body of knowledge that can tell us what to do with our world. We now see the explosions of local stories coming from people themselves, who are becoming more assertive in their interpretations of their own experiences, through emerging social movements that are not based on class struggle but on identity politics, even as we continue to experience the globalization of culture and of the economy. In this context, we experience the rise and growing importance of transnational bodies and institutions. We also see a global diaspora not only of commodities, but also of symbols and of people. We see the results of this, for example, through CNN, or in Jollibee outlets in the US. West coast, or in overseas Filipino workers. This is now actively aided by the information superhighway, where ideas and images are rapidly transmitted across vast spaces, effectively touching people's lives. In this global age, the face of terror, pain and suffering, as well as the lifestyles of the rich and famous are delivered to our living rooms courtesy of cable television and the internet.

In this age of information, mass media emerges as a powerful institution that shapes not only our visions of the present, but also our imaginations of the future and our interpretation of the past. Popular culture, through popular media, has gained enormous power to a point that they no longer merely reflect and tell stories, but in fact influence the unfolding of the stories of our lives. The rise of the media is particularly strong in the production of politicians and of politics, and the emergence of politics as theater or reality TV. This is evident in the electoral supremacy of celebrities; or in the way televised news becomes a powerful venue for the shaping of political agenda. It is also the lynchpin that propels soap operas, *telefantasyas*, and reality game shows into becoming a daily fare that

captivates the citizen, effectively rendering simulations of reality as powerful as the reality they simulate.

In this context, the State loses its sole monopoly to authority, and science has begun to accommodate the views of those excluded. Hence, we now see the emergence of participatory governance, and its attendant discourses of adaptive co-management, social capital, and a plethora of technologies and concepts that now relocates a lot of the impetus for establishing social order away from the State and into civil society and local communities. This decline of the State as having a monopoly for governance is seen both in privatization and deregulation, and in the adoption of participatory development strategies wherein partnerships with local communities and other civil society organizations are enabled. We now also see efforts to bring in participatory science, where science is made politically relevant, and becomes embedded in the discourse of governing.

POSTMODERNITY IN THE PHILIPPINES: FOCUS ON SCIENCE AND POLITICS

Some might challenge my characterization of Philippine society as postmodern. Yet, it has been already said that we are a country without a viable scientific culture, and that we have a very weak State. People who said so lament these as unfortunate, rendering us unable to truly develop in the modernist sense. These two, the rationality of science and the controlling ethos of a strong State, are the very foundations of modernity.

I argue, and declare, as I have always declared, that while indeed the lack of a culture of science might be debilitating, and that a weak State can be a disadvantage, that we can turn these curses these into blessings. My quarrel with arguments that belittle our knowledge systems and label these as lacking in science, and with claims that demean our modes of governance and label these as symptoms of a weak State, is that they totally miss the point.

Indeed, we are lagging behind compared to our neighbors, both in terms of our budget allocation to scientific research and development (which is only about 0.15 percent of our national budget) and in terms of the actual growth of such allocation (which is only about 7 percent annually). Some, like Raul Pertierra, an Australian social scientist now connected with Ateneo de Manila University, have made seemingly convincing arguments about our lack of scientific culture, but mainly focusing on the cultural basis for this scientific vacuum in our consciousness; labeling it as the culture of our everyday lives (Pertierra 2003). At one point, he even cited our concept of otherness, or our deep notion of self-identification wherein we delineate the social boundaries of people who are *iba* from those people who are *di-iba* as one of the probable culprits. He wondered how could we develop a culture of science if we have this notion deeply entrenched in our minds.

He further pointed out that even scientists he interviewed manifested some characteristics, which he described as enchantments with the supernatural such as a belief in a supreme being or the determinacy of life as ordained by fate that would indeed be incongruous with how the scientific mind should behave. Of course, this is suggesting that the true scientific mind is one that upholds the power of the human intellect to reshape life, and not in accordance with any destiny ordained by God.

Well, granting that the argument that we have no science culture even among our scientists is indeed with empirical basis, the issue of whether we are better off or worse off for being such is debatable. Indeed, the argument that we have multiple bases for our reality compromises the possibility for celebrating science. Science, in fact, is an authoritarian body of knowledge that insists on only one mechanism to discover truth. Thus, it would not accommodate myths, or superstition, or philosophy, or even religion from being sources of factual knowledge. Thus, it becomes an Archimedean point for the establishment of truth and knowledge, a grand narrative that would exclude any other way of telling the story of life.

However, the Filipino mind is one that celebrates multiplicity of narratives. We are, at the very least, a clear example of the postmodern: one that celebrates the polyvocality of life, where many voices emerge to provide different views of human experience. Of course, this could come with its disadvantages. However, it could also have its advantages. This could be the source of our strength, in the sense that we have higher levels of tolerance for stupidity and grandstanding politicians. We simply dismiss these as other ways that we should ignore.

The scientific mind could indeed be superior in providing a mechanical, materialistic basis for progress. Needless to say, our present economic condition as a country would be a good measure for the problems that societies like ours could face. However, this does not make us into a lesser community.

I challenge the argument about the constraining effect of our concept of otherness for the simple reason that it is not even a valid one. All communities, whether imbued with a scientific mind or not, whether developed or not, have their own notions of *iba* and *di-iba*. In fact, the United States, which ranks high on the list in terms of government spending for science and technology, have perfected the art of double-standard diplomacy by differentiating countries it identifies as *iba* from those it considers as *di-iba*. Of course, here the *kaibahan* is based on the willingness of the country's governments to subscribe to the American political agenda. Malaysia, which is also highly rated in terms of science and technology, has a well-entrenched policy of distinguishing *bumiputeras* or ethnic Malays from the Chinese and Indian Malays. Thailand treats its hill-tribes as non-Thai others. Japan, with its monolithic society, is one with a deeply entrenched concept of the collective self as differentiated from the non-Japanese other.

Thus, while Pertierra's work is a result of a descriptive study by an objective, white, male social scientist (one which science would really approve of with its celebration of objectivity as a cornerstone of its work ethic) it had an effect that leaves me uncomfortable. As a social scientist who views knowledge as an extremely political domain, and who looks at science as loaded with discriminatory power, I was hurt by the unintended implications of his conclusions. His descriptive, cold-neutral study supported by data gathered from a purposively sampled group of scientists and students had the effect of demeaning the Filipino mind and capacity. The unsaid premise is that science is a superior domain. The empirical claim was that the Filipino culture restrains the Filipino mind to have a scientific place in it. Therefore, the logical conclusion is that we are lesser than our more scientifically endowed neighbors in Asia, and in the world.

I simply could not take this. This is not about nationalistic pride being hurt, but about an academic sensitivity being transgressed. I, myself, have difficulty in dealing with the political tragedies we are confronting now as a people. These tragedies are

consuming us to a point that there is no more rage left, only amusement on one hand, and exasperation on the other. The logic of politics, not based on any scientific rationality, has infected our political community. We are governed by a system that defies reason, and that explodes not only myths but even textbook knowledge of what is normal and sane. However, this does not in any way make us a society condemned to be politically inferior to the rest of the world.

The Filipino has, for several years since the first extra-constitutional political transition in 1986, engaged political science in ways that political scientists, particularly Filipino political scientists, should reflect on theoretically and conceptually. Textbook categories, concepts, and theories that we teach in our classes have been challenged, or deconstructed by Philippine political experiences. We are the only country in the world with a Senate that gives chairpersonships to people from the opposition minority parties. We have a convoluted party-list system that does not fit the taxonomy of any textbook classification. The dynamism of the theory of devolution, which in its original conceptualization applies to the transfer of power from state institutions to local political authorities, has been constricted by our own interpretations of political and authority. Through the Local Government Code, we have arrested such dynamism by limiting the political to state institutions and authority to bodies that are bestowed with legal-rational legitimacy only through electoral contests. Thus, we limited devolution to the process of transferring power from national state bureaucracies to elected local government units (which are in themselves state institutions), when in fact it could include, and must in fact include, organic political bodies such as indigenous institutions and organizations that are also political authorities in their own right.

However, while we have limited devolution to a statist and static definition, we have also contributed something that enriched the realm of civil society theory. We have provided a vocabulary to distinguish a non-governmental organization (NGO) from a peoples' organization (PO), something that other countries do not make, and in which the dominant and non-Filipino literature on civil society is silent. While we may not have the scientific mind, we have elevated the art of political satire, and of simulation through the hyper-real domain of television, texting, and the cyberspace, to become central institutions not only for political socialization, but also for political legitimization and articulation. Our strength lies not in the formal institutions of the State but in the resilience of civil society. Thereby it is challenging dominant political science literature. These are just some of the instances where the Filipino has carved a niche of its own in political theory.

Thus, even if we may be faulted for not adhering to the kind of science that the Enlightenment would like to have us, and even if we, as a people, may have troubles with our political experience, we are not made of a lesser stuff. We contribute a new perspective, even as our very own existence as a people challenges the dominant paradigms of science.

How can we be less as a people when, despite all our flaws and our troubles, we are able to offer a collective deconstruction of the powerful institution of science? Scientists do not get awards because they validate knowledge. They get one because they challenge it and build new ones. I enumerated above the instances where the Filipino has carved a niche of its own in political theory. What is now needed is to elevate these not as

aberrations, but as alternative forms (if not powerful deconstructions of) Western and dominant political science, theory, and practice.

Another point: others and even our own political analysts have repeatedly lamented the fact that we have weak political institutions. Our political experience, from the failed coup attempts, to the series of people power mobilization, to the corruption in government, has fueled a plethora of lamentations about the fragility of our political institutions and of the weakness and vulnerability of our political community. These reflections on what is wrong with our society (and of condemnations of our supposed flaws as a people) are mostly based on prevailing textbook categories of how strength should be projected by modern states and political communities.

I have to express my dissent on this. This position stems from my discomfort with concepts of strength that are derived from the absence of crisis. The Philippines, with all its crises, is an exciting place to be in. We face life with so many challenges, some of which are disastrous in magnitude. We are battered by typhoons. Earthquakes shake us. Volcanic eruptions are quite normal. Human error and greed compound our natural propensity for calamities to further bring to us more tragedies. Overloaded ships collide and sink. Planes that are badly maintained crash. Unregistered and rickety buses fall off ravines. We have been ruled by a dictatorship. We have also been ruled by stupidity. Currently, someone with a volcanic temper rules us. We have had coups. In addition, of course, we have our traditional politicians. Collectively enough to give us a century dose of human tragedy. Nevertheless, in all of these, we survive, with our sanity and sense of humor intact. Yet, many of our esteemed scholars and intellectuals still call us weak. But may I ask: how could we be weak?

One time, while I was in Malaysia, a friend who was driving downtown Kuala Lumpur was complaining about the heavy traffic. I, for one, was not noticing any. The cars were moving, though not at 80 km per hour but maybe around 40 km per hour. Nevertheless, we were moving. I guess I was just used to traffic jams where everything was at a standstill. However, this Malaysian friend was almost hysterical in her condemnation of such a traffic mess. I could just imagine how she would behave if she was driving in Manila. When I was in Hawaii many years ago as a graduate student, Honolulu experienced a power black out which lasted for about five hours. It was big news; as if the Japanese again attacked Pearl Harbor. Of course, we Filipino students shrugged the event as just an ordinary matter. After all, you simply would not mind five hours without power when you come from a country where, at the time, eight hours of brownouts could even be shorter than expected. I used to live within the UPLB campus where a simple heavy downpour would mean hours of working in candlelight. Being used to this, I soon associated brownouts not with inconvenience, but with resignation coupled with a strange feeling of romantic anticipation. After all, candlelit dinners with your family are so sweet, and cheap. You do not have to pay for the ambience even as you get a lower electric bill.

These are just two instances where we, crises-tested Filipinos, in fact, emerge stronger than those who are not used to the crises of life. If at all, life is full of crises. Yet, the measure of one's strength is not diminished by crises, but how we as individuals and collectives survive despite them. There is another word for this, more powerful than strength itself. It is called resilience.

And perhaps, creativity too. This is particularly seen in our unique sense of humor. It is both wicked and creative. We can easily convert our tragedies into comedies, and make them as fodder for stand-up comedians, gag shows, and crazy text messages. Of course, the more serious scholars among us would again lament this trivialization of the serious matter of governance, and the lack of serious engagement of the matter of politics. In this league come related complaints about how we simply do not subscribe to a politics of substance. Instead, we elevate people to the positions of elected power whose major talent is dribbling balls in the hard court, or reading prompt cards, or acting funny in movies, or looking good while endorsing a detergent or a vitamin brand, or launching failed coups. What compounds the irony is the fact that we are also a people that are easily aroused by political combat. Elections are treated with much fanfare. We have one of the highest electoral turnouts in the world. This is not to mention the fact that we hold the distinction of being the only country that was successful in mobilizing its people to peacefully oust two sitting Presidents. We are indeed something.

This seeming contradiction is in fact the key element of our power as a political community. I have always argued that the strength of our political community is seen not in the robustness of its formal political processes, but in the health of its organic civil society processes. We may have weak state institutions, but we have strong civil society institutions. Our formal governmental structures may not be at par with the stable models from North America and Europe. We may fall short of the efficiency of Singapore, Thailand, and South Korea. In fact, we have been repeatedly lumped with the banana republics of South America, and some have even griped that Vietnam has overtaken us. Even Cambodia and Laos are gaining on us.

But we have to quickly remind ourselves that while we do not have a strong Republic model, we have a strong sense of community and civility. When Marcos left the Philippines in 1986, we had no government for three days. Yet, we survived. There was no massive looting. No mayhem. No rioting. The series of coups launched against the Aquino government all failed; similar coups have succeeded in Thailand and in other countries. The last round of military adventurism that we saw in Makati again failed. What was significant there was not much the deployment of the brute and formal powers of the military wing of the State to suppress the challenge, but the deployment, and triumph, of a sense of community: of friends urging friends to give up, of *mistahs* talking to fellow *mistahs* to solve the problem another way, of relatives pleading their loved ones to give peace a chance, and of a mother who talked to a President on behalf of her rebel son. Earlier in 1986, Marcos, despite his demonization, could have ordered troops to fire at the crowds at EDSA. He did not.

These are powerful symbols of strong, and not of weak, political communities. These are strong evidences of a political community that is stable in its own unique way and has the capacity to self-recuperate from crisis. Perhaps the source of the lament of scholars is the fact that most of them perceive politics from what I call as a statist perspective. Here, the stability of society is derived from the stability of formal institutions of governance, particularly those that use state processes to consolidate the political community and achieve political order. Indeed, if this is the parameter that will be used, then the Philippines will be found wanting.

However, the way power is exercised in our society goes beyond the State and its instrumentalities. Ordinary citizens perceive the State as a theater, and statist politics as

just some kind of a show, or a performance. The sources of political order in most of our communities are not the laws and their agents, but the norms and traditions that abound in the many organic spaces that we inhabit: our family, kinship, neighborhoods, and associations. I would even be bold to claim that most citizens do not take statist politics seriously because it is not as relevant to their lives as their local institutions where they derive their individual and collective senses of security and sanity.

This is the source of our strength. It is where our resilience is welded into our collective consciousness, and where an organized chaos and postmodern pluralism becomes the watershed that seals the very creativity that keeps our body politic from crumbling and make it sane despite the many challenges it has sustained from natural disasters and human follies. When we are confronted by crises, we summon the very root of our strength: our collective sense of polity is not found in the halls of Congress or Malacañang, and not in the armory of the Army, but in the awesome display of community.

In the end, I would always take our society over one that seems to have everything in place (strong political institutions, efficient civil service, robust economic fundaments) but where communities are falling apart through unbridled individualism; or one that could not even elect a woman President; or one that could not kick the butt of a President who lied to his own people just to go to war; or one wherein people talk in whispers when they are critical of their governments; or one wherein a simple slowdown of traffic or a power outage can create mass hysteria.

Of course, Filipinos still would like to see our elected politicians, appointed bureaucrats, and military brass behave in ways that would be true to what is expected of them in accordance to our social contract. We would also not justify the prevalence of corruption and ineptitude as a natural resource that we are cursed with and therefore have no choice but to cope with our own brand of civility and creative sense of humor. In fact, even as we laugh over the stupid antics and are amused at the self-serving grandstanding of politicians, or even if we shrug our shoulders at the corruption of our public officials, or even if we tolerate the discomforts brought upon by incompetence, there is also a limit to our patience. Even as we watch the political spectacle with amusement, there is also a time when we switch the political channel and pull the plug on a political program that is badly written and acted. Like that popular game show, there is a time we kick butt and say: goodbye! They should ask Marcos and Estrada. The two would know.

While the people know that those who tried to wrest power from a corrupt government had a point in their condemnation of corruption, and while we lauded their idealism we disagreed with their violent means in as much as we smelled something fishy behind what could otherwise be called righteous anger. We also shuddered at the possible consequences had they succeeded. Thus, in all of the bloody attempts to topple government, we stayed in our homes and left the plotters and rebels out in the cold to eventually succumb and yield to the pressures of community. And they dare call us weak. Weak my foot!

CHALLENGES FOR ENVIRONMENTAL GOVERNANCE IN A POSTMODERN WORLD

At this point, perhaps many of you would now feel impatient with what seemed to be a lengthy digression away from the environmental theme of this conference. I have purposely tried to illuminate for you the basic premise of this paper, without first touching on the environmental theme, if only to dramatize one point: one of the core mistakes in our attempts to search for a solution to the environmental problems of our country is that we have premised it on wrong assumptions. We have always assumed that the solutions would be more technical than political, and that the political solutions rest in a strong State while the technical solutions lie in Western science. While indeed a strong State, through clear policies and credible institutions, and strong science would constitute a significant part of the strategies to protect and govern our environment, the big lie exists in the argument that strong states and Western science as they are presented are unproblematic, and they are the only sources of solutions.

In a postmodern world, of which I have argued the Philippines belongs, there are many attributes that we have to deal with in our search for strategies. One of the key mistakes that we commit is to look for a single formula, a grand policy regime that would address our environmental problems. Hence, we have this fixation for a single Water Code, a single Land Code, a single Forestry Code, a single formula for annual allowable cut, and so on. We find it convenient to codify our strategies through single policy regimes despite the fact that we deal with multiple and complex realities. The Philippines is an archipelago. Each island system possesses attributes that are unique. Cultural diversity and differences are more the norm than the exception in this country of more than eighty ethnolinguistic groups. It is about time that we have to have governance arrangements that are authentic relative to this complexity. The vocabulary for this, in fact, is already in place, with our concepts of devolution, participatory local governance, community-based forestry, and other management strategies that open the avenue for local voices. What is perhaps needed is a more serious effort to scale this up at the national level, and to prevent the State from simplifying complex policy settings into convenient single policy domains. The move towards a federal form of government may also be a step in the right direction in this regard, as this provides a stronger institutional basis for more localized, appropriate and relevant modes of governance of the environment relative to the local context and conditions.

Participation has become an important consideration in governance, particularly in the context of development and democratization. Rights-based mechanisms have surfaced to lend additional emphasis to mainstreaming the concerns of marginalized sectors, including women, the poor, indigenous peoples and children. As governments are confronted by the challenges of globalization (such as the impacts of market liberalization on the lives of these marginalized sectors) policies can no longer emerge in the context of top-down mechanisms, but in avenues by which these sectors can be organized to affect fundamental changes. This was shown in the dynamics of environment and forest policy development in the Philippines. Alternative political actors and processes challenge traditional politics to engage a new way of looking at the world through democratic, gender-equal perspectives.

Key to this alternative type of politics is recognition of the role of a deconstructed science in the process of governance. Ideally, scientific knowledge leads to the development of technologies that become inputs to the development process. Most, if not all, development problems require both political as well as technological solutions. It is most unfortunate that the world of science has usually been projected to be neutral, and therefore apolitical.

The political nature of knowledge can be seen in the manner environmental resources such as forests and forest-lands are often defined, a seemingly technical issue that is far from being merely a scientific endeavor. Postmodern theory has long argued that production of knowledge is a domain for the operation of power. This power relation is seen, for example, when a specific definition of what constitutes a forest also determines institutions for access and control over the resource. Furthermore, the idea of what constitutes the environment is also the product of institutional forces. In this regard, for example, a forest is no longer merely a biological entity, but becomes a social construction reflecting the agenda and ideology of a dominant group, and a dominant system of knowledge and representation. This system has direct bearing on the techniques of management and the modes of governance that are deployed.

More politically, the social construction of forests becomes embedded in the process of myth-making (Stott 1999), wherein the dominant group that controls the production of knowledge uses this production as leverage to further its agenda in the context of a political economy articulating the process of state-building. As Escobar (1998) argued, the major locus for the definition of nature lies on how it articulates with the production of capital. Laungaramsri (2000), in her analysis of the discourse on forestry in Thailand, captures the logic of this argument: “The changes in the discourses of ‘forests’ and ‘nature’ in Thailand represent not only the shifting state attitudes and practices towards natural landscapes but also the complex forces circumscribing the multiple forms of technologies in the state resource control” (op cit. p. 92). In the Philippines, the development of forestry knowledge is deeply rooted in the colonial character of the traditional science of forestry. This science was used as an academic anchor for the colonial exploitation of forest resources, and in the continuation of such even during the post-colonial years (Contreras 2002).

Science, while espousing the ethic of neutrality, is actually a political domain wherein truth is produced using certain rules, rules that can be very exclusionary. Furthermore, the ethos of science has been characterized as an alienating, mostly male and elite dominated world, wherein the production of knowledge is susceptible to the control of elites both within countries as well as across nations in the global community. Biotechnology, for example, has become a domain of knowledge that has been controlled by transnational science-industry complexes. Mechanisms such as patenting have caused big corporations to sequester control over traditional knowledge and have caused the alienation of organic knowledge long nurtured by indigenous peoples and women. Forestry science was largely dominated by a corporate ethic that placed more emphasis on the forest as an economic resource and a crop. The forest, as a field of subjectivity, was managed from this perspective where local communities were seen as problems instead of solutions. The earlier recalcitrance of the forest bureaucracy with regard to the accommodation of community forestry is largely an outcome of a forestry science that valued the forests only for its trees. Decades of sensitization, including a change in

paradigm and curriculum, had to pass for the idea of community forestry to be mainstreamed in the Philippine forest bureaucracy.

The other sad reality lies in the fact that even as science remains controlled by Western, elitist and male-dominated structures and worldviews, governance mechanisms, particularly at the local level, fail to utilize science in solving societal problems. For their part, many scientists, particularly those in the natural sciences, lack the capacity to translate their research into materials that can become inputs to better governance. This is aggravated by lack of state support for scientific research, causing scientists to be dependent on external funds coming from transnational sources, most of which carry their own agenda. Furthermore, the cultural difference between politicians and policy makers, and civil society advocates, or those who now inhabit the governance domain on one hand, with the scientists on the other, prevents a meaningful articulation of science-based governance mechanisms to address societal problems.

Thus, even as there are now mechanisms that enable participatory and alternative politics to be mainstreamed in environmental governance, much has to be done to mainstream a deconstructed science in governance. This type of science, far from its traditional role, will critically engage the exclusionary, elitist and patriarchal discourse that dominates science, and the exclusionary, elitist and patriarchal discourse that dominates traditional politics. Here, there are two different but extremely related tasks: (1) the development of mechanisms to mainstream science in good governance and (2) the development of mechanisms to deconstruct science.

Thus, the key challenge is how to link science-based forest and environmental governance to the democratization process, where multiple and local voices are given spaces to participate. Related to this is to provide spaces within which indigenous knowledge systems of local communities can be recognized as valid in these processes. Furthermore, there is also a need to bring more women into the discussion. The potential for this is promising, considering the fact that there already exist networks in civil society that address development concerns and are committed to engaging the State in the development of policies. In fact, the Philippines already has a history wherein university-based academics and organic intellectuals have contributed to the development of strategies that expanded spaces in forest and environmental governance, and have provided avenues for mainstreaming gender issues, and for recognizing the legitimacy of the knowledge of local communities (Contreras 2002).

These are the key challenges. There is still much to be done to link these networks and mechanisms to a similar network of natural scientists that have an appreciation of their crucial role in the development of alternative governance systems and sustainable development processes. These epistemic communities will have to be developed to foster science-based policy, even as it has to be reconfigured and deconstructed so that traditional Western scientific knowledge can accommodate local knowledge and the voices of the marginalized. Through this, these communities can become mechanisms to further the agenda of alternative politics and sustainable development, and to strengthen the knowledge base needed for the attainment of good environmental governance.

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THE FUTURE OF THE SIERRA MADRE MOUNTAIN RANGE: RESPONDING TO SOCIAL AND ECOLOGICAL CHANGES

Jan van der Ploeg and Andres B. Masipiqueña

The Cagayan Valley Program on Environment and Development (CVPED) is the research and education partnership of the College of Forestry and Environmental Management (CFEM) of Isabela State University in the Philippines and the Institute of Environmental Sciences (CML) of Leiden University in the Netherlands. Established in 1989, the interdisciplinary program aims to contribute to a better understanding of social and environmental changes in the Cagayan River basin.

Over the past sixteen years we have seen transformations affecting the people and forests of Sierra Madre that few would have imagined. An unprecedented effort by civil society has largely stopped large-scale commercial logging. This culminated in the proclamation of the Northern Sierra Madre Natural Park (NSMNP) in 2001 by virtue of Republic Act 9125. Significant progress has been made in the policy arena: not only in protected area management but also in the fields of community-based forest management, indigenous peoples' rights, the devolution of authority over natural resource management to the local level, and land reform. But, as the papers in this book describe, changing conditions on the ground proves much harder. Patterns of resource use, societal values or political patronage systems are not easily restructured with the stroke of a pen, especially not in a context of widespread poverty, a violent insurgency and a contemporary history of state-sponsored resource extraction.

Every three years CVPED organizes a conference to disseminate research outputs. These international conferences on environment and development have become a hallmark event in Region 02. Here, the balance is made up of the advances in research, biodiversity conservation and rural development in the Northern Sierra Madre (see CVPED 1992; Guzman and de Groot 1997; Bernardo and Snelder 1999; van der Ploeg, Masipiqueña and Bernardo 2003; Snelder and Bernardo 2005). This book is the output of the fifth international conference on environment and development. It aims to give an overview of the research conducted in the framework of the joint program, and place it in the wider Philippine setting.

From 11 to 16 April 2005 more than one hundred fifty people attended four scientific panels and a multi-stakeholder meeting at the Cabagan campus of the Isabela State University. First, a panel on agroforestry aimed to highlight an encouraging development in the uplands of the Philippines that is all too often overlooked: the spontaneous tree planting activities of smallholders. Second, a panel critically assessed the popular synergy between indigenous peoples' rights and sustainable natural resource management. Third, five forestry schools presented their education and research programs and brainstormed about ways to address common challenges in a panel on forestry education. Fourth, a panel on land use transition modeling brought together scientists and policy makers to share information and assess land use planning scenarios for the Cagayan Valley. The papers presented in these four panels form this book. They

show the diversity of topics covered by the joint program. And they show the complexity of the problems in the Sierra Madre.

To facilitate the dissemination of scientific results to a wider audience a multi-stakeholder meeting was organized in which the main findings of these panels were presented. This meeting was organized in cooperation with the Sierra Madre biodiversity corridor program spearheaded by Conservation International. Policy makers, fieldworkers of non-governmental organizations, community-leaders, and government officials listened to the findings of the scientists and discussed their consequences. This set up proved to be an effective way to, on one hand, assure the scientific quality of the papers, and on the other hand, facilitate the effective sharing of research results to practitioners in the region.

The role of the Cagayan Valley Program on Environment and Development has been (and will continue to be) to combine empirical information from the local level with the newest scientific advances at the international level to forward innovative and practical solutions. We hope the papers in this book will contribute to the on-going efforts to create a better future for the people and nature of the Sierra Madre.

We would like to thank the Isabela State University and Leiden University for their continued support to the joint program. The scientific panels on tree planting and indigenous peoples were made possible by the financial support of Netherlands Ministry of Foreign Affairs (DGIS) through the junior expert program. The panel on agroforestry was organized in cooperation with the World Agroforestry Center (ICRAF). The multi-stakeholder conference was organized in the framework of the Sierra Madre biodiversity corridor program, a partnership of Conservation International, the provincial governments of Isabela and Cagayan, the Department of Environment and Natural Resources (DENR) and several civil society organizations in the region: Cagayan Valley Partners for People's Development (CAVAPPED), Process Luzon, Enterprise Works Worldwide (EWW), and WWF-Philippines.

We would like to thank the following people who were instrumental in the organization of the fifth international conference on environment and development: Robert Adap, Dr. Artemio Antolin, Dr. Restituta Antolin, Dr. Dante Aquino, Dr. Mary Aquino, Dr. Roberto Araño, Dr. Rose Araño, Dr. Eileen Bernardo, Dr. Myrna Cureg, Mr. Nonie de la Peña, Ms. Edith de Roos, Prof. Domingo Paguirigan, Dr. Edmundo Gumpal, Dr. Hans de Iongh, Governor Edgar R. Lara, Dr. Rodel Lasco, Dr. Mercedes Masipiqueña, Drs. Tessa Minter, Ms. Susan Naval, Ms. Annelies Oskam, Ms. Padma Perez, Dr. Gerard Persoon, Dr. Romeo Quilang, Prof. Richard Ramirez, Prof. Marino Romero, For. William Savella, Drs. Susan Schuren, For. Romulo Sitchon, Dr. Denyse Snelder, Prof. Jouel Taggueg, and Ms. Perla Visorro,

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PANEL ONE

TREE GROWING IN AGRICULTURAL LANDSCAPES: SMALLHOLDER TREE GROWING FOR SUSTAINABLE RURAL DEVELOPMENT AND ENVIRONMENTAL CONSERVATION AND REHABILITATION

Denyse J, Snelder, Rodel D. Lasco, Susan H.G. Schuren and Andres B. Masipiqueña

CHAPTER ONE

INTRODUCTION

TREE GROWING IN AGRICULTURAL LANDSCAPES: SMALLHOLDER TREE GROWING FOR SUSTAINABLE RURAL DEVELOPMENT AND ENVIRONMENTAL CONSERVATION AND REHABILITATION

Susan H.G. Schuren, Denyse J. Snelder, Rodel D. Lasco and Andres B. Masipiqueña

The state of forest resources in countries world-wide has reached a critical point; never before have forest ecosystems been so greatly and rapidly affected by human activities as during last decades. Large stretches of the world's forests, that have served in the subsistence and development of humankind, have been converted to other uses particularly agriculture or are severely degraded. The net change in total forest between 1990 and 2000 approximates a loss of 9.4 million ha y-1 world-wide, leaving 3,682 million ha of natural forest and 187 million ha of forest plantations in the year 2000 (see table 1). Most of these losses (14.2 million hectares y-1) occurred in tropical countries due to deforestation and land use conversion (FAO 2001) and contributed to the unequal distribution of forest resources over the different continents (see figure 1).

Figure 1: The distribution of remaining forest resources (in percentage of total land area) in countries world-wide (FAO 2001)

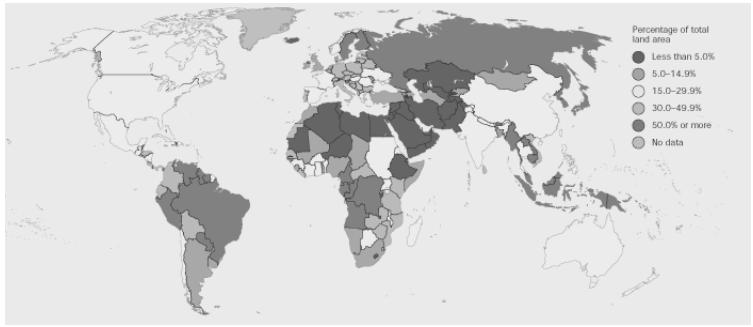


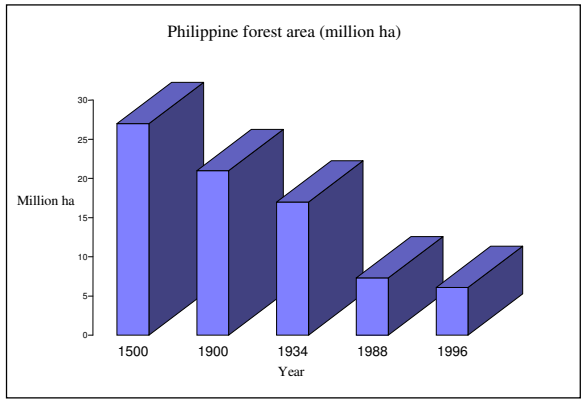
Table 1a: Forest area by world region 2000 (FAO 2001)

Region	Land area	Total forest (natural forests and forest plantations)				Natural forest	Forest plantation
	million ha	million ha	percent of land area	percent of all forests	net change 1990-2000 million ha/year	million ha	million ha
Africa	2 978	650	22	17	-5.3	642	8
Asia	3 085	548	18	14	-0.4	432	116
Europe	2 260	1 039	46	27	0.9	1 007	32
North and Central America	2 137	549	26	14	-0.6	532	18
Oceania	849	198	23	5	-0.4	194	3
South America	1 755	886	51	23	-3.7	875	10
World total	13 064	3 869	30	100	-9.4	3 682	187

Note: changes are the sums of reported changes by country.

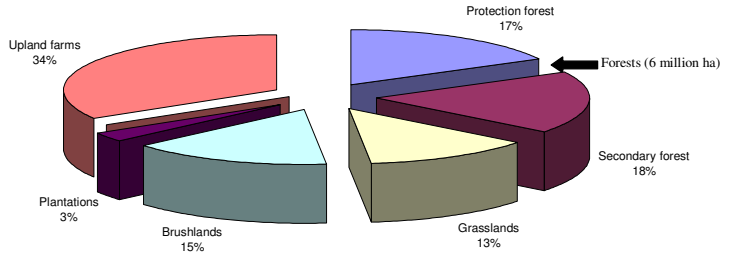
Table 1b (see below) shows the distribution of forest resources in Southeast Asia for the year 2000. Also within this region, remarkable differences in forest area occur. Whereas countries like Indonesia and Malaysia have still more than 50 percent of their land area under forest, the Philippines has, aside from Singapore, the relatively smallest part under forest: 19.4 percent of the country's total land area. Like Myanmar, it lost 1.4 percent of its forest area between 1990 and 2000, the highest rate of forest reduction in Southeast Asia. Figure 2 shows an even much more pronounced decrease in Philippine forest area for the period before 1990, particularly between the 1930s and 1980s when the forest area dropped from about 17 to 6 million ha due to large-scale logging. Although nowadays 15.9 million ha of land is categorized as forest land based on a Philippine land cover classification system, figure 3 shows that in fact only 6 million ha (or 35 percent) are indeed under forest cover, the remaining being open land (brushland, grassland or upland farms, and some plantations).

Figure 2: The significant decrease in forest area (in million ha) between 1500 and 1996 in the Philippines (Lasco this volume; Forest Management Bureau 1998)



In addition to declining forest areas, the areas suitable for the production of food to meet present and future demands of a growing world population are dwindling as well. Mainly marginal lands remain, aside from the fertile lands that traditionally have been utilized for various forms of crop cultivation. Consequently, agricultural intensification is currently being practiced in many parts of the world in order to increase crop production and provide food security for present and future generations. However, agricultural intensification has not automatically led to sustainable forms of land use; on the contrary, it has been accompanied by serious forms of land degradation, particularly in the developing world where roughly one quarter of all farmland has been degraded (Garrity 2004). Farmland is affected by soil nutrient depletion and soil physical degradation due to repeated cultivation and harvesting practices without applying fertilizers or manure. The much needed farm inputs, or fallowing time, for restoring the soil are lacking whereas the knowledge on alternative, cost-effective methods of sustainable land use is limited. Agroforestry systems have been promoted as sustainable systems of land use for quite some time (Young 1997) and their role in poverty alleviation is regaining wider recognition, although smallholder tree production is still inadequately quantified. Yet, the implementation of tree-based farming systems still faces controversy, given for example their contested role in providing profits to farmers under present conditions of increasingly competitive world markets. Whereas a small number of tree crops (e.g., coffee, cacao, tea) played a critical role in setting off economic growth in Southeast Asia during past three decades, at present there is a need to broaden the array of tree products delivered to global markets by developing countries given the current overproduction and decreased profitability of the few traditional tree crop commodities (Garrity 2004).

Figure 3: The distribution of the different land use systems over land classified as forest land in the Philippines (Lasco and Pulhin 2000; FMB 1996)



Open areas = 10 million ha

The urgency to stop, or at least control, the destruction of remaining forests and look into a wide spectrum of solution-oriented measures of sustainable land use has nowadays been recognized as crucial to our survival. This recognition has triggered projects and programs on forest conservation, reforestation, and agroforestry aimed at the integration of trees in denuded, agricultural landscapes.

WHY A PANEL ON TREE GROWING IN AGRICULTURAL LANDSCAPES?

Trees outside the forest (i.e. trees established mostly on farmlands and built-up areas) both rural and urban, play an important role as a source of wood and non-wood forest products. Communities that do not have easily access to forests increasingly diversify their production and protect their land by maintaining various tree systems on their farms. In Kerala for example, the most densely populated state of India, a study revealed that trees outside the forest account for about 90 percent of the state's fuel wood requirements. Of the 14.6 million cubic meters of wood produced per year, an estimated 83 percent was derived from homesteads (house compounds and farmlands), 10 percent from estates and only about 7 percent from forest areas (FSO 1998 in FAO 2001). Trees may thus relieve the pressure on remaining forest resources and at the same time restore and safe-guard ecological and socioeconomic sustainability in agricultural landscapes. However, not much is known about the dynamics of trees on farmlands and their corresponding contribution to the production of wood and other products and services. Although the multipurpose trees-outside-forest resource is widespread and promoted by various institutions engaged in agroforestry and tree plantations, its significance is unclear due to its absence from most official statistics.

Table 1b: Forest resources and management in Southeast Asia (FAO 2001)

Country	Land area	Forest area 2000					Area change 1990-2000 (total forest)		Volume and above-ground biomass (total forest)		Forest under management plan	
		Natural forest	Forest plantation	Total forest								
	000 ha	000 ha	000 ha	000 ha	percent	ha/ capita	000 ha/ year	percent	m^3/ha	t/ha	000 ha	percent
Brunei	527	439	3	442	83.9	1.4	-1	-0.2	119	205	-	-
Cambodia	17,652	9 245	90	9,335	52.9	0.9	-56	-0.6	40	69	-	-
East Timor	1,479	507	-	507	34.3	0.6	-3	-0.6	79	136	-	-
Indonesia	181,157	95,116	9,871	104,986	58.0	0.5	-1,312	-1.2	79	136	72*	n.ap.
Laos	23,080	12,507	54	12,561	54.4	2.4	-53	-0.4	29	31	-	
Malaysia	32,855	17,543	1,750	19,292	58.7	0.9	-237	-1.2	119	205	14,020	73
Myanmar	65,755	33,598	821	34,419	52.3	0.8	-517	-1.4	33	57	-	-
Philippines	29,817	5,036	753	5,789	19.4	0.1	-89	-1.4	66	114	6,935	120
Singapore	61	2	-	2	3.3	n.s.	n.s.	n.s.	119	205	2	100
Thailand	51,089	9,842	4,920	14,762	28.9	0.2	-112	-0.7	17	29	-	-
Viet Nam	32,550	8,108	1,711	9,819	30.2	0.1	52	0.5	38	66	-	-
Total Southeast Asia	436,022	191,942	19,972	211,914	48.6	0.4	-2,329	-1.0	64	109	-	-
Total Asia	3,084,746	431,946	115,847	547,793	17.8	0.2	-364	-0.1	63	82	-	-
Total world	13,063 900	3,682,722	186,733	3,869,455	29.6	0.6	-9,391	-0.2	100	109	-	-

WHY FOCUS ON SMALLHOLDERS?

Mainly large-scale reforestation projects have been implemented to address the deforestation issue since the early 1900s. However, the rate of success among these projects has been less than expected, and as a result, the rate of reforestation has been lagging far behind the rate of forest loss. For example in the Philippines where reforestation started already in 1916, about 70,000 ha of land had been successfully reforested during a seventy-one year period (1916 to 1987) when the average rate of deforestation was estimated at 100,000 ha per year (FMB 1988; Pasicolan 1996).

Since the introduction of agroforestry in the 1970s, tree growing by smallholders has likewise been proposed as a means to combat deforestation and promote sustainable land use. In addition, it has been promoted as an effective instrument in the fight against rural poverty. However from the start of its promotion, smallholder tree growing has received considerably less attention from the (less-) developed and scientific worlds, when compared to large-scale tree planting and reforestation. More recently, with the expansion of cultivated areas in many regions of the world, the awareness is mounting that lands controlled by smallholders are of increasing importance in both sustainable food production and safeguarding environmental services, such as, biodiversity conservation and carbon sequestration. They more and more determine the environmental, economical and ecological value of the landscape. Whether smallholder tree growing does indeed make a difference, and if so, to what extent it contributes to sustainable development and environmental protection and conservation, needs further investigation.

Natural forests are increasingly protected, which has lead to a ban on logging and restrictive use of natural forest products in countries like Thailand and the Philippines. Smallholders are therefore in search of alternative sources of tree products and ways of integrating trees into their farming systems. Moreover, it is expected that, with mounting population and land shortage, the number of farmers with smallholdings will continue to increase in the near future.

The panel on tree growing in agricultural landscapes was set up to realistically assess, the status of smallholder tree growing in countries like the Philippines. To what extent have trees been integrated into smallholder farming systems and what evidence do we have that such systems lead to sustainability and enhanced livelihoods? Where is the concept exceptionally promising, and where should we admit its failure? How can we ensure successful implementation of different tree-based farming technologies in terms of adoption, impact on livelihoods and environmental impacts? In short, is smallholder tree growing a viable strategy for sustainable development in rural areas?

THREE PANEL THEMES

The questions raised in the discussion above have resulted in the formulation of three panel themes, as outlined below.

Smallholder on-farm tree growing for rural development

This theme explored smallholder tree growing and associated systems of product processing as means to improve rural livelihoods. What kind of tree based farming systems can we distinguish and how do these compare to other types of land use in terms of profitability? To what extent can smallholder rural processing be implemented as a way to raise the value of tree products? In this context, also experiences with public-private partnerships have been discussed.

Smallholder on-farm tree growing for sustainable land use

Agricultural intensification has presented countries like the Philippines with substantial environmental problems over the past decades. Farmers experience a decrease in soil fertility and are forced to apply growing quantities of chemical fertilizers, pesticides and herbicides in order to sustain their cash crop yields. With increasing awareness of farmers' struggle to maintain adequate yields, initiatives have been undertaken, by both government and non-governmental organizations, to promote more sustainable land use. Smallholder tree growing has been considered as one of the most promising technologies. Yet, it is still unclear whether tree growing has been practiced in such a way that all aspects of sustainability have been met. What is farmers' perception about (newly introduced) tree-based farming systems and to what extent, and under which conditions, have they indeed adopted such systems? What methods of scaling up of smallholder tree growing have been successful and what knowledge and communication gaps do still exist?

Smallholder on-farm tree growing for biodiversity conservation and other environmental services

The on-going disappearance of large stretches of forests threatens biodiversity and the natural environment in general throughout the Philippines. In order to conserve remaining forest, protected areas have been established worldwide. Yet, in recent years, the growing of trees in agricultural areas has become an additional focal point for safeguarding the environment and its services. However, various questions remain to be answered. To what extent do smallholder tree based farming systems indeed contribute to environmental services like biodiversity conservation, carbon sequestration and watershed protection? What are the most optimal systems, and to what extent do these systems meet the needs of both smallholders and society in general? How can we reward smallholder tree growers contributing to environmental conservation and sustainability that serve society as a whole?

PANEL ORGANIZERS AND PARTICIPANTS

The panel was hosted by Isabela State University Cabagan campus and co-organized with the World Agroforestry Center of the Philippines (ICRAF). The organization of the panel was also an activity conducted within the framework of the Junior Expert Program funded by the Ministry of Foreign Affairs in the Netherlands. The latter program formed an extension of the Cagayan Valley Program on Environment and Development within two specific fields of research, i.e., agroforestry and indigenous people. A total of twenty-four participants, coming from the Philippines, Indonesia, Malaysia, Sri Lanka and the Netherlands, joined the panel.

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CHAPTER TWO

RESTORING THE PHILIPPINE NATIVE FORESTS: CAPACITATING SMALLHOLDER TREE FARMERS TO DOMESTICATE INDIGENOUS TREE SPECIES

Enrique L. Tolentino, Jr.

ABSTRACT

This paper examines trends and patterns in the selection of tree species in reforestation and tree farming programs in the Philippines. It also discusses experiences in growing indigenous tree species and provides recommendations to promote the domestication of indigenous tree species for timber production by smallholder tree farmers. Exotic tree species dominate the landscape of plantation forestry and farm forestry in the Philippines. Data shows predominance of mahogany, gmelina, teak, *Acacia* spp. and *Eucalyptus* spp. Reasons for the popularity of these exotic species among tree planters will be addressed. The paper will also discuss experiences, in terms of germination characteristics, nursery stock production and early plantation growth performance, with the domestication of eight indigenous tree species tested in portions of the Sierra Madre (Laguna and Quezon provinces). The study results in the following recommendations in order to capacitate smallholder tree farmers to domesticate indigenous tree species: (1) prioritization of potential indigenous tree species, (2) production and distribution of quality germplasm, (3) generation of farmer-friendly production technologies, (4) re-designing of biodiversity conservation programs, (5) market information and links, (6) policy review and reforms coupled by incentives for plantation development, and (7) institutional reforms.

INTRODUCTION

The Philippines is richly blessed by nature with around eight thousand flowering plants. An estimated three and a half thousand are classified as trees indigenous to the country (Salvosa 1963). Of this number, only 10 percent is considered economically important (Meniado et al. 1974) with the family *Dipterocarpaceae* as the prime source of premium hardwood timber for many decades. Lush tropical forests occupied approximately 90 percent or 27 million ha of the country's total land area back in the 1500s, prior to the colonization by the Spaniards (Garrity et al. 1992). As of 2000, the area under pristine forests has decreased to 0.8 million ha (Acosta 2005) or a loss of almost 97 percent of the original forest cover. Deforestation peaked at 170,000 ha annually in the 1970s while reforestation averaged only 52,150 ha per year (FMB 2003).

With this staggering loss of forest cover, reforestation found an important place in Philippine forestry. The roots of reforestation can be traced back to the pioneering School of Forestry at the University of the Philippines Los Baños in 1910. The silviculture class made experiments on various methods of replanting grassland areas that were infested with *Imperata cylindrica*. In six years time, about 600 species were tested in the nursery and plantation of the school. Formal government reforestation efforts were started in 1916 in a badly denuded government land in Cebu. Subsequently, different reforestation projects were funded in various parts of the country (for example in Arayat, Ilocos, Zambales and Impalutao). Reforestation saw a major scaling-up in implementation from 1937 to 1941 with

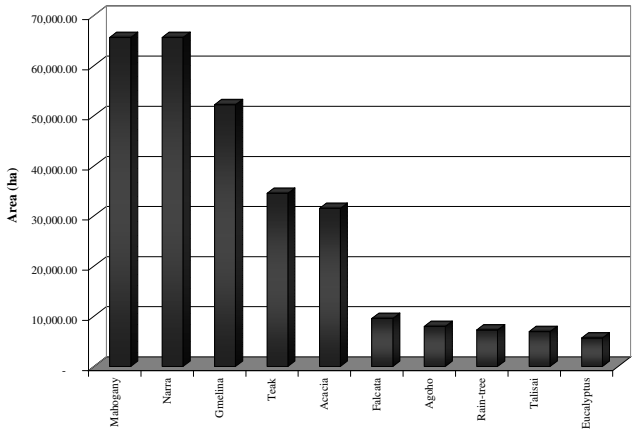
regular government land appropriations. World War II wreaked havoc to the nearly 28,000 ha plantations (Agpaoa, et al. 1976). A revitalized effort was initiated in the 1960s with the creation of the Reforestation Administration. Accordingly, under this office, tree planting accomplishments never went below 10,000 ha per year. This period also witnessed the active participation in tree growing activities by the private sector like the Paper Industries Corporation of the Philippines (PICOP) and the Provident Tree Farm Inc. (PTFI) (JOFCA, 1996). Plantation forests in the Philippines now occupy approximately 7.1 million ha (FMB 2003).

This paper examines trends and patterns in species selection and provides perspectives with regard to the use of indigenous tree species particularly by smallholder tree farmers. It will also discuss constraints and limitations in the use of indigenous tree species and explores how smallholder tree farmers could be capacitated to contribute to timber production using indigenous tree species.

SPECIES SELECTION IN INDUSTRIAL PLANTATIONS AND FARM FORESTRY IN THE PHILIPPINES

The number of species commonly used in reforestation is surprisingly low considering the long list of commercially valuable species used by the wood industry. Data from the Reforestation Division of the Forest Management Bureau (FMB) immediately confirms this assertion. Of the top ten species planted in reforestation projects around the country, eight are exotics and only two are indigenous tree species (figure 1). Mahogany (*Swietenia macrophylla*) and gmelina (*Gmelina arborea*) are among the dominant exotic trees planted. Narra (*Pterocarpus indicus*), a common indigenous tree species, comes as a close second. Another indigenous tree species, agoho (*Casuarina equisetifolia*) ranks seventh among the commonly planted species.

Figure 1: Top ten species planted in reforestation projects in the Philippines (ERDB 1998).



The Ecosystems Research and Development Bureau (ERDB) reported that PICOP in Surigao del Sur has plantations of more than 40,000 ha planted mainly to exotic species such as falcata (*Paraserianthes falcataria*), eucalyptus (*Eucalyptus deglupta*) and acacia mangium (*Acacia mangium*). The Nasipit Lumber Company (NALCO) in Agusan del Norte has more than 4,000 ha plantation of exotics. The main species planted in this plantation are: falcate, gmelina, Japanese acacia (*Acacia auriculiformis*), mangium, caribbean pine (*Pinus caribaea*), mahogany and teak (*tectona grandis*). PTFI in Agusan del Sur has established another 6,000 ha of plantation dominated by exotics like acacia mangium and gmelina. The Bukidnon Forest Inc., owner of an industrial tree plantation in Malaybalay (Mindanao), has successfully established 6,367.52 ha of assorted exotic trees. The major species planted are: acacia mangium, eucalyptus and Caribbean pine. Some native species, such as *Casuarina equisetifolia*, *Lagerstroemia speciosa*, *Pterocarpus indicus var. echinatus* and *Shorea contorta*, have been tried. However, very small areas were allocated for planting these native species. It was claimed that most of these species are slow growing with high mortalities which increases plantation costs and therefore render these species undesirable as plantation trees (Cuevas 1999).

A study of small-scale private tree farms in the Philippines indicates that exotics glaringly dominate in these private lands as well (Carandang 2000). Gmelina and large leaf mahogany vie for the top positions. In fact, all tree farms registered with DENR in Region 02 are planted with either of the two species. It is also important to note that the two species are found in all regions. In the six regions intensively studied by the same author, it was found that gmelina (75 percent or forty-seven respondents) and mahogany (40 percent or twenty-five respondents) are indeed the two most popularly planted species. Mangium (38 percent), eucalyptus (37 percent), falcata (24 percent) and narra (6 percent) are the other commonly planted species in private tree farms.

Another study conducted among fifty smallholder tree nursery operators in Cebu, Bukidnon and Misamis Oriental reinforces this idea of the predominance of raising exotic trees. Seedlings in these forest nurseries studied are composed of 59 percent timber species

and 36 percent fruit trees. Of the timber species being raised, 35 percent are indigenous and 65 percent are exotic. Bagras (*Eucalyptus deglupta*) ranks as the most popular species being raised in 48 percent of the nurseries studied. Other popular species include large leaf mahogany (35 percent), acacia mangium (21 percent), black wattle (*Albizzia lebekkoides*, 19 percent), *Eucalyptus robusta* (19 percent), *Eucalyptus torreliana* (17 percent), narra (17 percent), and gmelina (15 percent). All, with the exception of narra, are exotics (Tolentino et al. 2001).

Exotic trees dominate the country's tree farming and reforestation efforts for the following reasons: (1) exotics have wide adaptability and are tolerant to stress, (2) they growth fast and reach high yields, (3) there is available research and technology for exotic species and, (4) there is abundant germplasm available.

Wide adaptability and tolerance to stress

An important advantage of exotic species, one that is recognized by most foresters and tree farmers today, is their versatility under unfavorable conditions. Table 1 lists some of these desirable growth characteristics for selected exotics. The adaptability of exotics to degraded sites (e.g. acidic, low fertility, fire-prone areas) and their ability to colonize even marginal grasslands is an attractive feature of these trees that makes them widely planted.

Table 1: Desirable characteristics/properties of selected exotic trees commonly planted in the Philippines (ERDB 1998).

Species	Desirable characteristics
Acacia mangium	Tolerates short dry season Nitrogen fixer Tolerates degraded soil Competes with *Imperata cylindrica*
Acacia auriculiformis	Fire resistant Drought tolerant Nitrogen fixer Tolerates degraded soil Competes with *Imperata cylindrica*
Eucalyptus camadulensis	Tolerates dry sites Tolerates periodic water logging Will coppice Mature trees are fire resistant Adopts to a wide range of soils
Gmelina arborea	Excellent wood Fast growth Relatively fire resistant Wind firm Suppresses grass competition
Paraserianthes falcataria	Fast growth Light colored wood Will coppice Nitrogen fixer
Swietenia macrophylla	Fast growth Excellent wood

Fast growth and high yield

Concomitant with the ability to survive and grow under a wide range of environmental conditions, exotics exhibit fast growth and high yield returns. These characteristics render exotics very attractive for smallholder tree farmers desiring to get immediate returns to their investment (table 2).

Table 2: Summary of the average growth and yield of selected exotic trees (ERDB 1998)

Species	Growth		Yield ($m^3ha^{-1}y\ 16^1$)	Economic rotation (yr)
	Height (m)	Diameter (m)		
Acacia mangium	15-30	0.5-0.9	Dry site: 20-25 Good site: 40	Pulp: 6-8 Solid wood: 14-16 Pole: 15
Acacia auriculiformis	8-15	0.4-0.6	10-25	Fuelwood: 3-5 Pulp & paper: 8-10
Swietenia macrophylla	30-40	1.0-1.5	10-20	Solid wood: 17-50
Paraserianthes falcataria	24-30	0.5-1.0	25-35	Pulp: 7-9 Solid wood: 10-15
Eucalyptus camaldulensis	30-40	1.0-1.5	Dry site: 5-10	Dry site: 20-25 Good site: 5-10
Gmelina arborea	20-30	10-15 cm (3 yr) 0.6 –1.0	Average site: 20-25 Good site: ≥ 30	Pulp: 6-8 Solid wood: 15-30

Research and technologies for exotic tree species

Libraries and other information resource centers (including the internet) are replete with references for exotic trees, from production to processing technologies, while, as will be shown later in this paper, information on indigenous tree species is scanty, fragmented and oftentimes completely lacking.

Tree farmers are concerned about the available production and utilization technologies for the species they intend to plant. Easy access to this information is a critical factor for their decision to plant a particular species. Moreover, forestry professionals and students are generally more familiar with exotics than malaruhat, ulaian, talakatak, kuling-baboi and other indigenous tree species. Students' exposure to indigenous tree species is limited and teaching on indigenous tree species propagation and management techniques is nearly absent. Similarly, foresters working in the field hardly get exposed to indigenous tree species due to the predominance of exotics.

Germplasm availability

Another obvious advantage of exotic tree species over indigenous tree species is the availability of abundant germplasm, particularly with regards to improved seeds. The World Agroforestry Center (ICRAF) has published a tree seed suppliers' directory where several thousand species have been included. It is striking that the popular exotics were found to have the highest number of seed suppliers. To cite some of them, teak, Japanese acacia and gmelina were available at twenty-six suppliers; *Acacia mangium* at twenty-four suppliers and mahogany has seventeen suppliers around the world (Kindt et al. 1997). In contrast, low germplasm availability for indigenous tree species has commonly been mentioned as an important constraint to indigenous tree species adoption in farms and plantations. This

shortage of germplasm can be explained by the limited number and scattered nature of mother trees, which, in addition, are also located in remote and inaccessible areas.

THE UNIVERSITY OF THE PHILIPPINES LAND GRANT EXPERIENCE

The University of the Philippines (UP) has two land grants in the Sierra Madre mountain range (Laguna and Quezon provinces) covering an area of 10,000 ha. These land grants were given by the government to the university for the primary purpose of providing additional resources for the operation of the university. The first land grant was given in 1930 and the second one in 1961. As a timber land the area was subjected to logging. Timber harvesting started in the 1960s and repeated in the 1980s. It was only in 1989 that legitimate logging was ordered to a halt. Unfortunately, local residents who have been used to forest-based livelihood continue to illegally extract timber, make charcoal and gather other forest products (poles, rattan and wildlife). The threat to the remaining forests is exacerbated by the practice of shifting cultivation by a number of upland farmers including the entry of land speculators. The decades of unsustainable logging and these current threats continue to put pressure on the remaining natural resources in the land grants which are in a precarious state.

To replenish the lost timber resources, a modest reforestation effort was started in 1997. Initially, it was decided what tree species to be plant. Instead of utilizing the commonly-used and popular exotic tree species, a paradigm shift from the conventional reforestation was conceived to pioneer a bold tree planting program that trail blazes the use of indigenous tree species. Rigorous species priority setting requires understanding of user needs and preferences, technological opportunities and systematic methods for ranking species (Jaenicke et al. 1995). A species priority setting scheme was developed (Franzel et al. 1996). The seven stage system involved long listing and consecutively reducing the number of species through a participatory method. However, in this study, it was slightly modified. A series of consultative meetings, mostly informal discussions, were held with upland farmers practicing shifting cultivation inside the land grants. Moreover, interviews were held with illegal loggers at the moment they were apprehended. A total of sixty-one tree species were identified and initially listed. Tree species preference based on uses (e.g. lumber, furniture, handicrafts, medicine and food) and market value were ranked (table 3). The final list contained tree species mostly used for general construction. The utility column also manifests that the preferred species are those, which generate high prices in the market. In addition to the users' preferences and tree product marketability, the management of the land grant area added germplasm availability as another criterion. Thus, only species with available seeds were included in the trial. Currently, there are about twenty species used in the trials.

Table 3: Indigenous tree species in the UP land grants identified by local residents as having potential for plantation forestry

Name of species		Uses	Priority
Local	**Common**		
Narra	Narra	Furniture	1
Kuling Manok	Kuling Manok	General construction, furniture	1
Kamagong	Kamagong	General construction, furniture	1
Bitokling	Batikuling	Handicraft	1
Malagmat	Red lauan	General construction	2
Palong maria	Bitanghol sp.	General construction, furniture	2
Mayapis	Mayapis	General construction, handicraft	2
Malaanunang	White lauan	General construction, handicraft	2
Tiaong	Tiaong	General construction, handicraft	2
Margapali	Margapali	General construction	2
Isak		General construction	2
Bakuyan	Bagtikan	General construction, handicraft	2
Panab-ang	Dao	General construction, furniture	2
Marang	Marang sp.	General construction, handicraft	2
Himamao	Himamao	General construction	3
Kamalan		General construction, furniture	3
Dalingdingan	Dalingdingan	General construction	3
Katmon	Katmon	General construction, furniture	3
Batino	Batino	General construction, furniture, medicine	3
Malaruhat sp.	Malaruhat sp.	General construction, furniture	3
Dulitan	Dulitan	General construction	3
Salasaan		General construction	3
Apitong	Apitong	General construction	3
Palosapis	Palosapis	General construction	3
Dita	Dita	General construction	4
Amlang	Gubas	Handicraft, frame	4
Almaciga	Almaciga	Furniture	4
Malamanga	Malamanga	General construction	4
Harirondong		General construction, bark for walling	4
Malasantol	Malasantol sp.	General construction, furniture, handicraft	4
Lepote	Lepote sp.	General construction, furniture, food	4
Bagna	Bagna	General construction	5
Antipolo	Antipolo	General construction	5
Kalingag	Kalingag	General construction, furniture, medicine	5
Kuling baboi	Kuling baboi	General construction, furniture	5
Balinghasay	Balinghasay	General construction	6
Goyong-Goyong		General construction	6
Balikbakan		General construction	6
Matang-araw	Matang-araw	General construction	6
Pagsihingin	Pagsihingin	General construction	6
Balobo	Balobo	General construction	6
Kahoy dalaga	Kahoy dalaga	Fuel/charcoal, construction	6
Papuwa		General construction	6
Duguan	Duguan	General construction	6
Anubing	Anubing	General construction	6
Muling-muling		General construction, food	6
Igang	Dangula	Fuel/charcoal, handles	7
Lanete	Laneteng gubat	Furniture, handicraft	7
Bolong eta	Bolong eta	General construction, furniture	7
Tapulao		Walls	7
Agosip	Agosip	General construction	7
Poas		General construction	7
Bahai	Bahai	General construction	7
Burawisan		White lumber	8
Balete	Balete	White lumber	8
Tangisang bayawak	Tangisang bayawak	White lumber	8
Takip asin	Binunga	Fuel/charcoal	8
Hagod		Lumber	8
Taluto	Taluto	*Bakya*	8
Babaysakan	Babaysakan	Fuel/charcoal	9
Wild castanias	Wild castanias	Fuel/charcoal, food	10

Priority refers to the relative demand and market value as perceived by respondents in the area.

Equipped with sound and basic silvicultural principles coupled with determination to propagate indigenous tree species, the project went about collecting, processing and sowing the seeds of the selected indigenous tree species. Simple experiments accompanied by trial and error procedures were employed in the nursery and in the planting site. Table 4 summarizes the important observations regarding the seed, nursery and plantation practices for some of the indigenous tree species used in the trials.

Seeds of all the species were collected from the ground (from the natural seed fall) as most of the tress are in the remote areas of the land grants. Forest guards doing their regular patrols were given the additional task of seed collection. Seed dormancy, expressed as delayed and staggered germination, was observed only in Batikuling and Talakatak (Philippine chestnut or wild *kastanyas*). All the rest of the species listed in table 4 have insignificant dormancy. In the nursery, absence or weak seed dormancy is advantageous when the sowing period coincides with the fruit or seed collection, while dormant seeds cause delays and disruptions in nursery production schedules. Dormancy however, is a desired characteristic of seeds bound for storage, as they will have longer longevity even under ambient conditions. For natural regeneration, the seed fall has to coincide with conditions favorable for germination and subsequent growth, like availability of adequate soil moisture and optimum temperature and light conditions. When these favorable germination conditions are absent then dormancy, which is a survival mechanism, is normally present.

Practically no propagation problems were encountered in the nursery except for very slow growth. This was observed in batikuling, kuling baboi, malaruhat pula, malaruhat, and babaysakan (ulayan). These same species were consistently slow in growth even when out-planted. This growth habit makes indigenous tree species in this class less desirable for tree farmers desiring quick returns obtained from harvesting fast-growing exotic trees like gmelina, acacias and eucalypts.

Light requirements of these species vary both in the nursery and after out-planting. Many species require full shade to partial shade in the nursery except for malaruhat. Batikuling and kuling manok can tolerate open conditions when in the sapling stage. This indicates that these species are mostly shade tolerant which is common to many species in the advanced stages of succession. The two-year species survival performance is good if provided with adequate maintenance particularly weeding. Survival ranges from 60 to 90 percent especially for potted seedlings. However, one farmer group used bare rootstocks and consequently survival rates decreased to 40 to 50 percent. Rough handling, quite unavoidable in the difficult terrain of the land grants, contributed to seedling shock that depressed survival of out-planted seedlings. No significant pests or disease problems were encountered either in the nursery or field. A few leaf-eating insects were observed but they posed no serious threats. A major deterrent to full-scale planting of the species tested is the availability of germplasm, particularly from superior mother trees. Successive logging operations and the unabated illegal logging activities have removed many of the best mother trees. This dysgenic practice has depleted the genetic pool, leaving mostly poor quality mother trees located in remote and often inaccessible sites.

Table 4: Some seed, nursery and plantation practices for selected indigenous tree species at the UP land grants

Species/Aspect of study	**Results**
Batikuling (*Litsea leytensis*)	
Seed Collection	Ground collection of fruits
▪ Fruit size	1.5 cm diameter; 2 cm length
▪ Seed size	1 cm diameter; 1.3 cm length
Seed processing	Manual removal of fruit cap and pulp; Removal of impurities and soaking in tap water overnight
Nursery propagation	
▪ Sowing method	Line sowing in seedbed, pointed upwards
▪ Soil	Top soil and chicken manure (10:1 by volume)
▪ Seed Dormancy	Pre-germination period (PGP) 30 days; Germination period (GP) 6 months
▪ Growth	Very slow. Average height: 1.2 cm; average diameter 0.22 cm in 4 monts
▪ Pests and diseases	Seeds infested by larvae (unidentified insect)
▪ Shade requirement	Partial shade
Plantation performance	
▪ Growth	Slow
▪ Pest and diseases	None
▪ Light requirement	Shaded at seedling stage then open at sapling stage
Uses	
▪ Primary	Handicrafts
▪ Secondary	Lumber
Talakatak *(Castanea philippinensis)*	
Seed Collection	Seed/fruit; natural seed fall
▪ Fruit size	
▪ Seed size	1.5 cm diameter; 1.5-2 cm length
Seed processing	Removal of fruit caps; Manual removal of impurities
Nursery propagation	
▪ Sowing method	Line sowing in seed bed; seed pointed upward
▪ Soil	Top soil
▪ Seed Dormancy	PGP one month; GP one year
▪ Growth	Slow
▪ Pests and diseases	None
▪ Shade requirement	Shade-demanding
Plantation performance	
▪ Growth	Moderate
▪ Pest and diseases	None
▪ Light requirement	Shade-tolerant
Uses	Fuelwood, charcoal, food
Kuling baboi *(Dysoxylum altissimum) Merr.*	
Seed Collection	Ground collection
▪ Fruit size	
▪ Seed size	0.75 cm diameter; 0.5 cm length
Seed processing	Manual removal of fruit cap
Nursery propagation	
▪ Sowing method	Line sowing in seedbed
▪ Soil	Top soil
▪ Seed Dormancy	Not significant
▪ Growth	Slow to moderate – 17 cm height; 0.3 cm diameter (5 months)
▪ Pests and diseases	None
▪ Shade requirement	Shaded to partially open
Plantation performance	
▪ Growth	Slow
▪ Pest and diseases	Resistant
▪ Light requirement	Shaded to partially open
Uses	Furniture; general construction
Malaruhat bundok *(Syzygium urophyllum) Merr.*	

Seed Collection	Fruit – ground
▪ Fruit size	
▪ Seed size	1.5 cm diameter; 1.5 cm length
Seed processing	Removal of fleshy pulp; cleaning
Nursery propagation	
▪ Sowing method	Line sowing in seedbeds
▪ Soil	Top soil
▪ Seed Dormancy	Not significant
▪ Growth	Slow– 17.5 cm height; 0.1 cm diameter (5 months)
▪ Pests and diseases	Occasionally attacked by an unidentified insect but able to recover even with no control measure
▪ Shade requirement	Partially shaded
Plantation performance	
▪ Growth	Slow
▪ Pest and diseases	None
▪ Light requirement	Partially shaded
Uses	General construction; furniture
Makaasim *(Syzygium nitidum) Benth*	
Seed Collection	Fruit – ground
▪ Fruit size	1.5 cm
▪ Seed size	1 cm (round seed)
Seed processing	Manual maceration (depulping); cleaning and sundrying
Nursery propagation	
▪ Sowing method	Line sowing in seed beds
▪ Soil	Top and chicken manure (10:1)
▪ Seed Dormancy	Not significant
▪ Growth	Fast – ave height 17.5; 0.1 cm diameter (2 months)
▪ Pests and diseases	Occasionally attacked by an unidentified insect but able to recover even with no control measure
▪ Shade requirement	Preferably open
Plantation performance	
▪ Growth	Slow
▪ Pest and diseases	Clay loam
▪ Light requirement	None
Uses	General construction; furniture
Dangula *(Teijsmaniodendron ahernianum) (Merr.) Bach*	
Seed Collection	Ground collection
▪ Fruit size	0.1-0.2 cm round shape
▪ Seed size	
Seed processing	
Nursery propagation	
▪ Sowing method	Broadcast sowing in seedbed
▪ Soil	Top soil
▪ Seed Dormancy	None
▪ Growth	Fast, average height – 17 cm; diameter – 0.2 (4 months)
▪ Pests and diseases	None
▪ Shade requirement	Fully shaded
Plantation performance	
▪ Growth	Fast height growth from seedling to sapling stage
▪ Pest and diseases	None
▪ Light requirement	Partially open
Uses	Fuel; handle of carpentry equipments
Babaysakan/Ulaian *(Lithocarpus buddii) Merr.*	
Seed Collection	Ground/natural seed fall
▪ Fruit size	1.5 x 1.5 cm
▪ Seed size	1.5 x 1.5 cm
Seed processing	Removal of fruit caps

Nursery propagation	
▪ Sowing method	Pointed downward
▪ Soil	Top soil and chicken manure (10:1 by volume)
▪ Seed Dormancy	Not significant
▪ Growth	Slow to moderate, height 16 cm; diameter – 0.2 cm (7 months)
▪ Pests and diseases	None
▪ Shade requirement	Preferably shaded
Plantation performance	
▪ Growth	Slow to moderate
▪ Soil	Clay loam
▪ Pest and diseases	None
▪ Light requirement	Preferably shaded
Uses	Charcoal
Kuling manok *(Agalaia luzoniensi)*	
Seed Collection	Ground
▪ Fruit size	3-5 cm diameter x 4-5 cm length
▪ Seed size	1-1.5 cm diameter x 3-4 cm length
Seed processing	Manual removal of capsule (1-3 seed per capsule)
Nursery propagation	
▪ Sowing method	Direct sowing in pots
▪ Soil	Top soil
▪ Seed Dormancy	None
▪ Growth	Moderate
▪ Pests and diseases	None
▪ Shade requirement	Both shaded and open areas
Plantation performance	
▪ Growth	Moderate
▪ Pest and diseases	None
▪ Light requirement	Partially shaded to open
Uses	General construction handicrafts, furniture

THE MINDANAO AND CEBU SMALLHOLDER NURSERY OPERATORS PERSPECTIVE

Smallholders' familiarity with indigenous tree species was assessed in a study of smallholder nursery operators from Mindanao (Bukidnon and Misamis Oriental) and Cebu (Tolentino et al. 2001). Indigenous tree species appeared to be a vague concept or grouping of species to most nursery operators. The term indigenous or native might be unfamiliar being an English word. However, when some examples were cited, the respondents readily provided what they thought are indigenous. It was noted that commonly and widely planted species like eucalyptus, mahogany and gmelina were frequently mistaken as indigenous due to their abundance and prolonged period of planting. The nursery operators identified ninety-one species. Familiarity was simply gauged by the number of times an indigenous tree species was mentioned. In all three sites, nursery site operators were most familiar with the species (1) molave (*Vitex parviflora*) locally called tugas (thirty-three times mentioned), (2) lauan (twenty-nine times mentioned), (3) bagalunga (*Melia dubia*), manggolingao, and narra (all sixteen times mentioned). In Cebu, the most cited species were: molave (eleven times), hambabalod (eight times), and manggolingao (seven times). The most popular indigenous tree species in Lantapan were: manggolingao (nine times), lauan (eight times), molave (eight times) and ulayan (eight times). Lauan (sixteen times), molave (fourteen times) and narra (thirteen times) were the most mentioned in Claveria.

Lumber and furniture top the list of uses identified for indigenous tree species which confirms the preference of local people for construction wood and highly marketable species. Most respondents mentioned several uses per indigenous tree species. The findings indicate that indigenous tree species have tremendous potentials recognized by the communities. The nursery operators have also expressed willingness to plant the indigenous tree species in their agroforestry farms. The same study found out that upland farmers are interested and are willing to raise indigenous tree species in their nurseries (table 5). However, the interest and willingness hinge on the availability of good germplasm and nursery holders´ ability to identify indigenous tree species wildlings. Additionally, a limited number of operators preferred exotics or fruit trees due to slow growth of indigenous tree species, restrictive policies on harvesting and transporting of indigenous tree species and perceived better markets for exotic trees.

Table 5: Some views on raising indigenous tree species in forest nurseries in Cebu, Lantapan, Bukidnon and Claveria, Misamis Oriental

Views	No. of respondents			
	Cebu	Lantapan	Claveria	Total
Will raise indigenous tree species as long as seeds are available		6	19	25
Cannot raise due to difficulty of identifying indigenous tree species (seeds and wildlings)	3		9	12
Doesn't want to raise as indigenous tree species are slow growing		1	3	4
Cannot raise due to DENR policy of prohibiting cutting of indigenous tree species			3	3
Cannot raise due to the absence of planting stock production technology		1	1	2
Fruit trees are better than indigenous tree species		2		2
Will not raise as exotics are more popular/have more market		1	1	2
Will raise if there is a demand	1	1		2
Doesn't care whether species is indigenous tree	1			1
species or exotic				
Will not raise indigenous tree species due to their limited uses	1			1

THE QUIRINO INITIATIVE

Currently, we are conducting a research on community-based production system for selected trees and vines in support of the furniture and handicraft industries. We have chosen a partner in Diffun (Quirino Province): the Gabriela Multi-Purpose Cooperative Inc (GMPCI) to conduct the research on the tree component of the project. This People's Organization (PO) is currently testing the following indigenous tree species: bagalunga (*Melia dubia*), mamalis (*Pittosporum*) and malapapaya (*Polycias nodosa*). As we are in the incipient stage of the project, no observations and results can be reported at the moment. But similar to other upland farmers, the smallholders in Quirino express willingness and interest to raise these indigenous tree species as long as the market for the wood will be good.

LANDCARE FOUNDATION IN MINDANAO

This year the United Nations Development Program (UNDP) small grants program for operations to promote tropical forest approved to fund a project about facilitating community-based conservation and planting of indigenous trees in Misamis Oriental and Bukidnon. The project will be implemented by the Landcare foundation of the Philippines with the Landcare associations in the two provinces. These Landcare groups consist mainly of indigenous people (Higa-onons and Tala-andigs). The following are the target trees of the project: mangulingao or bagalunga (*Melia dubia*), sagimsiman, kalaw, tagnato, almasiga, lin-awat, balangas, uluhaw, kati-i (*Castanopsis philipensis*), narra, mantalisay, lauan (*Shorea*), tipolo (*Artocarpus*), kalingag and ibu. The project aims to achieve natural resources and biodiversity conservation, specifically the conservation of a wide range of indigenous trees while helping in alleviating poverty in upland communities. The project will achieved this objective by facilitating and providing technical support for community learning on seed technology, propagation, nursery techniques, planting, re-generation, care and management of indigenous or native trees while providing assistance for the upland people's livelihoods.

CAPACITATING SMALLHOLDER TREE FARMERS TO DOMESTICATE INDIGENOUS TREE SPECIES

The potential for domesticating a variety of indigenous tree species by smallholder tree farmers is undeniably tremendous. There are 4.9 million ha under Community-Based Forest Management Agreements (CBFMA), 20,000 ha tree farms and 94,000 ha under agroforestry leases (FMB 2003). Assuming that even 10 percent of this area will be devoted to the planting of indigenous tree species, it still represents a staggering 500,000 ha! Devoting this area to timber production is important because it can substitute for current wood product imports, which amounts to US$ 162.9 million for the year 2003 (FMB 2003). With a suitable investment climate and incentives, stable market, appropriate technologies and supported by policies friendly to smallholder tree farmers, domesticating indigenous tree species has bright prospects. The following is a discussion of constraints and limitations affecting the planting

of indigenous tree species and recommendations to capacitate smallholder tree farmers to plant indigenous tree species in their farm lots.

Prioritization of potential indigenous tree species

The number of indigenous tree species with potential for use in upland farms is very high, which implies that developing technologies for all of them will be virtually impossible. It is therefore necessary that technical experts, local communities, indigenous people, wood industry officials and other key stakeholders in the uplands sit down together to identify the indigenous tree species that will be most useful and promising in their respective areas. The prioritization procedure should be a farmer-led and market-driven process. A more detailed procedure for setting priorities for multipurpose tree improvement was described by Franzel et al. (1996). Briefly, the seven-step procedure includes: (1) team building and planning, (2) assessment of client needs, (3) assessment of species used by clients, (4) ranking of products, (5) identification of priority species, (6) valuation and ranking of priority species, and (7) final choice. This exercise creates a long list of indigenous tree species and should be done for each of the biogeographic regions.

Production and distribution of quality germplasm

Having prioritized the species, availability of quality germplasm is the initial step in the production. Support for planting indigenous tree species could be increased if the government and the private sectors or other upland organizations will spearhead the production and distribution of quality indigenous tree species germplasm. Genetically diverse and superior sources of the selected species should be identified and conserved. It is not enough that seeds or seedlings are supplied to the farmers, in doing so it should be guaranteed that the germplasm is of superior quality. Many farmers' hopes have been crushed when the promise of millions in income did not materialize because the germplasm used was inferior and the resulting trees grew considerably less or were below market standards.

In Lantapan, the seed and seedling business found a market niche among the upland farmers through the Agroforestry Tree Seed Association of Lantapan (ATSAL). After developing appreciation for quality germplasm, the organization, which grew in membership and scope, has reportedly earned PhP. 2 million since indigenous tree species start in 1998. The PO has gained popularity in the Visayas and Mindanao as a major source of agroforestry germplasm which includes both indigenous and exotic species.

The Mount Apo Farmers Cooperative (MAFAMCO) is another PO that markets agroforestry seeds in Mindanao (Bansalan) through the Mindanao Baptist Rural Life Center (MBRLC). Originally, a seed business organization, it has now expanded into credit and merchandizing (Palmer, 1999). However, it is not clear whether the organization is making rigid and strict selection of seed sources like ATSAL. The existence and operation of these two POs is a clear manifestation that upland organizations can respond to the need for quality germplasm. However, with vast hectares to be planted in the uplands, this may not be sufficient. Other sectors have to come in and scale up the efforts of providing quality germplasm.

Asexual propagation, particularly of recalcitrant species and those exhibiting seed years (e.g. dipterocarps), should complement the short supply of seeds. ERDB and UP researchers have come up with low-cost non-misting system for production of dipterocarp rooted cuttings. Agroforestry farmers could adapt this technology with assistance from the

government. In the future, when protocols for tissue culture of indigenous tree species have been perfected, low-cost planting materials from superior and genetically diverse sources could be effectively distributed for planting in the uplands. However, the current focus in forest biotechnology seems to favor exotics, although initiatives in the field of indigenous tree species exist as well.

Wildlings could be another source of quality germplasm, but with limited natural forests, they may be hard to find. Additionally, the sources of these wildlings are located in protected forests where gathering of wildlings is strictly prohibited. Moreover, these areas are very remote, which causes the seedlings to suffer from transportation shock and can result in high mortality. Biodiversity conservation programs should allow silvicultural treatments of potential mother trees to increase indigenous tree species fruit and seed production (e.g. thinning of competing trees, fertilization).

Generation of farmer-friendly production technologies

Information about indigenous tree species is either limited, fragmented or non-existent. This was confirmed through an analysis of available information about indigenous tree species (Tolentino 2000; Tolentino 2003). The comprehensive tree species selection and reference guide agroforestree database listed forty-three native tree species to the Philippines (ICRAF 2002). Of these forty-three species, twenty-eight species have good and sufficient information about propagation methods (65.1 percent). This is complemented by sufficient information about tree management (60.5 percent or twenty-six species). On the other hand, only ten species have good information about germplasm management. On the contrary, thirty species have limited information about germplasm management and for three species no information exists at all. Information about natural habitat comes second in the list of species with limited studies (twenty-seven species or 62.8 percent) and for many trees, information on pests and diseases is lacking (twenty-six species or 60.5 percent). Quite close are twenty-one species with limited information regarding reproductive biology and history of cultivation. For eight species (18.6 percent) we lack information about their history of cultivation. This was followed by three other species without information regarding pests and diseases and germplasm management. Two species lacks information about tree management, while a single species each is without available information regarding natural habitat, biophysical limits, reproductive biology and propagation methods. Based on functional use, the native species are obviously multiple use or multiple service tree species. The matrix analysis also provides some interesting observations regarding the way other countries plant native species. apalang (*Barringtonia racemosa*) is endemic in the Philippines, but it is planted in thirty-two other countries as an exotic. Another species, *Artocarpus altilis* though native to three other places, is planted in another fifty-one countries or major islands. Several of these native tree species have wide exotic distributions (more than twenty countries), namely: *Albizia procera, Aleurites moluccana, Flemingia macrophylla, Lawsonia inermis, Sennasiamea, Sesbania grandiflora*, and *Syzygium cuminii*. This illustrates that it is not only the Philippines that have a proclivity for exotics. Correspondingly, some native species (in the Philippines and other countries) have no recorded exotic distribution, e.g. *Agathis philippinensis, Antiaris toxicaria, Arenga pinnata, Casimiroa edulis, Casuarina equisetifolia, Dipterocarpus alatus, D. grandiflorus, Dracontomelon dao, Hardwickia binata, Macaranga tanarius, Mesua ferrea, Parkia speciosa, Piliostigma malabaricum, Schfima wallichii, Shorea negrosensis, Trema orientalis, Vitex parviflora* and *V. pubescens*.

Research on appropriate seed, nursery and plantation technologies for the prioritized species should be conducted on-station and on-farm to ensure that the production technologies will be acceptable and affordable to the upland farmers. Tree domestication is farmer-led thus the old paradigm of purely researcher-generated technologies for the uplands should be adapted to this new insight. Farmers can play an active role in the planning, implementation, management, monitoring and evaluation of the smallholder tree farm programs. Incorporation of indigenous knowledge, when available, is another viable step. Research could be conducted in Community-based Forest Management (CBFM) sites where a strong community organization is in existence. Community-based research is currently undertaken in several areas and the author is involved in one of those (the Quirino study cited earlier).

Another question that needs to be addressed by researchers is how to improve planting stock production. In one study, the quality of planting materials in many smallholder nurseries was found to be low (Tolentino et al. 2001). Root-shoot ratios were low, many roots were defective and quite a number are overgrown. Some recommendations to improve the production of planting stocks include: availability of improved or quality sources of germplasm, applications of root pruning, use of alternative containers (e.g. root trainers), development of appropriate nursery stock quality assessment and promotion of compost use. But as most of the operators of these smallholder tree nurseries are resource-limited, some assistance on training and logistical support is necessary. Other aspects of the tree production system that needs to be addressed are proper site selection, appropriate tree management and sustainable harvesting system.

Active participation of smallholder tree farmers should be sought in the development of an appropriate production model. Considering the diverse conditions, options, limitations and sociocultural conditions existing in various parts of the country, no single species, species' combination or production model could be recommended for all the smallholder tree farmers in the Philippines. It is a challenge to develop site and locality-specific domestication strategies for indigenous tree species. However, the production of particular species in a locality should not be too small to make it uneconomical or unsustainable to support the local wood processing requirements. Wood industries normally require large-scale plantation in order to have a reliable source of raw materials for their processing plants. With the shift to CBFM, there is clearly a need to develop models of smallholder tree farms that could, together, supply the needs of wood processing plants using indigenous tree species. Additionally, upland farmers rarely plant trees in blocks, thus models or schemes which integrate indigenous tree species in the agroforestry farm should be investigated in order to design systems that respond to market requirements and demands while at the same time addressing farmers' limitations and their livelihood options.

Enrichment plantings particularly in CBFM projects should shift to the use of indigenous tree species. Accomplishments of the community-based projects with assisted natural regeneration and timber stand improvement components with funding from Asian Development Bank (ADB) and the Japanese Bank for International Cooperation (JBIC) revealed that most of the species planted are the fast growing exotic species: gmelina, mahogany and madre de cacao (*Gliricidia sepium*). Narra is the only indigenous tree species commonly used by POs.

Technologies for wood processing and post-harvest practices should be suitable for the production models of smallholder tree farmers. There are small sawmills that are suitable for processing small diameter and small volumes of wood and that are present in many smallholder tree farms. Post-harvest technologies should be available to farmers to minimize losses due to poor handling and storage. This could include wood drying and if necessary wood preservation technologies.

The experience of Landcare in the Philippines highlights how farmer participation in and support for the adoption of soil conservation measures was generated. Although in another realm, these principles appear to be a good model for generating technologies to domestication indigenous tree species by smallholder tree farmers. Based on the experiences with Landcare the following could be concluded and applied: (1) dissemination of simple technologies one step at a time is more effective than complex technology packages, (2) technologies must fit local social, economic and physical conditions, (3) technologies should be simple and easily tested and adapted by farmers in their own individual situations, (4) technologies must be profitable and low risk, (5) technologies should have immediate short term benefits as well as long term impacts, (6) technologies must be low cost and culturally acceptable, (7) farmers need to be involved in developing, testing and adapting technologies, (8) farmers should be involved in helping to disseminate technologies to other farmers, acting as role models, and (9) encourage visits to farms that have adopted technologies, but avoid funding model farms that would be sustainable without such funding (ACIAR 2004).

Dissemination of technologies should form part of the technology generation program. Effective means of communication to other upland farmers should be designed and implemented at a large scale. Data banking of relevant information for indigenous tree species should also be addressed. The agroforestree database was developed by ICRAF (already in its 2nd version). The database contains both exotic and indigenous tree species. The department of forestry of Leyte State University is using software called ALICE which accordingly stores information on indigenous tree species (Mangaoang pers. comm.). Both of these databases are undergoing regular improvements and updates. It is also recognized that much information and data have not been integrated into these existing databases and exist in some libraries, offices, or even in the communities. Thus, there is a clear need to gather, collate, analyze and validate the information before it is included in the data banks. Access to this technological knowledge will facilitate adoption of the technologies by smallholders. Effective technology transfer programs should target this audience.

Re-designing of biodiversity conservation programs

A number of conservationists, particularly conservative conservationists, interpret conservation as no-touch at all. Certainly, there are very fragile areas that necessitate this kind of approach, but declaring the whole country as a non-harvesting zone seems overreacted. The recent heated discussions on a national logging ban clearly illustrate the point. It is not the intention of this paper to focus on this discussion. This paper wants to bring to the fore the need to plant indigenous tree species and one strategy to encourage planting these species would be to allow the planters to reap what they sow. A national land-use zoning through land-use suitability studies and participatory planning with concerned stakeholders should be implemented. This will identify production and protection zones and clearly delineate the areas where production-oriented tree planting could be acceptable and where it is not. These production zones could result in economic activities that might generate the needed funds for the protection of the whole watershed. No conservation program can be sustained if continuous expenditures are not coupled with any economic gains. Conservation projects, whether foreign or locally funded, were often not sustained when revenue generation was left out. It is also an accepted reality that there can be no success in biodiversity conservation programs when overt poverty exists in the area of implementation. More importantly, external support for biodiversity conservation programs is not increasing and probably diminishing. We have to generate internal support for this very essential endeavor and planting and harvesting indigenous tree species in designated areas

might be a potential source of funding. Policies should evolve to include environmental charges in forest charges and plantation taxes.

The concept of biodiversity corridors, as laid out in the national biodiversity strategy and action plan, could utilize indigenous tree species for this purpose. In these corridors, planting of so-called keystone species could mean planting of indigenous tree species. Keystone species are those indispensable species which control the structure of the community and help determine which other species are present. While we still lack information on what are those keystone species, it is undeniable that there are indigenous tree species that support the food or habitat requirements of wildlife or are the associated species of other trees in the forest.

Market information and links

Farmers have always complained about poor markets for the crops (either agricultural or trees) cultivated in their upland farms. False hopes of handsome returns have been erroneously raised among poor farmers which frequently led to disappointment when market prices turned out to be much lower than expected. Correct market information, particularly on seasonal variations in demand, price fluctuations, product specifications or standards, existing or potential competitors (both direct or substitute) and reliable market channels, are vital information that farmers should be provided with. It might even be worthwhile for people's organizations to have an honest-to-goodness discussion with potential buyers who will directly provide information about their wood requirements and the prices they are willing to pay. Assistance in linking farmers to potential buyers or markets will be crucial in farmers' decision to raise indigenous tree species.

Additionally, the wood processing industry and the wood market should be developed to absorb the indigenous wood products. Indigenous tree species were the species the industry was processing during the start of the logging industry except that the trees were naturally-grown and of bigger diameter. Technologies for processing of plantation-grown smaller diameter trees should be introduced and improved to allow the market for indigenous tree species to expand and develop.

The case of malapapaya (*Polycias nodosa*) in Gumaca, Quezon Province, serves as an example. A processing plant which manufactures chopsticks, popsicle sticks, veneer and bento boxes (Japanese lunch boxes: a good substitute for styrofoam boxes) buys naturally-grown malapapaya trees from the area. The presence of this market has promoted the planting of this species in the area. But while planting has increased, production technology particularly for planting stock is not fully perfected. The ERDB and the company (MP Woods Inc.) have partnered together to conduct production technology research for the species, but the technology has not reached the smallholder tree farmers.

Policy review and reforms coupled with incentives for plantation development

In a recent publication, the director of the FMB admitted that "the development of private industrial forest plantations has not progressed well despite the incentives provided and the prescriptions of the Philippines forestry master plan" (Acosta 2004). The author enumerated the factors that hinder forest plantation in the Philippines namely: (1) financial viability of plantation development, (2) security of land tenure, (3) unstable forest policies (changing personnel who do not honor previous commitments between government and investors).

To cite specific examples, resource-limited farmers are often plagued by the lack of capital to finance even the most essential components of their agroforestry farm. Financial assistance at reasonable interest rates would augment the farmers' meager resources. Most upland farmers are also non-bankable; practically no bank is willing to extend credit to the tree farming business of members of this sector of society. High risks, associated with environmental problems and low repayment rates, are the explanatory factors. It would be better if POs themselves will be the one to extend credit to the farmer-members (a self-help type of credit organization).

The relatively short land tenure schemes currently offered by the government (twenty-five years and renewable for another twenty-five years) do not encourage plantation investors to invest in tree farming. The private sector is suggesting a tenure security close to private ownership or if possible complete privatization of state forest lands (Acosta 2004).

On the regulatory side, special permits are required to harvest and transport certain indigenous tree species, particularly premium hardwood species. DENR administrative order (DAO) no. 78 regulates the cutting of narra and other premium hardwood species: molave (*Vitex parviflora*), dao (*Dracontomelon dao*), kamagong (*Diospyros philippensis*), ipil (*Instia bijuga*), acacia (*Samanea saman*), akle (*Serialbizia acle*), apanit (*Mastixia philippinensis*), banuyo (*Wallaceodendron celebicum*), batikuling (*Litsea leytensis*), betis (*Madhuca betis*), bolong-eta (*Diospyros pilosanthera*), kalantas (*Toona calantas*), lanete (*Wrightia lanit*), lumbayao (*Tarrietia javanica*), sangilo (*Pistacia chinensis*), supa (*Sindora supa*), teak (*Tectona philippinensis*), tindalo (*Afzelia rhomboidea*) and manggis (*Koompassia excelsa*). In private lands, a special private land timber permit (SPLTP) has to be secured to be allowed to harvest and transport the lumber. Acacia, which is an exotic species but has adapted to Philippine conditions, has subsequently been de-listed in 1992 by virtue of DAO no. 46. Almaciga, on the other hand, is totally banned from cutting in any part of the country as per DAO no. 74 series of 1987. No regulatory problems will be encountered in tree planting operations except some registration procedures, but the difficulties arise when trees reach harvesting age. For the indigenous tree species, volumes less than 10 cubic meters are approved for cutting and transporting by the regional executive director (not CENRO or PENRO). Volumes in excess of this amount will have to be approved by the DENR Secretary. A smallholder tree farmer or owner of a private land may not have the patience, time and resources to secure the necessary special permit from the DENR regional or central office. Besides providing the legal framework to arrest illegal loggers of premium hardwood from the natural forests, these policies have created an environment that tends to discourage the massive planting of these indigenous tree species. Undeniably, these policies have spawned conditions that favor the planting of exotic trees instead of planting these endangered tree species.

The same paper on plantation incentives (Acosta 2004) suggests the following actions to tap into the potential of CBFM for plantation development: (1) full rationalization of forestry rules and complete devolution of forest management functions to communities and people's organizations, (2) research and development and extension support to CBFM, and (3) strengthening the financing and market links between corporate forestry entities and

CBFM organizations. Furthermore, Acosta proposed the re-evaluation of the present ban on export of logs and rough lumber from the natural forests and deregulation of harvesting, transport and trade of plantation timber. Taking a broader perspective, examples of incentives to plantation development in the Asia-Pacific region (nine countries studied) include state planting, low-cost seedling provision, land grants, nursery subsidies, survival incentives, grants to growers, concessionary loans, tax concessions, joint venture agreements, research and extension, resource security and, in general, focuses on enabling incentives and removal of structural constraints (Enters et al. 2004). Essential conditions for forest policies to promote plantation development include: (1) provide a stable and coherent forest policy that is supportive of economic activities, (2) ensure that other (non-forestry) policies are aligned so that plantation investment can occur on a level playing field, (3) develop research and extension support for plantation development, (4) establish strong industry clusters, including supporting infrastructure, a competent labor force and appropriate practices and technologies, (5) collect and make readily available objective, high-quality resource information to support policy making, forecasting, planning and monitoring, and (6) encourage a healthy debate and discussion on the merits and reasons for offering particular incentives (Enters et al. 2004).

Simplification of policies governing the establishment, harvesting and transport of indigenous tree species from CBFM and private tree farms will facilitate the procedures farmers have to go through during the harvesting and transport of their produce. The current cumbersome and bureaucratic process discourages many farmers from engaging in indigenous tree species planting. The Forestry Development Center of UPLB has recently completed a study towards the simplification of rules, regulations and procedures of DENR.

Institutional reforms

The institutions, both government and private, whose tree planting efforts focus purely on exotic species should shift their perspective of reforestation and smallholder tree growing to incorporate indigenous tree species. This requires budgetary re-alignment, re-training, re-orientation of staff and policy reforms to favor indigenous tree species planting and harvesting. The familiarity with exotics has to be challenged by the desire to promote native trees.

CONCLUSIONS

The Philippine reforestation effort, dating back from the early 1900s, is characterized by the dominance of exotic tree species. Reasons for their common use include: (1) wide adaptability and tolerance to stress, (2) fast growth and high yield, (3) available research and technologies for the exotics and, (4) availability of abundant germplasm. Despite these apparent advantages of exotics, indigenous tree species have a niche to occupy in Philippine forestry and in timber production by smallholder tree farmers in particular. Experiences with and interest in indigenous tree species is developing as manifested by reforestation trials described in the UP land grants, and in activities in Quirino and Mindanao. However, there are big hurdles that need to be overcome in order to successfully integrate indigenous tree species. But, with a resolute stand to bring back the Philippine native forests, foresters, smallholder tree farmers and private land owners can unite to restore the lush tropical forests of our country. A last note, this paper does not advocate a complete shift from exotics to purely indigenous trees. I am not a radical environmental nationalist who would label all exotics as evil. As a silviculture, I have a pragmatic approach on species selection and would want to provide the best options for the benefit of the people and the society who depend on the Philippine forests.

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CHAPTER THREE

THE ROLE OF TREES IN THE BIOREMEDIATION OF DRINKING WATER IN NAWAKKADUWA, SRI LANKA

Kamal Melvani

INTRODUCTION

Natural forests are integral for environmental stability since they, at all stages, fix and cycle energy or carbon, regulate hydraulic flows and conserve nutrients. In addition, forests provide man with food, fuel wood, medicine, fiber, fodder and timber. Forests provide habitat for biodiversity and are fundamental to life.

Yet, forests are being lost at a rapid rate whereas soil and water resources are exploited and polluted. The destruction of tropical forest environments impoverishes traditional people. This destruction must be stopped, for so much has been lost in the past few decades that if we are to make any difference to the world of the future, this trend must be reversed and forest land rehabilitated. Forests, if planted in areas contaminated with chemical residues, effluents or leachates, are capable of filtering them and rendering the environment to its original state. With this goal in mind, the Neo-Synthesis Research Centre (NSRC) in Sri Lanka began a series of experiments in analog forestry.

ANALOG FORESTRY

Analog forestry is a system of land management that seeks to establish a tree dominated ecosystem analogous in architectural structure and ecological function to the original climax or sub-climax vegetation community. It seeks to empower rural communities both socially and economically through the use of species that provide marketable products. Analog forestry moves beyond other agroforestry practices since it includes an explicit focus on the identification and incorporation of biological diversity. Analog forestry seeks to identify specific functions of the natural forest, an analog forest can provide for soil creation, clean water, microhabitat, an amicable microclimate, and environmental stability among other things. The diversity of crop products also reduces the risk of crop failure and market dependency for the farmer (Mallet & Senanayake 1997).

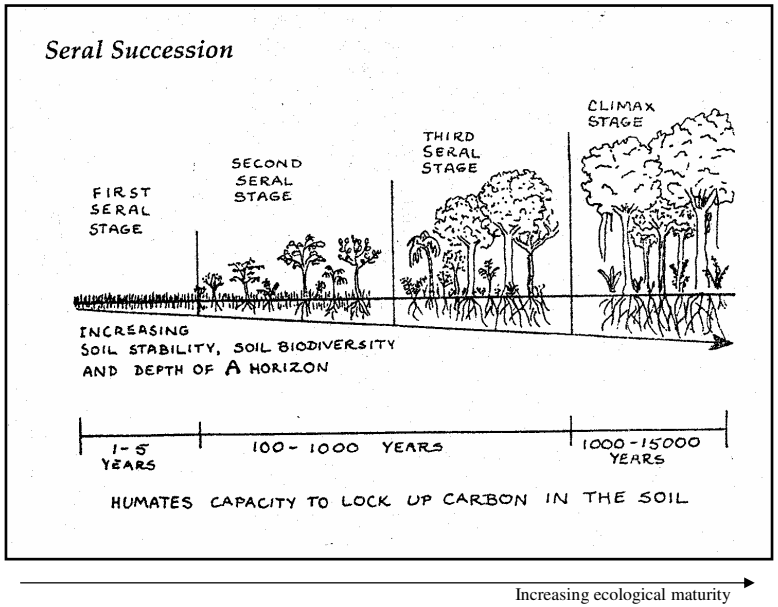
The ecological restoration of degraded environments involves two levels of activity that operate simultaneously. One level will address the actual field restoration process that will include the following components:

- The very first step in restoration is to assess the current land use pattern of the area to be restored, the dominant physical and geographic features, water sources, their drainage patterns, status of the soil or scale of soil erosion and status of that landscape in terms of serial progression.
- Visit the closest natural forest patch in your area and determine architectural structure and ecological function. Identify the plant and animal species that live in it. Identify the serial stage the forest is in.
- Identify the ecological roles played by those plant species like providing habitat, fixing nitrogen in soil, be it a feeding plant for a butterfly, host plant for an orchid or the filtration of water, etc.

- Identify their utility functions like providing food, timber, medicines, fire wood, fodder, etc.
- Take a close look at the soil and the leaf litter on the soil. Look out for soil fauna as well.

The information collected on the natural forest is the basis for the proposed landscape design of the area to be restored. The design must strive towards attaining the same serial stage of the natural forest.

Figure 1: A forest can be seen as a tree-dominated phase of a succession of ecosystems, which usually gains biomass with maturity. While the succession process progresses with time, local or climatic events can arrest the process of maturity and hold a serial stage constant for long periods of time, a characteristic that has been utilized in human designed cropping systems



The second level involves the mobilization of the people who live in the area targeted for restoration. The landscape design and the management plan of the proposed area designated for restoration must be developed in participation with the people or community who inhabit the area. The needs of the people must share equal precedence with the ecological needs in the landscape design.

Analog forestry is a new science that has been used extensively in the restoration of degraded land in watersheds, critical habitats for biodiversity and in the bioremediation of water and soil by the use of agrochemicals. The land use planning promulgated by conventional agriculture includes among many other facets, the intensive use of agrochemicals, monoculture of one or two crop species, the removal of all other vegetation, the introduction of new crop varieties and increased pressure on the land to support three cropping cycles. The intensity of conventional agriculture in sensitive environments is rife with negative impacts. For instance, in many countries, ground water from shallow aquifers is used to supply potable water and for irrigating crops grown with the use of chemical fertilizers and pesticides. The leaching of these agrochemicals into the groundwater table has had a significant impact on ground water quality. Few, if any studies on the leaching of agrochemicals have been undertaken in developing countries even though the use of both chemical fertilizers and pesticides are high.

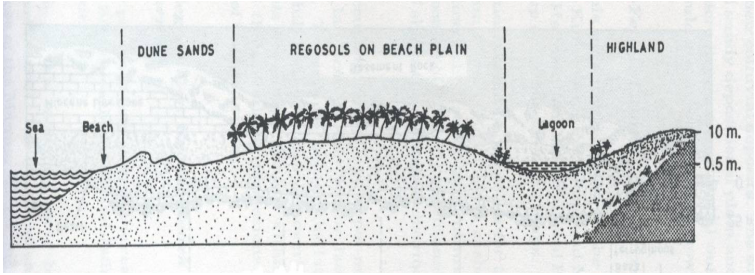
BIOREMEDIATION OF POLLUTED WATER AND SOIL BY ANALOG FORESTRY: A CASE STUDY IN THE KALPITIYA PENINSULA, SRI LANKA

Description of study area

The Kalpitiya peninsula is located on the west coast of Sri Lanka. The climate is characterized by high temperatures throughout the year and an average rainfall of 800-900 mm that occurs only between October and January.

Sandy regosols occupy the central portion and a greater part of the elevated beach plain that is adjacent to the lagoon in the Kalpitiya Peninsula. The dune sands are mainly present on the seaward side of the beach plain. Of special significance is the underlying Gyben-Herzberg lens of freshwater that is present in the beach plains with a flat to gently undulating topography. This permits stable human settlement and agricultural production on this landscape even in the very dry environment (Pannabokke 1996). The sand regosols are located on the elevated beach plains with a flat topography.

Figure 2: Coastal sandy regosol soilscape



Despite the dry environment that prevails in these regions, the underlying freshwater supplies found on these lands within a shallow depth have permitted viable coconut plantations as well and sustained human settlement. However the past forty years has seen the intensive cultivation of seasonal high value crops like chili, onion, tobacco, potatoes and other vegetables under lift irrigation from shallow wells. The freshwater lens is extensively pumped for irrigation and potable water supplies, and the recharge is from direct infiltration from both rainfall and from return irrigation flows. The development of the shallow aquifer has altered the natural flow regime and now ground water flow within the aquifer is dominated by the abstraction from the shallow irrigation wells. Ground water quality over large areas of the peninsula is good and is of the calcium bicarbonate type. However within the cultivated areas, ground water concentrations of nitrate, chloride and potassium are exceptionally high. The nitrate and chloride concentrations in cultivated areas are in the ranges of 10-15 mg N/1 and 100-300 mg/l, respectively; whereas those in the uncultivated areas are in the range of 0-2 mg N/l and 500 -100 mg/l, respectively (Lawrence and Kuruppuarachi 1986).There is a clear correlation of ground water quality with land-use.

Farmers in the Nawakkaduwa area have fairly large land holdings, ranging from three to twenty-five acres in some instances. They grow crops like chilies, onions, tobacco as monocultures while coconut is their only tree crop. They use agrochemicals in doses far in excess of the recommendations given by the Department of Agriculture. Chemical fertilizers like urea, ammonium-sulfate, Triple Super Phosphate (TSP), Muriate or Potash are used along with specific fertilizers for chili, onions and coconut. Almost no organic fertilizer is used. The same story is true in the application of chemical pesticides and fungicides. The other problem is that since crops are grown in monocultures, the threat of pest attacks and disease in epidemic proportions is entirely possible and results in the increasingly excessive use of pesticides. In 1962, the volume of NPK fertilizers used was in the range of 80,000 ton. In 1988, the value increased to 200,000 ton. (DA 1990). There are no other crops, either annual or perennial, that are used in intercropping and no active cultivation of green manures to facilitate compost production.

Farmers use the water pumped from shallow wells to irrigate their fields. Farmers use up to 75,000 l of water per acre per day or if computed, 35 percent of the cost of production is devoted to the cost of watering (NSRC 2005). Hence with the rising cost of agrochemicals and that of fuel for operating water pumps, production is becoming increasingly unprofitable. Even more problematic is the impact on human health with the increased leaching of salts through the sandy soils into the ground water.

Effects of land use on water quality in Kalpitiya

The most damaging impact has been to the freshwater lens that has got contaminated by the leaching of salts. This subject has been studied in the Jaffna Peninsula in 1986 (Nagarajah et al. 1986) and in Kalpitiya from 1988 to 1992 (Lawrence et al. 1998). Both studies confirmed that farm and domestic wells were contaminated with nitrate pollution from the continuous and liberal use of organic manures and inorganic fertilizers. The transport and behavior of Carbofuran, a well known pesticide in the aquifer was also monitored and it was found that the pesticide leached into the ground water table and was and was broken down into a less toxic compound that remained in the ground water (*Ibid*).

The implications of the contamination of the ground water on human health were also assessed. Some of the more grave effects of high nitrate intake on human health are the incidence of Methaemoglobinaemia and gastro intestinal cancers. Methaemoglobinaemia describes the condition wherein the oxygen carrying capacity of the blood is reduced. It is a condition mostly restricted to babies and very young children and is often referred to as the blue baby syndrome. Nitrates and nitrites are also reduced to N-nitroso compounds that are known carcinogens in rodents.

A study conducted by the University of Ruhuna (1995) on the nutritional and physiological effects of nitrates in drinking water in Kalpitiya showed that 64 percent of the infants suffered from malnutrition and potential methaemoglobinaemia. In addition, the lack of proper sanitation was evident since the water samples contained high levels of bacteria, viral, protozoan pathogens and helminthes.

The preliminary survey conducted by NSRC to assess the socioeconomic status of the beneficiaries in Nawakkaduwa revealed that out of 109 families interviewed, twenty families had experienced still births, which meant that nearly 19 percent of the population were directly affected (NSRC 2003).

THE RESTORATION EFFORT

In 2001, the National Water Supply and Drainage Board began the construction of several wells to supply and distribute potable water. However after testing it was found that more than 50 percent of the wells was contaminated and unfit for human consumption. The water had a high content of nitrate, nitrite, chloride and potassium. In 2003, the National Water Supply and Drainage Board awarded the NSRC the contract to conduct research on possible ways to mitigate the nitrate and nitrite contamination in drinking water wells.

The drinking water well that was located in the Nawakkaduwa village was the worst affected. Hence, initial discussions were held with people of that village who were the potential beneficiaries of the well water. They agreed that their present management of the land was what was causing the contamination of the well, but stated that they knew of no other alternative to the agricultural practices that they presently engaged in. They stated that if they saw an alternative land management practice on the ground they would adopt it. Therefore, the main thrust of our work involved:

- The establishment of a demonstration model in and around the land on which the drinking water well was located. Sustainable land management technologies would be adopted in the landscape design proposed.
- A study to assess the efficacy of the conventional system of agriculture presently adopted by farmers would also be carried out in order to compare the two systems.

- The study of the populations, diversity and frequency of soil fauna would be undertaken in the closest natural forest as well as in the demonstration area.
- The results of the landscape design implemented would be investigated and the efficacy of the technology employed in bioremediation be verified.

Establishment of the demonstration model

Since the closest natural forest would provide the model for us to base our restoration strategies on, we visited the forest patch in Daluwa in order to identify the ecological roles the forest performed, the architecture, species composition in terms of height and growth categories and the surface biodiversity seen. In addition, we looked at the forest soil and soil macro fauna. The physiognomic classification of the forest was undertaken using the notation developed by Kuchler and later modified by Senanayake (Senanayake 1989). The data gathered revealed that this forest was of the dry monsoon forest type and has six canopies. Most of the trees are broad-leaved evergreen species and are distributed in a sporadic manner. While there are several indigenous species like *Manilkara hexandra* and *Dryptes sepiara*, the presence of exotics like *Anacardium occidentale* or cashew suggests that this forest is disturbed and has anthropogenic elements in it. Lichen is found growing on trees and there are five species of climbers and one species of palm.

The data gathered on the structure and composition of the natural forest in Daluwa revealed that ideally, the forest to be recreated should have six canopies and be composed of mostly evergreen species of trees. Climbers and palms would have to be incorporated in the proposed landscape design. Both indigenous and exotic species could be used in the landscape design since the area would be managed. The landscape design of the model well area involved three main aspects:

- The micro watershed of the water source, the immediate area around the well was referred to as the buffer zone where several deep rooted, mostly indigenous trees that had long and short cycles of growth were planted in a dense manner so as to form a root mat below the surface. The main idea was to facilitate the uptake of nitrates by the roots.
- The surrounding area was developed as a production area where both perennial and annual crops were grown using organic cultivation regimes. The crops chosen would provide food, fuel wood, timber, fodder, medicine as well as habitat for biodiversity. Already the demonstration model has several species of butterflies, birds and snakes who find refuge there. Furthermore, shade has increased by almost 20 percent in the area of the buffer thereby increasing the ambient relative humidity.
- The fence area was developed using several species that could withstand the salt laden, sea breeze and serve as wind breaks.

Table 1: Landscape design of demonstration model and index with utility functions of plants (1 acre).

Botanical Name	Common Name	Use
Production area		
Mangifera indica	Mango	F
Flacourtia inermis	Lovi	F
Annona muricata	Soursop	F
Annona squamosa	Custard Apple	F
Annona sps.	Meti Anoda	F
Flacourtia indica	Ugurassa	F
Achras zapota	Sapadilla	F
Cycas circinalis	Madu	FO
Aegle marmelos	Beli	F
Limonia acidisima	Wood Apple	F
Averrhoa carambola	Carambola	F
Murraya koenigii	Curry Leaf	S
Psidium guajava	Guava	F
Punica granatum	Pomegranate	F, M
Prunus Americana	Apricot	F
Elaeocarpus serratus	Weralu	F
Syzygium caryophyllatum	Dan	F, WF,B
Nyctanthes arbor-tristis	Sepalika	O,R
Musa acuminate	Banana	F
Cocos nucifera	Cococnut	N, T
Artocapus heterophyllus	Jak	F,T,B
Anacardium occidentale	Cashew	F,T,B
Garcinia quaesita	Goraka	F
Schleichera oleosa	Kon	T, B
Justicia gendarussa	Kaluweraniya	M
Phyllanthus emblica	Nelli	F,M
Phyllanthus acidus	Rata Nelii	F
Carica papaya	Papaw	F
Citrus reticulate	Mandarin	F
Citrus sinensis	Orange	F
Citrus aurantifolia	Lime	F
Citrus madurensis	Kalamasi Lime	F
Citrus sps.	Cideran	F
Citrus grandis	Grape Fruit	F
Spondias dulcis	Spanish Plum	F
Flacourtia sps.	Bool Lovi	F
Persea Americana	Avacado	F
Pterocarpus marsupium	Gammalu	T, M
Acerola sp.	Aserolla	F
Ixora coccinea	Rathmal	O, B, WF
Psidium cattleianum	China Pera	F
Ananas sativus	Pineapple	F
Vitis vinifera	Grapes	F
Passiflora edulis	Passion Fruit	F
Averrhoa bilimbi	Bilin	F
Aloe vera	Aloe	M, C
Cymbopogen citrates	Lemon Grass	S
Tithonia diversifolia	Wild Sunflower	GM
Sesbania grandiflora	Kathuru murunga	LV
Bauhinia racemosa	Bauhinia sp.	M
Around the well		
Pandanus kaida	Pandanus	WF
Syzygium caryophyllatum	Dan	F, WF, B

Botanical Name	Common Name	Use
Pagiantha dichotoma	Divikaduru	WF
Pandanus amaryllifolius	Rampeh	S, WF
Grewia damine	Daminna	B
Euphorbia tirucalli	Nawahandi	M
Areca catechu	Betel Nut	Ma, T,WF, B
Bixa orellana	Rata Kaha	FC
Thespepsea populnea	Gansuriya	T, GM
Berrya cordifolia	Halmilla	T
Datura metel	Attana	M, P
Adenanthera pavonina	Madatiya	O, B
Chukrasia tabularis	Hik	T, B
Azadirachta indica	Kohomba	M, BP, R, T
Diospyros ebenum	Kaluwara	T
Manilkara hexandra	Palu	T, B
Chloroxylon swietenia	Burutha	T, B
Moringa oleifera	Murunga	FO, WF
Terminalia arjuna	Kumbuk	WF, T, M
Delonix regia	Flamboyant	O, GM
Diospyros malabarica	Timbiri	T, B
Artocapus heterophyllus	Jak	F,T,B
Calophyllum inophyllum	Domba	WF
Pisonia grandis	Wathabanga	FO, GM
Vitex pinnata	Milla	T, B
Aleurites moluccana	Kekuna	Oi
Pongamia pinnata	Magulkaranda	M, B
Sterculia foetida	Thelambu	B
Antiaris toxicaria	Riti	B
Dillenia retusa	Godapara	WF
Pterospermum suberifolium	Welan	T, B
Madhuca longifolia	Mee	Oi, M, B
Plectranthus zeylanicus	Iriweriya	M
Kaemferia galangal	Ingurupiyaliya	S, M
Munronia pumila	Bin kohomba	M
Curcuma domestica	Tumeric	S,M
Picrohiza kurrooa	Katukarosana	M
Vitex negundo	Nika	GM, M
Fence		
Sterculia foetida	Telambu	B
Barringtonia racemosa	Mudilla	WB
Erythrina variegate	Erabadu	GM
Thespepsea populnea	Gansuriya	T, GM
Pisonia grandis	Wathabanga	FO, GM
Cocoloba uvifera	Kokolowa	F
Hibiscus rosa sinensis	Wada	O, GM
Sp 3	Catha	LV
Bixa orellana	Rata Kaha	FC
Aloe vera	Aloe	M, C
Cymbopogon citratus	Lemon Grass	S
Casuarina equisetifolia	Casurina	WB
Ceiba pentandra	Silk Cotton	WB, GM
Moringa oleifera	Murunga	FO, WF

Legend: F: Fruit; FO: Food; M: Medicine; S: Spic; WF: Water Filter: B: Biodiversity Enrichment; O: Ornamental; R: Religious/culture; T: Timber; C: Cosmetic; GM: Green Manure; LV: Leafy Vegetable; Ma: Masticatory; FC: Food Coloring; P: Poison; BP: Biological Pesticide; Oi: Oil.

While farmers in the Kalpitiya Peninsula only cultivated chilli, onions, tobacco and melon species, several varieties of vegetables were tried in the experimental plot. Snake gourd, bitter gourd, ridge gourd, *Amaranthus* sp, maize, spinach, ladies fingers, cucumber pumpkin, long bean, tomato, spring onions, brinjal, squash, gotukola, wing beans and many varieties of chili are grown here. Only compost fertilizer made of green leaves, straw, cow and goat dung as well as minerals like rock phosphate are used in cultivation.

The landscape design includes the cultivation of several green manures like *Gliricidia maculatum, Tithonia diversifolia, Malviscus* sp., *Vitex negundo, Thespsea populnea, Pavetta indica, Ceiba pentandra* and *Pisonia alba*. Further, the sandy soil is treated with the addition of a special soil mixture comprised of coco peat, laterite, lagoon clay, goat dung, and straw as mulch. Coco peat and straw form the basis for the addition of carbon to the sandy soil. In 2004 out of a total addition of 155,080 kg of diverse inputs, 67,300 kg of organic matter was added to the soil. One of the reasons for adding carbon in this great a quantity was to facilitate humidification since the entry of external soil inputs served to inoculate the soil in the demonstration model that had previously been depleted by the past application of pesticides. Presently, the habitat for soil fauna is well established. This is evident in the high numbers of macro fauna found in the soils of the demonstration model. Millipedes, wood lice (pill bugs), carabid worms, collembolans, termites, spiders and mites were found in soil. A study to compare the soil macro fauna in both the natural forest in Daluwa and that of the model is ongoing. Further the addition of carbon was intended to provide the ideal conditions for de-nitrification, which will be described later.

Plant extracts of *Azadirachta indica*, *Tithonia diversifolia*, *Derris scandens*, *Lantana camara*, *Vitex negundo*, *Gliricidia maculatum*, *Ceiba pentandra* and *Pisonia alba* were used in the manufacture of biological pesticides and liquid fertilizers used to control attacks from pests and diseases. The planting of a diverse array of plants enabled the re-creation of habitat for biodiversity; there has been seen an increased frequency of birds and other predators who act as biological control agents. The cultivation of vegetable crops also paid attention to the traditional practice of choosing the auspicious time. The economics of conventional agriculture with specific regard to the quantum of water used in cultivation is also an important area for study. Surveys carried out in 2004 have revealed that the greatest expenditure farmers in Kalpitiya incur is related to watering their crops. Farmers need to water their fields twice a day since there is no moisture retained in the sandy soil that is bereft of mulch. The average water use is 75,000 l per acre per day as opposed to 12,600 l used to water the demonstration model (Wild 1993).

Investigation of the water in the model well and piezometers

In February 2004, a comprehensive test was conducted on the water from the drinking water well that was established in Nawakkaduwa. The standard parameters of nitrates, nitrites, chloride, iron, ammonium, conductivity, alkalinity, pH, hardness, turbidity and color were tested as well as those tests to check pesticide residues, heavy metals and microbes. The results revealed that the water contained high levels of nitrogen in the form of nitrate, nitrite and ammonia. The water also contained pesticide residues in the form of phenolic compounds. While no heavy metals were found in the water, the other parameters were elevated and hence unfit for human consumption. In addition to the full test conducted on the water from the model well, monthly testing was carried out on water in the eight piezometers established around the well, and two wells each located in the adjacent plots.

The results of the tests conducted on water from the model well, piezometers, Chooti's and the sea well between February 2004 to February 2005, showed a significant

decrease in levels in nitrates and nitrites over the past thirteen months of testing. There were changes in the other parameters tested, but none so dramatic as that seen in the levels of nitrates and nitrites. Graphical representations of nitrate levels recorded over time are presented herewith where figure 3 shows the levels of nitrate recorded in the model, sea and Chooti's wells, whereas figure 4 shows the levels of nitrate recorded in the eight piezometers and the model well.

Figure 3: Nitrate parameter over time. February 2004 to February 2005

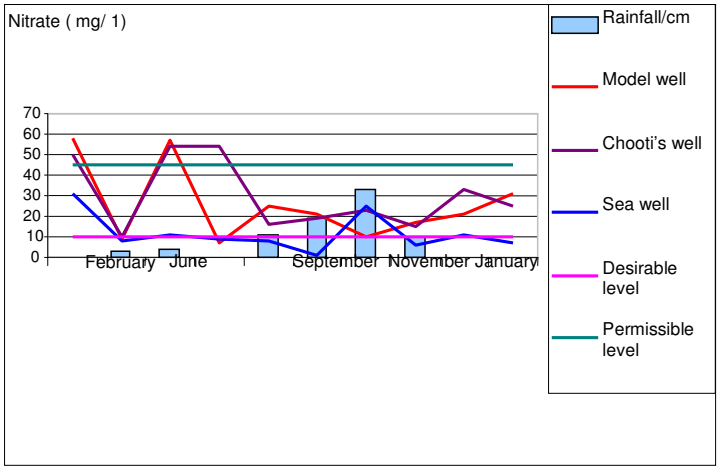
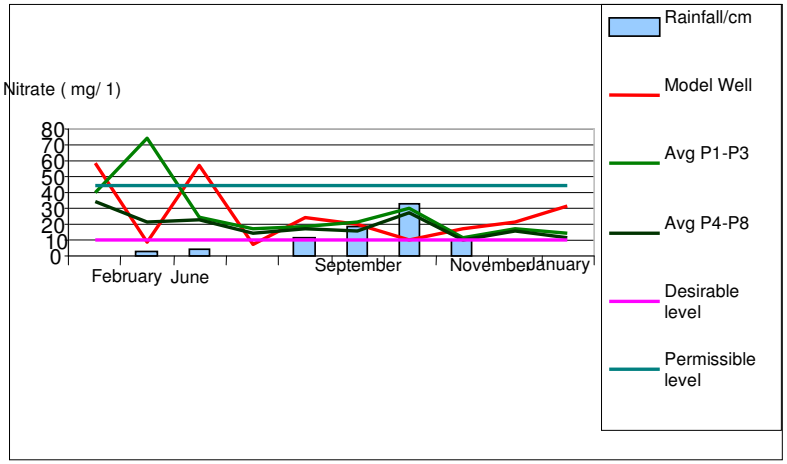


Figure 4: Nitrate parameters over time February 2004 to February 2005



In February, 2004, the comprehensive testing was conducted on the water from the drinking water well established in Nawakkaduwa. All the standard parameters as well as those to check pesticide residues and heavy metals were conducted. The results revealed that the water contained high levels of nitrogen in the form of nitrate, nitrite and ammonia. The water also contained pesticide residues in the form of phenolic compounds. While no heavy metals were found in the water the other parameters were elevated and hence unfit for human consumption. In addition to the full test conducted on the water from the model well, monthly testing was carried out on water in the eight piezometers established around the well, and two wells each located in the adjacent plots.

The results of the tests conducted on water from the model, piezometers, Chooti's and, the sea well, between February 2004 to February 2005, are dramatic. After initial increases at the early stages of the experiment, the levels of nitrate in the water of the piezometers in particular have reduced greatly.

DISCUSSION

The decreasing trend in nitrate levels could be attributed to the process of de-nitrification that was taking place in the below surface environment of the model well. De-nitrification refers to the process that occurs during completion of the nitrogen cycle. This term refers to the reduction of nitrates and nitrites to nitrogen or oxides of nitrogen through microbial activity (biological de-nitrification) or to the chemical reduction of nitrites and other unstable nitrogen compounds (chemical de-nitrification). There are two types of biological de-nitrification: (1) assimilative de-nitrification and (2) dissimilative de-nitrification.

Assimilative de-nitrification refers to the actual uptake of nitrates by the roots of plants for protein synthesis and where the outputs of nitrogen or ammonia are released through respiration into the atmosphere. Dissimilative de-nitrification requires the following conditions:

- The presence of nitrate, metabolizable carbon compounds and the complete absence of oxygen at the site of reduction. Soil organic matter, plant roots and organic manures provide the metabolizable carbon compounds.
- The concentration of oxygen is reduced to a sufficiently low level when the soil air is displaced by water, as after heavy rainfall, irrigation or flooding.
- The soil does not need to be devoid of oxygen since de-nitrification can occur at micro-sites like soil aggregates in the rhizosphere that are water saturated areas and hence oxygen is restricted; these conditions can then be considered as anaerobic.
- The rate of de-nitrification increases with temperature and is highest at a soil pH between six and eight.

The process of de-nitrification is a stepwise reduction: nitrate (NO_3)→ nitrite (NO_2)→ X → nitrous oxide (N_2O) → nitrogen (N_2) gas, where the intermediate X might be nitric oxide (Wild 1993).

Having stated the theory of the possible modes of de-nitrification, let us examine their applicability in the processes that could be taking place within the root mat established in the soil of the demonstration model. The decrease in the levels of nitrate could be attributed to the process of assimilative de-nitrification taking place in the ground water/root interface. The growth of the canopy cover of the vegetation in the area around the well is concomitant with the growth of the root mat. This was evident when project staff dug around each piezometer. The landscape design of the area around the model well consisted of a buffer zone, a production area and dense fence planting. The trees used in the buffer zone planting

immediately around the well comprised of pioneer, sub climax and climax species. Hence, even though species like ebony (*Diospyros ebeneum*) and *palu* (*Manilkara hexandra*) grow slowly, other fast growing pioneer species like *Thespepsea populnea* and *Moringa oleifera* would grow rapidly to establish a canopy cover and with it the skeleton of the root mat. The decrease in the levels of nitrate could be attributed to the process of dissimilative de-nitrification taking place in the ground water/root interface. Since all the conditions required for dissimilative de-nitrification are met with in Nawakkaduwa, the assumption that, that process was occurring is valid.

Let us examine the facts. The water in the well is contaminated with high levels of nitrate; the addition of over 67,000 kg of carbon in the form of coco peat and straw were added to the sandy soil. The conditions that exist between the tree roots and the ground water (micro-sites) could possibly be anaerobic because of exudates like tannins given out by the roots. The conditions could alternatively be such that the bacteria performing the function of nitrate conversion use the extra electron of oxygen in the nitrate by reduction. The Kalpitiya Peninsula is located in the arid zone and hence is subject to high temperatures, low rainfall and low relative humidity. The pH value or hydrogen+ concentration of the water is also between six and seven. Hence with the combination of factors favorable for dissimilative de-nitrification in place, the probability that dissimilative de-nitrification is taking place is very high.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The roles played by tree roots, soil organic matter and denitrifying bacteria are a subject worthy of further research and discussion. However, the extended collection of data over an extended period of time will enable the possibility of statistical testing for enhanced verification. In addition, there will be the need to monitor the movement of water and the contaminant in the various wells and piezometers when the process of mass extraction takes place. It is then that the efficacy of this technology be really gauged. Having said that it must be remembered that the growth of the root mat vis-à-vis the growth of the tree cover will also be taking place in synchrony with the reduction of the contaminant in the aquifer. This is our hypothesis and after the first year it seems a distinct possibility.

The extension of the technology

The apparent success enjoyed by the project in the first year resulted in many farmers requesting us to extend the fruits of our labor to their drinking water wells. Hence, in 2004, the project decided to extend this technology to a further twenty-five drinking water wells in Nawakkaduwa, Mampuri, Daluwa and Nirmalapura villages in the Kalpitiya peninsula with the support of the community water initiatives project of the United Nations Development Program (UNDP). While twenty of the selected were domestic wells, five wells were used by the general public serving a minimum of five hundred persons. The project began by conducting a socioeconomic survey in January 2004 to select the potential beneficiaries. A total of one hundred and nine families living in the Nawakkaduwa village were surveyed. The survey looked at familial composition, occupation, health, availability of potable water, sanitation, income, land extent, ownership, and land use amongst a host of other parameters.

The survey showed that there are three types of persons living in the village: (1) large-scale land owners, (2) those who manage the land of the land owners, and (3) those who work on the land as laborers. While the land owners had large land holdings the other two categories of persons in the Nawakkaduwa owned village owned small extents of land. The

survey also looked at the health related problems of the communities and revealed that twenty families of the one hundred nine interviewed had suffered still born births over the past ten years. Most of the victims were born to those families from the laborer category in the populace.

Several meetings were held with the beneficiaries, *grama sevaka niladharis* (village headmen), the assistant government agent and the parish priest of the local Catholic Church to discuss the proposed activities and formulate a macro-level plan. Subsequently, the project conducted monthly meetings with the farmers/beneficiaries to monitor and evaluate the work done in the past month and draw up the activity plan for the next month. The meetings also provided a platform for discussing whatever problems people encounter in a bid to come up with a solution that meets with everybody's agreement.

As a primary step, the four staff officers appointed by the project were trained in organic agriculture, analog forestry, soil ecology and biodynamic agriculture. Since they would become trainers of the trainees this exposure was essential. The project then went on to educate the farmers in these new techniques for alternative land management. The exposure also included the rudiments of sanitation and toilet use. These awareness sessions were specially conducted for those farmers who received toilets from the project.

As a first step, the prevailing land use practices engaged in by the people of Nawakkaduwa were assessed by drawing a land use map. This map portrays the land holdings, the home gardens, the roads, the lagoon, etc. It is essential in the total ecosystem planning and management of the Nawakkaduwa village (figure 5).

Figure 5: Land use map of Nawakkaduwa, Kalpitiya

Subsequently, baseline maps were drawn of each individual beneficiary's garden that portray the significant physical features of the land, the position of well and toilet if any. It also depicts the dominant trees in the garden. The map serves as the framework to base the landscape design on.

The alternative land use strategy planned for the restoration of the farmer's gardens was then discussed with the farmer and was based on the following:

- The physiognomic structure, floristic composition and ecological functions of the species found in the in the only remaining natural (dry monsoon) forest patch in Daluwa, Kalpitiya.
- The adoption and planting of the same elements and species used in the landscape design around the well; specific areas for annual and tree crops as well as the fence were followed.
- The requirements of the farmer/land owner that arose whilst executing the landscape design with special emphasis on bioremediation, food, fuel wood, timber, fodder, medicine and biodiversity regeneration.

After the landscape designs had been executed for all farmer gardens, the project initiated a plant nursery to service the planting requirement of the project. Five thousand sixty-four native and utility plants in over sixty species were propagated in the project nursery. Some high value plants like grafted mango and orange were bought from external nurseries. Farmers were also encouraged to propagate some of the planting material and were taught techniques of plant propagation. Over two thousand plants including green manures like gliricidia, pavetta and papaya, beli and tamarind were propagated therein.

The execution of the landscape designs began only with the onset of the monsoon rains in November. The planting was carried out with the farmer and his family. By the end of the monsoon season of the 2004, a total of 7,616 plants had been planted in both the farmer's gardens and around the public wells.

Table 2: list of species in Immanuel's garden.

Botanical Names	**Quantity**
Production area	
Acerola sp.	1
Persea americana	2
Musa acuminata	38
Aegle marmelos	5
Piper betle	9
Averrhoa bilimbi	2
Munronia pumila	1
Anacardium occidentale	12
Cocos nucifera	8
Murraya koenigii	4
Artocarpus altilis	3
Punica granatum	8
Rauvolfia serpentina	1
Vitis vinifera	16
Artocarpus heterophyllus	7
Citrus nobilis	6
Syzygium jambos	2
Averrhoa carambola	2
Sesbania grandiflora	5
Annona muricata	2
Cocos nucifera (var)	3
Ficus hispida	1
Citrus limon	2
Citrus aurantifolia	25
Mangifera indica	10
Phyllanthus emblica	2
Citrus sinensis	6
Carica papaya	60
Passiflora edulis	12
Psidium guajava	8
Filicium decipiens	3
Ananas comosus	150
Phyllanthus acidus	2
Piper longum	5
Annona reticulata	2
Elaeocarpus serratus	2
Limonia acidissima	5
Inga edulis	5
Spondias dulcis	3
Flacourtia ramontchi	3
Phaseolus adenanthus	1
Fence	
Acalypha indica	10
Chloroxylon swietenia	1

Casuarina equisetifolia	7
Caesalpinia pulcherrima	5
Codiaeum variegatum	10
Berrya cordifolia	10
Hibiscus rosa - sinensis	15
Diospyros ebenum	6
Tecoma stans	10
Bauhinia variegata	4
Azadirachta indica	10
Ceiba pentandra	10
Abrus precatorius	5
Manilkara hexandra	6
Pavetta indica	115
Albizia lebbeck	4
Tamarindus indica	3
Tabebuia rosea	2
Pisonia grandis	8
Tabernaemontana coranaria	3
Gliricidia sepium	250
Around the well	
Syzygium caryophyllatum	1
Pagiantha dichotoma	2
Calophyllum inophyllum	2
Mangifera zeylanica	2
Thespepsia populnea	3
Berrya cordifolia	2
Lannea coromandelica	2
Diospyros ebenum	1
Azadirachta indica	2
Terminalia arjuna	2
Adenanthera pavonina	2
Pongamia pinnata	2
Madhuca longifolia	2
Moringa oleifera	3
Vitex negundo	2
Areca catechu	3
Pandanus amaryllifolius	6
Acorus calamus	1
Manilkara hexandra	1
Marshland	
Syzygium caryophyllatum	6
Terminalia arjuna	4
Areca catechu	6
Already planted on land	
Cocos nucifera	101
Azadirachta indica	13
Cocos nucifera (var)	1
Calotropis gigantean	1

Musa acuminate	8
Moringa oleifera	5
Adenanthera pavonina	1
Phyllanthus acidus	1
Psidium guajava	3
Ixora coccinea	1
Tamarindus indica	2
Borassus flabellifer	7
Tecoma stans	8
Manihot utilissima	4
Limonia acidissima	3

Organic agriculture

The landscape design of all farmer gardens incorporated the cultivation of vegetables using organic cultivation regimes. These farmers had previously bought all their daily requirement of vegetables although grown with agrochemicals from outside. Now since the project had taught them the art of making compost, liquid fertilizer, biological fungicides, etc., they were better equipped to engage in organic agriculture. Further, with the addition of straw and coco peat provided to farmers by the project, their soil fertility levels began to increase along with increases in soil fauna. The addition of organic matter into the soil is ensured since the landscape design includes the growing of several green manures. Much success was experienced by the farmers when growing ridge, snake and bitter gourds, tomatoes, onions, chili and a bevy of diverse leafy vegetables. The farmer's children were the most benefited. While they consume most of the vegetables grown in their home gardens, there are excesses that they sell locally. The consistent use of mulch has also decreased the quantum of water necessary for vegetable cultivation, making the task less laborious. Few casualties were experienced from pests and disease though getting good seed remained a problem.

The water in all wells is tested for the standard water quality parameters once every three months. The results of the first test were astounding (see table 3). Not one of the wells selected for restoration contained water that was entirely potable. While certain parameters like turbidity, pH, color, hardness, alkalinity, conductivity and high iron content are treatable easily, it is not the case with contaminants like nitrate, nitrite and chloride. The problem is most acute in the public wells where in the school well the nitrate content is 113 mg/l; more than one hundred times the tolerance level since the World Health Organization (WHO) standard is 10 mg/l of water.

Two of the families the project worked with had experienced still births while there were recorded cases of respiratory illnesses, kidney and urinary tract diseases. Seven families with no toilets were given them by the project. Since many did not have knowledge about toilet training, the project staff held several informal lecture sessions. Farmer families are also taught the basics about the disposal of plastic and other non-biodegradable material. Special attention is paid to the drainage of bath water since most people bathe around the drinking water well thus creating another source of contamination through the entry of soap and other detergents. Drinking water quality is also impacted by the presence of iron; this is a natural phenomenon and the few wells that experienced it were given simple iron filters.

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CHAPTER FOUR

THE REFORESTATION VALUE CHAIN FOR THE PHILIPPINES

Rodel D. Lasco

ABSTRACT

The Philippines has almost one hundred years of reforestation experience. In spite of this long history, reforestation efforts in the country have not reaped much success. In this paper, we propose that a more holistic and sustainable strategy be adopted for reforestation in the Philippines. We propose that a chain of key activities that add value to the whole reforestation be identified right at the start. This reforestation value chain can then be used as a guide for reforestation projects, from design to implementation to evaluation. Our main thesis is that the success of a reforestation project should take into account each of the components of the value chain right from the very beginning. The reforestation value chain has several implications. First, reforestation efforts that address only part of the chain are likely to be unsustainable. In other words, each component of the value chain should be well thought of from the outset of a reforestation project. Second, policy makers and stakeholders will be better informed on where in the chain they could contribute best.

INTRODUCTION

The Philippines has almost one hundred years of reforestation experience. In spite of this long history, reforestation efforts in the country have not reaped much success (Carandang et al. 2005; Pasicolan et al. 1997). Glowing statistics on paper of vast areas supposedly reforested hardly matches what is on the ground. It is therefore timely to ask, how can we reverse this track record?

The main objective of this paper is to propose a more holistic approach to reforestation and tree planting in the Philippines by adopting the value chain approach first developed for business enterprises by Porter in 1985 and subsequently applied from the firm level all the way to global industry level (Kaplinksky and Morris 2005; Kaplinksy et al. 2003; Elloumi 2004; Sturgeon 2001). For the first time, this paper explores the application of this approach to reforestation. Here, I show how the use of value chain analysis could provide a more long term and holistic perspective to reforestation in the Philippines which will help address the often myopic efforts at present. The term reforestation is used generically to include all tree planting activities including agroforestry, whether for environmental protection and/or economic gain.

DEFORESTATION AND REFORESTATION IN THE PHILIPPINES

Deforestation rate

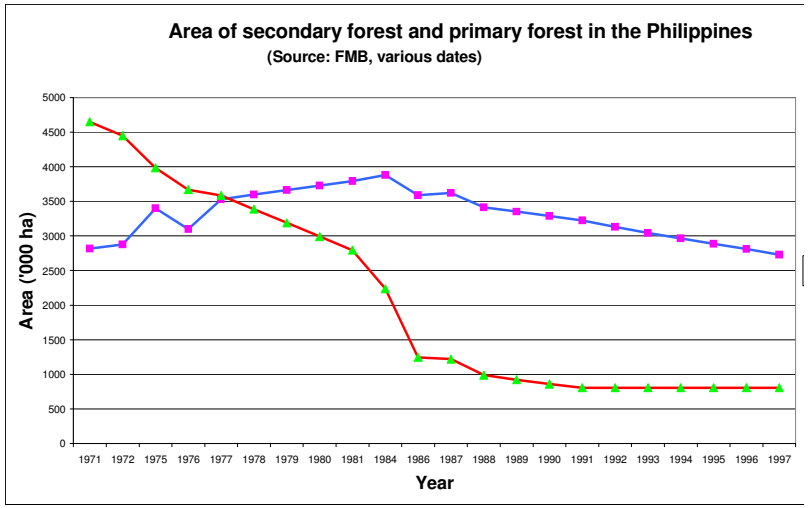
When the Spanish colonizers first set foot in the Philippines in 1521, 90 percent of the country was covered with lush tropical rainforest (ca. 27 million ha out of 30 million total land area). By the year 1900, there were still 70 percent or 21 million ha of forest cover (Garrity et al. 1993; Liu et al. 1993). However, by 1996 there were only 6.1 million ha (20 percent) of forest remaining. Thus, in last century alone, the Philippines lost 14.9 million ha of tropical forests.

Historically, the most important driving forces in the conversion of primary forests to secondary forests were logging activities by big companies (Kummer 1992). The main tenure instrument for commercial logging was the Timber License Agreement (TLA). At the height of the logging activities in the 1970s, there were 471 TLA holders in the Philippines controlling an aggregated area of more than 10 million ha, a staggering one third of the total land area of the country. At that time, a few companies (and families) controlled much of the country's natural resources. Since the mid 1980s the number of TLAs has steadily declined and by 1997 there were only twenty-six TLAs covering an area of 1.31 million ha (FMB 1998).

While logging operations were supposed to be sustainable through the application of the Philippine selective logging system, in many cases commercial logging sets into motion a process that eventually led to deforestation and severe degradation of forest lands (Kummer 1992). That is, logging roads facilitated establishment of communities inside the forest area leading to other activities such as shifting cultivation and further cutting (often illegal). For example, Liu et al. (1993) have shown using GIS analysis the strong correlation between the development of road networks in the Philippines and the formation of highly degraded secondary forests and ultimately to the destruction of these forests resulting to denuded grassland areas. While the area of secondary forests remains more or less the same from 1971 to the present, the area of primary forests declined steeply from more then 4.5 million ha to less than 1 million ha (figure 1). The difference between the two is the area deforested during the same period or roughly 140,000 ha per year of deforestation.

The ultimate driving forces of secondary forest formation (from primary forests) and their eventual destruction (deforestation) are more complex than simply blaming loggers and shifting cultivators. As Kummer (1992) rightly pointed out, deforestation in the Philippines is tied up to the larger issues of corruption, poverty, high population density, and migration to upland areas.

Figure 1: Change in area of primary and secondary forests in the Philippines (Lasco et al. 2001)

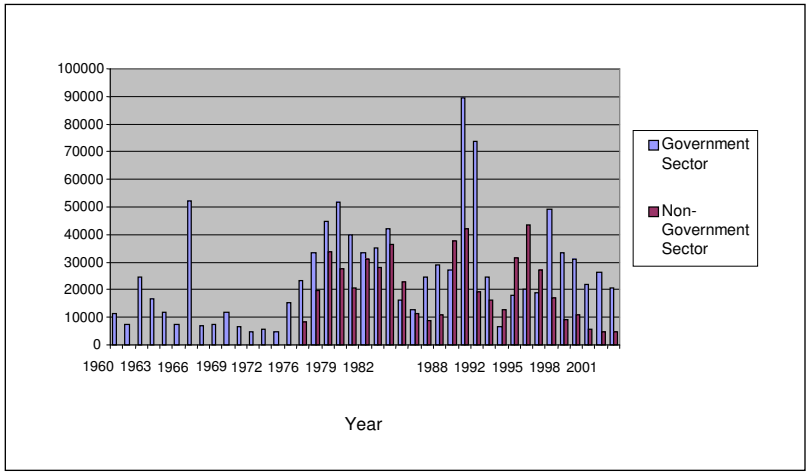


Reforestation efforts

Reforestation work in the Philippine started during the first decade of the twentieth century. A recent review of reforestation in the Philippines showed that reforestation rate significantly lagged behind deforestation rate (Carandang et al. 2004). From 1960 to 2002, the annual average area planted is about 41,000 ha per year (figure 2) which is less than 50 percent of the annual deforestation rate for the same period. More importantly, the actual success rate of the reforestation effort could be less than 30 percent in many cases. Official statistics report the area planted for the year but do not track what portion still exists. This is validated by the fact that available maps do not show where the reforested areas are.

Reforestation is not cheap. Just between 1988 and 1992 the Asian Development Bank (ADB), the World Bank, and the Japanese government lent US$ 731 million for forestry projects in the Philippines (Korten 1995). With such a low rate of success, much of these funds have been wasted. In the future, reforestation of the country's 8.4 million hectares of denuded forests could cost the government some PhP. 361 billion (US$ 6.6 billion).

Figure 2: Annual area planted by the government and non-government sectors in the Philippines from 1960 to 2002 (Carandang et al., 2004)



THE REFORESTATION VALUE CHAIN APPROACH

One of the main reasons for the failure of reforestation projects in the Philippines is the short term planning and implementation of a great majority of projects. Tree planting projects typically last for three years from seedling propagation to planting and maintenance. After the three-year period, most of the trees planted eventually die or are cut. Thus, in the long term, areas reforested revert back to grasslands or brush lands. Many reasons can be cited why trees do no survive after the project is over. One common reason is that the reforested land is often claimed by farmers. After project staff leaves, the farmer cuts the trees and resumes farming activity. In other cases, the open access nature of reforested land coupled with the high demand for fuel wood results to cutting of trees. It is also not unknown for local people to intentionally burn reforested lands because of real or imagined injustices.

Above, reforestation is viewed as a mere tree planting activity without regard to the other factors that are essential to the long term sustainability of tree planting. For example, many tree planting projects do not have a well-thought out plan for what to do after tree establishment (e.g. marketing).

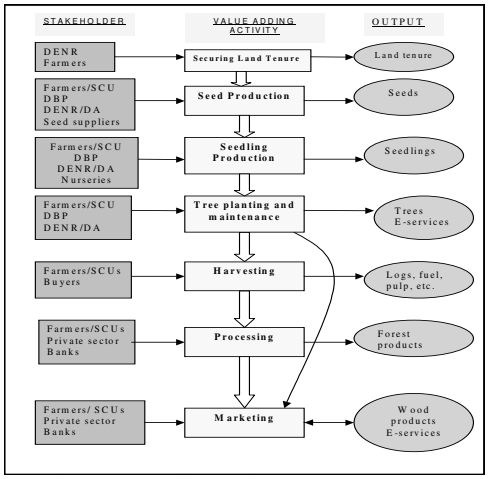
In this paper, I propose that a more holistic and sustainable strategy be adopted for reforestation in the Philippines based on the value chain approach originally conceptualized by Porter (1985) to enhance the competitive advantage of business enterprises. A "value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use" (Kaplinsky and Morris 2005). While value chain analysis has been applied in different types of industries and at various scales from firm to nations (Kaplinksy et al. 2003; Elloumi 2004; Sturgeon 2001), it has not been applied to reforestation viewed as an enterprise.

Porter (1985) distinguished between two general types of activities, primary and secondary activities. Primary activities are directly concerned with the creation or delivery of a product or a service (Recklies 2001). On the other hand, support activities facilitate primary activities such as human resources management, infrastructure, and research.

The whole series of activities in a reforestation project can be viewed as a chain similar to any enterprise. The difference being that here the output is not a commercial product or service but environmental rehabilitation and socioeconomic improvement through tree planting. Thus, it is proposed that a chain of key activities that add value to the whole reforestation be identified right at the very beginning of the project. This can then be used as a guide for reforestation projects, from design to implementation to evaluation.

Figure 3 shows the generic reforestation value chain for Philippine reforestation projects. The middle boxes are the key activities that add value to the reforestation process. These correspond to the primary activities under Porter's value chain approach. The left boxes show the key stakeholders who should be involved in each of the value-adding activity (middle boxes). The right boxes show the outputs that emanate to each value adding activity. The key inputs for each of the value-adding activity are shown in table 1.

Figure 3: Generic reforestation value chain for the Philippines



Legend: SCU: State Colleges and Universities; DENR: Department of Environment and Natural Resources; DA: Department of Agriculture; DBP: Development Bank of the Philippines.

Table 1: Inputs for the reforestation value chain

Inputs	Value-adding activity
Mother trees Seed orchards Seed suppliers	Seed production
Quality seeds Nurseries	Seedling production
Quality seedlings	Tree planting and maintenance
Technology	Harvesting
Technology	Processing
Markets marketing system	Marketing

1. Land tenure

Legally, upland areas which are the target of reforestation projects are owned by the government. In reality, there are perhaps up to 20 million people in these areas (Cruz and Zosa-Feranil 1988). In 1995, community-based forest management was adopted as the national strategy for sustainable forestry and social equity. The different programs and projects that were implemented in the last two decades were integrated and unified into one umbrella program, known as the Community-Based Forest Management (CBFM) program. A key component of this program was the granting of land tenure to farmers who participate in the government's tree planting program such as reforestation and agroforestry. The main premise of these programs is that a secure tenure is a prerequisite for meaningful participation of local farmers. To date, close to 6 million ha of forest lands are under some form of community forest management. Of these, about 4.7 million ha have been issued with various forms of land tenure instruments including around 1.57 million ha issued with Community Based Forest Management Agreement (CBFMA) (FMB 2004).

Thus as a first step, the reforestation value chain recognizes the need to ensure that the land tenure arrangement is clear before the start of any reforestation activity. If there is any conflict over land, then chances are the reforestation activity will not succeed. This is borne out of experience. For example, trees planted by government personnel or contractors on land claimed by farmers are eventually destroyed by the latter.

2. Seed production

The aim of this activity is to produce quality seeds. There are a series of activities under this starting from mother tree selection to seed treatments to seed storage. A value chain can in fact be constructed for seed production. In the Philippines, technology for seed production is more commonly available for exotic species than for indigenous species (Tolentino this volume). The establishment of seed production areas is still in its infancy in the Philippines. There is no nationwide system of seed certification. In many cases, the seeds are simply collected from any seed-bearing trees without regards to phenotypic or genotypic characteristics.

Globally, restricted availability of good quality tree germplasm at the farm, village and municipal level has been identified as a major constraint to the development and scaling-up of improved agroforestry systems in many tropical countries (Cooper and Denning 1999). This is especially true in the Philippines (Gunasena and Roshetko 2000). In view of this, seed production is one of the weak links in the reforestation value chain that needs to be addressed to enhance the chances of success of reforestation in the country.

3. Seedling production

With the rise of government reforestation projects in the Philippines, there is also a corresponding increase in small nursery operations throughout the country. There are no statistics available on the number and distribution of these nurseries. The government primarily the DENR also maintains a network of forest nurseries. The quality of seedlings coming out of private and government nurseries is largely unknown, partly because the seed

sources are also of uncertain quality. Low quality planting materials lead to poor survival in the field.

4. Tree planting and maintenance

Reforestation projects in the Philippines use more or less similar methods of site preparation, planting and maintenance. The site is typically prepared for planting by ring clearing or strip clearing which are standard procedures for grassland areas (Weidelt 1975). In the former, grasses are cut in about 0.5 m radius patch. Afterwards, patches are cultivated and all rhizomes removed. Seedlings are planted in the center of these patches. In strip clearing, 1-2 m wide strips are cleared. Patches where seedlings will be planted could be cultivated before planting.

5. Harvesting

For natural forests, the Philippine government prescribes the Philippine selective logging method which includes very specific guidelines for each activity (Bureau of Forestry 1970; Weidelt and Banaag 1982). For community-based tree farms, there are no specific guidelines except that labor intensive methods are preferred. In reforestation projects designed mainly for watershed protection and rehabilitation no harvesting is allowed.

6. Processing

Processing of tree products is typically not included in the plans for reforestation projects. This is especially crucial in agroforestry farms where there could be a number of products from the farm, both wood and non-wood. Processing could really add value to farm outputs. However, in many cases farmers do not have access to even basic processing technology resulting to low prices for their outputs.

7. Marketing

Just like processing, marketing of forest products is typically not included in government reforestation programs. This is understandable considering that most projects last for only three years, much earlier than the time of harvesting which will take place ten or more years after planting. Aside from wood products, new markets have opened up for reforestation activities. For example, under the Clean Development Mechanism (CDM) of the Kyoto Protocol, reforestation projects in the Philippines may qualify (Lasco and Pulhin 2001). The absence of a market strategy in most reforestation projects in the Philippines denies farmers from capturing the true market value of the products and services they provide.

The reforestation value chain in project design

Using the aforementioned key components of the reforestation value chain it becomes clear why many reforestation projects fail in the Philippines. In a great majority of cases, the emphasis is given only on seedling production (but still seedlings are of doubtful quality), on actual planting, and to a lesser degree on maintenance for a couple of years. The rest of the value chain is largely ignored. For example, more emphasis should be given on the long-term maintenance of reforested areas. Key questions include: Who will pay for the cost of maintenance? What are the incentives for local farmers to maintain the trees planted? In addition, marketing should also be given more emphasis. The value of tree products could be

enhanced greatly if the farmers can take advantage of the market. In reality, it is not uncommon for farmers to get a low price for their products (from middlemen) when the price of the commodity in urban centers is much higher.

In addition to the primary value adding activities described above, secondary activities that will facilitate them are also important including human resource development (e.g. for DENR, LGUs), institution building (e.g. local community organizing), research and technology development, and infrastructure development. For example, an organization like the World Agroforestry Centre (ICRAF) could assist in technology development as well as in local institution building. In the Philippines, the use of natural vegetative strips was developed by farmers and ICRAF scientists to help reduce soil erosion (Garrity 1995). In local institution building, ICRAF pioneered the use of the Landcare approach in community-based natural resources management (Mercado et al. 2000).

Of course, the reforestation value chain approach does not mean that all the components should be present in all reforestation projects. For example, a carbon sequestration project may not have harvesting and processing components. Each specific project should prepare its own reforestation value chain. In addition, the generic reforestation value chain presented here could be modified in terms of its key components depending on the specific project situation.

REFORESTATION VALUE CHAIN ANALYSIS: EXAMPLES

In this section a couple of hypothetical examples are presented to show how the reforestation value chain can be used in a reforestation project. A typical tree planting project may have the value chain analysis shown in table 2 while a carbon sequestration project may have a value chain analysis shown in table 3. The main difference between these two examples is that the former project allows for harvesting of trees while the former does not. These examples show how the reforestation value chain can be used to identify the essential stakeholders and their roles in the whole reforestation process from the very beginning rather than as afterthought. Absence of any key stakeholder could mean failure of the reforestation project. In addition, the reforestation value chain analysis could show the key inputs required and their cost.

Through the reforestation value chain, reforestation project managers are forced to plan ahead and anticipate the factors necessary for the success of the project. Moreover, the weaknesses of existing reforestation projects can also be identified. Remedial measures can then be developed to address these weaknesses. For example, if the first case above is already an existing reforestation project, it could be that reforestation value chain analysis will reveal that the markets for products are still uncertain. In such a case, efforts will be made to find markets for the expected tree products.

Table 2: Example of reforestation value chain analysis for a hypothetical reforestation project in the Philippines where harvesting is allowed

Stakeholders	Inputs	Value-adding activity	Cost	Output
Farmers DENR (issue to tenure instrument)		Land tenure		Tenure instrument

Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) ADB (financing)	Seed orchards of narra	Seed production	PhP. 0.22 per seed	High quality narra seeds
Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) ADB (financing)	Narra seeds (of superior germplasm)	Seedling production	PhP. 1.42 per seedling	Hardened seedlings for field planting (at least 30 cm tall)
Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) ADB (financing) Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) ADB (financing)	Narra seedlings hardened for planting	Tree planting and maintenance	PhP. 5.47 per tree	
Farmers Cutting contractors DENR (permits)	DENR permits	Harvesting	To be determined	Forest products income for farmers
Furniture company (processing) DBP (financing)	Harvested wood	Processing	To be determined	Furniture
Furniture company (marketing) DBP (financing)	Furniture	Marketing	To be determined	Income for furniture company

Table 3: Example of reforestation value chain analysis for a hypothetical reforestation project in the Philippines where environmental services (carbon) is the main product (harvesting is not allowed)

Stakeholders	**Inputs**	**Value- Adding Activity**	**Cost**	**Output**
Farmers DENR (issue tenure instrument)		Land tenure		Tenure instrument
Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) World Bank (financing)	Seed orchards of indigenous species	Seed production	PhP. 0.22 per seed	High quality seeds
Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) World Bank (financing)	Genetically superior seeds	Seedling production	PhP. 1.42 per seedling	Hardened seedlings for field planting (at least 30 cm tall)
Farmers of *sitio* Isidro CENRO-DENR (technical assistance) Green Foundation (community organization) WB (financing)	Hardened seedlings	Tree planting and maintenance	PhP. 5.47 per tree	

Farmers ICRAF (carbon stocks measurement)	Carbon assessment methods	Carbon measurement and monitoring	To be determined	Amount of carbon sequestered
Farmers DBP (CDM financial intermediary) Japan Fund (carbon buyer)	Emissions reductions purchase agreement (ERPA)	Marketing	To be determined	Carbon credits Income for farmers

CONCLUSIONS

With millions of hectares of degraded uplands, reforestation will continue to be a critical part in the Philippines environmental agenda. However, current efforts are beset by short-sighted planning and implementation. The reforestation value chain provides an analytical and planning tool that could help reforestation projects be more holistic and sustainable.

The use of the reforestation value chain has several practical implications. First, reforestation efforts that address only part of the chain are likely to be unsustainable. In other words, each component of the value chain should be well thought of from the outset of a reforestation project. Second, policy makers and stakeholders will be better informed on where in the chain they could contribute best. For example, external fund sources (e.g. ADB, World Bank, USAID) may be in a better position to assist in the early phases on the chain since they have more resources. Local financial institutions, such as the DBP may be more effective in assisting in the marketing and processing activities. The reforestation value chain must be tested in an actual reforestation project and the results documented. The specific components could be refined depending on the objectives and resources of a reforestation project.

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CHAPTER FIVE

BRINGING WOODY PATCHES BACK INTO AGRICULTURAL LANDSCAPES: THE DUTCH EXPERIENCE

Jos J.T. Teeuwisse and Geert R. de Snoo

ABSTRACT

At the beginning of the historic era most of the Netherlands was covered with forest. Over the centuries this primeval forest was cleared as a result of population growth, economic expansion and the steady extension of productive farmland. By 1900 only 3 percent of the country was still forested. This did not mean an unending landscape of fields and pastures, however. On a local and regional scale, the landscape was still well-endowed with trees. For farmers, hedgerows and woody patches still served the important functions of livestock containment and wood supply, and in the Dutch uplands, particularly, a small scale, varied landscape had developed.

After World War II the government encouraged farmers to boost production, a goal that could only be achieved through intensification, mechanization and scaling-up of farming practices. In the space of fifty years the former small scale landscape had changed beyond recognition, mainly as a result of farmland re-allotment. Biodiversity and landscape quality suffered enormously and today only 2 percent of the land managed by arable farmers can be termed semi-natural habitat.

In the 1960s city-dwellers became increasingly vocal in their protests against this destruction and by 1975 this had spawned new government policy more sensitive to the quality of habitats and landscapes in farming regions. Numerous citizens' groups were formed to help maintain the historical landscape features that still remained. Initially, the farming community paid little heed to these developments, but towards the end of the 1980s this changed, as massive agricultural surpluses were brought under control by the introduction of quota to stem further growth in output. Dutch farmers began to look for other sources of income and the government responded by introducing an extensive array of subsidies for habitat and landscape management. Hedgerows and small patches of woodland on farm holdings gained new functions. Modern society had expressed its desire for a varied landscape, for biodiversity and for regional identity, and the government was prepared to compensate farmers for efforts towards that end. Besides government policy, the social factor was also important for farmers' embracing habitat and landscape management. Over the past fifteen years numerous farmers conservation associations have been set up across the Netherlands which endeavor, on behalf of their members, to acquire maximum government funding for habitats and landscapes. We are witnessing a gradual turning point in the way landscapes are being cared for. Increasingly, farmers are working together with government agencies and non-governmental organizations (NGOs) to enhance rural environment quality in a wider sense. For the sustainable development of rural areas it is of the utmost importance that a new balance be sought between the economic, ecological, historical and aesthetic qualities of the landscape. Only then will a landscape emerge that is of true value for future generations.

INTRODUCTION

The name Holland derives from *holtland*, or forested land, and at the beginning of the historic era the Netherlands was indeed predominantly forest. With the passing of the centuries, though, this primeval forest was destroyed through human activity. Beekbergerwoud, the country's last tract of primeval forest, in the province of Gelderland, was cleared in 1867. The main driving forces behind forest clearance were changes in livelihoods and population growth. In former centuries the vast majority of the Dutch population had been employed in agriculture, but as the population grew, more and more farmland was needed, at the expense of primary forest. From the sixteenth century onwards, urban trade became increasingly important and spurred ever greater demand for timber: for house and ship building and to meet the ceaseless demand for fuelwood. At the turn of the twentieth century, a mere 3 percent of the Netherlands was still forested (Kuiper 2000). This did not mean an endless landscape of fields and pastures, however. Across the country there were still many areas that looked leafy enough, but the trees still standing were intimately bound up with farming and farmers.

TREES IN THE AGRICULTURAL LANDSCAPE

Until deep in the twentieth century agriculture remained the Netherlands' major economic sector. Although farm production had long been geared to urban markets, individual farms were still largely self-supporting, deriving most of their means of production from on and around the farm. Thus, firewood, construction timber and wood for poles, tools and fencing were generally harvested from a farmer's own hedgerows and woody patches. In many cases these wooded margins and areas served a second function, too, as barriers to keep livestock in their paddocks and off the fields (Reijnders 2002; Dirkmaat 2005). There were also major regional differences (Zonneveld 1980). Some regions were virtually bare of trees, like the clay polders along the coast. In the uplands of South Limburg and elsewhere hedgerows predominated, while the true lowlands further north were characterized mainly by pollarded trees and copses. In the uplands, especially, was a landscape that gave the impression of being extensively forested, while in fact offering mainly scenic views. After barbed wire made its appearance, the significance of wooded banks and hedgerows as livestock barriers steadily declined. Nonetheless, until the 1950s the traditional agricultural landscape continued to define the face of the Netherlands.

AGRICULTURAL CHANGES

After about 1950 Dutch agricultural landscapes began to change dramatically. Food shortages during World War II had spawned a widespread feeling that domestic food production had to grow. In the 1960s the Netherlands was co-instrumental in founding the European Union (EU) and one of the goals of that community was efficient agriculture that could provide low cost food. This could only be achieved through rationalization, mechanization and scaling-up of farming practices. The upshot was a complete reform of traditional agriculture in the space of just a few decades. The government supported these changes by investing heavily in know-how, putting major efforts into farm re-allotment schemes and subsidizing both production growth and closure of inefficient holdings. For agriculture as well as the landscape, the consequences were enormous. Re-allotment, in particular, meant that within a decade old landscapes had assumed an entirely new, more sober look. Anything not contributing directly to production had to go. For semi-natural habitats like hedgerows and woodland, particularly, this spelled unparalleled devastation. The timber they had formerly

provided could now be readily imported. Fuelwood was superseded by coal, oil and gas, and cheap industrial alternatives became available for poles, tools and wooden fencing. All in all, 70 percent of Dutch farmland acreage underwent the streamlining of re-allotment. This transformation of the agricultural landscape heralded the demise not only of the traditional farm holding, but with it much of the biodiversity and landscape beauty so bound up with traditional ways of farming (De Snoo 2004).

TURNING POINT

In the 1960s dissatisfaction with this impoverishment of the landscape began to grow, especially among city dwellers. This led to the creation of numerous citizens' groups who demanded action at the regional or national level to address the issue of habitat and landscape devastation and specific government measures to turn the tide. Voluntary organizations sprang up, both locally and regionally, to help farmers with the upkeep of those landscape features that still remained. Within a short space of time, the ecological and environmental awareness of the population had grown by leaps and bounds.

In policy terms, 1975 marked a turning point. In that year the government issued several key policy papers setting out an array of new measures to conserve landscapes and wildlife. The cornerstone document was the so-called Relation Paper (*Relatienota* 1975), which designated 200,000 ha of agricultural land (5 percent of the Dutch land surface) as farmland of high ecological value. On half that land, profitable farming was deemed no longer feasible and a subsidy scheme was introduced to encourage conservation agencies to purchase such land and assume responsibility for its management. On the remaining 100,000 ha agriculture and conservation were deemed compatible and farmers were given the option of entering into an agreement with the government to protect the flora and fauna on their holding. In return, they would receive compensation for any income losses arising through delayed mowing of ditch banks and so on. To back up these national policies, provincial subsidy schemes were also introduced, in particular for the upkeep of hedgerows, woody patches and other small landscape features. Initially, farmers showed little interest in the new schemes, mainly because payments were not for production but for discontinuation of certain activities. Against this background the University of Leiden set up a research program that sought the cooperation of farmers, with a view to developing new payment structures and new strategies for on-farm conservation (Musters et al. 2001).

Largely as a result of EU farming subsidies, by about 1980 European agriculture had become a victim of its own success, caught up in enormous surpluses of all kinds of produce. It was time for a new approach and a string of quotas, penalties and tighter regulations were introduced, marking the proverbial limits to growth (Meadows 1972). For Dutch farming, in particular, with one of the highest outputs in the world, this had major consequences. Farmers began to show an interest in alternative sources of income, including payment for producing what later came to be known as ecological services.

In 1990 the Dutch government presented its plans for an Ecological Main Structure (EMS), an integrated network of habitats spanning the country (*Natuurbeleidsplan* 1990). Besides traditional nature reserves and national parks, the EMS also encompassed the aforementioned 200,000 ha farmland of high ecological value. In addition, a further 50,000 ha of farmland was designated as nature development area. Under this new concept, agricultural land was to be converted permanently to marshland or woodland, say, after purchase by the conservation agencies that wished to manage the site.

In response to this array of developments, across the country farmer's collectives sprang up that voiced the opinion that farmers were just as proficient in managing nature as

established conservation agencies, but that such efforts would have to be duly reimbursed. Their voice was heard and today there are some one hundred twenty-four farmers' conservation associations (*agrarische natuurverenigingen*) in the Netherlands (*Natuurbalans* 2004). During this same period the government introduced a new system of payments for both conservation agencies and farmers (*Programma Beheer* 1997). In the agricultural community there is enormous interest in the scheme. At the time of writing, these new-style associations are estimated to be active in over half the country's rural areas (*Natuurbalans* 2004).

FUNCTIONAL CHANGE OF LANDSCAPE FEATURES

It is not only farmers and farm production that have seen massive change in the past fifty years. The same holds, too, for the functions of small landscape features. Prior to 1950, these features had a clear utility value for the individual farmstead. Since then, their value has come to be dictated more and more by functions stemming from society as a whole (table 1). The second half of the twentieth century saw an enormous upsurge in society's desire for landscapes with specifically ecological, historical and aesthetic qualities. Landscape diversity became highly valued and that diversity is now determined largely by features unrelated to primary agricultural output. These landscape features are more than mere adornment, though. They reflect a landscape's historical genesis and are of prime importance for a region's legibility and identity (Hendriks & Stobbelaar 2003; de Snoo 2004). A recent study by Manhoudt and de Snoo (2003) has found that semi-natural habitats today account for only 2 percent of Dutch arable acreage (table 2). At the same time the original differences among regional landscapes have been largely obliterated.

Table 1: Historical changes in the functions of small wooded landscape elements

Old functions (pre-1950)	New functions (post-1950)
Fuelwood	Biodiversity
Livestock confinement	Cultural heritage
Erosion control	Recreation (landscape adornment)
Construction timber/Poles, fences, tools	Source of income

Table 2: Area of semi-natural habitat on Dutch arable farms in different landscapes (Manhoudt and de Snoo, 2003)

Region	Landscape type	Landscape features (percent area)
Haarlemmermeerpolder	Large-scale, clay soil landscape	2.4 ± 0.6
Wieringermeerpolder	Large-scale, clay soil landscape	2.7 ± 1.4
Zeeland	Smaller-scale, clay soil landscape	0.7 ± 0.9
Overbetuwe	Smaller-scale, clay soil landscape	2.2 ± 1.5
Veenkoloniën	Large-scale, reclaimed peatland	4.0 ± 1.8
Drenthe	Small-scale, sandy soil landscape	1.6 ± 1.1
Noord-Brabant	Small-scale, sandy soil landscape	0.9 ± 0.4
Average		2.1 ± 1.6

While farmers' attitudes towards nature and the landscape have certainly changed, as set out above, this has not yet led to any significant rise in the number of landscape features, even though increasing the percentage area of on-farm habitats to, say, 5 percent (including responsible upkeep) might well enhance the value of agricultural landscapes to society as a whole. Now required, then, are new policy instruments and initiatives to facilitate and articulate that process of enhancement.

PRESERVATION OF PUBLIC GOODS: GOVERNMENT INSTRUMENTS

Nature, landscape and other elements of a country's heritage are public goods that belong to society as a whole. When it comes to preservation and development of those goods, governments bear a special responsibility, disposing over a range of instruments with which to steer and encourage conservation and development of landscape qualities. Those instruments fall into three categories: (1) legislative, (2) financial and (3) social, and these will now be discussed in turn.

Legislative instruments

In the Netherlands, the two main items of legislation having a bearing on trees and woodland in farming regions are (1) local planning provisions, and (2) the tree felling order, both of which operate at the municipal level. Local development plans lay down the designated function of each parcel of land in the municipality and are legally binding. Although small landscape features generally lie within wider areas designated as farmland, certain individual features may be categorized under the rubric nature, in which case they may not be interfered with by the land owner or manager without permission from the local authority. For the conservation of individual trees and wooded patches, the tree felling order is also important.

Tree felling requires a permit, which will not be granted if the trees or woodland are deemed to have a high societal value.

Financial instruments

For the conservation and development of small landscape features, subsidies are available at both the national and provincial level. Farmers or volunteers who help with the upkeep of trees, woody patches, ponds and reed beds are eligible for reimbursement (*Programma Beheer* 1997). Subsidies are also often available for tree planting or creation of new landscape features. Farmers who manage existing features or establish new ones are said to provide ecological services, supplying a commodity for which there is a demand in society and for which they are consequently paid. Although considerable use is being made of the schemes for landscape upkeep, creation of new landscape elements has been slower to take off, however.

Social instruments

Farmers generally have close ties to the land they farm and the landscape and nature around them. In the Netherlands most farmers have been brought up as Christians and feel some kind of responsibility for safeguarding Creation. Indeed, the notion of stewardship is deeply rooted in the Dutch farming community. Education also has an important part to play in farmers' attitudes towards wildlife and the landscape. Agricultural training and advisory services are important vehicles for influencing farmers' attitudes and practices and it is only over the past two decades that these have come to re-embrace issues of wildlife and landscape. Another significant factor, of course, is a farmer's own conversation when socializing. For many years, talk was restricted mainly to matters relating directly to production, with mention of nature or the landscape not done. Since the emergence of the farmers' conservation associations, though, it has become far easier to discuss the importance of other kinds of values. One recent development has been the creation of benchmarking instruments allowing farmers to compare records vis-à-vis wildlife and landscape protection, including internet tools (de Snoo 2005). Another significant factor, finally, has been the changed attitudes of the wider citizenry towards the farming community. For many years farming had had a fairly negative image in the Netherlands, with farmers cast largely in the role of polluters. This image is undergoing substantial revision (de Snoo 2004). Indeed, there are now numerous instances of farmers' and citizens' organizations joining forces towards a common goal: the preservation of green spaces.

POLICY TRENDS

Dutch society is particularly dynamic: the pace of social change is high and the same therefore holds for changes to the landscape. Today, farmers still effectively manage 60 to 70 percent of the Dutch countryside and without their participation there will be little progress on creating quality landscapes. Farmers' attitudes towards semi-natural habitats are determined largely by government policy and this section therefore examines policy factors that have influenced the relationship between farmers and landscape quality.

The first such factor is the European Common Agricultural Policy (CAP). Until a few years ago production subsidies formed the main thrust of the CAP, with farmers eligible for

support from Brussels for numerous products. This resulted in overproduction of commodities like cereals, dairy products and wine. A substantial proportion of the EU budget (40 percent) still goes to agricultural subsidies, but gradually the system of product subsidies is being replaced by income subsidies. The principal aim, or first pillar, of the EU agricultural policy is no longer high agricultural output at low prices, but quality of life in rural areas. Farmers are crucial for that quality and, so they can continue to play that role, are now eligible for support from the EU: the second pillar of the CAP. For such income support they must satisfy a number of conditions with respect to the first pillar, though, particularly in the environmental realm. This is known as cross-compliance. For farmers, proper care of the natural surroundings is fast becoming the basis for their license to produce. To be eligible for support, they must meet minimum standards with respect to environment quality, habitats and landscape, referred to as Good Agricultural Practice (GAP). An additional criterion for such GAP certification might be for the farm holding to have at least 5 percent semi-natural habitat.

At the national level, 2005 saw the introduction of new Dutch legislation designed to conserve and develop valuable historical agricultural landscapes. Across the country, twenty regions with a high quality landscape have been designated as National Landscape, together comprising no less than 40 percent of the Dutch land surface. In these areas, policy is now directed towards preserving and strengthening existing landscape features and structures. The national government is also supporting experimental projects in various parts of the country, involving both farmers and researchers and aimed at developing more nature and landscape friendly farming methods (Stortelder et al. 2001).

At the regional level, finally, there are numerous developments that are giving farmers a new role in co-managing rural areas. Mention has already been made of the new farmers' conservation associations, farmer cooperatives that enter into an undertaking with government to manage habitats and/or landscapes in return for payment. These associations are now active in most of the Netherlands' farming regions. The wider citizenry is also keen to play an active role in enhancing the quality of the rural environment where they live. In many places private citizens now collaborate with farmers to protect nesting farmland birds, for instance. Elsewhere, experiments are underway with landscape funds, to which government, industry and citizens can contribute to reimburse farmers who make an additional effort to enhance ecological and landscape values on and around their holding. All these initiatives can be subsumed under the term rural development projects and as such are eligible for EU funding under the second pillar of the CAP.

SUSTAINABILITY

A landscape of value for future generations is a landscape embodying a proper balance between the various demands that society sets on the landscape in general. There should be visible, spatial coherence between economic, ecological, historical and aesthetic qualities, and new developments need to be assessed for their impact in all four respects. This is illustrated by the case of new hedgerow planting. On three of these counts, hedgerows score positively: (1) aesthetically (good for tourism and recreation), (2) ecologically (good for many plant and animal species) and (3) historically (restoring landscapes in areas where hedgerows have been lost). Economically, though, to farmers, hedgerows may be rather less appealing. This can be remedied if the government and/or other actors in a particular region or landscape fund are prepared to pay for the planting and upkeep of hedges. Another option is for farmers' conservation associations to conclude contracts with energy utilities for the supply of coppiced wood for green power generation. By giving equal consideration to all four aspects of landscape quality, landscapes can be created that are of true value for future generations; in other words, sustainable landscapes. To achieve this kind of sustainability requires new coalitions between farmers, citizens, government and industry that can help shape the kind of developments described here (de Snoo 2003). It is at the regional level that these developments are occurring, and steering by means of regional policy is therefore of the essence.

COMPARISON WITH THE PHILIPPINES

When it comes to the function of woody patches in farming regions, there are clear parallels between the Philippines and the Netherlands. Around Cabagan, the primary forest of the Sierra Madre continues to be cleared on a massive scale, a process that took place in the Netherlands many centuries ago. As in the Netherlands, it has had serious repercussions on the economy, on living nature and on environmental quality. In many cases deforestation leaves only desolate wasteland, at increased risk of flooding, shifting sands and other such disasters. In such areas, biodiversity plummets. Historically, the Netherlands has devoted substantial government efforts and funding to reforestation and today some 10 percent of the country is once again woodland. However, this figure pales in comparison to the area of the Philippines that is still currently forested: 18 percent (Rowthorn 2003).

For many years, most of the trees and woodland in the Netherlands were on and around farms, but it was functional woodland: the trees played a role in the farm holding's economy. As agriculture was modernized, that function vanished and in the space of fifty years over three-quarters of farmers' coppices and hedgerows were cleared. Today, there is widespread regret and a realization that communities need a high-quality, sustainable environment to live in. Endeavors by NGOs in the Philippines to interest farmers in tree-planting and tree nurseries should perhaps be based on a more integrated vision of environmental quality. At the moment, it is above all the economic and ecological functions of trees and woodland that are being promoted. Little is known about the significance of trees and woodland for local cultural identity and little if any thought given to future landscapes that are attractive from the angle of tourism and recreation, too. What kind of landscape appeals to the local population, what kind to visiting urbanites? Today, sustainability should be the starting point in any move to encourage new developments and this can only be achieved by adopting an integrated, regionally based approach. It is here that the landscape comes into its own, for it is the landscape that can provide the required integrative

framework. When it comes to redeveloping small-scale patches of woodland in farming regions, the Netherlands and the Philippines face much the same challenge.

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CHAPTER SIX

SMALLHOLDER FOREST TREE PLANTING IN PENINSULAR MALAYSIA: IS THERE A FUTURE?

Hin Fui Lim, Weng Chuen Woon and Haron Norini

ABSTRACT

Tree planting among smallholders is not new in Malaysia. The indigenous peoples and rural villagers have been planting fruit trees and rubber trees for a long time to meet their subsistence food need, to generate income and to provide shade to their living environment. However, commercial planting of forest trees among the smallholders in relatively new. A survey on twenty-one smallholders in 2002 shows that farmers plant forest trees in a small area, on average about 2 ha each. The main reason for planting forest species is economic. While land is not regarded a problem for the smallholders, problems faced have discouraged active planting. Problems and obstacles faced include appropriate species selection, difficulty in obtaining quality seedlings, lack of knowledge in planting, and lack of information on potential markets and prices. To further encourage forest tree planting among smallholders, special measures need to be taken by the government. These include: (1) extension services to individual planters should be stepped up and rendered continuously, (2) encouraging agroforestry practices, (3) relevant government agencies act as one-stop agencies dealing with the buying and selling of timber and non-timber products, and (4) disseminating new research findings related to forest tree planting to the smallholders in a timely manner.

INTRODUCTION

Forest tree planting has been a major world and national issue in many countries. The world community at large is concerned that the rate of deforestation is much higher than the rate of reforestation, especially in developing countries. In insular Southeast Asia (Indonesia, Malaysia, Philippines and Singapore), the area under forest and woodland declined from 154,687,000 ha in 1980 to 135,456,000 ha in 1990. In these countries, from 1981 to 1990 period, the annual deforestation rate was 1,926,000 ha while the area of forest plantation established was 482,000 ha per year (WRI 1994). In some developing countries, the forestry sector plays a key role in the national economy in terms of income generation and employment creation. Depleting forest resources simply means less employment and income for these countries. In the case of Malaysia, in 2000, the total export value of wood and wood-based products was RM 17.6 billion (US$ 4.6 billion) or 4.7 percent of the country‘s total export value of RM 373.3 billion (US$ 98 billion). By 2003, the total export value of wood and wood-based products declined to RM 16.3 billion (US$ 4.3 billion) or 4 percent of the country‘s total export value of RM 398.9 billion (US$ 105 billion). This indicates that if the forestry sector wishes to maintain its status as a major export income earner, the sector has to deal with a number of challenges.

One of these challenges is the paradigm shift from sustained timber yield to that of sustainable forest management and good management practices of both timber and non-timber resources. Malaysia is committed to achieve International Tropical Timber Organization (ITTO) objective 2000 where all timber products come from sustainable managed forests. It means lowering the level of annual harvesting coupes from the natural

forest and emphasizing the multiple use of forests. To achieve this, the annual coupe in timber harvesting was reduced from 52,250 ha per annum for Peninsular Malaysia during the sixth Malaysia plan (1991-1995) to 46,040 ha per annum during the seventh Malaysia plan (1996-2000) and to 42,870 ha per annum during the eighth Malaysia plan (2001-2005). Consequently, the overall log production decreased from 12.8 million m³ in 1990 to 5.07 million m³ in 2000 and to 5.0 million m³ level for the eighth Malaysia plan period (Woon 2001). The overall impact of the reduction in log supply has brought about great socioeconomic impacts. There was the reduction in the number of sawmills in operations from 602 in 1992 to 436 in 2003 in Peninsular Malaysia. For the wood-based industries in Peninsular Malaysia, the number of workers employed decreased from 72,138 in 1993 to 41,996 in 2002.

In 2003, the total log production in Peninsular Malaysia was 4,419,396 m³. A total of 436 sawmills or 66 percent of the total 662 registered sawmills in Peninsular Malaysia are on actual operation (table 1). The installed capacity of sawmills was 10.7 million m³ while 4,630,397 m³ of logs consumed by the operating sawmills in 2002. On the other hand, thirty-two of the total fifty-two registered plywood mills (62 percent) were operating in 2002. In the same year, the installed capacity of plywood mills was 1.7 million m³. A total consumption of 795,238 m³ of logs is required by the plywood mills. The log input for both sawmills and plywood mills was 5,425,635 m³. There was a deficit of 1,067,345 m³ between year 2002 log production and log consumption by sawmills and plywood mills. Hence, commercial forest tree planting is needed to continue supply the required log volume to the industries. Besides commercial-scale companies as source of logs, another possible way to increase wood supply is to encourage forest tree planting among smallholders.

Table 1: Log input and installed capacity of sawmills and plywood mills in Peninsular Malaysia, 2003 (FDPM 2003 and 2004)

	2002 Input (m³)	**2003 Operating**	**2003 Registered**	**Capacity in 2002 (million m³)**
Sawmills	4,630,397	436	662	10.7
Plywood mills	795,238	32	52	1.7
Total	5,425,635	468	714	12.4

TREE PLANTING AMONG SMALLHOLDERS: A HISTORICAL PERSPECTIVE

Tree planting among smallholders is not new in Malaysia. The indigenous peoples and rural villagers have been planting fruit trees and rubber trees for a long time to meet their subsistence food need, to generate cash income and to provide shade to their living environment. Collectively, the indigenous peoples in Peninsular Malaysia (Sabah and Sarawak) amount to about 3.25 million people or 14 percent of Malaysia’s population of 23,274,690 in 2000. The majority lives either within or near forest areas.

Generally, the indigenous peoples are engaged in a variety of economic activities and this varies from place to place. In remote areas, shifting cultivation is still practiced. Indigenous villages located relatively nearly to the economic growth centers have gradually given up shifting cultivation. Within this latter category of indigenous people, youths are more interested in generating cash income from commercial agriculture or other wage earning opportunities and use the money to purchase rice rather than planting upland rice. In any case, the tradition of planting forest trees and upland rice (in remote areas) persists.

After a number of years of planting upland rice in a certain area, indigenous farmers usually shift to a new area. Fruit trees such as durian (*Durio zibethinus*), rambutan

(*Nephelium lappaceum L.*), petai (*Parkia speciosa*), duku or langsat (*Lansium domesticum Jack*), nangka (*Artocarpus integrifolia*) and mangoes (*Mangifera indica L.*) are often planted in the abandoned area. There, they serve several different purposes. Planted trees are used as traditional boundaries. Even though such customary community land ownership is often not legally recognized by the government, trees are important markers of land ownership at the local level. After a number of years, the household concerned would return to this same area to harvest the fruits or plant upland rice again. The indigenous peoples also plant fruit trees to mark the birth of their children. After the children grow up, they either take care of the trees themselves or return to the village during fruiting seasons. In short, fruits produced from planted trees meet both subsistence need (as food), generate cash income and strengthen social ties among family members.

Traditional tree planting by indigenous peoples is done in an unsystematic manner. Besides the indigenous people, other rural villagers (mainly Malays, Chinese and Indian) also planted fruit trees in their orchards and near their houses. However, there is yet to be a large-scale planting of forest trees among these rural farmers. Commercial forest tree planting among smallholders in Malaysia is still in infancy even though the practice of forest plantations goes back to at least the beginning of the twentieth century. This could be observed from the stages of planting forest trees in Peninsular Malaysia where much effort was undertaken by the government (table 2). Currently, the total area planted under the forest-plantation program in Peninsula Malaysia covers 74,052 ha (table 3). In 2000, the area planted under the government's Compensatory Forest Plantation Project (CFPP), launched in 1982 and planted species such as *Acacia mangium*, *Gmelina arborea*, and *Paraserianthes falcataria*, totaled 56,107 ha (75.7 percent), whereas the area planted under the state government programs totaled only 6,272 ha (8.5 percent). Other areas planted with teak, pine, hevea, and acacia mangium amounted to 2,433 ha (3.3 percent), 3,555 ha (4.8 percent), 1,313 ha (1.8 percent) and 2,235 ha (3.0 percent) respectively.

Table 2: A summary of notable events in the history of forest tree planting in Peninsular Malaysia (Appanah and Weiland 1993; Krishnapillay and Appanah 2002)

Year	Event
Before 1877	Villagers planting forest fruit trees in shifting cultivation areas, orchards and around houses. This continues until today even though some villagers have given up shifting cultivation.
1877	Rubber (*Hevea brasiliensis*) in Kuala Kangsar, Perak.
1880 - 1900	Small-scale planting of species such as nyatoh taban (*Palaquium gutta*), rambong (*Ficus delastica*) and rubber (*Heave brasiliensis*), *Casuarina equisetifolia, Eugenia grandis, Dryobalanops aromatica, Swietenia macrophylla,* and *Fragraea fragrans.*
1901 - 1913	Regular plantations of gutta percha (*Palaquium gutta*), and rubber (*Hevea brasiliensis*); line-planting of chengal (*Neobalanococarpus heimii*) in forest reserves; experimental planting in abandoned mining land. Species trials with teak were first tried by a rubber planter in Langkawi Island, Kedah.
1927 - 1941	Forest Research Institute set up in Kepong, and experimental plantations in lowlands were started; plantation experiments in Cameron Highlands (ca. 1,500 m.a.s.l.); Rantau Panjang and Bukit Sungai Puteh Forest Reserves, Selangor; teak planting in Langkawi Island.
1945 - 1950	Experimental teak plantations in northwest Malaya; plantings in forest clearings resulting from disturbances during the Japanese Occupation (1942-1945).
1954 - 1958	Experimental teak plantations in northwest Malaya were stepped up. Some exotic species (such as pines, yemane and eucalypts) were tried on experimental plantations.
1959 - 1962	Large-scale experimental planting with *Pinus caribaea* and *Pinus insularis* in the lowlands. Experimental plantings in shifting cultivation areas; line-planting and small-scale plantings of secondary growth of *Dryobalanops aromatica, Eusideroxylon zwageri, Flindersia brayleyana, Fagrae fragrans, khaya* spp., *Pentaspadon officinalis* and *Shorea macrophylla.*
1963 - 1965	Bigger trials of *Pinus* spp. conducted in Selangor.
1966 -1970	Under UNDP, pilot plantations of fast growing industrial tree species were initiated, mainly for production of pulp; plantations of pine were expanded in Selangor, Johore, Pahang, Negeri Sembilan and Kedah; *Shorea* and *Drybalanops* spp. planted under the *taungya* system in Negeri Sembilan; jelutong (*Dyera costulata*) plantations were expanded in Sungai Buloh Forest Reserve.
1971 - 1976	Mixed plantations of *Pinus* and *Araucaria* were tested on poor soils in Bahau; enrichment planting using indigenous species became important.
1981 - 1992	The CFPP through Asian Development Bank loan was initiated; fast growing tropical hardwoods like *Acacia mangium, Gmelina arborea* and *Paraserianthes falcataria* were chosen for producing general utility paper. Trial planting of rubber trees for the production of timber alone took place between 1987 and 1991.
1992 - 1996	Planting of teak began earnestly in wetter sites; sentang (*Azadirachta excelsa*) was also given importance as a plantation species.
1996 - now	Government encourages large-scale planters and smallholders to plant forest tree species, such as teak (*Tectona grandis*) and sentang (*Azadirachta excelsa*).

The history of forest tree planting indicates that development will be slow if forest tree growing efforts are initiated by the government alone. Since the 1990s, the government has taken steps to encourage private forest plantations in the country. Subsequently, incentive packages have been introduced under the Promotion of Investment Act 1986 and the Income Tax Act 1967. Under the 1986 Act, the two incentives offered were: (1) a pioneer status and (2) an investment tax allowance. Those planting timber, rattan, and bamboo, which were promoted under the Promotion of Investment Act, were granted pioneer status. For instance, a company granted the status would be eligible for the 100 percent exemption for a period of ten years from the date of its first sale. The investment tax allowance provided an agriculture allowance (100 percent of the qualifying capital expenditure incurred within five years from the date of approval of the project) to those who invested in forest plantations.

Under Income Tax Act 1967, schedule 4A allows for qualifying farm expenditure incurred for the purposes of an approved agricultural project on the followings: (1) the clearing and preparation of land, (2) the planting (but not replanting) of a crop relating to an approved agricultural project, (3) the construction on a farm of a road or bridge, (4) the construction on a farm of a building used for the purposes of an approved agricultural project which is carried out on that farm or the construction on that farm of a building provided for the welfare and accommodation of persons employed in that project and which, if that project ceased to be carried out, is likely to be of little or no value to any person except in connection with the working of another farm, or (5) the construction of a pond or the installation of an irrigation or drainage system which is used for the purposes of an approved agricultural project. This is subject to the following conditions: (1) the forest plantation project is at least 50 ha, (2) the period/rotation age is six to fifty years depending on the type of species specified in the second schedule (seventy-three species of tree, rotan (*Calamus*) and bamboo poring (*Gigantochloa levis*).

Table 3: Existing areas of forest plantation projects, peninsular Malaysia (FDPM 2001)

Year	CFPP	State Projects	Teak	Pine	Hevea	Acacia mangium	Others	Total
< 1990	39,266	3,728	1,084	4,446	30	240		48,794
1991	44,507	3,728	1,384	4,446	30	240		54,335
1992	49,388	3,728	1,479	4,446	30	240		59,311
1993	52,370	3,728	1,628	4,446	30	252		62,454
1994	53,535	3,728	1,798	4,446	392	252		64,151
1995	54,499	3,728	2,028	4,446	608	472		65,781
1996	57,346	3,728	2,363	4,446	908	657		69,448
1997	57,980	3,728	2,363	4,446	1,419	859		70,795
1998	57,980	3,728	2,363	4,446	1,419	1,041		70,977
1999	56,593	3,728	2,433	3,561	1,674	1,765		74,435
2000	56,107	6,272	2,433	3,555	1,313	2,235	2,137	74,052

Besides government incentives for companies to plant forest trees, efforts were also made by forestry agencies to encourage forest tree planting by smallholders. Road-shows were held by the Forest Research Institute Malaysia (FRIM) and the Forestry Department Peninsular Malaysia (FDPM), supported by the Rubber Industry Smallholders Development Authority (RISDA). These have been instrumental in encouraging smallholders to plant trees. The planting of sentang (*Azadirachta excelsa*) and teak (*Tectona grandis*) became a hot issue among many smallholders immediately after FRIM organized road shows on these two species in 1996 and 1997. In the mean time, there was also a private syndicate encouraging smallholders to plant forest tree species. Even though the role of the syndicate is economically motivated (i.e. the sale of seedlings), it helped raised the interests in forest tree planting among smallholders.

In 2002, we conducted a study on the planting of forest tree species among tree planters in the private sectors (Lim et al. 2002). A total of twenty-one smallholders and six companies were asked about various aspects of forest tree planting. The role smallholders play in planting forest species is as important as that of the private companies. The total area planted by individuals in 2002 was 11,823 ha (15.6 percent), whereas the area planted by various companies was 11,404 ha (15.1 percent) as indicated in table 4. Probably, what differentiates the two groups is the area planted individually, which usually is much larger for a company than for an individual planter. The average size of a tree plantation was about 2 ha

per smallholder (table 5) while it averaged 75 ha per company (n=6). Two-thirds of the twenty-one smallholders planted on land less than 2 ha. About half of the smallholders planted mono crop (i.e. either teak or sentang) while the rest practices agroforestry where teak or *sentang* is mixed with other crops such as rubber, oil palm or tongkat ali (*Eurycoma longifolia*), the most popular medicinal plant in Malaysia as indicated in table 6. Of the twenty-one smallholders, 70 percent previously planted rubber (table 7). All the twenty-one smallholders planted forest trees between 1993 and 2000 (table 8).

Table 4: Distribution of forest plantation areas by private entrepreneurs, government agencies and individual planters, Peninsular Malaysia in 2002 (in ha) (FRIM 2002)

State	Private companies	Various government agencies	Individuals	Total
Johore	6,599	12,069	2,020	20,688
Kedah	95	1,003	441	1,539
Kelantan	15	3,866	650	4,531
Malacca	40	12	126	179
N.Sembilan	723	4,314	554	5,590
Penang	7	4	11	22
Pahang	2,129	16,571	3,606	22,306
Perak	396	3,219	1,079	4,694
Perlis	78	311	407	795
Selangor	304	9,025	831	10,161
Terengganu	1,017	2,053	2,098	5,168
Total	11,404	52,445	11,823	75,672

Table 5: Smallholders' forest tree planted areas in 2002

Land size (ha)	No. of smallholders	Percent
Less than 1	9	43
1-less than 2	4	19
2-4	5	24
7-8	3	29
Total	21	100

Average land size = 2.2 ha

Table 6: Type of forest tree species planted by smallholders in 2002

Type of tree	No. of smallholders	Percent
Teak only	5	24
Sentang only	5	24
Teak and oil palm	2	10
Teak and banana	1	5
Teak and tongkat ali	2	10
Sentang and rubber	6	29
Total	21	100

Table 7: Previous crops planted by smallholders in 2002

Previous land use	No. of smallholders	Percent
Oil palm	2	10
Rubber	15	70
Fruits	1	5
Coconut	2	10
Residential land	1	5
Total	21	100

Table 8: Planting year of forest trees by smallholders in 2002 (Lim et al. 2002)

Land size (ha)	No. of smallholders	Percent
1993	1	4
1994	2	10
1995	2	10
1996	2	10
1997	3	14
1998	2	10
1999	8	38
2000	1	4
Total	21	100

REASONS FOR TREE PLANTING

Of the 100 ha of agricultural land owned by twenty-one smallholders, 47 ha were planted with forest trees. This shows that smallholders willing to plant forest trees have allocated about half of their land for this purpose. A few reasons may explain this situation. Among some planters, it proves to be problematic to interest the younger generation to engage in traditional agricultural activities since many among them prefer to work in the non-agricultural sectors in the urban areas. In the rural areas, the smallholders normally have two choices. One is to continue utilizing the land for traditional crops such as rubber or fruit trees. In this case, as smallholders are getting old and trees grow older, rubber tapping becomes difficult as one has to bend the body or squat to tap the trees. Normally, smallholders would switch to oil palm cultivation where relatively less labor is required. In either case, the aged smallholders have to employ workers to tap rubber or harvest the oil palm fruits. For some smallholders, with small land areas, it is also not economically feasible to employ local or foreign workers. As the owners get older, when economic livelihood is not a problem, it is best to plant forest trees, which are expected to have future potential.

Smallholders were asked to provide their main reasons for planting forest trees. Economic returns are the main reason for the smallholders to engage in forest tree planting as indicated in table 9. For the smallholders, unlike the companies, investment in forest tree planting is based more on expectation rather than detailed calculation of costs and revenues. Two typical explanations were given by the smallholders. First: "We are getting too old to work on the rubber land. Our children have grown up and they work in the urban areas. None of them are willing to come home to engage in rubber tapping. We also do not encourage them to become rubber tappers. Since we were told that planting forest trees would give very good returns in the future, we gave it a thought. The government agencies have also encouraged the smallholders to plant jati (teak) and sentang trees. We have listened to their briefing; it seems lucrative to invest in forest tree planting". Second: "In 1996, I was approached by a friend who told me that planting jati trees is a means to become rich within seven years. Accordingly, the jati trees grow very fast and could be harvested after seven years of planting. He showed me photos of big size jati trees. With the planting distance of 2 m by 2 m, we could plant 2,500 seedlings on one ha of land. The production after seven years was expected to be 100 m^3 per ha. At a price of RM 4,000 (US$ 1,053) per m^3, the gross income was about RM 400,000 (US$ 105,262) per ha. Since I planted 2 ha of jati, my gross income would be about RM 800,000 (US$ 210,526). After deducting the cost of production, I would receive a net income of about RM 700,000 (US$ 184,211). This is a very attractive investment. I would be a rich man after planting jati for seven years."

Other reasons were also given for planting forest trees. These relatively less significant reasons include crop diversification, soil rejuvenation, and landscaping. These reasons are regarded secondary compared to economic expectation.

Table 9: Main reasons for planting forest trees by smallholders in 2002 (Lim et al. 2002)

Reasons	Individual planters (n=21)	Percent
Income generation	21	100
Crop diversification	7	33
Soil rejuvenation	7	33
Landscaping	1	5

PROBLEMS FACED AND RESPONSES

By the beginning of the new millennium, forest tree planting, however, appears to decline in popularity. In the 2002 survey, the twenty-one smallholders were asked on the problems faced in forest tree planting. From the frequency of reasons given by the respondents, the problems faced in terms of ranking include lack of knowledge in tree planting, difficulty in selecting appropriate species, lack of markets, uncertain market price, unavailability of land, and difficulty in obtaining quality seedlings. The issue of marketing has been highlighted (table 10). Among the twenty-one smallholders, 53 percent stated that they could either sell their timber to trading agents or furniture mills while 47 percent did not know to whom they could sell their timber. Some of the smallholders even requested us to identify potential buyers who were willing to offer good prices.

The following typical case exemplifies the problems faced by the smallholders: "I thought planting jati was also a simple matter as I have experience planted rubber trees. The fact is jati is different from rubber. In the case of rubber, we can always turn to other rubber smallholders or RISDA for help when problems arose. However, in the case of jati, the situation is not the same. We do not know much about quality seedlings, diseases and soil suitability. After five years of planting, the trees do not seem to grow as fast as expected. Then, there are issues of marketing and prices. To whom can we sell our timber and at what price?"

Table 10: Perceived potential buyers by smallholders in 2002

Perceived buyer	Smallholders (n=21)	Percent
Trading agent	2	10
Furniture mill	9	43
Do not know	10	47
Total	21	100

Even though the 1990s witnessed some smallholders turning to planting teak or sentang, the interest does not appear to persist. An important phenomenon observed in forest tree planting among smallholders is the conversion of forest trees to commercial crops (especially oil palm) after a few years of planting. The phenomenon occurred across the country. In Yong Peng area (in the state of Johore), three key informants (teak tree planters) informed that about 160 ha of smallholdings were planted with teak trees since mid-1990s. By 2004, about 40 ha remained while 120 ha were converted to other agricultural crops, mainly oil palm. The main reason for this conversion was that the teak trees planted did not grow well and it is likely to take a longer time than seven years before timber harvesting. Within these seven years, smallholders with limited capital, have to continue investing in

fertilizing and weeding while no income is received. On the other hand, oil palm cultivation appears to be more attractive. Oil palm trees bear fruits after three years of planting. They are harvested twice a month, rain or shine, thus ensuring regular income for the smallholders.

Smallholders who maintain their forest trees after planting are the relatively better-off farmers who do need to depend on the forest trees for short-term income generation. Rather, they have other sources of income to sustain daily livelihood. The explanations given by two smallholders are relevant. First: "I started to plant *jati* trees with high hope, as recommended by a friend. After five years of planting, I need to see forest tree planting in a different way. It is now more of investment for the future generation rather than for me. I was told that it will take at least fifteen years and not seven years before harvesting. By then, it is likely that my children will reap the benefits. I now regard it as a long-term investment. Currently, I earn my income from running a restaurant" (a farmer in Terengganu, Peninsular Malaysia). Second: "It has been ten years now after planting jati trees. My trees grow well and they are regarded model trees in the Yong Peng area. Our problem is to find buyers offering good prices. For teak trees planted after fifteen years with a diameter breast height of 30 cm, the log price in 2004 was about RM 500 (US$ 132) per m^3. But we were earlier told that it could fetch as high as US$ 2,000 per m^3. I have to be patient and wait for another few years. Forest tree planting is taking up my saving. Since 2004, I have to find additional source of income. The Japanese sweet potatoes are popular as health food in Malaysia now. I planted about 2 acres (0.8 ha) of sweet potatoes in early 2004. So far, I have harvested 4,000 kg after eight months of cultivation and sold at an ex-farm price of RM 1.60 per kg thus generating about RM 6,400 (US$ 1,684) gross income. It is expected to be a source of income for me in the future." (a smallholder in Johore, Peninsular Malaysia).

DISCUSSION AND CONCLUSION

The problem of wood shortage to meet the needs of local wood-based industries is real in Malaysia and other tropical countries. Over the years, the wood-based industries react to this situation in different manners. Some mills closed down while others switched to economic activities such as manufacturing shoes and biscuits. More mills are likely to close down when they cannot get regular supply of logs. Other sawmills would continue to import logs from other countries to sustain operation.

The forestry sector has played an important role in both national income generation and employment creation in Malaysia. The forestry industries are facing the problem of shortage in wood supply. Importing logs is not a long term solution as there is also wood shortage at the global level. For example, China is sourcing wood worldwide as its ambitious planting program could bear fruit only in the next two decades while Fiji and Papua New Guinea will not encourage export of logs. Forest plantations are becoming increasingly important source of wood supply to the world community (ABARE 1999) amidst dwindling areas of natural forests (Ball 1997). Under these circumstances, if Malaysia wishes to develop its forestry sector in a sustainable way, more concerted efforts have to be made in establishing additional forest plantations to meet the needs of the wood-based industries. Besides the large companies in the private sector, encouraging smallholders with idle land to plant forest species is essential. Smallholders with idle land could contribute as an important supplementary source of wood supply in the future. With proper incentives and guidance, the indigenous peoples and rural villagers could play a role in supplementing future wood supply as tree planting is not new to these communities. Such incentives and assistance is important as our study in 2002 also showed that none of the twenty-one smallholders engaged in forest tree planting were planning to replant such trees in the future. Smallholders observe the

growth performance of the trees planted and the actual economic returns. The general view was that if the forest trees grow well and fetch good prices, most respondents would consider planting more forest trees in new areas.

In the case of Malaysia, to further encourage forest tree planting among smallholders, special incentives were initiated in 2003. RISDA extended an incentive system in September 2003 whereby rubber smallholders with land areas of 2.5 ha or less, approved for conversion to forest species are given an assistance (cash and kind) of RM 4,448 (US$ 1,171) per hectare. Accordingly, some smallholders are responding well to this incentive system. Our study indicates also that, besides incentives for smallholders, other measures will need to be taken by the government. First, extension services to individual planters should be stepped up and rendered continuously and easily available to the smallholders. Smallholders need to have a clear and complete picture on forest tree planting, especially site and species matching, maintenance, fertilizing, weeding, pests and diseases, harvesting, market and expected prices. This means that extension services offered to planters should not stop once trees are planted. Services should be rendered to the smallholders continuously to help surmount their problems.

Second, there is a need to encourage smallholders engaged in tree planting to practice agroforestry. This is important as some smallholders have limited land areas and they depend on land as the major source of monthly income. Practicing agroforestry is a practical means to generate short-term income while waiting for the forest trees to mature in the future. The main agroforestry practices include the combination of forestry species, agricultural crops, animal husbandry, medicinal plants, fishery and organic vegetables. These systems potentially provide both short term and long-term income to rural peoples (Lim et al. 2004).

Third, the relevant government agencies must act as one-stop agencies dealing with the buying and selling of timber and non-timber products. This will help solve problems related to marketing. The practice that is currently being used by RISDA, especially in selling latex and rubber wood logs, could be adopted. Such an approach is practical when dealing with smallholders who have problems selling their timber.

Finally, there is a need to disseminate all new research findings related to forest tree planting to the smallholders in a timely manner. Technology transfer via extension services should be intensified. FRIM, as a research institution, should ensure that new research findings related to forest plantation development are disseminated to smallholders in a timely manner. Such an effort would keep smallholders abreast of the most current issues related to forest tree planting. Such information could be disseminated to smallholders through various offices of the Agricultural Department and RISDA at the district level and farmers' organizations at the local level.

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CHAPTER SEVEN

DUDUKUHAN: TRADITIONAL TREE FARMING SYSTEMS FOR POVERTY REDUCTION

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ABSTRACT

Dudukuhan are traditional tree farming systems in West Java, Indonesia. These systems are distinguished from home gardens (*pekarangan*) by location, distance from the house and a lower level of management. *Dudukuhan* can be divided into four types: (1) timber system, (2) mixed fruit-timber-banana-annual crops system, (3) mixed fruit-timber system, and (4) fallow system. Traditionally all types of *dudukuhan* are managed on an extractive basis: few inputs (quality germplasm, fertilizers, labor, *etc*.) are allocated to these systems. This management approach is caused by limited land tenure, small land size, off-farm employment opportunities, limited market access, and farmers' limited experience with intensive tree management. Depending on the socioeconomic conditions and market opportunities facing a farmer, the allocation of a specific piece of land may shift between the four types of *dudukuhan*. This transformation occurs gradually over a number of years and affects the tree biodiversity and total number of trees in the system. A desire for tree products, market opportunities and land tenure status are the key factors that influence farmers' decision concerning which type of *dudukuhan* to develop. Positive changes in these factors have a positive influence on tree biodiversity and tree density. Income generation is the primary factor influencing farmers' choice of tree species. Soil conservation is a secondary but important factor influencing both choices of *dudukuhan* and tree species. Farmers and agricultural specialists agree that *dudukuhan* are underproductive and hold great untapped potential for meeting the raising demand for tree and annual crop products in West Java. Farmers are interested in intensifying the management of their *dudukuhans*, but hesitate because they do not know where to focus their efforts. Experience indicates that farmers in Nanggung may be best served by transforming their traditional subsistence tree farming systems into semi-commercial enterprises that yield products to meet both home and market demand. This process requires that farmers: (1) focus on a limited number of tree species that are appropriate for local biophysical conditions and a high market value/demand, (2) utilize high quality germplasm (provenance, varieties, *etc*.) to increase productivity and profitability, (3) manage the *dudukuhans* to yield tree products that meet market specifications, and (4) develop permanent market linkages. Extension specialists, local governments and researchers can facilitate this process by providing access to quality inputs, training and information. However, the driving force should be farmers' self-interest to improve their livelihoods.

BACKGROUND

Agroforestry is a dynamic, ecologically based, natural resources management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production that derives from the (potential) social, economic and environmental benefits for all land users (ICRAF 2004).

In Indonesia, most agroforestry systems are established through shifting cultivation, which complements relationships between trees and crops, and between forest and farming (Michon and de Foresta 1995). The complementary relationship is that the natural forest may support livelihood of local people and later, forest vegetation may gradually establish on farms (de Foresta *et al*., 2000). Indonesia boasts a number of agroforestry models that were established gradually with the integration of both biophysical and socioeconomic functions. Examples of these models include: (1) the *repong damar* resin producing system in Krui, Lampung, (2) the jungle rubber systems in Jambi and South Sumatera, (3) the *tembawang* system in West Kalimantan, (4) the *pelak* system in Kerinci-Jambi, (5) the durian gardens in Gunung Palung, West Kalimantan, (6) the *parak* system in Maninjau-West Sumatera, and (7) the *talun-dudukuhan* systems in West Java (Foresta *et al*. 2000).

Dudukuhan are traditional tree farming systems in West Java, Indonesia. *Dudukuhan* can be divided into four types: (1) timber system, (2) mixed fruit-timber-banana-annual crops system, (3) mixed fruit-timber system, and (4) fallow system. These systems are distinguished from home gardens (*pekarangan*) by location (away from the house) and a lower level of management. Traditionally all types of *dudukuhan* are managed on an extractive basis: few inputs (quality germplasm, fertilizers, labor, *etc*.) are allocated to these systems. This management approach is caused by limited land tenure, small land size, limited market access, and farmers' limited experience with intensive tree management. Limited management results in low system productivity and low farm income.

A study was conducted to characterize *dudukuhans* and evaluate their potential as a system for poverty reduction. Three key points were addressed: (1) tree diversity and *dudukuhan* profiles based on sample villages and *dudukuhan* types, (2) farmers' perceptions of the selection and uses of tree species, and (3) management of *dudukuhan*. Results from the study were used by World Agroforestry Centre (ICRAF), Winrock International and the Indonesia Institute for Forest and Environment (RMI) to help farmers improve the productivity and market-orientation of their *dudukuhan* systems. This paper reports on key results of that study.

METHODS

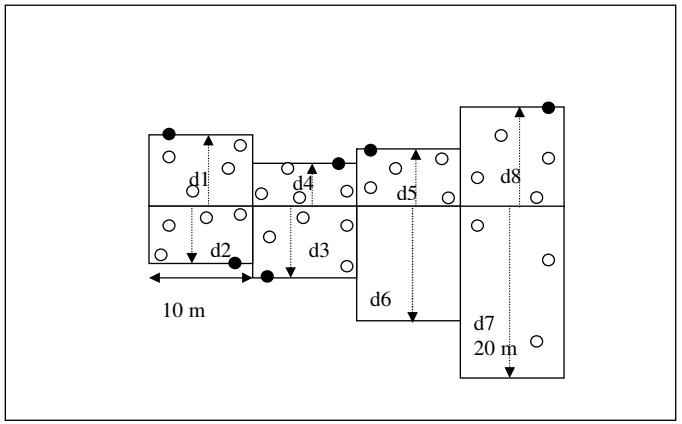
Site

The study was conducted in Nanggung subdistrict located at longitude 106^{o} 27' 35" to 106^{o} 35' 26" and latitude 06^{o} 33' 25" to 06^{o} 45' 45". Nanggung subdistrict consists of ten villages with an area of around 11,000 km^{2} and elevation between 400 and 1800 m.a.s.l. Nanggung has 74,211 inhabitants and 17,187 households. Average landholding per household is 0.3 ha of irrigated rice land, and 0.5 ha of *dudukuhan*. *Dudukuhan* systems cover 16.7 percent of total area of the subdistrict. While 73.3 percent of the household heads consider themselves farmers, agriculture provides only 31.2 percent of household incomes. Trade (operating small shops), the service sector, gold mining, bentonite mining and plantation work are alternative sources of household income (Budidarsono *et al*. 2004). The study was conducted in three sample villages that were purposively selected according to their location (upstream, mid-stream, and downstream). The villages selected are Cisarua, Curug Bitung and Parakan Muncang.

Tree diversity and *dudukuhan* profiles

The tree diversity and profiles of *dudukuhans* were assessed through an inventory of thirty-six *dudukuhans*. Three of each *dudukuhan* type was inventoried in each of three villages. The dynamic sample unit method developed by Sheil et al. (2002) was used to conduct the inventory. The method uses 40 m long transect lines to measure species richness, tree density, and tree basal area. The transect line is divided into eight tree sampling units as depicted in figure 1. Within each unit a maximum of five trees are measured. Trees must have a diameter at breast height greater than 10 cm. For each sampling unit, the following data were recorded: the number of trees, the species of trees, the diameter at breast height of each tree and distance of the fifth tree from the transect line (d1, d2, d3… as depicted in figure 1). The maximum distance for searching up to five stems is 20 m (d7). The maximum distance for searching in each cell before deciding it is empty, is 15 m (d6).

Figure 1: Tree sample units along 40 m of transect line



Farmers' perceptions regarding tree selection and uses.

Participatory Rural Appraisal (PRA) methods, namely group discussions and individual interviews, were used for collecting information about farmers' perceptions regarding tree selection and use. Farmers' perceptions on tree selection were compiled under three main variables: (1) tree biophysics, (2) landscapes and climate, and (3) socioeconomic. Fourteen variables were used to identify farmers' perceptions regarding tree use: (1) leaves' biomass, (2) canopy shading, (3) root characteristics, (4) fast growth and fruiting, (5) tree use value, (6) pests-diseases, (7) *dudukuhan* size, (8) slope angle (in degrees), (9) soil type and fertility, (10) elevation, (11) weather and rainfall, (12) marketing opportunities, (13) land tenure

status, and (14) government policy. Farmers' perceptions on tree use were explained by eight variables including: (1) foods, (2) income, (3) fire wood, (4) construction, (5) fodder, (6) medicine, (7) erosion control, and (8) child education.

Management of *dudukuhans*

Dudukuhan management (including inputs, outputs and financial returns) were documented as part the farm and household economic study of *dudukuhan* owners in Budidarsono et al. (2004). Thirty-five households were purposively selected to be interviewed in each of the sample villages mentioned above.

RESULTS

Tree diversity and *dudukuhan* profiles

Measurements were made on a total of thirty-six *dudukuhans*. *Dudukuhan* sizes reported by the landowners varied between 0.054 and 0.419 ha (Suseno et al. 2003). A total of fifty-one tree species (excluded banana plants) were identified as components of *dudukuhan* systems. These include twenty-five fruit species and twenty-six timber species. The Shannon-Weiner index (H') (Smith 1990) was used to describe the tree diversity in the *dudukuhan* systems. Shannon-Weiner index for each sample village is as follows: Cisarua (1.02), Curug Bitung (0.97), and Parakan Muncang (1.19). Statistically, there is no difference between villages in tree diversity (Shannon-Weiner index). A high number of trees of afrika timber (*Maesopsis eminii Engl.*) (34.6 percent) causes the tree diversity value for Curug Bitung village to be lower than the values for the other sample villages, although the number of tree species in Curug Bitung village was higher than either Cisarua or Parakan Muncang villages. Table 1 shows that the number of fruit tree species was higher than timber tree species in all sampled villages. The numbers of fruit tree species in Parakan Muncang and Curug Bitung villages were higher than in Cisarua village. But the numbers of timber tree species in Curug Bitung and Cisarua villages were higher than in Parakan Muncang village.

Table 1: Tree species composition based on samples villages in the Nanggung sub district in West Java

Local name	Botanical name	Tree Number (per ha)			Percentage		
		Cisarua	Curug Bitung	Parakan Muncang	Cisarua	Curug Bitung	Parakan Muncang
Fruit products							
Cempedak	*Artocarpus integer (Thunb.) Merr*	0	0	1	0.0	0.1	0.2
Cengkeh	*Eugenia aromatica O.K.*	2	4	10	0.5	0.7	1.5
Duku	*Lansium domesticum Corr.*	6	7	2	1.5	1.3	0.3
Durian	*Durio zibethinus Murr.*	3	6	15	0.7	1.1	2.2
Gandaria	*Bouea macrophylla Griff.*	0	0	1	0.0	0.0	0.2
Jambu air	*Syzygium aqueum (Burm.f.) Alston*	0	1	0	0.0	0.2	0.0
Jengkol	*Archidendron pauciflorum (Benth.) Nielsen*	8	21	31	2.0	3.7	4.6
Kapuk randu	*Ceiba pentandra (L.) Gaertn.*	1	2	5	0.1	0.3	0.8
Kecapi	*Sandoricum koetjape (Burm.f.) Merr*	1	4	21	0.3	0.7	3.1
Keluih	*Artocarpus communis J.R. & G.Forster*	0	1	0	0.0	0.1	0.0
Kemang	*Mangifera caesia Jack ex Wall.*	11	2	10	2.8	0.3	1.5
Kemiri	*Aleurites moluccana (L.) Willd.*	3	0	0	0.8	0.0	0.0
Kepayang	*Pangium edule Reinw.*	1	4	0	0.3	0.7	0.0
Kupa gowok	*Eugenia polycephala Miq.*	7	4	3	1.8	0.7	0.4
Kweni	*Mangifera odorata Griff.*	4	5	18	1.0	0.8	2.7
Lamtoro	*Leucaena leucocephala (Lam.) de Wit*	1	0	0	0.2	0.0	0.0
Limus	*Mangifera foetida Lour.*	4	1	1	0.9	0.1	0.1
Mangga	*Mangifera indica L.*	0	0	5	0.0	0.0	0.8
Manggis	*Garcinia mangostana L.*	0	2	9	0.0	0.3	1.3
Melinjo	*Gnetum gnemon L.*	0	0	14	0.1	0.0	2.0
Menteng	*Baccaurea racemosa (Reinw.) Muell. Arg*	0	1	1	0.0	0.1	0.1
Nangka	*Artocarpus heterophyllus Lam.*	42	11	13	10.0	2.0	1.9
Pala	*Myristica fragrans Houtt.*	0	2	0	0.0	0.4	0.0
Petai	*Parkia speciosa Hassk.*	4	21	10	1.0	3.8	1.6
Pisang	*Musa sp.*	54	121	267	13.0	21.4	39.7
Rambutan	*Nephelium lappaceum L.*	6	9	39	1.4	1.7	5.8
Timber products							
Afrika	*Maesopsis eminii Engl.*	121	195	48	29.2	34.6	7.1
Calik angin	*Macaranga tanarius*	1	0	0	0.2	0.0	0.0
Cangkalak	*Knema laurina (Blume) Warb.*	0	3	0	0.0	0.6	0.0
Jirak	*Symplocos ferruginea*	1	0	0	0.3	0.0	0.0
Kanyere	*Bridelia minutiflora Hook. f.*	0	1	0	0.0	0.1	0.0
Karet	*Hevea brasiliensis Muell. Arg.*	0	0	17	0.0	0.0	2.5

Kihiang	*Cassia javanica L.*	1	0	0	0.2	0.0	0.0
Kihujan	*Engelhardia spicata Lech. ex Bl.*	0	1	0	0.0	0.1	0.0
Kihuru	*Litsea noronhae*	4	0	0	1.0	0.0	0.0
Kikacang	*Maniltoa grandiflora Scheff.*	1	0	0	0.2	0.0	0.0
Kirinyuh	*Eupatorium inulifolium H.B.K.*	0	1	0	0.0	0.1	0.0
Kisampang	*Euodia latifolia DC.*	29	19	0	7.1	3.4	0.0
Meranti	*Shorea spp.*	0	3	0	0.0	0.5	0.0
Mindi	*Melia azedarach L.*	1	1	2	0.2	0.1	0.3
Pinus	*Pinus merkusii Jungh. & De Vr.*	10	5	1	2.5	0.8	0.2
Pulai	*Alstonia scholaris (L.) R.Br.*	0	0	1	0.0	0.0	0.1
Puspa	*Schima wallichii Noronha*	22	6	35	5.3	1.1	5.3
Rasamala	*Altingia excelsa Noronha*	0	1	0	0.0	0.3	0.0
Renghas	*Gluta renghas L.*	5	0	0	1.3	0.0	0.0
Salam	*Syzygium lineatum (Bl.) Merr. & Perry.*	0	3	0	0.0	0.6	0.0
Seketi	*Eurya acuminata*	0	0	2	0.0	0.0	0.3
Sengon	*Paraserienthes falcataria (L.) Nielsen*	58	92	86	14.0	16.4	12.9
Sungkai	*Peronema canescens Jack*	0	1	0	0.0	0.2	0.0
Suren	*Toona sureni (Bl.) Merr*	0	1	0	0.0	0.3	0.0
Tisuk	*Hibiscus cannabinus L.*	0	3	1	0.0	0.5	0.2
Waru	*Hibiscus tiliaceus L.*	0	0	1	0.0	0.0	0.2
Total		416	566	671			

The Shannon-Weiner Index (H') of each *dudukuhan* type is: (1) timber system (0.44), (2) mixed fruit-timber-banana-annual crops system (1.18), (3) mixed fruit-timber system (1.31), and (4) fallow system (1.10). The T-test results for tree diversity (H') in each type of *dudukuhan* show significant differences between the timber system and both the mixed fruit-timber-banana-annual crop system and the mixed fruit-timber system, at the 1 percent level. But the differences between the timber system and the fallow system are significant at the 5 percent level. The tree diversity (H') of mixed fruit-timber-banana-annual crops system indicates no significant difference with the mixed fruit-timber system, but it indicates significant differences at 5 percent level with the fallow system. Tree diversity (H') of mixed fruit-timber system indicates significant differences at 5 percent level with fallow system.

Table 2 shows that the priority species are those that occur in almost all *dudukuhan* types with high number of trees: *Musa* spp., *Maesopsis eminii Engl., Paraserienthes falcataria (L.) Nielsen, Artocarpus heterophyllus Lam., Durio zibethinus Murr., Archidendron pauciflorum (Benth.) Nielsen, Mangifera odorata Griff., Euodia latifolia DC., Parkia speciosa Hassk*, *Nephelium lappaceum L.,* and *Schima wallichii Noronha* are the priority species for the Nanggung area.

Table 2: Tree species composition based on dudukuhan types

Local name	Botanical name	*Dudukuhan* types (trees/ha)								Total	Percent
		Timber system	Percent	Mixed fruit-timber-banana-annual crop system	Percent	Mixed fruit-timber system	percent	Fallow system	Percent		
Fruit products											
Cempedak	*Artocarpus integer*	0	0.0	1	0.1	2	0.4	0	0.0	2	0.1
Cengkeh	*Eugenia aromatica O.K.*	0	0.0	7	0.9	7	1.6	8	2.2	22	1.0
Duku	*Lansium domesticum*	0	0.0	8	1.0	9	2.0	4	1.1	20	0.9
Durian	*Durio zibethinus Murr.*	1	0.2	11	1.5	14	3.2	5	1.5	32	1.5
Gandaria	*Bouea macrophylla Griff.*	0	0.0	0	0.0	2	0.3	0	0.0	2	0.1
Jambu air	*Syzygium aqueum (Burm.f.) Alston*	0	0.0	0	0.0	1	0.3	0	0.0	1	0.1
Jengkol	*Archidendron pauciflorum (Benth.) Nielsen*	0	0.0	26	3.4	15	3.4	39	10.9	80	3.6
Kapuk randu	*Ceiba pentandra (L.) Gaertn.*	0	0.0	8	1.1	1	0.2	1	0.3	10	0.5
Kecapi	*Sandoricum koetjape (Burm.f.) Merr*	0	0.0	28	3.8	5	1.1	2	0.5	35	1.6
Keluih	*Artocarpus communis J.R. & G.Forster*	0	0.0	1	0.1	0	0.0	0	0.0	1	0.0
Kemang	*Mangifera caesia Jack ex Wall.*	0	0.0	7	1.0	20	4.4	4	1.2	31	1.4
Kemiri	*Aleurites moluccana (L.) Willd.*	0	0.0	1	0.2	3	0.7	0	0.0	4	0.2
Kepayang	*Pangium edule Reinw.*	0	0.0	2	0.3	4	0.9	0	0.0	7	0.3
Kupa gowok	*Eugenia polycephala Miq.*	0	0.0	2	0.3	15	3.3	2	0.4	19	0.9
Kweni	*Mangifera odorata Griff.*	1	0.2	18	2.4	10	2.3	7	2.0	37	1.7
Lamtoro	*Leucaena leucocephala (Lam.) de Wit*	0	0.0	1	0.2	0	0.0	0	0.0	1	0.1
Limus	*Mangifera foetida Lour.*	0	0.0	1	0.1	6	1.3	0	0.0	7	0.3
Mangga	*Mangifera indica L.*	0	0.0	5	0.6	0	0.0	2	0.7	7	0.3
Manggis	*Garcinia mangostana L.*	0	0.0	0	0.0	12	2.6	2	0.6	14	0.6
Melinjo	*Gnetum gnemon L.*	0	0.0	0	0.0	16	3.4	3	0.9	19	0.9
Menteng	*Baccaurea racemosa (Reinw.) Muell. Arg*	0	0.0	0	0.0	2	0.4	0	0.0	2	0.1
Nangka	*Artocarpus heterophyllus Lam.*	0	0.0	37	5.0	40	8.7	10	2.9	87	4.0
Pala	*Myristica fragrans Houtt.*	0	0.0	0	0.0	3	0.7	0	0.0	3	0.1
Petai	*Parkia speciosa Hassk.*	0	0.0	25	3.3	11	2.5	12	3.3	48	2.2
Pisang	*Musa spp.*	128	19.9	328	43.8	17	3.7	117	32.7	589	26.8

Rambutan	*Nephelium lappaceum L.*	0	0.0	22	2.9	41	9.1	9	2.5	72	3.3
Timber products											
Afrika	*Maesopsis eminii Engl*	260	40.6	95	12.7	112	24.6	19	5.4	486	22.1
Calik angina	*Macaranga tanarius*	1	0.1	0	0.0	0	0.0	0	0.0	1	0.0
Cangkalak	*Knema laurina (Blume) Warb.*	0	0.0	0	0.0	4	1.0	0	0.0	4	0.2
Jirak	*Symplocos ferruginea*	0	0.0	0	0.0	2	0.4	0	0.0	2	0.1
Kanyere	*Bridelia minutiflora Hook. f.*	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0
Karet	*Hevea brasiliensis Muell. Arg.*	0	0.0	0	0.0	19	4.3	3	0.9	23	1.0
Kihiang	*Cassia javanica L.*	0	0.0	1	0.1	0	0.0	0	0.0	1	0.0
Kihujan	*Engelhardia spicata Lech. ex Bl.*	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0
Kihuru	*Litsea noronhae*	3	0.5	0	0.0	1	0.1	2	0.6	6	0.3
Kikacang	*Maniltoa grandiflora Scheff.*	0	0.0	0	0.0	1	0.3	0	0.0	1	0.1
Kirinyuh	*Eupatorium inulifolium H.B.K.*	0	0.0	0	0.0	1	0.1	0	0.0	1	0.0
Kisampang	*Euodia latifolia DC.*	9	1.4	44	5.8	12	2.5	0	0.0	64	2.9
Meranti	*Shorea spp.*	0	0.0	3	0.4	1	0.2	0	0.0	4	0.2
Mindi	*Melia azedarach L*	3	0.4	1	0.1	1	0.3	0	0.0	5	0.2
Pinus	*Pinus merkusii Jungh. & De Vr.*	0	0.0	7	1.0	14	3.0	0	0.0	21	1.0
Pulai	*Alstonia scholaris (L.) R.Br.*	0	0.0	1	0.2	0	0.0	0	0.0	1	0.1
Puspa	*Schima wallichii Noronha*	15	2.4	16	2.1	13	2.9	39	11.0	84	3.8
Rasamala	*Altingia excelsa Noronha*	0	0.0	0	0.0	2	0.4	0	0.0	2	0.1
Renghas	*Gluta renghas L.*	0	0.0	0	0.0	0	0.0	7	2.0	7	0.3
Salam	*Syzygium lineatum (Bl.) Merr. & Perry.*	0	0.0	3	0.4	2	0.4	0	0.0	5	0.2
Seketi	*Eurya acuminata*	0	0.0	0	0.0	0	0.0	3	0.9	3	0.1
Sengon	*Paraserienthes falcataria (L.) Nielsen*	219	34.1	36	4.8	6	1.3	56	15.6	316	14.4
Sungkai	*Peronema canescens Jack*	0	0.0	0	0.0	1	0.3	0	0.0	1	0.1
Suren	*Toona sureni (Bl.) Merr*	0	0.0	0	0.0	2	0.4	0	0.0	2	0.1
Tisuk	*Hibiscus cannabinus L.*	0	0.0	2	0.2	4	0.8	0	0.0	5	0.2
Waru	*Hibiscus tiliaceus L.*	0	0.0	1	0.2	0	0.0	0	0.0	1	0.1
Total		641		749		454		357		2200	

Tree density, tree basal area, number of species, and number of total trees are the main characteristics that distinguish the four types of *dudukuhan*. Table 3 shows the average of tree density, tree basal area, number of tree species, and number of trees based on plot measurement in each type of *dudukuhan*. Tree density of *dudukuhan* system ranged from 240 to 511 trees per ha. To maximize yield of timber, farmers planted two timber species (*Maesopsis eminii Engl.* and *Paraserienthes falcataria (L.) Nielsen*) with a higher density in the timber system. These fast-growing species can be harvested in five to eight years. Tree basal area varied 6.6 to 15.2 m^2 per ha. Mixed fruit-timber system and mixed fruit-timber-banana annual crop system have a higher of tree basal area, number of fruit species, and number of fruit tree than the other systems. This is a result of farmers' strategy to favor fruit trees that maintain fruits for long periods in these systems. Tree density and tree basal area are the lowest in the fallow systems that receive no management. The large distance of the land to the farmers' house (more than 3 km) explains why this system is never maintained by the farmer. Off-farm employment opportunities are another reason why the farmer can leave this system fallow for five to fifteen years.

Table 3: The profiles of *dudukuhan* based on plot measurement.

Type of *dudukuhan*	Tree density (trees/ha)	Basal area (m^2/ha)	Number of species		Number of trees	
			Fruits	Timber	Fruits	Timber
Timber system	511	9.3	0.2	2.6	0.2	33.7
Mixed fruit-timber-banana-annual crop system	423	12.3	7.0	3.6	15.5	15.9
Mixed fruit-timber system	437	15.2	8.1	3.2	19.1	15.0
Fallow system	240	6.6	3.4	2.1	7.3	6.7

Farmers' perceptions of the selection and uses of tree species

Figure 2 explains the perceptions of farmer on tree selection. Tree use value, marketing opportunities, and land tenure status were the main factors (highest rank) for the farmers to select the tree. Fast growth, fruiting period and pest-disease problems were important factors also. Competition for water and nutrients between tree crops could be considered by farmers as well: some fruit and timber species would not be planted closely to one another in order to reduce competition for water and nutrients. Elevation and weather-rainfall are least considered for tree selection by farmers. Government policies still impede farmers' tree selection. The government charges fees to the farmers who sold pine trees (*Pinus merkusii*).

Figure 2: Rank of consideration for tree selection

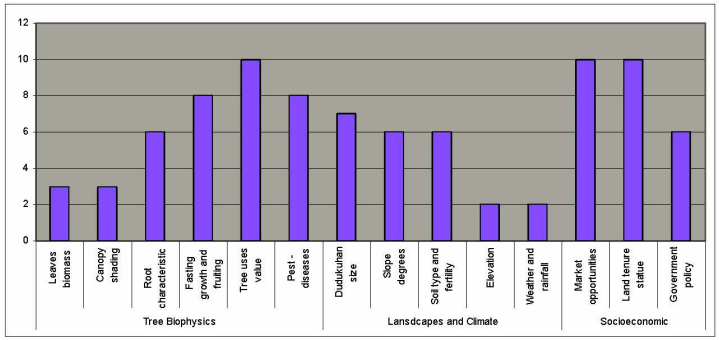
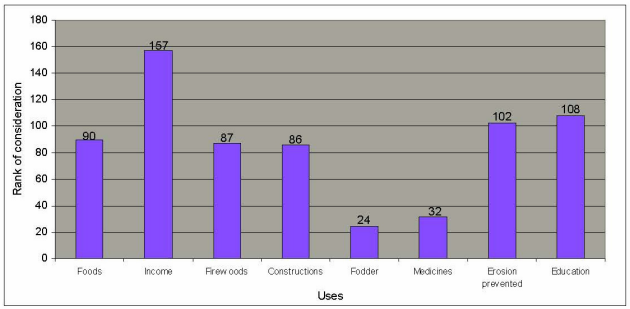


Figure 3 explains the perceptions of farmer on tree uses. Farmers planted trees in *dudukuhan* systems to sustain the income of their household (highest rank). A part of the income was used for saving or paying tuitions of their kids. The high rainfall and hilly topography in Nanggung area motivated farmer to plant trees for erosion control. A part of the fruit tree products (that are not sold by farmers) will be used to meet subsistence needs. A part of the timber products are used for construction and as firewood. Farmers' awareness of the use of the fodder and medicinal tree species is still low.

Figure 3: Rank of consideration for tree uses



Management of *dudukuhans*

Table 4 shows the results of a study conducted by Budidarsono et al. (2004). The study indicates that very little management conducted in *dudukuhan* systems during the planting season 2002-2003. With regard to labor inputs, based on activities implemented, the data shows that harvesting is the most common activity in the *dudukuhan*. The study found that chemical fertilizer was applied to around nine to ten *dudukuhan* plots (0.9 percent of the total plots) and organic fertilizer to around four to five *dudukuhan* plots (1.9 percent). The rate of fertilizer application, for chemical fertilizer was also very low, that is 7.4 kg ha^{-1}, whereas the application of organic fertilizer was reasonably high, up to 4.0 ton ha^{-1}. During the previous year crops were harvested in nearly three-quarters (27.3 percent) of the *dudukuhan* plots. Weeding and maintenance of tree or seasonal crops is the next most common activity, conducted 8.9 percent of the *dudukuhan* plots. The number of person-days involved in harvesting (7 ps day/ha) is less than the number of person-days involved in weeding and maintenance (27 ps day/ha).

Table 4: Level of inputs and returns by type of *dudukuhan*

Type of *dudukuhan*	**Timber system**	**Mixed fruit-timber-banana-annual crops system**	**Mixed fruit-timber system**	**Fallow system**	**Total**
Number of plots	15	24	38	8	85
Percent	17.6	28.2	44.7	9.4	100
Total area (ha)	3.82	8.97	15.94	0.43	29.16
Area per plot (ha)	0.254	0.374	0.419	0.054	1.101
Tradable inputs					
Chemical fertilizer					
a. Plots with chemical fertilizer application (percent)	-	-	0.9	-	0.9
b. Rate of fertilizer application (kg/ha)	-	-	7.4	-	7.4
Organic fertilizer					
a. Plots with organic fertilizer application (percent)	0.5	0.9	0.5	-	1.9
b. Rate of organic application (kg/ha)	1,429	3,000	4,000	-	2,646
Pesticide					
a. Rate of pesticide application (l/ha)	-	-	0.001	-	0.001
Labor inputs					
Planting					
a. Plots with planting activity (percent)	0.5	0.5	0.9	-	1.9
b. Total labor (ps-d/ha)	8	2	13	-	8
Tree and crop care					
a. Plots with tree and crop	1.4	2.8	4.7	-	8.9

care activity (percent)					
b. Total labor (ps-d/ha)	37	70	14	-	27
Harvesting					
a. Plots with harvesting activity (percent)	2.8	9.4	15.1	-	27.3
b. Total labor (ps-d/ha)	7	7	7	-	7
Returns (IDR 000)					
Fruits (IDR/ha)	-	22,111	15,536	-	37,647
Timber (IDR/ha)	5,604	14,345	22,042	-	41,991
Annual crops (IDR/ha)	-	1,485	-	-	1,485
Sum	5,604	37,940	37,578	-	81,122
Net returns (IDR 000)					
Total	4,900	35,913	34,942	-	75,755
Average per plot	327	1,496	920	-	891
Average per ha	1,284	4,002	2,192	-	2,598

DISCUSSION

The tree diversity in the *dudukuhan* systems was lower than the tree diversity in the Gunung Halimun National Park (H' = 4.05; Suzuki et al. 1997). The natural forest in the national park has achieved a climax for tree diversity, but in the *dudukuhan* systems periodic enrichment of exotic and indigenous species of fruit and timber trees occurred by farmers. Yet, the periodic enrichment with tree species by farmers did not result in a tree diversity climax such as in the natural forest.

Tree diversity (H'), tree density, and tree basal area of all *dudukuhan* systems indicate a transformation process of *dudukuhan*. The transformation process occurred by dynamic changes in tree species composition and number of trees (see table 4 and 5 and figure 4). This is farmers' strategy for continuing the productivity of the *dudukuhan* and enhancing household income (as the main factor), and (as the second factor) preventing erosion. The strategy has a great impact on biodiversity conservation. Indigenous and exotic tree species are usually planted by farmers. The indigenous fruit and timber species are used for meeting the household subsistence needs, but the exotic (introduced) fruit and timber species are sold on the local market to enhance household income. The occurrence of these species in large numbers in *dudukuhans* demonstrates that they are: (1) adapted to the biophysical conditions of the Nanggung area and (2) meet farmers' subsistence needs.

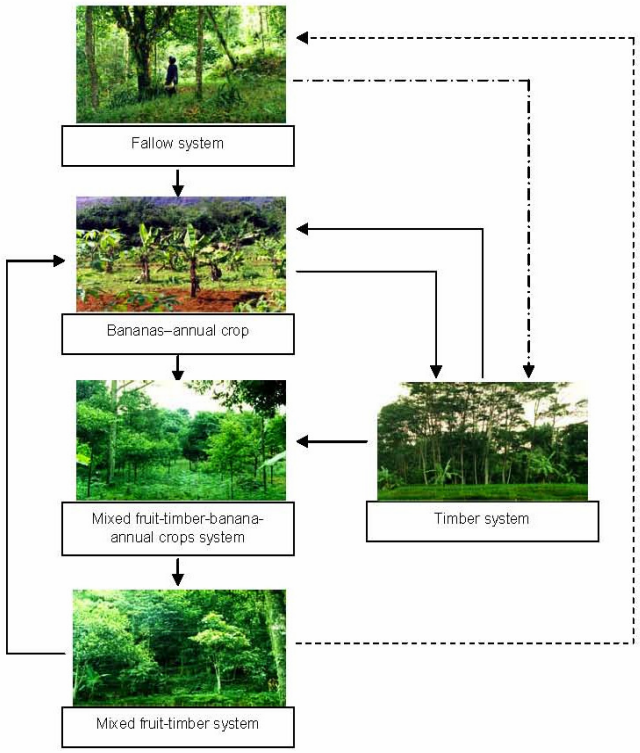
In general, the transformation of *dudukuhan* types (figure 4) starts from fallow. The vegetation is cleared by the farmer for the establishment of bananas and annual crops that are cultivated for three to four years. During that period, farmer enriched the *huma* with several fruit and timber species such as *Maesopsis eminii Engl., Paraserienthes falcataria (L.) Nielsen, Artocarpus heterophyllus Lam., Durio zibethinus Murr., Archidendron pauciflorum (Benth.) Nielsen, Mangifera odorata Griff., Euodia latifolia DC., Parkia speciosa Hassk*, *Nephelium lappaceum L.,* and *Schima wallichii Noronha*.

Both the mixed fruit-timber-banana-annual crops system and the timber system are an extended form of the *huma* (*tegalan*). But the timber system could be changed into *huma* again after the farmer has harvested the timber products. The mixed fruit-timber-

banana-annual crops system is preferred by the farmer, providing short-term as well as long-term household needs. The farmer harvests bananas and annual crops to meet short-term needs, and *Artocarpus heterophyllus Lam.* and various bamboo species for medium-term needs. The other fruit and timber species provide for long-term needs. Enrichment with fruit and timber species occurred continuously in the mixed fruit-timber system as an extended form of the mixed fruit-timber-banana-annual crops system. In this situation, farmers would not plant the bananas and annual crops in between tree spaces.

At a certain time, the productivity of mixed fruit-timber system decreases and fails to support the income of the household. Then the farmer considers transforming the system into a *huma* (*tegalan*). But if the distance of the mixed fruit-timber system is far from the farmer' s house (more than 3 km), the farmer changed the plot into a fallow system.

Figure 4: Transformation of *dudukuhan* types



The regression analysis was conducted to describe the relationship between the profiles of *dudukuhan* and the number of species and the number of trees. In the regression equation, the number of species and the number of trees function as the dependent variable (*y*), and the *dudukuhan* size, tree density, basal area, elevation, and also the number of fruit-timber species, and number of fruit-timber trees function as the independent variables (x_1, x_2, x_3, ..., x_i). The relationship between the profiles of *dudukuhan* (such as dudukuhan size, tree diversity, tree basal area, elevation) tends to influence the number of tree species and number of tree on fruit and timber trees.

Table 5: Results of the regression analysis for the *dudukuhan* timber system

Variable	Timber system			
	Number of species		Number of trees	
	Fruits	Timber	Fruits	Timber
Dudukuhan size (ha)	0.100	0.007*** (+)	0.671	0.586
Tree density (N/ha)	0.328	0.217	0.105	0.016** (+)
Basal area (m^2)	0.621	0.354	0.086* (+)	0.042** (-)
Elevation (m. a. s. l.)	0.521	0.778	0.052* (-)	0.012** (+)
Number of fruit species		0.083* (+)		
Number of fruit trees				0.072* (+)
Number of timber species	0.083* (+)			
Number of timber trees			0.072* (+)	

*** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level.

(+) and (-) indicate interrelation between independent variables (x_i) and dependent variable (y)

Statistically, table 5 shows that an increase in the number of timber species and the number timber trees causes an increase in the number of fruit species and number of fruit trees, and vice versa. Although the timber trees are the main trees in this system, farmers initiated to enrich the timber system with some fruit species such as *Durio zibethinus* and *Mangifera odorata*. When both *Maesopsis eminii* and *Paraserienthes falcataria* are harvested after five to eight years, the productivity of the dudukuhan is still supported by fruit trees. In this situation, the timber system transforms into the mixed fruit-timber-banana-annual crops system. During the maintenance period, the farmer keeps a number of fruit trees whereas the timber species are harvested.

The number of fruit trees tends to be higher in the Parakan Muncang village in the downstream area of Nanggung subdistrict than the other sample villages, but the number of timber trees tends to be higher in the upstream villages Curug Bitung and Cisarua (table 3). Marketing opportunities for fruit products are available in the Parakan Muncang village whereas marketing opportunities for timber products are available in the upstream area. In the upstream area, farmers prefer to enrich the *dudukuhan* system with timber species when the size of the *dudukuhan* is expanded. The timber trees are planted at high density, limiting stem growth and the basal area of timber trees.

Table 6 shows that total labor for tree and crop care activity is higher (seventy person-days per ha) in the mixed fruit-timber-banana-annual crops system than in the

other *dudukuhan* systems. Farmers prefer to maintain this system for short-term up to long-term needs. In the planting season 2002/2003, the annual crops, fruit, and timber products contributed IDR 37,940,000 per ha. Net returns that farmer can get from these products is IDR 4,002,000 per ha. Compared to other systems, the mixed fruit-timber-banana-annual crops system gives the highest net returns (average per hectare) to the farmer. In general, this system is almost similar with the home garden system and some of the plots close to the farmers' house.

Table 6: Results of the regression analysis for the *dudukuhan* mixed fruit-timber-banana- annual crops system

Variable	Mixed fruit-timber-banana-annual crops system			
	Number of species		Number of trees	
	Fruits	Timber	Fruits	Timber
Dudukuhan size (ha)	0.782	0.839	0.140	0.286
Tree density (N/ha)	0.856	0.921	0.569	0.964
Basal area (m^2)	0.957	0.846	0.277	0.195
Elevation (m.a.s.l.)	0.585	0.679	0.431	0.816
Number of fruit species		0.555		
Number of fruit trees				0.297
Number of timber species	0.555			
Number of timber tree			0.297	

*** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level.

(+) and (-) indicate interrelation between independent variables (x_i) and dependent variable (y)

Transformation from the mixed fruit-timber-banana-annual crops system to the mixed fruit-timber system is conducted by farmers through dynamic changes in tree species composition. The dynamic changes in tree species composition are based on household needs (table 2 and table 7). Some of farmers tend to decrease the number of timber species, by replacing some timber trees with fruit species. And the opposite, some fruit species are replaced with timber species.

In the mixed fruit-timber system, farmers tend to add a number of trees from fruit species although the size of the *dudukuhan* is limited. They plant the fruit trees at a lower density than the timber trees. Fruit trees planted at a low density result in larger tree basal area. Farmers follow this strategy in order to continue the productivity of the *dudukuhan* by maintaining fruits for long periods. Planting activity in this system is higher than both the mixed fruit-timber-banana-annual crops system and the timber system. Harvesting is the dominant management activity in the mixed fruit-timber system. To increase productivity at harvesting time, some of the farmers apply both organic and chemical fertilizers. The application of fertilizers in this system is higher than in other *dudukuhan* systems (table 6). The mixed timber system is the last *dudukuhan* system with harvestable fruit and timber products, before farmers transform it to the fallow system.

Table 7: Results of the regression analysis for the *dudukuhan* mixed fruit-timber system

Variable	Mixed fruit-timber system			
	Number of species		Number of trees	
	Fruits	Timber	Fruits	Timber
Dudukuhan size (ha)	0.785	0.498	0.046** (-)	0.619
Tree density (N/ha)	0.371	0.722	0.051* (-)	0.657
Basal area (m^2)	0.740	0.863	0.030** (+)	0.636
Elevation (m. a. s. l.)	0.159	0.022** (+)	0.011** (-)	0.514
Number of fruit species		0.050* (-)		
Number of fruit trees				0.294
Number of timber species	0.049** (-)			
Number of timber trees			0.294	

*** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level.

(+) and (-) indicate interrelation between independent variables (x_i) and dependent variable (y)

The availability of market for fruit products in Parakan Muncang village (downstream) causes farmers to maintain more fruit trees. Budidarsono et al. (2004) mention that gains from fruit products in Parakan Muncang village is higher than in the other sample villages. At the same time, the number of timber species is higher in the upstream area (Curug Bitung and Cisarua villages). Probably, the Gunung Halimun National Park located close to the Cisarua and Curug Bitung villages serves as a source of germplasm for the *dudukuhan* system in those villages.

The regression results for the fallow system (table 8) show that the number of fruit species tends to increase with the size of the *dudukuhan*. But this situation happened in downstream area. In Parakan Muncang village, where the owners of a fallow system never maintain these systems, the local community living in and around these fallow systems tends to allow the growth of fruit trees for the gathering of fruit products.

Table 8: Results of the regression analysis for the *dudukuhan* fallow system

Variable	Fallow system			
	Number of species		Number of trees	
	Fruits	Timber	Fruits	Timber
Dudukuhan size (ha)	0.099* (+)	0.164	0.221	0.347
Tree density (N/ha)	0.199	0.619	0.146	0.670
Basal area (m^2)	0.165	0.526	0.242	0.342
Elevation (m. a. s. l.)	0.057* (-)	0.325	0.068* (-)	0.329
Number of fruit species		0.133		
Number of fruit trees				0.393
Number of timber species	0.133			
Number of timber trees			0.393	

*** indicates significance at 1 percent level, ** at 5 percent level, and * at 10 percent level.

(+) and (-) indicate interrelation between independent variables (x_i) and dependent variable (y)

The farm and household economic study conducted by Budidarsono et al. (2004) includes a farm budget analysis for the period of the study for every plot of *dudukuhan* controlled by the surveyed households. This analysis mainly focused on net returns calculation during 2002-2003 planting year. It should be clarified that net returns in this regards represents net cash inflow for a single year (2002-2003 cropping year), and does not represent land use profitability. Table 4 summarizes the net returns calculation by type of *dudukuhan*. The results of the analysis show that, except the fallow system, three types of *dudukuhan* gain positive net returns, meaning that cash inflow was larger than cash outflow. In other words, three types of the *dudukuhan* provide income to the owners. The *dudukuhan* systems have a high potential to enhance the productivity.

Farmers in Nanggung area may be best served by transforming their traditional subsistence tree farming systems into semi-commercial enterprises that yield products to meet both home and market demand. This process requires that farmers: (1) focus on a limited number of tree species that are appropriate for local biophysical conditions and a high market value/demand, (2) utilize high quality germplasm (provenance, varieties, *etc*.) to increase productivity and profitability, (3) manage the *dudukuhans* to yield tree products that meet market specifications, and (4) develop permanent market linkages. Improving quality of germplasm may be achieved through tree propagation training and management techniques.

Through deliberate management, polyculture tree gardens can be developed based on four or five priority tree species, which yield products with high market values but also contain a number of other valuable species such as indigenous species to serve household needs and reduce risks. When possible, intercropping with short-rotation crops is encouraged to provide products and income during the establishment phase of priority tree species. The additional *dudukuhan* products resulting from deliberate management can be used in the home (to improve family diet, food security and health) or sold at markets. The greatest benefit to family livelihood is to sell these products at high-demand markets in Bogor and Jakarta, and potentially through international linkages.

Farmer-designed trials and participatory evaluation are low-cost methods to increase farmer participation in species evaluation and agroforestry technology

development, as well as to enhance the effectiveness of research activities to meet farmers' needs and improve their welfare (Franzel et al. 1998). Improving marketing for *dudukuhan* products may be achieved through a series of activities in marketing workshops including: (1) discussions between farmer groups and traders (local, regional or exporter) in a workshop, (2) visits of farmer groups to various markets (local, regional, and supermarket), (3) village meetings between farmer groups and traders, (4) visits of regional traders to farmers' plots, and (5) farmer groups' practice of harvesting and post-harvesting techniques (Roshetko et al. 2004). Extension officers, local government, NGOs, private sectors (traders), and research institutes may participate in the innovation of the *dudukuhan* system through the extension approach, strengthening farmers' technical and group management skills and empowering farmer groups to compete for marketing opportunities.

CONCLUSION

Dudukuhan is a traditional tree farming system with a high diversity of tree. Dynamic changes in tree species composition and number of trees in each type of *dudukuhan* are farmers' strategy to continue the *dudukuhan* productivity, enhance their income and prevent erosion. The strategy has a great impact on biodiversity conservation. In economic aspect, except the fallow system, three types of the *dudukuhan* provide income to the owners.

Traditional-extractive management, low productivity, and low income are the main problems in the *dudukuhan* systems. In order to improve the *dudukuhan* system, various aspects should be addressed including farmers' technical management skills, marketing linkages and institutional strengthening of farmers. Agroforestry innovations through semi-commercial enterprises that yield products to meet both home and market demands should be a guarantee for livelihood enhancement. This process requires that farmers: (1) focus on a limited number of tree species that are appropriate for local biophysical conditions and a high market value/demand, (2) utilize high quality germplasm (provenance, varieties, *et*.) to increase productivity and profitability, (3) manage the *dudukuhans* to yield tree products that meet market specifications, and (4) develop permanent market linkages. Integrating collaboration between multi-stakeholders through extension may improve management skills of farmer in tree propagation and marketing linkages.

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CHAPTER EIGHT

A RAPID ASSESSMENT OF FARM FORESTRY IN BOHOL: CHARACTERIZATION, CONSTRAINTS AND RECOMMENDATIONS

Calixto E. Yao., Manuel G. Bertomeu, and Geramil Cordero

INTRODUCTION

El capital leñoso ni es inmenso ni, por desgracia, inagotable, y las maderas preciosas van siendo raras en muchas, en muchísimas localidades donde abundaban pocos años ha, sin que se vea en ellas repoblados de la misma especie que las pueda sustituir [Tree stocks are neither extensive nor, unfortunately, inexhaustible, and in many localities hardwoods that used to be abundant are now already rare, and without being replaced by natural regeneration of the same species].

Vidal y Soler (1874) Memoria sobre el ramo de montes en las Islas Filipinas

The main reason for the loss of commercial forest areas is shifting cultivation.

FAO/UNEP (1981) Forest resources of tropical Asia

There is, however, some evidence to indicate that forms of agriculture other than shifting cultivation exist in the uplands.

Kummer (1992) Upland agriculture, the land frontier and forest decline in the Philippines

Evidence now exists that small full-time farmers on the upland agricultural frontiers are moving into production of timber trees as a major self-financed enterprise that has the potential to be a major force in environmental rehabilitation of the uplands.

Garrity and Mercado (1994) Reforestation through agroforestry: market driven small-holder timber production on the frontier

The statements above reflect the radical shift of Philippine forestry throughout its history. But although an increasing number of people recognize that smallholders plant and nurture trees, these trees and their productive and protective functions are still invisible to the eyes of many, particularly policy-makers. Thus, the role of farmers as effective land managers and reforestation agents continues to be ignored. The reality is, however, that in the Philippines perennial tree farming is no longer neglected, as some government officials stated a few years ago (NEDA 1981 as cited by Kummer 1992), and the numerous observations of increasing tree cover in many parts of the country (Garrity and Agustin 1995; Pasicolan et al. 1996) indicate that tree cultivation is widespread. In this paper tree farming is simply defined as: farmers growing trees on their land for economic return. As such, it applies to any type of tree, not just timber. The island province of Bohol, Central Visayas, is just another of such places where widespread, and mostly spontaneous, tree planting has been taking place. Officially, reforestation efforts in Bohol started in the 1960s, when the Philippine government successfully planted *Swietenia macrophylla* (hereafter referred to as mahogany) in Bilar and Dagohoy reforestation projects. In the following years, tree planting gained momentum as people in the vicinity of the project area started to plant mahogany at a large scale, encouraged by the demonstration effect of the reforestation, government support of tree planting with free seedlings, Local Government Unit (LGU) initiatives, and demand for lumber. Nowadays,

driven by the strong market demand from the neighboring city of Cebu, farm forestry is an important tree-based livelihood activity for many rural people, and it has the potential to become a major economic activity in the province. Farm forestry and smallholder forestry are used to denote any tree farming practice that involves growing trees for timber, poles, or fuel wood on farmland (Huxley and Houten 1997).

This paper examines the importance of farm forestry in Bohol and the constraints perceived by tree planters. Using government (DENR) records and data, we assess its current status, the constraints, opportunities and threats to tree farming in the province. The scope of the paper is limited in as much as it does not consider farmers management of many productive landscapes of which a large variety of trees are an integral part. However, its importance lies in the fact that it provides evidence of the extent and interest in farm forestry, and its potential as an economic activity and a reforestation approach in the Philippines.

MATERIALS AND METHODS

Description of the study site

Bohol is one the four provinces comprising Central Visayas (Cebu, Negros Oriental, Siquijor and Bohol). It is the tenth largest island in the country, covering a total land area of 411,726 ha. Unlike Cebu and Negros Oriental, Bohol's topography is generally flat, with 47 percent of the land area classified as level to rolling (0-18 percent). It has two major distinct soil types: (1) the calcareous soil in the southern part, from Tubigon, Carmen (the Chocolate Hills), and Garcia Hernandez down south, and (2) the sandy loam in the north, dominated by *cogon* grasses. For both soil types, mahogany and *Gmelina arborea* (gmelina) are the most commonly planted timber trees in the island. They are well adapted to both soil types except in heavily compacted soil in the north, like old pasture lease areas. Climate is generally classified as type IV (under the Corona's climatic classification), with rainfall more or less distributed throughout the year. Based on rainfall, temperature, elevation, soil and vegetation, three agro-climatic zones can be distinguished: (1) wet (rainfall> 2,500 mm), mostly in the highlands, (2) moist (rainfall from 1,500 to 2,000 mm), on upland to hilly areas, and (3) dry (rainfall < 1,500 m) in low hill areas and lowlands. Water is an abundant resource, found all year round dispersed all over the island. Based on the flora, fauna and geological composition Bohol belongs to the biogeographic region of Camotes, which includes the islands of Leyte and Samar (DENR-UNEP 1997).

Approximately 25 percent (101,271 ha) of the area of Bohol land area is classified as timber land or state forest land and 37.69 percent (162,684 ha) of the total land area is agricultural land. Although none of remaining forests in the province are classified under the production category, a large portion of this is under some form of cultivation or use. Major crops include: rice, cassava and other root crops, corn and coconut.

In 1990, the total population in the province was 948,315. Of these, there were about 146,596 rural households with an average size of 5.4 members. The population and population density were expected to reach 1.2 million and 282 people per km^2 respectively in 2002. Agriculture is the dominant source of employment, with 37 percent

of the population employed in the sector. In terms of poverty level, Bohol ranks sixteenth among the country's seventy provinces in the entire country. The government aims to lift Bohol out of the top twenty poorest provinces in three years and to reduce poverty incidence from 47.3 percent to 23 percent by 2015.

Data collection

Two surveys were conducted for data collection. In the first survey, forty-five farmers from ten municipalities were interviewed using a semi-structured questionnaire, and forty-eight tree farms were visited. The objective was to gather information on farmers' tree plantations (species, arrangement, management, harvesting and marketing, extension support), and eliciting their perceptions on constraints to tree farming. In addition, two mayors and six barangay captains were also consulted on revenues generated from planted trees, LGU-led programs on tree farming, and the enacted ordinances on tree farming. In the second survey, we met with DENR officials in Bohol and in the regional office (Cebu) to obtain information on harvesting and marketing: buying and selling price of lumber and the cost of establishing a mini sawmill in case tree farmers would organize and put up a sawmill. Harvesting, sawing and transportation costs from the tree farm to Tagbilaran and other lumber dealers were determined, the necessary data and procedure in the registration of tree farms, fees, and other documents in transporting forest products. Shipping lines also provided transport cost of lumber and charcoal from docking points in Bohol (Tagbilaran City, Tubigon, and Talibon) to Cebu City, being the main market for forest products.

Limitations of the study

Due to time constraints, the study narrowly focused on tree farming by registered farmers, based only on the available official data and statistics on farm forestry. As noted in the introduction, we have not attempted to include in the study the many farmers involved in perennial tree cropping and the many trees they manage in one way or another in the landscapes of Bohol. By simple observation, one can easily grasp the extent of tree cultivation in these landscapes, and how difficult it is in many cases to define the boundary between the farm and the forest. As far as we know, all these tree planting and management activities go unrecorded and therefore truly capture the importance of tree growing by smallholders.

RESULT AND DISCUSSION

The importance of tree farming in Bohol is shown in table 1. According to the official records of DENR regional office, Bohol with 2,280 tree farmers covering 8,596 ha has more farmers and larger area covered by tree farms than all the three provinces have in Region 07 combined (table 1). Of the forty-two municipalities and one city in the province, only two LGUs have no registered tree farm.

Table 1: The extent of farm forestry in Bohol as compared to other provinces in Region 07 (DENR Region 07 2005)

Province	***No. of farmers***	***Area (ha)***
Bohol	*2,280*	*8,596*
Cebu	*621*	*1,723*
Negros Oriental	*910*	*3,971*
Siquijor	*165*	*133*
Total	*3,976*	*14,423*

Note: The list covers tree farms in titled lands. Tree farms in public lands (Integrated Social Forestry, Family Approach Contract, Community-Based Forest Management Agreement, etc.) and tax declarations are not included.

Characterization of farm forestry in Bohol

Contrary to expectations, most of the registered tree farmers are smallholders owning farms below one ha in size (table 2). This is somehow surprising, as one would expect that only those farmers with land in excess of that which can be cultivated with family labor, would be involved in tree farming. Other studies conducted in Claveria, Misamis Oriental, found that although owners of large farms (> 3 ha) had planted almost three times as many trees as owners of small farms (< 1 ha), the tree density (trees ha-1) in the smaller farms were three times higher than in the largest farms (Bertomeu 2004). High tree densities and consequently, limited crop production on the smaller farms may indicate that land-poor farmers have to engage in off-farm work or farm wage labor, thus devoting their small farm to accumulate capital in the form of timber trees or to obtain seasonal income from other tree crops (e.g. fruit trees). Although this is speculative, what clearly emerges from the study is that small farm size is not a deterrent to tree planting.

Table 2: Small farm size do not prevent tree planting in Bohol (CENRO Tagbilaran 2005)

Farm size (ha)	**No. of tree farmers**	**Percentage**
< 1 ha	1,045	73
1-5 ha	351	24
> 5 ha up	45	3
Total	1,441	100

Approximately 50 percent of the tree farms visited were planted to mahogany and the other 50 percent to gmelina. Many farmers have planted both species. Elsewhere in the Philippines, gmelina has been more widely planted than mahogany because of the very fast growth of the former. In Claveria for instance, 62 percent of the timber trees

planted are gmelina and 24 percent mahogany (Bertomeu 2004). It is not clear why in Bohol mahogany is so popular. It is likely that the demonstration effect of successful reforestation projects with mahogany, its quality wood and attractive color, and its higher price are the factors behind its popularity. The widespread planting of medium to long-term rotation species such as mahogany demonstrates that farmers are willing to wait longer than what it is commonly assumed and that there is an opportunity for them to utilize many other native timber species with similar characteristics as mahogany.

Although the government has implemented numerous programs in support of reforestation that have provided free seedlings, the majority (90 percent) of the farmers interviewed produced their own planting materials. Different strategies are used to establish tree farms: (1) collecting seeds and growing the seedlings, (2) wildlings collected from neighbors' plantations, and (3) direct seeding (one farmer achieved 70 percent survival by direct seeding mahogany) The various tree planting strategies that farmers use have important implications for the way farm forestry projects approach the issue of tree propagation and plantation establishment. Future research should assess the trade-offs of these methods with regards to labor requirements, seedling quality and growth, while project managers should be aware of the various ways in which farmers respond to the need to propagate trees according to their specific resources and conditions.

All plantations visited, except two, were planted at close spacing (1x1 m or 2x2 m), and none of the tree farmers either apply fertilizer or prune or thin their plantations. Therefore, tree performance in the plantations visited was generally very poor. This is common not only in Bohol, but elsewhere in the country. In the Philippines, high tree density and close spacing have been typically promoted whether the programs were concerned with plantation forestry or smallholder agroforestry (Agapaoa et al. 1976; Valdez 1991; Gacoscosim 1995; DENR-ERDB 1998). The only exception is the line planting system or 1x10 m spacing promoted by the Paper Industries Corporation of the Philippines (PICOP) in its tree farming scheme (Santiago 1997). Studies conducted in Claveria show that this system is more appropriate for smallholder farmers as trees grow faster, and farmers are able to plant intercrops at a commercial scale for longer periods as there is less competition between trees and crops (Bertomeu 2004). Proper tree management and silvicultural practices can make up for the more open light regime in plantations at wide distance. A twelve year old gmelina at 2x3 m spacing in Loay, applied with fertilizer and partial thinning (20 percent) has attained an average diameter of 26 cm for 139 trees, by far the best plantation in Bohol. Had thinning been done at 75 percent, average diameter could have easily reached 40 cm (Dalmacio 1995; Bohol Province and GOLD 1998).

Farmers' reasons for planting timber trees

Most farmers (85 percent) plant timber trees for household use as building materials and additional income to be used in times of emergency or when extra amounts of money are needed (e.g. to pay school fees) or as enterprise. One such farmer has established a plantation under the Tree Farm Leasehold (TFL), an informal tree farm tenure system in Bohol, where the developer agrees to give a 20 percent share to the land owner after

harvest in fifteen years. Five farmers (11 percent) planted trees because the degraded farms could no longer produce corn and cassava while two farmers (4 percent) planted trees to improve the environment (table 3).

Table 3: Farmers' reasons to plant timber trees in Bohol in 2005

Reasons for planting trees	**Count (n = 45)**	**Percentage of farmers reporting**
For additional income	20	44.45
Construction materials (own consumption)	18	40.00
Because I can no longer plant annual crops in my degraded land	5	11.11
Environmental improvement	2	4.40
Total	45	100

Note: farmers could report more than one reason

Aside from small patches of coconuts, most of the arable areas are either planted to corn or cassava and few are devoted to vegetables or legumes (peanuts, cowpeas and mung beans). With the increasing price of fertilizers (PhP. 700 to 900 per sack), many farmers are no longer planting cash crops, thus increasing the chance to plant trees. Improvement of the local environmental conditions for fresh air, shade and shelter is another important reason for planting trees.

LGU initiatives

One of the major reasons for the widespread adoption of tree farms in Bohol is the active participation of the LGUs (governor and mayors). The LGU initiatives include:

- The Bohol Tree Enterprise Program (BTEP) initiated by the province under the Bohol Environmental Management Office (BEMO), which started in 1997 and promotes tree enterprise for self sufficiency in lumber and improved environment through training on silvicultural practices for optimum tree growth at the earliest possible time. The program was assisted by the Governance on Local Democracy (GOLD), a USAID assisted project (Yao et al. 1998).
- Clean & Green Program, a continuing nationwide tree planting program that has gained wide support among the Boholanos.
- Volunteerism for Irrigation Project, 1993-1996, a special project of then Mayor Auguis of Pilar on tree planting in watershed and farm lots for water conservation in support to irrigation.
- Training on silvicultural practices, 1996, Mayor Digal of Loboc sponsored a training workshop on silvicultural practices for tree farmers, conducted by PENRO Bohol in support to the thriving furniture of the municipality. The mayor

had also encouraged all barangays to establish at least one hectare of tree plantation for the furniture industry (GOLD 1995).

- DENR-ADB/OECF contract reforestation project, 1989-1992, has a family approach contract component wherein farmers within timberland were contracted for three years to reforest their farms at PhP. 16,000/ha.
- The Community Based Resource Management Project, 2002-2005, a World Bank assisted project in selected LGUs with tree planting component.
- The Central Visayas Regional Project (CVRP), 1985-1992, a World Bank assisted project with tree planting component in selected LGUs.

A majority of the farmers interviewed (80 percent) recognized that they have been influenced or encouraged to plant timber trees because of the demonstration effect of the above programs.

Marketing

Most tree farmers sell their trees on stumpage value to lumber dealers and canvassers. Commonly, logs are first processed (squared) in the field with a chainsaw. In most cases, log ends and branches from harvested trees are wasted due to the lack of marketing opportunities. Squared lumber is then transported to the sawmills in Tagbilaran and Cebu City for further processing and slicing into wooden planks of different sizes (e.g., 2x4x8 or 4x6x8). Tree buyers take charge of all the transaction permits and fees. These include, PhP. 90 for DENR and LGU certification, PhP. 20 for the barangay certification, PhP. 50 for the mayor's certification, and; transport fees ranging from PhP. 5 to 15 per tree, or PhP. 0.25 per board foot (bdft) to PhP. 300 per truck load. All these various fees and certifications probably pose as a major constraint to tree cultivation, as high transaction costs are ultimately paid by tree farmers (in the form of lower prices for their timber), and unclear procedures and farmers' lack of understanding of these prevents them from further tree planting. Moreover, prices for farm-grown timber have remained steady for the past ten years. Currently, prices of gmelina lumber range from PhP. 5 to 7 per bdft and PhP. 8 to 10 per bdft for mahogany lumber. However, the Philippine Coconut Authority (PCA) has recently regulated cutting of coconut trees causing increased price of coco lumber from PhP. 9 to PhP. 17. With this new development tree farmers could expect at least 50 percent increase of their lumber.

Perceived constraints to farm forestry

Tree planting is very popular in the province but is beset with prevailing constraints. First, lack of extension support: when farmers interviewed became tree farmers they believed that the more trees per unit of land were planted, the more timber they will produce. Therefore trees were planted at close spacing, following general recommendations given at that time. Unfortunately, slow and poor growth of planted trees due to lack of management or the use of low quality planting materials has caused disappointment among tree farmers. Some farmers interviewed are now convinced that

they could have improved tree growth with minimal investments in fertilizer or silvicultural practices (pruning and thinning). Even buyers are now advocating thinning. It is necessary therefore, for farm forestry programs to establish demonstration trials to show tree farmers the benefits of proper pruning and thinning and other key aspects to successful tree growing (e.g., the importance of quality germplasm or seedlings).

Second, low price of farm-grown timber: the buying price of timber on stumpage value indicated above has not changed in the past decade. In parts of northern Bohol, some farmers reported that the price is even lower at PhP. 2 per bdft. Consequently, farmers interviewed stated that they would rather use the lumber for their own needs than sell it at the current price. There is agreement among the farmers and lumber dealers interviewed, that poor quality is the ultimate reason for the low price of farm-grown timber. The poor quality of lumber is due to harvesting of undersize (low lumber recovery) and underage (lower wood density/high shrinkage percentage) trees.

Third, policy restrictions: in addition to the many fees and certifications reported above, there are a number of government policies that discourage tree farmers: (1) planted trees within protected areas (like in the Inabanga watershed) even in titled lands are prohibited to be harvested, (2) planting trees belonging to the premium hardwoods (e.g., *dao*, *narra* or *molave*), farmers have to apply for a Special Private Land Timber Cutting Permit (SPLTP) and pay PhP. 3,000 m^3 for forest charges, (3) the recent log ban after the killer flash floods in Luzon, which rendered planted trees in timberland and tax declared land within Alienable and Disposable (A&D) lands unharvestable, has affected many tree farmers in Bohol, (4) farmers are also required a permit to cut naturally growing trees and pay forest charges even if these tree have been conserved and to some extent, nurtured, by smallholders like the ubiquitous antipolo (*Arthucarpus blacoi*). Patches of natural growth should be considered under assisted natural regeneration (ANR), considering its proximity to home lot. And besides, the policy on natural growth was meant for the large chunks of forest, especially the dipterocarps, and should therefore exclude different kinds of forest patches. The above policies are counterproductive to the tree planting program of the government.

Fourth, lack of tree species options: farmers are aware that prices of native premium timbers are substantially higher than prices of those trees commonly promoted (mostly mahogany and gmelina). Reports on farmers' protection and management of native tree species (natural regeneration) supports what farmers interviewed in this study reported: that they are willing to plant these species if seeds, seedlings or other planting materials were made available. For farm forestry to be an important economic activity, it is imperative therefore to expand the number of tree species that can be used and improves farmers' access to these options through the establishment of decentralized tree seed production and distribution systems.

Fifth, poor market access and lack of marketing options, because of remoteness of tree farms and poor road access; small size of plantations and limited volume; and lack of marketing associations or farmers' cooperatives. Therefore, individual farmers are forced to sell lumber at a low price, whenever they need cash. Some of the farmers interviewed reported that because of difficult access to markets they are being exploited by buyers who offer them prices below the market rate or use the less-one system (i.e. for every squared lumber of say, 6x6x10 inch, which is equivalent to 30 bdft, payment will be based on 6x6x9 inch or 27 bdft). It is not clear however, whether buyers apply the less-

one system because of the low recovery rates using chainsaw or as a way of exploiting farmers.

Last, competition from other, heavily subsidized, tree crops: oil palm has become the latest option for farmers in the northern part of the province. A number of farmers have already established a 1 to 3 ha plantation. They can avail a loan from the oil palm company at PhP. 50,000 ha-1 for site preparation, plantation establishment and maintenance. Studies project that after five years, harvest starts and fresh nuts would be bought at PhP. 2,000-3,000 mt-1. Farmers can expect returns of PhP. 16,000 ha-1 per year-1. If projections are true, oil palm would be a more attractive option than farm forestry, with current return of around PhP. 50,000 per ha in ten to fifteen years. If the government does not provide assistance to tree farmers, many of them will surely turn to oil palm.

CONCLUSIONS AND RECOMMENDATIONS

Widespread planting of timber trees on small farms in Bohol and their commercialization provides evidence of the viability and appropriateness of farm forestry as an alternative farming system, and the potential of smallholders as timber producers. Encouraged by government reforestation efforts, many farmers are accumulating broad knowledge about timber trees and how to cultivate them. They grow timber trees for various reasons: for household consumption of wood products; to accumulate capital and generate cash; to improve soil fertility and productivity. However, some constraints in tree planting have been identified. The most important are: (1) the lack of more tree species options, (2) the lack of an effective extension support system, (3) competition from heavily subsidized tree crops, (4) government restrictions and regulations on planted trees, and, (5) poor market access and opportunities.

Therefore, if farm forestry is to be promoted as a viable strategy for rural development and poverty alleviation, the government extension system and agroforestry programs should address four broad issues. First, the improvement of tree management practices (i.e. pruning and thinning). A combination of on-farm trials, with active involvement of farmers in the design and management, and more training can address this. Second, the lack of quality germplasm of a wider list of timber tree species (including indigenous trees) suited to the diverse biophysical and socio-economic conditions of farmers. If germplasm is made available, smallholder farmers have already proven to be active and successful tree growers. There is a need to demonstrate to farmers the advantages of using quality germplasm. Extension and dissemination methods should also improve, helping farmers to make informed decisions rather than just promoting standard tree planting packages. Third, DENR, LGUs and NGOs, should help tree farmers organize themselves to attain a better marketing position and wider enterprise options (putting up saw mills, furniture shops, *etc*.) and promote the use of indigenous species (antipolo, bugo (*Garuga floribunda*), talisay gubat (*Terminalia foetidissima*), kalukoi (*Ficus callosa*), lipote (*Syzigium polycephaloides*) for seed production and biodiversity conservation. All species, except lipote, are native in the province, while the first four species have been successfully established in Siquijor (Yao 1993). Last, there is

an urgent need for a dialog with government agencies to lift policy regulations that discourage tree growing on farms.

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CHAPTER NINE

TREES, RURAL LIVELIHOODS AND FARMERS' DECISIONS: NDERSTANDING THE INTEGRATION OF TREES IN FARMERS' FIELDS IN NORTHEAST LUZON, PHILIPPINES

Susan H.G. Schuren

ABSTRACT

Tree integration and agroforestry adoption remain an important challenge in the Philippines as well as in many other developing countries, and will prove to be an even more important challenge under continuing pressures of agricultural intensification. Whereas home garden systems are common, tree integration in farmer's fields remains relatively limited in this part of the Philippines, despite the many research and development efforts directed at the promotion of agroforestry. This empirical study aims to describe and understand at the micro-level tree growing patterns in farm fields and to identify constraints to tree integration. The study finds that almost half of the respondents in the sample (n=141) adopted a tree system in at least one of their plots and about 32 percent of the plots cultivated by respondents contain a tree component. Systems containing few trees (i.e. boundary planting) are most commonly found, while purely tree-based systems are adopted to a much lesser extent. In most fields where trees are integrated, the perennials are combined with seasonal crops, but purely perennial systems and agrosilvopastoral systems do occur to a reasonable extent as well. Tree integration in farms is far more frequent in upland villages than in lowland villages. The study also indicates that current land use changes favor tree integration (i.e. in more past as well as planned land use changes a tree component is introduced instead of removed). Reasons for shifting into trees can be divided into pull and push factors: farmers value highly the timber and construction wood that can be generated from trees as well as the fruits in the case of fruit trees, while diminishing returns to investment in yellow corn production proves to be an incentive to shift into trees. Perceived advantages of growing trees in farms also concentrate on the productive functions of trees, while farmers regard the regular recurrence of typhoons, free-roaming livestock and local burning practices and wildfire as the mains problems in growing trees on farms. Current adoption patterns can be explained by the characteristics of tree cropping and the way this fits into rural livelihood systems, ecological processes affecting seasonal cropping in upland areas, emerging market imperatives and market integration rendering tree products more economically attractive, reorientation versus subsistence-oriented production or substitution by planting of resources formerly extracted from the forests or woodlands and the influx of migrants with a traditional ethnic background of tree growing who are introducing commercially oriented fruit-tree cultivation. Likewise there are also dynamics that discourage tree adoption, most importantly, continued land fragmentation which redirects farmers toward short-term cash income-generating crops and interlocking of credit and output markets which withhold farmer-cultivators to shift away from cash crops desired by rural moneylenders.

INTRODUCTION

The integration of trees in farm fields, backyards and grassland areas has widely been promoted for potential environmental, economic and ecological benefits. This accounts also for the Philippines where over the past two decades, agroforestry and smallholder tree growing have become important components in many policies and projects aimed at sustainable development particularly of upland areas. A wide array of benefits is attributed to trees when integrated in grassland areas or agricultural lands. Trees are thought to positively impact the environmental functioning of the landscape as well as the ecological value of it through improved hydrological functioning, decreased soil erosion, organic matter deposition and nutrient cycling, carbon sequestration and possibly, biodiversity conservation. Moreover, tree integration is also thought to have potential for rural development through the beneficial interactions of combined tree-crop systems that, in some instances, have been proven to increase total production and decrease fertilizer requirements for annual cropping. Tree growing by smallholders may also improve households nutritional conditions, spread financial risk by income diversification as well as optimize the utilization of households labor throughout the year (MacDicken and Vergara 1990). Often these potential benefits have received much attention, while the potential negative impacts of tree integration, such as possible increased soil erosion and loss of productivity through shading, have remained in the shadow.

Many programs and projects aimed to extend agroforestry technologies and promote tree integration have faced limited success (Arnold and Dewees 1995; Mercer 2004; Bannister and Nair 2003), which has forced scientists to adopt a more critical approach to agroforestry and tree integration. Over the past decade low adoption rates have led to growing attention for smallholder decision-making with regard to tree integration and agroforestry adoption. This research aims to explore current patterns of spontaneous and project-induced tree adoption by smallholders in hilly lowland and upland villages in Northeast Luzon. This area faces several dynamics, mainly population growth, market integration and land use intensification, that are important to take into account when assessing farmers' decisions regarding livelihood and land use. This paper will analyze patterns of spontaneous and project-induced tree integration in five villages in Northeast Philippines. It will zoom in on farmers' motivations for growing and maintaining trees, factors that constrain tree adoption and will determine changes that have occurred in tree integration patterns over time. In general, this research contributes to the growing body of knowledge on why farmers adopt trees in their farming systems and why they don't.

Tree integration in farm fields is a broad umbrella term wherein tree integration can take many different forms. It can include agroforestry systems, mono-species plantation systems up to reforestation as long as the area where the system is established, maintained or adapted is regarded as, to a more or lesser extent exclusive, production area by a farmer. It can range from highly anthropogenic systems to systems that resemble natural conditions.

AGRICULTURAL INTENSIFICATION AND SMALLHOLDER TREE INTEGRATION

Ecological degradation is an important element in the debate surrounding the development of upland areas. Since immigration results in more intensive use of marginal upland areas, the fragile formerly forest ecosystems are severely disturbed, which in turn also threatens the economic base of the local inhabitants. These, often largely subsistence oriented production systems on sloping lands, degrade under continuous cultivation, if insufficient time is left for regeneration. In a compilation of essays on upland development Fujisaka and Sajise (1986) found that permanent agroforestry cropping seems to be an ideal solution for upland sustainable cultivation and productivity increases, but the introduction of the technology is still limited by the absence of accessible and equitable provisions for credit, marketing, agricultural inputs and information. However, we pose that spontaneous tree integration is common and widely practiced, more so in upland than in lowland areas. This may be related to the statement in Fujisaka and Sajise that farmers are devising strategies to deal with new dynamics related to intensification, land degradation and expansion of grasslands.

In the analysis of adoption patterns of agroforestry (and tree integration in general) in different parts of the world, several theories have emerged. Scherr (1995) argues that induced innovation theory can be applied to agroforestry adoption. She found evidence that past increased in tree cultivation in Kenya were related to decreasing availability of natural supplies of trees, augmented subsistence and commercial demand for tree products and cultivators' perceived threat of resource and ecological degradation. These changing conditions affect the context in which smallholders take their decisions on land use and tree integration and will therefore affect actual tree integration patterns. Similar ideas have been expressed by Arnold and Dewees (1995). They describe how, in situations in which natural tree resources have declined or disappeared, private tree management and integration seems to go through different common stages or pathways. Basing themselves on Raintree and Warner (1986), they argue that private tree growing develops in different stages. When land use is extensive due to low population pressure and tree cover is still vast, private tree management tends to be passive. As tree resources become scarcer, management takes on a more active role by assisting regeneration for example. Continuing on this line of intensification and associated loss of tree cover due to seasonal cropping, tree management becomes more intensive and active and at this stage trees gain market value and can start playing a role as cash crop. Land use intensification, according to the authors, is coupled with increasing sophistication of tree management strategies. In response to augmenting land scarcity, local farmers have also been devising new strategies to increase their resource-base. Grassland areas, for example, being left behind as infertile and perceived to be unsuitable for cultivation in the past, are now being taken up for production purposes. Van Noordwijk et al. (1997) have linked agroforestry to intensification and the re-integration of severely degraded and *imperata*-infested lands into active farming systems

There thus seems to be an emerging consensus that land use intensification processes affect tree integration, and some, although limited, case material is available to support this hypothesis. This study aims to contribute to this discussion by examining

land use change trends and smallholders' motivations for these changes in areas under different levels of intensification in Northeast Philippines.

RESEARCH AREA AND METHODOLOGY

Research area

The research has been conducted in five villages at the foothills of the Sierra Madre Mountain Range. Since the early 1900s migration and population growth have caused inhabitants to move farther away from the fertile lands in the Cagayan Valley into less accessible and less agriculturally attractive lands in the hilly and sloping areas leading into the mountains and forests of the Sierra Madre. This has steadily continued over the past century and did not only lead to a retreating forest frontier but also resulted in substantial intensification of already cultivated areas closer to the lowland valley area (van den Top 1998). Land use has become permanent in most areas, and has intensified by green revolution-based introduction of hybrid varieties of rice and corn and institution of irrigation systems in the depressions near rivers, while in the less densely populated areas bordering the Northern Sierra Madre Natural Park (NSMNP), slash-and-burn based farming systems are becoming permanent, and fallow periods everywhere are reported to decrease. Moreover, land areas per household head have decreased in the past and still continue to do so, especially in the lowland and hilly zones were the land frontier has moved out already fifty years ago. Increasing market integration is slowly leading the farming households away from traditional subsistence oriented systems to more market-based production systems.

The research area is situated at a thirty minute to one hour ride from the highway which connects it to the local commercial center. The villages cover flat lands near the river as well as sloping lands closer towards the forest. Altitude ranges between 40 and 450 m.a.s.l. The communities, numbering in total 7,089 inhabitants, are predominantly agricultural with as other important source of income illegal logging. The area has been selected because it covers three different agroecological zones: lowland, upland and an intermediate area called hilly lowland. These three zones are situated in a gradient from intensive to extensive land use. Moreover, although these villages have been exposed to agroforestry and community forestry extension work, a relatively large number of smallholders in the community did not have any direct extension contact. This allows us to study both spontaneous tree planting as well as smallholders' response to these agroforestry and tree integration interventions.

Methodology

Respondents for this study were sampled randomly, based on village records of households. The data presented here are based on interviews with one hundred forty-four respondents, of which seventy-five classified as non-planters and sixty-nine as planters. Survey data were supplemented with field visits and informal interviews. Respondents have been classified as adopters when they planted or retained a minimum of seven trees

on one of their plots, with a minimum ratio of ten trees per ha. Respondents were household heads as defined by themselves (96 percent male). All data presented are farmer-based.

LAND USE, INTENSIFICATION AND TREE ADOPTION

Land use in the research area is highly dominated by cash crop cultivation, either irrigated rice in areas where the necessary infrastructure is in place or yellow corn in many other, often less favorable areas. However, table 1 shows striking differences between land use of residents of upland communities compared to that of residents of lowland communities. Among upland residents yellow corn combined with trees, pure yellow corn and pure perennial cultivation were found to be most common, while among lowland residents seasonal cropping is more prominent and trees, notably more absent. There, most farm lots are planted to pure yellow corn, followed by irrigated rice, and yellow corn with trees. Land areas owned or cultivated by households are more extensive than farm areas of lowland households. Fallows are generally absent, disregarding short temporary fallows in the summer months, when it is generally too dry for cropping in non-irrigated lands. Fallow periods of longer than one year were reported for only 3 percent of the plots; cropping has become continuous.

Table 1: Important characteristics of the research area in Northeast Philippines

Research villages	Classification	Population	Planters	Non-planters	Average land area per household
Batong Labang	Upland	2084	29 (83%)	6 (17%)	3.04 ha
Villa Immelda	Upland	852	21 (88%)	3 (12%)	2.10 ha
Cabesera 17-21	Hilly lowland	1287	18 (62%)	11 (38%)	1.32 ha
Cabesera 14-16	Lowland	2093	9 (22%)	33 (78%)	0.94 ha
Cabesera 25	Lowland	773	6 (29%)	15 (71%)	1.18 ha

Table 2 shows that tree integration in farms is substantial but not common. A little less than half of the respondents have at least one plot in which trees were integrated. Out of the total 358 plots, only 32 percent contained a tree system. Since plots with tree components are generally larger than plots under pure seasonal cropping, total land areas under systems with trees integrated is larger. Out of total land area cultivated, forty-seven, or 8 percent had trees integrated to a certain extent, while the remaining land area is under different combinations of seasonal crops (either mixed systems or sequential systems). However, the actual land area covered with trees is much lower since, many of the lands classified as having a perennial system do have large seasonal crop components.

Table 2: Farmer-reported current land use and perennial integration and their relative importance in Northeast Luzon

		Total land area in ha	Percent of total land farm land	Mean ha/ plot	Min.	Max.	No. of plots
Seasonal crop	Yellow corn	57,52	24,4	0,50	0,04	2,00	114
	Irrigated rice	24,96	10,6	0,35	0,02	2,25	72
	Other seasonal crops	36					
Perennial land use	Boundary planting	60,10	25,5	0,92	0,04	4,00	65
	Purely perennial	26,58	11,3	0,89	0,05	3,00	30
	Other perennial arrangements	18,99	8,0	1,58	0,09	4,00	12

CHARACTERIZATION OF TREE INTEGRATION

The most common practice in on-farm tree integration is to grow or retain trees in farm boundaries, while mixed cropping systems, comprising intercropping arrangements, are adopted to a much more limited extent (see table 3). Purely perennial based systems (including combined banana and tree plantations) on the contrary occupy a little over 10 percent of the total farm area. Most often trees are combined with seasonal crops, in which trees are planted in the boundary in order to avoid shading of the cash crops and sometimes also to serve as windbreak or live fence. Roadsides are popular for boundary planting as this configuration minimizes negative effects of shade and does not reduce crop harvest on neighboring plots of other owners. In many instances growing trees in the boundaries is considered forbidden if adjoining plots are rice fields, and for some farmers all shading of adjacent plots renders tree growing an impossible strategy. Purely perennial systems do occupy a sizeable land area as well. These range from pure timber plantations of gmelina (*Gmelina arborea*), to pure and mixed fruit tree plantations and combined mixed tree lots with banana. Only in 18 percent of tree plots there is some integration of livestock. A little over one third of the farms with perennial integration have substantial amounts of perennials (more than one hundred trees), while other lots contain mixed systems with fewer trees. In 28 percent of farms with a tree component, the number of trees planted or maintained was less than twenty-five. Tree species diversity was low, with over half of the tree plots containing two to five different tree species and less than 5 percent of plots containing more than ten different species. However, these data are based on farmer-reported diversity and may therefore be considered conservative.

Table 3: Arrangement and components of trees in farm fields in Northeast Philippines in percentages of total number of farm lots

	Total (percent)	Upland (percent)	Hilly lowland (percent)	Lowland (percent)
Perennial arrangement [a]	**(n=107)**	**(n=71)**	**(n=16)**	**(n=20)**
Boundary planting	61	56	69	70
Tree plantation	28	30	25	25
Mixed cropping systems	11	14	6	5
System components [b]	**(n=111)**	**(n=75)**	**(n=16)**	**(n=20)**
Agrosilvocultural	51	48	44	70
Pure perennial	28	29	25	25
Agrosilvopastoral	18	20	31	-
Silvopastoral/piscicultural	3	3	-	5

[a] data missing: 8
[b] data missing: 6

Our data demonstrate some, though not very outspoken, differences between patterns of on-farm tree integration among upland and lowland farmers. Systems combining livestock with trees are more common in upland areas, than lowland, where the focus is more on combining trees with seasonal crops in a boundary system, which seems to be related to lower average farm sizes in the lowlands. Upland farms slightly more often have mixed systems and there, tree systems exist with solely naturally growing trees, while the latter have completely been eradicated in the lowlands. Surprisingly, the ratio of combined naturally growing and planted in farms versus only planted trees in tree plots, is similar for both upland and lowland farmers. Also remarkably, no clear distinction can be made in terms of the number of trees integrated in farm lots as well as diversity of species integrated.

Table 4: Quantity, diversity and source of trees in farm fields in Northeast Philippines

	Total (percent)	Upland (percent)	Hilly lowland (percent)	Lowland (percent)
Tree quantity per plot	**(n=45)**	**(n=44)**	**(n=15)**	**(n=16)**
<25	28	25	47	19
25-50	19	14	27	25
51-100	17	18	13	19
>100	36	41	13	38
Farmer-reported species diversity	**(n=109)**	**(n=73)**	**(n=15)**	**(n=21)**
1	20	16	nda	27
2-5	51	52	nda	33
6-10	24	26	nda	33
>10	5	6	nda	5
Source of trees	**(n=96)**	**(n=60)**	**(n=15)**	**(n=21)**
Natural	3	5	nda	
Planted	68	62	nda	62

Natural and planted	29	33	nda	38

DIRECTIONS IN LAND USE CHANGE: TOWARD GREATER PERENNIAL INTEGRATION?

The following analysis is based on farmers' recollection of past land use changes and has therefore to be interpreted with precaution. The data demonstrate sizeable shifts in land use since the 1960s running parallel with intensification (see table 5). Tree integration has been more common than shifting land use away from trees. Most commonly, trees were added to existing systems, more than to shift from one seasonal crop to another, while shifts within tree based systems (which most often entailed adding trees in a plot which already contained a tree component) was fairly common as well. There are remarkable differences between past land use change patterns in upland and lowland-based farmers' fields. In upland areas tree integration in plots without trees or in plots with a tree component is dominant, but in lowland areas most shifts are between seasonal crops.

Table 5: Farmer-reported past land use changes (1975-2004) and plans for future shifts in land use in percentages of total fields

	Past land use change (percent)			**Plans for future land use (percent)**		
	Total	**Upland**	**Lowland**	**Total**	**Upland**	**Lowland**
Non-tree to trees	18	30	13	5	4	5
Seasonal crop to seasonal crop	13	5	17	5	5	4
Tree-based to other tree based/ or more trees	3	9	1	11	25	5
Tree-based to non-tree-based	1	0	2	1	2	0
Add non-tree component to tree based system	-	-	-	2	5	0
Total plots with change	35 (n=126)	45 (n=50)	32 (n=76)	23 (n=81)	41 (n=47)	15 (n=34)
No land use change	61 (n=232)	52 (n=58)	69 (n=160)	75 (n=277)	59 (n=67)	85 (n=200)

n = 358; data missing for past land use change is 4.2 percent or fifteen cases, data missing for future land use changes is 2.5 percent or nine cases.

Farmer's motivations for these land use shifts highlight the underlying dynamics at work. Focusing on the factors that have influenced tree adoption, the data suggest that there are pull and push factors at work; farmers mention either reasons to stop cultivating their previous crop (push) as well as reasons for integrating the new land use element (pull). Some farmers mention that the major competing crop, yellow corn, is becoming less profitable and productive (six times mentioned), while in the 1980s many farmers had shifted into this crop because it generated a high price and gave farmers access to credit through input and output linkages (thirty-two). Informal interviewing suggests that this productivity and profitability decline in yellow corn is related to land degradation, increasing prices of chemical inputs and farmers' growing aversion against dependence on moneylenders for credit. Integrating trees became a component in the 1990s. Farmers'

motivations to integrate trees in their farms are highly diverse. Farmers liked to plant trees in their farm in general because of financial strategies: savings (one), pension (two), income diversification (five) and due to low labor requirements of trees (three) and because trees can suppress grasses and weeds (three). In 2000, integrating trees for soil conservation became an often mentioned motive (six), while it hardly emerged in the 1980s and 1990s (one each). This may be related to emerging soil fertility problems due to continuous seasonal cropping, but may as well be associated with farmers' training on sustainable land use which has increased farmers' awareness of these soil-related processes.

Surprisingly, no farmer mentioned integrating trees because of free seedlings dispersal or any other project involvement. The main motivations behind specific tree integration activities of farmers refer to fruit and timber production for either household consumption (nine and twenty respectively) or market sale (nine). Farmers showed divergent levels of satisfaction regarding their farm outputs. Whereas satisfaction rates were lowest for yellow corn fields (42 percent), and for yellow corn with trees in the boundary (63 percent), while for irrigated rice (97 percent) and purely perennial systems (100 percent) satisfaction was high. Dissatisfaction originated mainly, and they all refer to yellow corn, from low productivity (12 percent), high production costs (29 percent) and associated debts to traders, high interest rates among traders (10 percent), low output prices for yellow corn production (15 percent) and high crop sensitivity to climatic conditions (8 percent).

PROJECT IMPACT ON TREE ADOPTION

Two out of the five communities studied, were covered by a Community-Based Forest Management Agreement (CBFMA). In this project, community members cultivating or claiming public lands were encouraged to plant timber trees, mostly gmelina, out of a reforestation objective. Direct project impact came about through workshops and trainings and by free tree seedling dispersals. The total area reforested through this CBFMA was limited (Tarun-Acay 2003). In all five communities PLAN International Philippines implemented the sustainable agriculture program, which entails a tree growing component. In this program selected participants were given trainings on tree management and fruit tree seedlings for planting in their fields. The impact of the program was narrow in scope since only few members per village were directly affected. However, there likely exists a broader impact of both projects on tree planting practices in the communities affected.

The projects' extension efforts in terms of training, seedling dispersal and other means of information dissemination have succeeded in augmenting adoption of trees in local farming systems. There is a significant and positive relation between the level of extension received and tree adoption. How projects have been able to stimulate smallholders in the area is unclear. Looking at the different elements of extension activities, it appears that all elements of extension (i.e. training, information dissemination such as dispersal of reading materials, and dispersal of seedlings) are correlated significantly with tree adoption but the impact of the different instruments is difficult to assess due to multicolinearity of the different extension activities. Many

farmers not only attended training sessions, but also received reading materials and seedlings within the programs dispersal activity.

Smallholders derive the idea to integrate trees in their farms from several sources (table 6). Mainly, the idea originates from farmers' direct surroundings, from relatives, neighbors or simply what they observe in the fields of co-farmers. Direct influence of extension activities on farmers' tree integration behavior is contradicted; farmers themselves do not often perceive extension as their major inspiration to plant or retain trees.

Table 6: Farmer-based sources of influence in tree integration

Source of idea to plant trees	Percent of responses (n=78)
Farmer himself	31
Social network	54
Extension	12
Extension and social network	4

Almost half of all tree adopters did not receive any form of extension. Thus, tree based systems are also adopted or maintained spontaneously. What are the differences between spontaneously adopted systems and systems that are adopted by farmers who have received extension? The data suggest there is not much difference between these systems in terms configuration and arrangement. Similarly, when categorized, systems with purely planted trees, planted and naturally grown trees, and solely naturally grown trees occur to a similar extent in systems with and without influence of extension efforts. Thus, extension efforts are an important determinant of tree integration, although this is not fully acknowledged by the extension recipients, the farmers. However, when tree integration takes place, it mainly follows the line of customary tree integration practices.

FUTURE LAND USE SHIFT PLANS AND FARMERS MOTIVATIONS

In general, land use is not very dynamic: only relatively few farmers were planning to change some cropping element in one of the plots at the time the survey was held. Where these plans existed, it entailed most often the adding of trees in already existing tree plots or tree-crop combinations, while also shifts from solely seasonal crops to combined seasonal perennial systems as well as shifts between seasonal crops are fairly common (see table 5). Land use changes were most commonly planned for fields currently devoted to yellow corn. Strikingly, plans for tree integration are more numerous among upland than lowland farmers, while in upland areas the tendency towards taking into use secondary forest or fallowed areas for production is also reflected in the data. The data clearly suggest a shift toward integration of trees in farms in the future, and although there seem to be differences between lowland and upland based farm-owned fields, this dynamic seems to apply to both areas.

Farmers mentioned several reasons why they want to change their current land use and these reasons can be divided into push factors, which induce them to stop

producing their current crop in the current configuration, or pull-factors, which brings farmers to integrate new components or shift completely into a new crop. Respondents are planning to shift away from yellow corn in lowland as well as upland areas, although this dynamic is more pronounced among lowlander farms. The main motivation for the farmers interviewed to integrate (more) trees in their farm in the future, lies in the benefits that can be derived from trees. Farmers in general mentioned several motivations for their planned land use change, most importantly, the current marketability and profitability of fruits (13 percent), and related, planting fruit trees to sell the fruits later (9 percent), profitability of tree products in general (7 percent), trees for income diversification (12 percent), trees as a pension provision (6 percent), resource advantages in tree production such as low labor requirements (5 percent) and modest capital investments for trees (5 percent) and trees for continuous income (2 percent) and as a form of savings (2 percent). The main reasons to integrate bananas refer to the immediate income that can be generated (3 percent), it's tolerance to drought (1 percent) and its low labor needs (1 percent). Timber trees are specifically planted to supply the households' timber needs for housing (4 percent) and furniture (1 percent) and to sell (4 percent) because on-farm planted timber is perceived to be profitable (3 percent) and to have a short maturation time (2 percent). Timber trees, mostly gmelina, are also planted because natural supply of wood is lacking since the forest frontier has retreated (2 percent). Tree integration also seems related to soil conservation (2 percent), the perception that the soil is unsuitable for other crops, often because of stones (3 percent), and the perception that the competing crops are not profitable or productive anymore (2 percent).

FARMERS' MOTIVATIONS FOR GROWING TREES

Why are farmers growing trees? Why do others refrain from tree integration in their farm, or remove naturally growing trees? As resource-poor farmers have little access to resources as land and capital (and sometimes labor as well), they make decisions on how to allocate their resources in a way that most effectively fulfills their household needs. This implies it is essential to understand how farmers value trees, what role the trees fulfill in the household economy and what barriers farmers' experience when integrating trees.

Trees for the family

Tree integration takes place predominantly to supply household needs of either fruits or timber for house construction or furniture (table 7). However, primarily market-oriented production for both timber and fruit exists as well. In farmers livelihood strategies this divide often is not as clear; whether tree produce is sold or kept for home consumption depends on product quality and quantity (often excess products are sold in the market), and fluctuations in cash needs of the producing household. Other important reasons to venture into tree growing relate to households financial strategies. In several cases growing trees was a means to save for emergencies or old age, while risk spreading through income diversification was also practiced at a sizeable scale. The predominance

of house construction in farmers' motivation to plant timber trees refers to the local practice of parents growing trees for future house construction for their children. Whereas in the past, the common source of wood in these areas was the forest, nowadays farmers have reverted to purposively growing timber trees in their farms or backyards. "The forest is getting far" is an often heard expression, when farmers explain their own tree growing decisions. There are no very distinct differences between motivations for lowland and upland farmers to integrate trees. It merely seems more common among lowlanders to grow trees in their farms for house construction than it is for upland farmers, which may indicate a greater dependence on farm-produced wood in lowland areas.

Table 7: Smallholders motivations (in percentages of total number of answers) for on-farm tree integration in farms in Northeast Philippines

	Percentage of responses			
	Total (percent)	**Upland (percent)**	**Lowland (percent)**	**Hilly lowland (percent)**
Reason to integrate or retain timber trees	**n=115**	**n=72**	**n=24**	**n=19**
House construction	35	32	42	37
Market sale	21	24	21	11
Home use	12	11	4	11
Diversification of income	4	3	4	5
Pension plan	4	4	4	5
Timber for furniture	4	3	4	5
Fuelwood	4	3	4	11
Soil conservation	4	3	4	5
Shade	3	3	-	5
Savings	3	4	-	0
Boundary demarcation	2	1	4	0
High income from timber production	2	3	-	-
Other	4	6	5	5
Total	100	100	100	100
Reason to integrate or retain fruit trees	**n=121**	**n=85**	**n=19**	**n=17**
Home consumption	49	46	53	59
Market sale	29	32	37	12
Diversification of income	5	4	5	6
Pension	4	4	5	-
Shade	2	2	0	6
Other	11	12	-	17
Total	100	100	100	100

Note: this table represents responses to open-ended questions. More than one answer per respondent was allowed.

Land and capital constraints feature prominently in farmers' explanations of not having planted or retained trees in their farm lots (table 8). Respondents mention having insufficient land to engage in tree growing, implying that their other lands are needed for the cultivation of daily foods or cash crops needed to fulfill their immediate cash needs. Related to this, many respondents mention directly that they prefer to grow cash crops in order to have immediate income, while a third related reason clearly marks farmers'

preference in cash crops as they find the negative effects of tree shade on cash crop yield sufficient to refrain from planting. The presence of animals roaming around in search for grasses or crop residues (either astray or deliberately put by other village members) tends to pose a real threat to any tree investment. Since tenancy is a regular phenomenon in lowland as well as upland areas, some farmers mention this as their reason not to plant, since landlords in the area tend to prefer seasonal crop cultivation. Additionally, unavailable planting stock and insufficient funds are mentioned as other constraints. There do not seem to be sizeable differences in reasons not to engage in fruit or timber tree cultivation. Only the necessary capital investment in order to buy good quality fruit tree seedlings stands out, as common timber tree species found in farm fields (*Gmelina arborea*) can easily be propagated. Land constraints are perceived to be most severe in lowland areas, where land has fragmented and average land areas per household are relatively small. It is also there that farmers are more concerned about loss of cash crop yield due to negative crop interactions (shading) of trees and cash crops. Contrarily, capital constraints are more often mentioned by upland residents as a reason to refrain from growing trees, as well as the lacking availability of high quality fruit tree planting materials.

Table 8: Smallholders' motivations (in percentages of total number of answers) for refraining from the integration of trees in farms in Northeast Philippines

	Percentage of responses			
	Total (percent)	**Upland (percent)**	**Lowland (percent)**	**Hilly lowland (percent)**
Reason not to integrate or retain fruit trees	**n=118**	**n=17**	**n=79**	**n=27**
Land area too small	20	6	24	22
Preference for cash crop for immediate income	17	12	17	19
Fruit trees will shade the cash crops/ crop neighbors	16	-	20	11
No capital to buy seedlings/inputs	13	18	5	22
Astray animals	11	12	9	15
Unavailability of good quality seedlings	8	22	6	11
Tenant cannot choose what crop to grow	5	18	5	-
Land is too wet to grow trees	3	-	5	-
Fruits will be stolen	3	6	3	-
Other	4	6	6	-
Total	100	100	100	100
Reason not to integrate or retain timber trees	**n=114**	**n=9**	**n=75**	**n=30**
Not enough land to grow trees	29	-	33	27
Preference for cash crop for immediate income	14	22	13	13
Timber trees will shade the cash crop / other farmers field	27	22	31	20
Astray animals will damage the trees	8	0	7	13
Tenant cannot choose what crop to grow	5	22	4	3
No time for growing trees	2	11	1	0
Trees are available in the forest	1	11	0	0
No capital to buy seedlings/inputs	2	11	0	3
Unavailability of good quality seedlings	5	-	4	10
Typhoon	2	0	3	0

Other	5	-	5	11
Total	100	100	100	100

Note: This table represents responses to open-ended questions. More than one answer per respondent was allowed.

Farmers' perceptions of constraints to tree growing

Two main problems confront smallholders in growing trees; (1) the frequent typhoons that plague the area and render tree investment particularly risky (48 percent of responses), and (2) the presence of large numbers of livestock roaming around destroying tree seedlings and damaging standing trees and fruits (39 percent). Since land areas per head declined through intergenerational land transmission and immigration, the remaining area is used intensively. As such, pasture areas have become scarce, and commonly livestock is put to graze on fields (after harvest) and in areas with trees since grasses there are common. Especially when tree seedlings are still young, livestock grazing is potentially very damaging. Farmers mention that protecting their land from so-called astray animals through either fencing or close supervision is not always within reach because of capital and labor constraints. Other minor problems mentioned by the respondents are burning and wildfire (9 percent) and capital constraints for tree system set up and maintenance (4 percent).

Farmers' perceptions of problems in tree integration vary according to agroecological zone. In upland areas livestock poses few problems (25 percent versus 41 percent and 63 percent in lowland and hilly lowland respectively). Here, fire and burning are perceived to be an issue (18 percent versus 4 percent and 0 percent in lowland and hilly lowland respectively). Since in intensively cultivated areas, most land is under crop or short-term fallow (no fallows longer than five months have been observed in these areas), burning is less prominent and occasional fires less likely to do damage. In upland areas on the contrary, grasslands are still common and burning and fires are common practices there.

The role of on-farm trees in rural households

Trees are planted by smallholders with various functions in mind (table 9). The main role of trees lies in their productive capacity (i.e. in their role of supplying households with goods needed at home or in supplying valued goods for cash income generation). Timber, building poles, fruit and fuelwood are common products from on-farm trees. Farmers also value the functional role of trees in their farms, mainly in their capacity to prevent soil erosion, to protect crops from wind damage and to provide shade for animals and farm workers. Using tree litter for organic manure is widely recognized and practiced and trees seem to be valued for their contribution to the scenery and landscapes' beauty. The interaction between trees and crops is much less known to smallholders, and were it is it is most often perceived as negative. Whereas a substantial amount of respondents derive medicine from tree bark, leaves or flowers, on-farm grown trees are hardly used for animal fodder or charcoal production. Trees in farms are also valued for land demarcation

as trees clearly mark lot boundaries and constitute an effective, albeit informal, claim to the area.

Table 9: Tree uses as specified by respondent

Function	Yes (percent)	No (percent)
Shade	97	3
Soil protection and conservation	94	6
Timber	93	7
Building poles	91	9
Windbreak	90	10
Fruit production	89	11
Fuel wood	79	21
Organic manure	73	27
Beautification	70	30
Crop interaction	39	61
Medicine	26	74
Animal fodder	4	96
Live fencing	3	97
Charcoal	1	99

These are answers to yes/no questions (n=77)

The picture that emerges from what farmers spontaneously mention to be the roles of trees on farms is unlike that presented in table 9. Assuming that what farmers spontaneously mention to be the roles of trees in their farms are those which they value the most, productive roles remain most important but, in the functional roles differences can be discerned (timber production is mentioned in 25 percent of responses and fruit production in 22 percent). Functional roles of trees are recognized by almost all tree growers, but they are much less often mentioned spontaneously, except for the capacity of trees to provide shade (shade provision 16 percent of responses, soil conservation 7 percent, beautification 1 percent and pension and savings 1 percent each as well). Trees for fuelwood generation is often recognized as a role trees have when suggested, but its importance may be much lower since it comes up much less spontaneously (9 percent of responses). Similarly, a tree as provider of shade and as a means for soil conservation is widely recognized when suggested, but much less emphasized by farmers spontaneously. Financial strategies (income diversification, savings and pension provisions) do play, be it a rather minimal role, in tree adoption on farms. The dissimilarities in responses between upland and lowland respondents give interesting information. Whereas trees are seen everywhere as producers of timber and fruits, trees in farms are valued more for the fuel wood that can be derived from them in lowland and hilly lowland areas, which indicates that local tree product scarcity can become an (additional) motivation to grow trees in farm land. The contribution of trees to soil protection and conservation though is most often mentioned by upland residents, while this function is completely disregarded by lowland respondents. This suggests that some upland farmers are aware of the beneficial functions trees can have with regard to soil conservation.

Table 10: Perceived functions of trees in farms in different agroecological zones

Function	Upland n=122 (percent)	Hilly lowland n=27 (percent)	Lowland n=36 (percent)
Fruit production	21	22	19
Timber production	25	22	27
Fuel wood	7	22	22
Soil protection and conservation	9	4	-
Shade	13	26	8
Tree products for home consumption	4	4	6
Beautification	-	-	4
Tree products for sale	7	-	14
Windbreak	2	-	-
Pension plan	4	-	-
Savings	4	-	-
Other functions	4	-	-

Thus, although trees in farms are clearly valued for their multiple roles, some roles are more appreciated than others. The ranking exercise confirms that smallholders value the productive role of trees over the service or functional roles (see table 11). In the rankings farmers made, fruit and timber production are valued the highest. Soil conservation however, consistently turned up third. Apparently, farmers in the area are well aware of land degradation threats, something that may have become clear over the past two decades as returns to lands under yellow corn production declined and especially hilly areas are facing increasing rock outcropping. "The stones are coming out' is an often heard complaint and an incentive for farmers to shift into trees as plowing gets hard and land productivity declines. Fuelwood, organic manure, medicine, charcoal and animal fodder are mere by-products that are valued but do seldom constitute a reason to integrate trees farms by themselves.

Table 11: Farmer ranked functions of trees in farms in Northeast Philippines

	Percent of responses
Valued most important role of trees	
Timber	54
Fruit	35
Soil conservation	5
Second most important role of trees	
Fruit	41
Timber	26
Soil conservation	9
Third most important role of trees	
Soil conservation	39
Shade	13
Fuel wood	9

DISCUSSION

Many programs and projects aimed to extend agroforestry technologies and promote tree integration have faced limited success (Arnold and Dewees 1994; Mercer 2004; Bannister and Nair 2003), which has forced scientists to adopt a more critical approach to agroforestry and tree integration. Over the past decade low adoption rates have led to growing attention for smallholder decision-making with regard to tree integration and agroforestry adoption. This research focused on on-farm tree integration in Northeast Luzon, farmers' motivations for growing trees on farm and the constraints they perceive and dynamics affecting tree integration practices.

The study demonstrates that tree integration in farm fields, although enhanced by extension work, does take place spontaneously as well. Mostly, trees are planted or retained because the end products benefit the household that owns or cultivates the land. These can be a consumption need of the household or a cash need, which is fulfilled by selling tree products. However, trees also clearly fulfill functional roles, such as providing shade for farm workers and animals, and contributing to soil conservation. Tree integration is far more common among upland based farmers than among lowlanders. This seems to be related to factors like slope of farmland (trees seem to be grown more often in sloping lands) and land availability (upland farmers tend to have larger farms and seem therefore more willing to devote part of it to trees). But both in lowland and upland areas marginal shifts into trees were observed. How to explain this shift, be it limited, toward tree integration? Farmers own motivations suggest that several factors are of importance. Projects are giving trainings and dispersals, farmers are planting trees to supply their own household needs since tree products have become scarce in their direct vicinity, tree products (mainly timber and fruits) have gained in market value and have become and important source additional income, productivity of competing crops is declining which makes trees as cash crop more attractive and trees have entered the range of farming options of farmers as a crop to be deliberately planted. As such tree growing is

incorporated as part of farming strategies aiming at diversification, risk-spreading and financial management (trees as savings or pensions).

Why do other farmers not integrate trees into their farms? There are several factors that constrain farmers to integrate trees and they are most pronounced in lowland areas. Limited and decreasing land areas seem to direct farmers' attention to cash cropping, although, as we have seen, decreasing availability of naturally grown trees associated with intensification processes tends to encourage tree adoption. The lack of capital and savings among smallholders makes them risk-averse and renders many among the farmers reluctant to experiment with new technologies whose potential still has to prove. Investments, mainly in fruit trees whose improved variety seedlings have high market prices and require extensive (pest) management and irrigation for optimal production, are costly. This proves to be a major constraint for farmers to venture into fruit growing, combined with factors such as lack of technical knowledge (increasing insecurity), insecure marketing channels for fruits versus established channels for seasonal crops and informal and formal credit facilities oriented at seasonal cropping while often not open for tree related investments. The regionally common system of interlocking output and credit, results in persistent seasonal cropping as moneylenders oblige farmers to cultivate cash crops. Moreover, the main ethnic group in the research area has been farming seasonal crops for many decades, while other ethnic groups that migrated to the study area are much more open to incorporating trees in their farms. This indicates that cultural factors, such as the relation between ethnic identity and farm crop choice, are important in assessing adoption potentials, a research domain that has often been ignored.

Changes in land availability have also induced farmers to graze their livestock in farm lands as pasture areas have become scarce or distant. Roaming livestock presents a major danger to (young) trees as well as typhoons which regularly occur in the study area and can greatly damage the value of standing tree stocks or fruit potential. Similarly, local burning, either intentionally or unintentionally, have not infrequently caused damage to tree crops. Interestingly, local residents are devising strategies to deal with these constraints and minimize their impact. Besides the recent institution of local level regulations aimed at minimizing the potential danger from burning and free-roaming animals to trees, farmers are also experimenting with management adaptations to avert damage from storm and typhoon through special pruning practices, typhoon-resistant species selection and other management adaptations. These strategies may be starting points for much needed scientific research aimed at devising sustainable tree systems adapted to regions that are seasonally confronted with typhoons.

Moreover, also especially in lowland areas, land areas per head tend to be small. With persisting poverty in this area, many farmers are forced to focus on short-term income earning activities, which by definition tree growing is not. Capital-constraints, renders years long investments a major obstacle for a portion of lowland farmers. Additionally, informal customs regarding land use prohibit tree integration if there will be damage in terms of production-loss in neighboring plots. This production loss, through shading is also a reason for farmers to abstain from tree integration in part of their land, since it may negatively impact cash crop outputs. Tree crop competition is known, mostly in shading, but also competition for water is mentioned especially in more elevated areas in the dry season.

Relating these results to theories linking tree growing patterns and intensification processes, this study provides some support for claims that land use intensification may result in higher levels of active tree integration. The study indicates that land use intensification patterns over the years have impacted land use and tree integration among others through shifting market imperatives. Tree products are now cultivated as cash crops. Secondly, as Scherr (1995) stated based on evidence from Kenya, there is also evidence that tree integration results from the lack of naturally grown trees in farmers surroundings. Since, due to migration and endogenous population growth, most land has been incorporated in the agricultural production process, secondary forests, long-term fallow systems as well as remnant forests have mostly disappeared, which induces farmers to grow trees in their farm land to supply household wood needs (timber for house construction and furniture, fuel wood).

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CHAPTER TEN

SMALLHOLDER TREE GROWING IN PHILIPPINE BACK YARDS: EXPLORING THE BIOPHYSICAL AND SOCIOECONOMIC DIVERSITY AMONG HOME GARDEN SYSTEMS IN THE CAGAYAN VALLEY REGION

Denyse J. Snelder

ABSTRACT

The growing of trees in village home gardens is one of the oldest practices in agroforestry throughout Southeast Asia. The trees are usually grown together with various other crops in multistory combinations and sometimes in association with domestic animals, around individual houses or homesteads. Although the home gardens on the Asian continent have received a reasonable amount of scientific attention, the home gardens in the Philippines form an exception to this rule. At first sight, the Philippine home gardens vary in tree abundance and seem less diverse in species composition and vegetation structure compared to the more widely discussed home gardens in Indonesia and India that are developed under similar climatic conditions. Yet, as opposed to the seemingly limited within-garden diversity, the home gardens are dynamic and vary in composition and relative focus on commercial crops, thereby affecting economic and ecological sustainability. The latter clearly depends on the status of various biophysical and socioeconomic conditions including soil fertility, location and travel distance to nearby markets, market prices, availability of land and other sources of livelihood and changes in each of these conditions over time.

The objective of this study is to explore and explain, in terms of biophysical and socioeconomic characteristics, the dynamics and diversity among home gardens in the Cagayan Valley region, paying specific attention to the proportion of tree and non-tree components. The study is based on field work conducted in two upland and two lowland villages, differing in travel distance to the main market, in the provinces of Isabela and Cagayan. A total of thirty-four home gardens were investigated by means of field observations and measurements, including plant counting and structured and semi-structured interviews with home garden cultivators. The dynamics and diversity of the home gardens in this study will be put into a broader perspective, by discussing how the home gardens in this study compare, in terms of both aspects, with those discussed in the literature and established under similar climatic conditions in Indonesia and India.

INTRODUCTION

The growing of trees in home gardens is a traditional practice throughout Southeast Asia. It may have been practiced already in prehistoric times by hunter-gatherers who deliberately or accidentally dispersed seeds of highly valued trees in the vicinity of their campsites (Bangor Forest Garden Project 2005). The earliest evidence of home garden

cultivation date back to 3000 BC and possibly 7000 BC (Soemarwoto 1987) whereas village forest gardens have been present since the tenth century AD (Michon 1983).

The home garden systems have received a reasonable amount of scientific attention, particularly those in Indonesia, being recognized as distinct multi-layered and multi-functional agroecosystems and described as such by various authors since the 1970s (see e.g. Michon 1983; Soemarwoto et al. 1985; Fernandez and Nair 1986; Vogl et al. 2004). These studies have mainly provided descriptive and location-specific information on species composition, garden structures and functions, leaving gaps of knowledge in economic and ecological aspects of home gardening (Nair 2001; Wiersum 2004).

Home gardens are known because of their role in a variety of functions and services like those listed in table 1. In home gardens, trees are usually grown together with other crops, and sometimes in association with domestic animals, forming multi-story combinations with overlapping canopy layers around individual houses or homesteads. Species richness and crop combinations are affected by the specific needs and preferences of households, their religious beliefs, cultural values and dietary customs, and the availability of other food sources, all aspects that vary within and between regions. Consequently, records on species richness may range significantly. In addition, climate, seasonality, and soil type control species diversity and home garden composition (e.g. Cuba paper). For the *pekarangan* gardens in West Java, Indonesia, Soemarwoto (1987) recorded a total of 219 species during the dry season and 272 species during the wet season, with an average of fifty-six species per garden. In Bangladesh, a total of ninety-two perennial species were recorded for eighty home gardens by Millat-E-Mustafa (1996), whereas Kumar et al (1994) found 127 woody species in the Kerala home gardens in India, with an average of eighteen to fifty-six plant species per garden type as reported by Peyre et al. (2005). In home gardens of Northeast Thailand, a total 230 species were found by Black et al (1996), with average numbers varying between fifteen and sixty species per garden, whereas Gajaseni and Gajaseni (1999) recorded twenty-six to fifty-three species per garden for the Chao Phraya Basin area (see also Kumar and Nair 2004).

Table 1: Examples of home-garden functions and services

Production of daily fresh (bio-)food
Household nutritional security (poor households)
Generation of cash income
Timber, fuel wood and non-timber tree products
Animal production
Testing site for trees and other crops
Employment generation
Soil and water conservation
Cost-saving system (low input costs, greater efficiency of use of labor and land, etc.)
Fulfillment of social and cultural needs (through recreational opportunities, product sharing or exchange)

Species richness is also influenced by home garden size, with the small-sized (<0.4 ha) home gardens showing the highest crop species diversity (Kumar et al. 1994;

Drescher 1996). In the more densely populated areas where planting space is limited, home garden cultivators are forced to plant many species in relatively low numbers on relatively small plots. If, however, the home garden is the only land available to the household, food crops like cassava (*Manihot esculenta*) tend to dominate the species composition (Wiersum 1982). Where households avail of other sources of income and purchase most of their food, like in urban areas, domination by ornamental and aesthetic species is more likely (Drescher 1996; Rio-Gray et al. 1990). It should be mentioned, however, that apparent variations in species richness in the literature are partly due to uncertainty whether the total numbers of species refer to a sample of home gardens or a single plot (Hoogerbrugee and Fresco 1993).

Like the records on species richness, the records on plant densities differ greatly, even within a specific region, with seasonality, soil type and home garden type and size. For example, in the case of the Kerala home gardens in India (Peyre et al. 2005) plant densities vary with home garden type between 449 and 1,672 individual plants per hectare on average.

Vegetation structure, in terms of horizontal and vertical stratification, is affected by garden age, with multi-strata canopies being most evident in older gardens. Yet, stratification can be counteracted by various management practices like trimming of trees, thinning, weeding, and regular sweeping and burning of litter.

The home gardens in the Philippines, also referred to as *halamanan sa tahanan* or *halamanan sa bakuran*, seem less diverse in species composition and structure compared to those in Indonesia, and perhaps those in India, although they are developed under similar climatic conditions. They vary in tree abundance at first site, but there is little information available to confirm this. Only few studies on Philippine home gardens have appeared in the literature so far. Some of the earlier studies discuss the traditional home gardens (Sommers 1978), whereas some of the latest publications discuss the establishment of allotment vegetable gardens in urban areas like Cagayan de Oro city (Holmer et al. 2002; Potutan et al. 2000). Home gardens are usually part of larger farming systems run by farmers' households. They do, however, play a significant role in daily food supply in villages and towns. Home gardens have been promoted by popular movements like the Green Revolution (a movement for countryside agricultural development) and the *Samahan ng Masaganang Kakanin* (SAMAKA) program, a united effort to produce ample food for the family (Hoskins 1973; Holmer et al. 2002). In the 1970s, over 70 percent of all Philippine households maintained a home garden (Christianity 1990). However, home gardens are dynamic and may have changed over time with the introduction of new technologies, the increasing shortage of land, the institution of land reform programs and the alterations in farmers' preferences. Species composition and the focus on subsistence crops may have consequently changed, thereby affecting ecologically sustainability and economic feasibility. The latter clearly depends on the status of various biophysical and other socioeconomic conditions including soil fertility, location and travel distance to nearby markets, market prices, availability of land and other sources of livelihood and changes in each of these conditions over time.

The debate on home garden development

The promotion of home gardening as a nutrition and community development strategy has been a controversial issue. On the one hand, opponents of home garden development state that home gardens are only feasible for households with access to land, water and technical assistance. They consider home gardens less cost-effective compared to other interventions like subsidies for resource-poor farmers. In their view, home gardens are too often considered as a panacea for the poor affected by food insecurity whereas in reality these systems seem unreliable as steady source of food and income. The latter is believed to be attributed to a lack of understanding of these systems and their adaptation to local conditions. On the other hand, advocates of home garden development argue that it is better for farmers to self-control food production than to rely on government goodwill and financial support. They further state home gardens rely on low-cost and low-risk technology and, consequently, are accessible to the poorest, referring to a full array of other home garden benefits often not taken into account in cost-effectiveness studies. Home gardens do improve food security and income as long as they are well adapted to local agronomic resource conditions, cultural traditions, and preferences.

The home gardens in the Cagayan Valley: their relevance and current changes

Although the population density in Northeast Luzon is the lowest of the whole Philippines, the pressure on natural resources outside the protected area of the Northern Sierra Madre Natural Park (NSMNP) is high enough to cause environmental constraints. Former forested land is nowadays composed of grassland threatened by overgrazing, spread of *Imperata* grass and increasing occupation by squatters in search of arable land. Monocultures of corn and rice have increasingly been practiced by smallholders (whose crop choice is often controlled by middlemen and landlords) since the introduction of high-yielding rice and hybrid corn varieties in the 1970s and mid 1980s respectively. This has resulted in a reduction in soil fertility where fallow periods are shortened or eliminated and the inputs of organic and chemical fertilizers are insufficient (see also Snelder 2001). The few places where the newly settled migrants and autochthonous communities spontaneously practice more sustainable forms of land use are those sites in and around villages and towns where more trees are planted, usually in mixtures with food and vegetable crops, forming the home garden systems.

During the last decades, with the introduction of the land reform programs in the 1970s (Presidential Decree 27) and 1990s (Comprehensive Agrarian Reform Program) in the region, farmers' land use choices and crop selection may have altered. If so, it is not clear in what direction. Tenants cultivating areas that fall under one of the land reform programs face, or have received already, (future) rights over land. Hence, they may be or become independent from middlemen and landlords prescribing what commercial crops to grow on their farms. They may adjust the crop combinations to their own needs and preferences, which in turn may affect their decisions on what to grow in their home gardens. Depending on location and road condition, more crops for commercial purposes (including fast growing timber trees and commercial fruit trees) may be included as travel time to the nearest market decreases. However, other factors may counteract a conversion

to more commercially oriented home gardens. With the transfer of land from one generation to the other, land is usually divided among family members. Hence, the sizes of home gardens and farms usually decrease and may make commercial production less feasible. More research is needed to determine in what direction changes proceed (i.e. whether home gardens develop towards the inclusion of more trees, more commercial crops, or remain focused on subsistence crops).

Well-developed home gardens can provide smallholders an extra source of income year-round, supplement their daily diets and serve as a backup during times of shortage and urgent needs. There is a growing awareness that home gardening, combined with nutritional education, can be a viable strategy for improving household food security and optimize nutritional diversity for at-risk populations, particularly women and children (Kumar and Nair 2004). From a survey of forty households with home gardens elsewhere in the Philippines, it was found that nearly all households could meet the recommended daily requirement for vitamin A, vitamin C, iron and calcium. One in four households could further meet their protein and energy requirements with the outputs and resources provided by their home gardens (Fernandes and Nair 1986). The home gardens under study may only need minor adjustments to achieve optimal nutritional output. At the same time, they may generate cash income and serve as reforestation nucleus or a site where trees, and their seed and seedlings, can be tested and, after determining optimal local growth conditions, be spread more easily to farms and exchanged with neighbors and other farmers.

The objective of this study is to explore and explain, in terms of biophysical and socioeconomic characteristics, the dynamics and diversity among the home gardens in the remote uplands and the accessible lowlands of the Cagayan Valley region. Specific attention will be paid to the proportion of tree and non-tree components and the relative importance of subsistence versus commercial crops, given past and more recent changes in technology and socioeconomic conditions.

METHODOLOGY

The study is based on field work conducted in two upland and two lowland villages that differ in accessibility and travel distance to the main markets in the provinces of Isabela and Cagayan. A total of thirty-four home gardens were investigated by means of field observations and measurements, including plant counting and interviews with home garden cultivators.

Households and their respective home gardens were selected at random using population lists, a total of nineteen in the lowland villages and sixteen in the upland villages. The species composition, plant densities and the vegetation structure of the home gardens were investigated. Young trees and seedlings, 50 cm or more in height, were included. Only those species, whether planted or spontaneously growing, that are used in one way or the other by the home garden cultivators were included in this study. Ornamental plants and weeds were not taken into account for data analysis. Species abundance was determined distinguishing three categories: (1) a low abundance where species are observed only once or twice and did not cover much of the garden area, (2) a medium abundance where several plants are recognized but covered less than one fourth

of the garden area, and (3) a high abundance where many plants occurred or covered more than one fourth than the garden area. The Shannon-Wiever index was calculated to analyze the diversity of home gardens for each study village with $H' = -\Sigma (p_i \ln p_i)$, where p_i is the proportion of occurrence of the ith species in a study village, expressed as a proportion of the total species occurrence N (Kent and Cocker 1992). From that, the equitability or evenness was calculated by $E = H'/H'max$, with $H'max = \ln s$ and where s is the number of species, to estimate the homogenous distribution of plants in the home gardens of a study village. In order to determine the similarity of species composition between the upland and lowland villages, the Sørensen coefficient of similarity was calculated by 2A/(2A+ B+C) x 100 percent, where A is number of species common to two types of villages, B is the total number of species in village type 1 and C is the total number of species in village type 2. Finally, the Whittaker's β diversity index was calculated to identify the differences in species composition between plots within upland and lowland villages, using the following formula (Coffey 2002): by $\beta = S / \alpha - 1$, where S is the total number of species in the home garden sample and α is the average number of species in each sub-sample. Cluster analysis will still be performed to identify different types of home gardens in the upland and lowland villages.

Semi-structured interviews were conducted with home garden cultivators to obtain information about the use of plants, the management and planting practices, and the reasons for having a home garden and the cultivators' perception on major constraints in home gardening.

Representative soil profiles were described, topsoils (0-10 cm) were sampled (composite samples of five to six cores) and analyzed for organic matter content, available P and K and pH. Methods for soil chemical analyses are described in Snelder (2000a).

THE STUDY SITES

The villages are situated in the moist agro-climatic zone (annual rainfall ranges from 1500 to 2500 mm and a growing season of seven to eight months), during the period March to July 2001. The upland villages, Dy Abra and Baliuag, are located in less densely populated areas with 30 to 150 person per km² (NSO 2001) in the hilly grasslands close to the forest edge. Dy Abra is East of Tumauini and Baliuag Northeast of Cabagan. The villages can be reached by jeepney from the nearby markets in Tumauini and Cabagan. The travel takes at least one hour (16 km or more) over gravel roads. During the wet season, the villages can become temporarily inaccessible, because of creeks that cannot be crossed by vehicles during times of heavy rain. The villages have no connection to the electricity network. Most farmers in the upland villages (at least 115 households per village) are Tinguians. They are migrants moved away from the province of Abra, in the 1970s or later. The latter explains why most home gardens have been established relatively recently, twelve years ago (table 2) on average. The home garden area is 0.12 hectares on average, about six percent of the total average farm size of 2.09 hectares. Only 25 percent of all households interviewed refer to their home garden and residential lot as private property, whereas others mention they squatted the land, leased it or are in the process of acquiring the land (tax declaration). In the latter case, it is often

unclear if the land is still owned by a land owner or by the Bureau of Land or the Land Bank. Most families further cultivate corn for marketing purposes, and some also rice, on Integrated Social Forestry (ISF) fields outside the village (table 2). The ISF arrangement concerns an agreement and a Certificate of Stewardship Contract (CSC) under which the owner can use the land for a period of twenty-five years, after which the agreement can be extended if the land is managed in a proper way. Beside this form of land tenure, there are other agreements under the Department on Environment and Natural Resources (DENR) or the Department of Agrarian Reform (DAR) (Snelder et al. 2005). Moreover, most families use a part of the forest for *kaingin* (shifting cultivation) and timber collection.

The lowland villages are located in the municipality of Tumauini, Isabela Province, a few kilometers Northwest and East of Tumauini respectively, on the fertile plains of the Cagayan River. They are part of the most densely populated areas of the Cagayan valley where population density varies from 150 to 600 persons per km² (NSO 2001). During the dry season, the villages can be reached by all types of transport within thirty minutes from the nearby market in Tumauini. During the rainy season the trails turn into mud, affecting traveling time. The distances from the residential sites to the farmland however do not exceed 1 km. The villages are provided with electricity. Most farmers in the lowland villages belong to the ethnic group, the Ibanag, meaning "from the river" as the original homeland of the Ibanag people is along the banks of the Cagayan River. This explains why most home gardens are relatively old of age; some being established more than seventy years ago (table 2). The home gardens and residential lots are all, except one, farmers' private land, but they are relatively small in size, being only 0.06 hectares on average (i.e. 4 percent of the total farm area). The tenure status of the farms surrounding the villages is rather different: half of all households interviewed has property rights over these farms (table 2), and more than thirty percent is tenant or has no land at all. They grow cash crops (i.e. corn and tobacco) planted in monocultures and separate seasons, and tenants have to give one third of their harvest to the landowner. Sometimes rice is cultivated for home consumption. Total farm area varies between 1 and 1.5 ha, with an average size of 1.38 ha. Most farmers acquired their land through land and agrarian reform (i.e. the land has been turned over from the landowner (*haciendero*) to the cultivators and their families). However, in most cases the land reform process has been complicated and not fully completed. Even if completed, the farmers are often still financially dependent from the landowner or a money lender, for paying off their land, their inputs and other high or unforeseen (e.g. medical) costs.

Table 2: Descriptive information on the households, home gardens, farms and land tenure of farmers in upland and lowland villages in Northeast Luzon, Philippines

	Uplands (n = 16)			**Lowlands (n = 18)**		
	Average	**Minimum**	**Maximum**	**Average**	**Minimum**	**Maximum**
Home garden area [a] (ha)	0,12	0,03	0,38	0,06	0,03	0,15
Age of home garden (years)	12	2	20	31	9	>70
Total farm area [b] (ha)	2,09	0	3,80	1,38	0	5,10
Members per household	6	2	10	6	1	14
	Number of households		**Percent**	**Number of households**		**Percent**
Main cash products [c]:						
Rice	3		19	0		0
Corn	12		75	15		83
Tobacco	0		0	9		50
Timber [d]	7		44	0		0
Land tenure of home garden:						
Private (titled land)	4		25	17		94
Paying tax / land reform [e]	4		25	1		6
CSC [f] lease contract	2		13	0		0
Squatted land	6		38	0		0
Land tenure of farm:						
Private (titled land)	2		13	9		50
Paying tax / land reform	2		13	1		6
CSC [f] lease contract	11[g]		69	0		0
Mortgaged land	0		0	3[h]		17[h]
Tenant	0		0	5		28
No land	1		6	2		11

n = sample size
[a]: including house and compound; the area of the house with compound is 129 m² on average
[b]: referring to the total area cultivated by a farmer household excluding the home garden area
[c]: excluding products from home garden
[d]: six of the seven farm households earn cash income by (illegally) hauling and logging trees just from the natural forest whereas the remaining household harvests its timber from a gmelina plantation
[e]: land to be titled / still in the process of land reform, i.e., land property rights will be transferred from land lord to tenant farmer
[f]: CSC issued for twenty five years and renewable for another twenty-five years
[g]: three of the eleven farm households have land partly under CSC and partly privately owned
[h]: two of three farm households have a mortgage on only a part of their land, the other part being titled

SPECIES COMPOSITION AND VEGETATION STRUCTURE

A total of 138 different plant species (table 3) are identified, including seventy-one different tree species, all of which are being used by the home garden cultivators, in one way or the other, in the upland and lowland villages. If including all ornamental plants and weeds, the total number of species will increase up to 312. The average number of used species per garden is highest for the lowlands, with twenty-seven species compared to twenty-two species per home garden in the uplands. Common trees are paper tree (*Gmelina arborea*), alim (*Melanolepsis multiglandulosa*) and fruit trees like mango (*Mangifera indica*), coconut (*Cocos nucifera*), guava (*Psidium guajava*) and jackfruit (*Artocarpus heterophyllus*). Favorite food and vegetable crops are taro (*Colocasia esculenta*), sweet potato (*Ipomea batata*), bitter gourd (*Momordica charantia*), bottle gourd (*Lagenaria siceraria*), squash (*Cucurbita maxima*), okra (*Abermoschus esculentus*), hot pepper (*Capsicum frutescens*) and eggplant (*Solanum melongena*). In every home garden common ornamental plants can be found, yet they were not included in the analysis. Cans planted with spices and seedlings are common in the lowlands, but are less frequently found in the uplands. Small rice paddies are laid out near most residential sites. Hedgerows marking field and residential boundaries and made of pruned trees (*Jathropha curcas*) and cassava (*Manihot esculenta*) are more common in the lowlands.

Table 3: Plant species richness, diversity, evenness and similarity indices for home gardens in upland and lowland villages in Northeast Luzon, Philippines

	Richness				**Shannon-Wiener**	**Evenness**	**Whittaker**	**Sørensen**
	Average	**Min**	**Max**	**Total**		**(percent)**		**(percent)**
Uplands (n = 16)								
All plants	22	10	50	104	4.19	90	5,0	
Fruit trees	6	2	12	24				
Other trees	6	1	14	33				
Lowlands (n = 18)								
All plants	27	9	54	98	4.25	93	3,8	
Fruit trees	9	2	23	31				
Other trees	6	2	13	23				
Uplands-Lowlands								43

The higher Shannon-Wiener and evenness indices for the lowland villages (table 3) indicate that the home gardens in these villages are somewhat more diverse and their species more evenly distributed compared to the home gardens in the upland villages. Moreover, the lowland villages have a greater diversity in fruit tree species whereas the upland villages have a greater diversity in tree species used for timber, fuel wood and fencing. The latter group of species is composed of trees that are planted and trees that are protected, after spontaneously establishing themselves, and used by the home garden cultivator. These trees are kept at considerably higher densities in the upland villages (table 4). Likewise, roots and tubers and multipurpose plants occur at higher densities

whereas in the lowland villages other crops predominate as is evident from the higher plant densities for vegetables, fruit trees, and beverage, spices and stimulants. In the upland villages, naturally growing grasses, herbaceous species and a large variety of weeds are further widespread and form an important component of the home garden. It should be noticed that many of the apparently useless weeds have a medicinal value although not always practiced as such by farm households. The relatively high Whittaker β index (table 4) for the upland villages indicates that the home gardens in these villages show greater differences in species composition than the home gardens in the lowlands. The latter also partly explains why the similarity between the upland and lowland home gardens is only 43 percent.

Table 4: Average plant densities for different crop categories identified in home gardens of upland and lowland villages in Northeast Luzon, Philippines

Plant category	Plant density (individual plants ha^{-1})						
	Uplands (n = 16)				Lowlands (n = 18)		
	Average	Min	Max		Average	Min	Max
All fruits	1,311	58	12,565		790	71	2,299
Ananas comosus	791	0	11,421		22	0	265
Musa sp.	160	0	1,099		399	0	1,477
Other fruits of tree species only	356	37	1,652		369	46	1,292
Multipurpose plants	117	0	368		84	0	321
Timber, fuel wood, fence trees	297	0	2,546		97	0	250
Shade, fence trees	107	0	779		14	0	71
Vegetables	3,122	26	16,900		3,436	0	23,737
Medicinal – fence plants	72	0	515		81	0	619
Roots and tubers	2,237	0	18,561		1,286	0	6,460
Fibers	9	0	52		5	0	26
Beverage, spices and stimulants	211	0	1,023		1,549	0	10,971
All plants	10,711	676	68,432		11,381	143	50,741
Trees only	1,038	107	4,244		966	143	3,709

[a]*: including young trees of ≥ 0.50 m*

Most home gardens are characterized by the presence of two or more vegetation layers or canopy strata, the lowest one composed of vegetables, ornamental plants, grasses and medicinal herbal plants and the highest one of tall fruit and timber trees. In the lowland villages, the highest canopy stratum of the home gardens is predominated by mango, jackfruit, paper tree and coconut. More species can be found in the second stratum, including banana (*Musa* spp.), horseradish (*Moringa oleifera*), guava, and also the younger trees of the first canopy stratum. The third stratum is composed of hedgerow species like pruned tawwa-tawwa (*Jathropha curcas*), madre de cacao (*Glidricidia sepium*) and *alim*, but also of crops like hot pepper and several ornamental shrubs. The fourth stratum consists mainly of climbing vegetables like beans, gourds, squash and alugbati (*Basella alba*). Vegetables and weeds form the lowest vegetation stratum. Overlap between the different strata is often limited to a small part in the back of the home garden where trees and shrubs form a natural boundary.

HOME GARDEN COMPONENTS, USAGE AND MANAGEMENT

A home garden covers a residential lot with adjacent field planted by a family composed of one, or sometimes two or three (e.g. parents and grown-up children), households. Except for a few trees (particularly mango) providing shade, the compound just around the house is kept bare and serves as a play ground and a place for relaxation. Some parts are reserved for the processing of crops, handicraft and other activities. The houses are made of concrete or bamboo with a galvanized or cogon grass roofs. In the lowland villages, the kitchen is usually separated from the house. Racks of bamboo are placed on the compound or in the seasonally cultivated fields. They are used for drying tobacco that is grown in fields outside the village. Farm products are stored in houses constructed on poles where close to the river. In the upland villages, the houses are similar but the kitchen is usually attached to the house. Aside from a house and a bare compound, the home gardens in both villages contain one or more of the following components: water pump, bath area, toilet, shed(s) for livestock, concrete platform for drying corn and rice, fishpond, compost pit, fences, cultivated field, and orchard.

Few farmers grow cassava, pineapple, taro or other crops in between or underneath the trees planted to provide shade in addition to fruits and wood for timber and fuel. Horseradish is an exception because the crown of this tree does not provide much shade and allows the growth of sun-loving crops. An important activity underneath the trees is the processing of tobacco and corn. Moreover, it is a resting place for people, cows and carabao. The majority of the vegetables is grown in direct sunlight on clearly marked fields during the rainy season. The appearance of the home gardens is very different during this season, when the activities of drying tobacco make place for growing vegetables, especially the leafy vegetables like pechay (*Brassica chinensis*) and mustard (*Brassica juncea*). Every little spot which receives enough sunlight is somehow used for vegetable growing and new horseradish trees are planted.

Most people grow vegetables in their garden for home consumption. Chickens, ducks, goats and pigs are also raised for consumption during special occasions and for selling during times of shortage or whenever cash is needed to purchase medicine, pay for hospital treatment, and other expenditures. Carabao are kept for plowing wet rice fields and transport of goods and, in the upland villages, for the hauling of (illegal) logs. Cattle is used for plowing dry fields and, like carabao, sold for meat when needed. The staple food of the households in the lowlands consists of corn and rice. Meat, fish and eggs are only consumed once a week or on special occasions if money is available. Home garden products do form an important supplement to the diet as the farmland is still, even after land reform, mostly used for the monocropping of cash crops (e.g. corn and tobacco) and rarely for subsistence crops. The home garden supplies green leaves like horseradish, amaranth (*Amaranthus viridus* and *Amaranthus spinoza*) and leaves of vegetables like bitter gourd and sweet potato, flowers of squash and himbabao (*Brouzonettia luzonica*), which are typical species that can be used throughout the year and which are often bartered with neighbors. It forms a good source of vitamins (Villareal et al. 1993; PCARRD 1988). Eggplant is a crop that is a favorite, probably because it can be harvested every three days during a long period. It is also the species

that is most commonly planted, particularly in the lowlands, to provide some cash income.

The mixtures of fruit trees in the village home gardens are such that they provide fruits throughout the year, with a peak in the dry season. The amount of harvested fruits supplements the diet, but is usually not enough for selling. Trees in the home gardens are pruned for fire wood and fallen branches are collected. In the lowlands, firewood is also collected from wood washed ashore on the river bank. During times of heavy rain or typhoon events, this source is enough to provide fire wood for the whole village for a couple of months. Some people in the lowlands are also hauling wood from villages close to the forest edge (among others Balasig and Masipi) by using cow and cart. Stems of tobacco, corn and dried cobs of corn are also used for fuel.

In the uplands, the residential lots and home gardens are larger compared to those in the lowlands (table 2), but often only a small part of the space is actually used for crop, firewood and timber production. Houses are built close to the road and in the back there is mostly a transition from home garden to pasture or sometimes a small rice field. The taps for water are next to the road. The area around the house can sometimes be distinguished by a clear change in vegetation or there is a row of trees or a fence that separates it from the rest of the home lot. Grass and herbal weeds cover an important part of the space around the houses. Trees are mostly planted at boundaries and some are planted close to the house for shade. Where trees (predominantly paper tree) are planted, the ground underneath is bare or covered with a short grass or herb layer. In upland village of Dy Abra, many trees however show stunted growth and newly planted seedlings as well as mature trees are destroyed by the free roaming goats.

The most important function of the home gardens in uplands is the function as source of fodder for goats and carabao. Also naturally growing species are used for medicinal purposes or harvested for food like amaranth and bush okra, not requiring any inputs. The consumption of these species is more popular in the rainy season when the shoots are soft. Favorite vegetables are string beans, taro and squash, but instead of cultivating their home lot, people have chosen to plant these vegetables in their farm. Compared to the lowlands, more products for home consumption are gathered from sites outside the village home gardens. For example, most fire wood is collected from a nearby river and from the forest patches on farmland, for example ipil ipil (*Leucena leucocephala*), and in grassland, for example arosip (*Antidesma pentandra*) and guava. Many people are using gas for cooking besides the use of fire wood. Other products gathered for home consumption from nearby forest patches include palm hart (*Oncosperma tigillarium*), young fern leaves (*Athyrium esculentum*), wild pigs and chicken, small crabs, fish and shrimps.

On the whole, the home gardens in the upland look less developed than those in the lowlands. Families do grow vegetables like taro, hot pepper and squash in a small field close to the house, but they form a minority. A border with common ornamental plants can be found in almost every garden.

FARMERS' PERCEPTIONS ON MAINTAINING A HOME GARDEN

Farmers maintain home gardens for all sorts of reasons, including those associated with short-term and long-term economic aspects, socio-cultural and aesthetic values, environmental quality, and accessibility. When asking farmers (or home garden cultivators) to give their main reasons for having a home garden, more than 40 percent responded spontaneously to produce food for daily home consumption and to save cash for spending on matters other then those related to food, such as, education and medicine (no need to use cash for buying food where food is grown in home garden). In the uplands, the convenience of having fresh food close to the kitchen was mentioned as another main reason. In the lowlands, the ability to sell the excess of home garden products was mentioned more often instead. Table 5 lists the outcome of farmers attempt to subsequently rank the various, pre-listed reasons for having a home garden in order of importance. It is clear that most farmers, in both upland and lowland villages, maintain a home garden in the first place to have fresh food for daily home consumption. The urgency to have something to eat during times of shortages is recognized as another main reason in both cases. Some differences occur between the perceptions of upland and lowland farmers when discussing other relevant reasons and their order of importance. The upland farmers perceive having something to inherit for their children in future and having fresh food close to the kitchen as a (shared) third main reason whereas the lowland farmers identify the production of cash crops and the lack of other farms producing food for home consumption as, respectively, third and fourth main reason. The cash crop production is a home garden function that receives higher priority in the lowland villages where 72 percent of the households do sell and exchange home garden products compared to 50 percent for the upland villages (see table 6). Particularly fruits and vegetables are sold including banana, coconut, mango, eggplant, *pechay*, and bitter gourd. In addition goats, pigs and chicken are sold on a regular basis. Other important reasons for maintaining a home garden include the rather long distance to markets and shops and, for the uplands, the fact that crops planted close to the house are not easily stolen.

Table 5: Farmers' reasons for maintaining a home garden in the lowland and upland villages in Northeast Luzon, Philippines

Farmers' reason for having a home garden	Score (percent)	
	Lowlands (n=19)	Uplands (n=15)
Short term economic		
To have fresh food for home consumption daily	98	82
To produce cash crops	53	33
Because other farms do not produce food for home consumption	43	25
Because there is no income from other farms	35	19
To produce fuel wood	18	18
To produce medicinal plants	8	18
To produce fodder	8	6
Because they received assistance from government or project	0	22
To have a place for social gatherings	0	24
Long term economic		
To have something to eat during times of shortage	56	60
To have something to inherit for children in future	23	56
To have something to sell during times of shortage	39	34
Because work in the garden can be done in between other jobs (flexible working times)	13	32
Because the work in the garden can be divided among family members (division of labor)	8	19
Economic, accessibility		
Because house is far from market and shops	39	41
To have fresh food close to kitchen	32	56
Because house is far away from other farms	16	5
Because of the availability of, or easy access to, water	14	23
Because crops planted close to the house are not easily stolen	13	49
Because it is easy to monitor plants close to the house	9	27
Because the road to the market is in poor condition	4	17
Sociocultural		
To produce food and seedlings for sharing with neighbors	25	30
To have something to be proud off	18	14
Because it is part of tradition	13	21
Because their neighbors have a nice home garden	10	24
Aesthetic, environmental quality		
To create shade	22	30
To have a safe playing ground for children	18	10
To plant flowers and beautify the surroundings	13	12
To create a peaceful area for relaxation	12	19

[a] *expressed as a percentage of the maximum score, i.e., the score attained if all interviewed farmers would have identified the reason in question as the most important one*

Table 6: Number of upland and lowland households (expressed as percentage of total households in this study) that either use all the home garden crops and products for home consumption or, in case of excess, exchange crops with neighbors or sell them in the village or at the local market in Isabela or Cagayan Province, Philippines

Use of home garden crops and products	Percentage of total households	
	Upland (n = 14)	Lowland (n = 18)
Products solely for home consumption; no crops are sold	50	28
Exchange of crop excess with neighbors and villagers	14	17
Selling crop excess to neighbors and villagers	36	33
Selling crop excess at market	43	50

Farmers face, however, a number of constraints while maintaining a home garden (table 7). In the uplands, farmers perceived the following constraints as most problematic in terms of home garden production (listed in order of importance): astray animals (particularly goats), soil fertility and productivity, pests, lack of fencing materials and seeds and seedlings. In the lowlands, the constraints include, in order of importance, pests, diseases, drought, lack of fence materials and flooding.

Table 7: Farmers' major constraints in maintaining a home garden in the upland and lowland villages in Northeast Luzon, Philippines.

Constraint	Score [a] (percent)	
	Lowlands [b]	Uplands [c]
Pest	62	53
Disease	44	19
Drought	40	26
No material for fencing	38	52
Flooding	37	19
Astray animals	33	59
Lack of seeds and seedlings	31	43
Damage to crops due to heavy rain or typhoon	26	21
Rain during florescence of mango trees	21	24
No animal traction for cultivation available	21	34
Soil fertility and soil productivity	15	55
Stoniness	13	23
Weed growth	12	21
Small size of home garden	10	15
Lack of labor	3	17
Lack of time	1	0
Erosion	0	3

[a] *: expressed as a percentage of maximum score, i.e., score attained if all interviewed farmers would have identified a given constraint as the most important one*
[b]*: n = 19*
[c]*: n = 15*

CONCLUSIONS

In summary, the results in this study show that, contrary to the upland home gardens characterized by their location in remote areas with low population density, the lowland home gardens (in accessible areas with high population density) are:

- smaller in size, which is also true for farm land,
- almost all private land,
- less different in species composition,
- planted with more banana and stimulants, beverage, and spices,
- richer in fruit trees and show lower numbers of other trees,
- identified by farmers (particularly tenants) as systems grown for cash production and to yield food because there is no food for daily household consumption on farm, and
- providing crops that are sold or exchanged with neighbors, friends and family by a larger number of farmers' households.

It is evident that the home garden forms just one component of a larger farming system, complementing livestock, field agriculture and other components of the farming system. These components are all interrelated, explaining why the home gardens' functional dynamics and species composition are affected by (changes in) other components of the farming system such as farm size and the type of crops grown in farms.

In our future research, we will further address the role of home gardens in environmental services (given home gardens are one of the few sites where people spontaneously grow trees), including biodiversity conservation (birds, soil fauna) and carbon sequestration

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CHAPTER ELEVEN

IMPROVING PRODUCTIVITY, PROFITABILITY AND SUSTAINABILITY OF DEGRADED GRASSLANDS THROUGH TREE-BASED LAND USE SYSTEMS IN THE PHILIPPINES

Canesio D. Predo and Herminia A. Francisco

ABSTRACT

This study aimed to quantify and analyze the productivity, profitability and sustainability of alternative land uses in the degraded grasslands using a bioeconomic modeling approach. The study was conducted in Claveria, Misamis Oriental in Mindanao, Philippines. Results of bioeconomic analysis showed that tree-based land use systems have significantly higher financial profitability and environmental benefits. The latter were measured in terms of higher carbon sequestration, least soil erosion, and sustained soil nutrients relative to current farmers' practice of maize cropping. Despite these, survey results showed the extent of tree farming remains low (<10 percent of land area). The risk analysis indicated that while timber-based systems earned the highest net present value (NPV), they seemed to be the most risky options as reflected by the high coefficient of variations of the NPV ranging from 164 percent to 205 percent. The study recommended measures to reduce price risk and the need to improve risk management capability of farmers to promote expansion of smallholder tree farming. Provision of relevant and timely price information and price risk insurance are such possibilities. It is also suggested that payments to farmers for environmental services like carbon sequestration be explored to encourage expansion of tree-based land use systems.

INTRODUCTION

Uplands are important geographical components of Philippine agriculture. Vast areas of the uplands in the Philippines are covered with grassland vegetation mostly dominated by *Imperata cylindrica* or cogon indicating low soil fertility and productivity level. Historically, these vast degraded uplands are the results of a land use transformation from natural forest to grassland areas via shifting cultivation and consequently into permanent agriculture due to increasing population pressures in the uplands (Bandy et al. 1993; Garrity and Agustin 1995).

Traditionally, shifting cultivation is sustainable with long fallow period. When fallow period shortens, soil fertility declines significantly due to increasing soil erosion, and has resulted in degraded grasslands that are generally acidic, with low organic matter and dry soil susceptible to soil erosion. In the Philippines, the environmental consequences of shifting cultivation in upland areas are severe and widespread with soil erosion as the worst environmental effect (World Bank 1989). Estimated total annual soil loss from the Philippines varied from 74.5 million tons (DENR 1992) to 80.6 million tons

(Francisco 1994). Soil erosion is a natural process; however, it is greatly accelerated by human activities.

The intensive cultivation of upland areas without the adoption of appropriate soil conservation practices produce high rates of soil loss and threaten the long-term sustainable productivity of the upland resource base (Francisco 1998; Nelson and Cramb 1998). This has serious implications on the economic welfare of a growing upland population with few feasible livelihood alternatives. There is evidence that the future of low-input shifting cultivation in the uplands is grim. Where economic viability is still being achieved, it is not likely to last as indicated by soil quality and long-term economic performance (Menz and Grist 1998). If smallholder farmers continue to practice intensive farming system without the application of new technology or inputs, returns to labor will fall to the point that most of these smallholder upland farms will cease to be viable (Menz and Grist 1998; Nelson et al. 1998; Magcale-Macandog et al.1998). For most smallholder farmers, the limited land area available implies that it is not financially feasible to reduce the cropped areas sufficiently to maintain yields and soil parameters at sustainable levels. The challenge therefore is to facilitate improved productivity and profitability of degraded uplands and at the same time maintain environmental quality of this resource for sustainable upland livelihood of smallholders.

Tree-based farming systems are potentially profitable alternatives for improving the productivity and sustainability of marginal upland areas. Tree growing is recognized to be effective in the control of imperata and other grasses via shading (Menz and Grist 1996; Gouyon 1992). It also provides additional public benefits in the form of carbon fixation by sequestering atmospheric carbon through their growth process (Nowak 1993). Tree growing is the only known practical way of removing large volume of greenhouse gases (GHG), especially carbon dioxide (CO_2), from the atmosphere (Trexler and Haugen, 1995). CO_2 is the most abundant and important GHG under human control (Moura-Costa, 1996; Houghton, 1996) and it is expected to account for more than 50 percent of the radiative forcing of GHG released from human activity over the next century (Houghton 1996; Houghton et al. 1990).

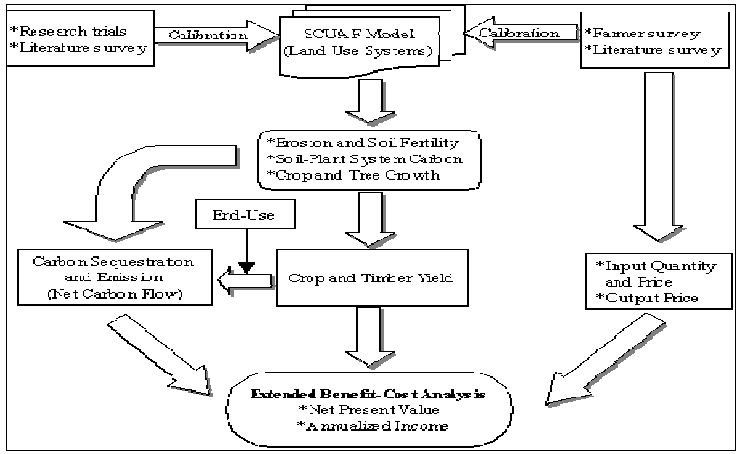
In this study we aimed to quantify the economic and environmental impacts of grassland conversion to tree-based land use systems. Specifically, the study aimed to: (1) estimate and analyze the private profitability, social and environmental benefits of smallholder tree based land use systems at the farm level in terms of carbon sequestration, soil fertility and erosion, and long-term productivity, (2) assess the degree of economic risk associated with each alternative land use system for degraded uplands, and (3) draw policy implications related to improving productivity of land uses of degraded uplands for achieving sustained livelihood while protecting the environment. To answer these objectives, the rest of the paper is organized as follows. Paragraph two presents the methodology, particularly the bioeconomic modeling procedures employed in the study. This is followed by the results and discussion of findings in paragraph three. The last paragraph discusses the conclusions, policy implications and recommendations of the study.

METHODOLOGY

A bioeconomic analysis (figure 1) was applied to determine the economic and environmental impacts, including carbon sequestration benefits, of tree-based farming systems vis-à-vis current cropping or land use system. The biophysical component was modeled and simulated using Soil Changes Under Agroforestry (SCUAF) version 4.0 (Young et al. 1998). SCUAF is a simple, deterministic model that can be used to predict crop yield as a function of changes in soil carbon, nitrogen and phosphorus content. These changes depend on various plant and soil processes taking place for each land use system.

Data from research trials and literature survey were used in calibrating SCUAF. The major inputs or parameters in the model include soil profile, characteristics and soil erosion, plant growth, plant composition, removals or harvesting, and transfer or pruning. SCUAF determines plant growth and soil changes on a per hectare basis; hence the systems under study are modeled on a hectare of landholding. Land use systems were specified in the SCUAF model and simulation outputs served as the basis for the analysis of economic and environmental outcomes (changes in soil carbon, nitrogen and phosphorus contents resulting from soil erosion, recycling of plant materials and mineral uptake in a specified land use system within a given environment). The associated economic model was implemented through the extended benefit-cost analysis (BCA) framework.

Figure 1: Economic valuation framework used to quantify the impacts of alternative land use systems



Sampling and data collection

The study was conducted in Claveria, Misamis Oriental, Philippines. The barangays included in the survey were selected primarily based on the presence of mixed land use systems, and secondly on accessibility. From the selected barangays, a targeted selection of respondents was employed for the household survey. Households with farms contiguous to each other were selected to cover four study sites. A total of 192 farmer respondents were interviewed, from which tree-based farming systems adopters and non-adopters were identified based on their current land use, particularly on whether or not they have planted trees on their farms. This method of classifying the respondents served as the basis in the analysis of data.

This study utilized both primary and secondary data. Primary data such as socioeconomic and farm characteristics were collected through survey using pre-tested structured interviews and key-informant interviews. Other primary data collected include landholdings, land use patterns, and other relevant information.

The study site

Claveria, Misamis Oriental was chosen as the study site to calibrate the model for the following reasons: (1) it is considered as a representative imperata-dominated grassland area in the Philippines that meets the characteristics of interest for the study, (2) the area has been subjected to long-term government and non-government interventions relating to soil conservation practices, (3) there is significant adoption of soil conservation practices and transformation of imperata grassland into tree-based land use systems, and (4) availability of biophysical and economic data for model parameterization.

Claveria is located 40 km northeast of Cagayan de Oro. It lies on an undulating plateau between a coastal escarpment and mountainous interior, ranging in elevation from 200 to 500 m.a.s.l. Soil characteristics in the site are as follows: well-drained oxisol, acidic (pH between 4.5 and 5.0), depth of soil profile is more than 1 m (Garrity and Agustin 1995). The study site has an average annual rainfall of 2,000 mm for a five-year period (Limbaga 1993). The wet season is from May to October while the dry season occurs for the rest of the year. Major crops planted include root crops, tomato and maize. Maize is the dominant crop as source of staple food and animal feed. Tree farming of fast-growing tree species (e.g. *Gmelina arborea*, *Acacia mangium*, and *Eucalyptus deglupta*) is emerging in the area.

Estimation of carbon sequestration

Carbon flow (as CO_2) in crop or forest production depends on two processes: fixation (assimilation) and emission processes. The former represents the biomass growth in living crop/trees (in CO_2 equivalents) due to the photosynthesis, while the latter represents the biomass decay of the wood (in CO_2 equivalents), as a consequence of natural mortality or human related removals and end-uses. For this study, the carbon flow

for each land use system was estimated using SCUAF by simulating the net carbon gains/losses from plant-soil system carbon and annual emissions from decaying biomass.

The SCUAF model simulated the changes in plant-soil system carbon annually as the difference between total carbon gains and losses for each system. Gains for plant-soil system carbon are from the atmosphere, as photosynthesis or net primary production, and from additions of organic material from outside the system. Soil carbon arising from organic matter or leaf litter decomposition is accounted for in the gains from photosynthesis. Carbon losses, on the other hand, are those from harvest, burning, erosion, and oxidation. Mathematical derivation for calculation of net carbon flow is given in appendix 1.

Land use systems modeled in the study

The study modeled six land use systems based on the existing and potential land use transformation pathways for imperata grassland (table 1). Farmers at the study site practiced these systems singly or in a portfolio of farming systems as a household livelihood strategy of reducing income risks.

Table 1: Description of land use systems considered in the study

Land use system	Description
IMPLUS	Imperata land use for animal pasture or grazing system
FPLUS	Farmer's current practice of annual maize cropping system (100 percent of the area devoted to maize)
TIMPLUS	Timber trees with imperata for animal pasture or silvopastoral system (85 percent is allocated to imperata and 15 percent is planted to trees)
TCLUS	Timber trees planted in hedgerows with annual maize cropping system at the alley areas (85 percent is devoted to maize and 15 percent to timber)
TCSFLUS	Timber-maize system where bigger area is planted to timber trees in hedgerows with annual maize cropping at the alley areas (40 percent devoted to timber and 60 percent devoted to maize)
TPLUS	Timber plantation land use system (100 percent of the area devoted to timber)

IMPLUS refers to imperata-dominated grasslands that have not undergone any burning or cultivation. In the modeling exercise, 100 percent of the area of 1 ha farms was devoted to imperata and 95 percent of above-ground biomass was consumed by grazing animals (cattle) during the year while the remaining parts were allowed to re-grow in the subsequent year. FPLUS refers to a continuous open-field maize cropping system where soil is cultivated prior to planting maize seeds. In the model, inorganic fertilizers were applied during the growing season at 60 kg/ha per cropping for nitrogen and 24 kg/ha per cropping for phosphorus. The FPLUS was modeled with 100 percent of the area devoted to maize production.

In the case of TIMPLUS, 85 percent is allocated to imperata (treated as crops) and timber trees occupy only 15 percent of the total area. Modeling scenario for TCLUS was based on current land use practice in the area where 85 percent is allocated to maize cropping at the alley areas and the remaining 15 percent is planted to timber trees as

hedgerow species. TCSFLUS, a variant of TCLUS system, is an adaptation of the social forestry agroforestry model where 40 percent is planted to timber trees in hedgerows while the 40 percent alley areas is devoted to annual cropping of maize. Two tree-species were modeled in the timber-based systems: (1) *Gmelina arborea* (non N-fixing tree) and *Acacia mangium* (N-fixing tree). Except for TCSFLUS system, all tree-based systems allocated 60 percent of the tree component to *Gmelina arborea* and 40 percent to *Acacia mangium*. In TCSFLUS system, the tree component was planted equally (50 percent of 0.4 ha) to both timber tree species. Timber seedlings were planted with 3 x 4 m spacing, yielding a density of 834 trees per ha. A block planting method was used for timber plantation system (TPLUS). Pruning of branches and twigs of trees were done in all tree-based systems during the first two years of the rotation interval to induce straight growth of gmelina and acacia.

Farmers preferred to cut gmelina trees at seven years (Magcale-Macandog et al. 1999), however, majority of tree growers in the survey reported the best age to harvest gmelina and other fast-growing timber tree species was between eight and ten years. Thus, an optimal rotation interval of ten years was specified in the model for timber trees. Simulations were run for two cycles of tree growth or twenty years in all land use systems. The analysis was based on a 1 ha system since SCUAF determines plant growth and soil changes on a per hectare basis.

Model parameterization, economic data and assumptions

The default values of biophysical parameters used in SCUAF model are based on the characteristics of the physical environment inputted in the model such as climate, slope class, soil drainage, parent material, soil texture, soil reaction, and organic matter status. The physical environment used in SCUAF model for Claveria has the following characteristics: lowland humid class of Köppen climate classification, moderate slope class, free soil drainage, intermediate parent material, clayey soil texture, strongly acid soil reaction, and intermediate organic matter status. The plant growth, nutrient composition, soil properties and erosion parameters were specified in the model for each land use system. A detailed discussion of these parameters can be found in Predo (2002) and are available upon request.

Data and assumptions used in the economic analysis were derived from SCUAF simulations, primary data (survey and key informant interviews), and secondary sources. The base parameter values used in calculating the NPV of each system are presented in table 2. These parameters include the following economic data and assumptions: labor requirements, wage or labor costs, material input requirements, input and output prices, cost of capital and other data. The detailed descriptions of these data can be found in Predo (2002) and are available upon request.

Table 2: Base parameter values used in cost-benefit analysis of alternative land use systems, Claveria, Misamis Oriental, Philippines

Parameter	Value	Units	Description	Source
Labor requirements				
L_{MD}	103	MD/ha/yr	man-day labor requirements for maize production	c
L_{MAD}	32	MAD/ha/yr	man-animal labor requirements for maize production	c
L_{AP}	22.8	MD/au/yr	labor required for tethering and caring animal	a
L_{TP}	9.6	MD/ha	labor for tree planting	d, e
L_{PW}	90.4	MD/ha	labor for pruning and ring weeding trees, twice per year for first two years	d, e
L_H	67.8	MD/ha	labor for harvesting timber and post harvest processing	d, e
L_{HL}	13	MD/ha	man-day to layout hedgerow for timber trees component	c
L_{HA}	2	MAD/ha	man-animal day to layout hedgerow for timber trees component	c
Wage price				
W_{MD}	70	P/MD	labor wage for man-day	a
W_{MAD}	140	P/MAD	labor wage for man-animal-day	a
W_{AD}	70	P/AD	labor wage for animal-day	a
Material inputs				
S_M	32	kg/ha/yr	maize seeds for planting	c
S_T	834	seedlings/ha	planting density (500 *Gmelina*; 334 *Acacia mangium*)	i
F_N	120	kg/ha/yr	nitrogen fertilizer application rate (approximately 261 kg/ha/year urea)	c
F_P	48	kg/ha/yr	phosphorus fertilizer application rate (approximately 264kg/ha/yr solophos)	c
C_{AI}	1,765	P/au/yr	Cost of inputs (feed supplements, veterinary drugs, ropes, etc) for animal maintenance	o
Input prices				
P_{SG}	15	P/seedling	price of *Gmelina* seedling	a
P_{SA}	10	P/seedling	price of *Acacia mangium* seedling	a
P_{SM}	10.50	P/kg	price of maize seeds	a, c
P_{FU}	8.30	P/kg	price of urea fertilizer	a
P_{FS}	10.40	P/kg	price of solophos fertilizer	a
Output prices/value				
P_M	6.3	P/kg	price of maize (grain)	a
P_C	510	P/tC	price of carbon	b
P_T	10	P/bdft	price of lumber	a
B_{AS}	10,710	P/au/year	animal services benefit at current wage rate	a, o
A_V	3,434	P/au/year	value of change in animal inventory per year	o, h
Cost of capital				
r_p	25	%	private discount rate (opportunity cost of capital)	c
r_s	10	%	social discount rate	f, g
Other data				
CPI	1.62	-	consumer price index for 2001	h
ψ_m	18	%	selling moisture content of maize	c
ψ_t	54	%	selling moisture content of lumber	e
δ	0.5	-	carbon content of biomass & wood	j, k
λ	0.07	-	decay constant of timber products based on half-life of 10 years	l, m

ω_G	0.35	t/m^3	wood density of *Gmelina*	e
ω_A	0.60	t/m^3	wood density of *Acacia mangium*	n

Sources: a = survey and key informant interview, b= Nordhaus (1993) cited by Tomich et al. (1997), c=Nelson et al. (1996c), d=Magcale-Macandog and Rocamora (1997), e= Mamicpic (1997), f= Medalla et al. (1990) as cited by Grist et al. (1997/2), g= Menz et al. (eds.) (1998), h= NEDA (2002), i= Magcale-Macandog, Predo et al. (1997), j= Lasco (1997), k= Young et al. (1998) and Schroeder (1994), l = Bechmann (1990), m= Grist et al. (1997/10), n= MacDicken and Brewbaker (1984), o= Magcale-Macandog et al. (1998).

Economic analysis

The economic component of the model was linked to SCUAF with specification of production and conservation inputs and outputs for harvest, including other biophysical impacts of modeled land use systems. These outputs from SCUAF were subjected to economic analysis through the BCA framework. Two decision criteria were used in evaluating each land use system: (1) NPV, and (2) annualized net benefits. The discount rates used in the analysis were based on existing cost of capital to upland farmers (25 percent) and the social cost of capital (10 percent).

The NPV of the land use systems over a period of time was computed as:

$$\text{NPV} = \sum_{t=0}^{T} \frac{(B_t - C_t)}{(1+r)^t}$$

where: B_t = benefit at time t, C_t = cost at time t, r = discount rate, t = time (in years) where observation is noted, and T = life span of investment (in years). In order for the land use system to be acceptable, the NPV must be greater than zero (i.e. positive). With mutually exclusive land use systems, the one with the highest NPV should be preferred.

In private/financial terms, B_t and C_t were calculated from all quantifiable on site outputs and inputs valued at market prices. Private benefits were estimated by multiplying the farm gate price with marketable outputs of the system resulting from SCUAF simulation. This measure of financial profitability ignores risks and other market imperfections such as externalities and public goods, including carbon sequestration and emission.

The BCA was extended to incorporate the social benefits from carbon sequestration. Carbon sequestration benefits were derived by quantifying the value of carbon sequestration from soil and biomass accumulation over a given rotation interval. Thus, social NPV of the tree-based systems was calculated by adjusting the private NPV as follows:

$$NPV_{social} = \sum_{t=0}^{n} \frac{(B_t - C_t + G_t)}{(1+r)^t}$$

where G_t is the imputed value of carbon sequestration function of each land use system at time t. All other variables are similarly defined as above. Ideally, social NPV should reflect the economic value of alternative system to society. For this study however, the social profitability of each system has to incorporate only the imputed value of carbon sequestration, while the other benefits and costs were still evaluated at market prices.

The net carbon sequestration potential for each land use system was quantified following the modeling procedure outlined above. Nordhaus (1993) as cited by Tomich et al. (1997) estimated the marginal cost of carbon emissions to be between US$ 5 and US$

20 per ton of carbon (tC). The monetary value of carbon sequestered for each system was calculated using the intermediate price level of US$ 10/tC or PhP. 510/tC.

The annual net benefit indicates how much the NPV translates into yearly income over the lifespan of the investment (T). The annualized net benefit was computed as:

$$ANB = \frac{\text{r (NPV)}\,(1+r)^T}{(1+r)^T - 1}$$

Risk analysis

To quantify the impacts of price risks (variability) on the estimates of the net benefits of the tree-based options considered in the study, risk analysis was undertaken. While SCUAF model is a deterministic model, a stochastic component can be built into the economic decision variables of the model. The stochastic version of the model was solved through Monte Carlo analysis based on deterministic results. This analysis was implemented using the @RISK software package trial version (Palisade 2000).

Following Purnamasari et al. (1999), the uncertainty specified in the output prices (i.e. historical price series from 1985 to 2001) of timber and crop was used as a base to produce numerical results as probability distribution of NPV. One thousand iterations were used for each stochastic run. A 10 percent discount rate was used, thus the results from the risk analysis are comparable to the point estimates obtained with a 10 percent discount.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

The mean age of total farmer-respondents was about forty-five years. The mean age of tree-based system adopters ranged from forty-three to fifty years while the mean age of non-adopters was about thirty-nine years. This indicates that upland farmers who invested in tree-based farming systems were significantly older than non-adopters. In similar pattern, the average years of farming experience of adopters (twenty years) was significantly longer than non-adopters (thirteen years).

On the average, upland farmers reached primary level, spending at least six years in school. The mean educational attainment of adopters (6.2 to 6.3 years) was not significantly different compared with the non-adopters (5.8 years). The majority (92 percent) of the upland farmers who make decisions about their upland farming activities were males. Both tree-based system adopters (90 to 94 percent) and non-adopters (93 percent) were predominantly males. The household size of total upland farmers surveyed ranged from two to eleven people with an average of about six members. Comparing the average household size between adopters and non-adopters was found to be not much different, which means that adopters and non-adopters have similar family labor resource.

The sources of annual cash income of upland farmers included farm, off-farm, and non-farm. Among these, farm income provided the highest cash income for both adopter and non-adopters; while the off-farm source provided the least income for

adopters, and the non-farm source for non-adopters. Farm income comprised the following sources: (1) annual crops such as corn, lowland and upland rice; (2) perennial crops such as mango, coffee, coconut, and banana, and (3) animal and livestock production. The average farm income over the last twelve months for tree-based system adopters ranged from PhP. 32,263 to PhP. 51,691 with an average of PhP. 37,861. This was significantly higher than average farm income of non-adopters (PhP. 15,379). This suggests that higher farm income of adopters may be due to increased farm fertility and productivity associated with the incorporation of trees into the farming system.

Farm characteristics of the respondents

The majority (92 percent) of the upland farmers had one to two farm parcels. On average, tree-based system adopters had slightly higher number of farm parcels (1.5) than the non-adopters (1.1). Total farm area ranged from 0.25 to 18 ha, with an average of 2.08 ha. Adopters of tree-based farming systems have significantly higher average farm size (2.2 ha) than the non-adopters (1.19 ha).

Fifty-nine percent of the respondents owned the farm parcels they were cultivating. The tree-based system adopters owned between 52 and 75 percent of their farms but only about 26 percent were owned by the non-adopters. The rest of their farms were tenanted and rented or leased. The majority of non-tree growing farmers (42 percent) were tenants of the farm parcels they tilled while only about 13 to 29 percent of the tree-based system adopters were tenants. Thirty-nine percent of the owned farm parcels were actually covered by a title. Twenty-five percent was owned thru a certificate of land transfer. No formal document, tax declarations, certificate of stewardship contract (CSC), and mortgage also often occur.

Extent of adoption of tree-based land use systems

Survey results revealed a significant adoption of smallholder farmers on tree-based land use systems. Of the 192 farmers interviewed, about 86 percent have planted trees on their farms (table 3). The majority of the adopters (49 percent) started to invest in tree growing about five years ago, while about 29 percent and 22 percent planted trees in the farm between six to ten years ago and eleven years and above, respectively (table 4). On the average, tree-based adopters commenced planting trees on their farms about seven years ago. The high adoption rate at later period possibly indicates that farmers' adoption of new technologies or land use systems was not automatic upon introduction of the new systems. This happens even for land use systems or technologies with high financial returns and more environmental benefits. The most probable reason is that adoption of tree-based systems may be driven also by factors other than financial considerations such as risks, particularly income risks and consequently consumption risks.

Table 3: Frequency distribution of smallholder farmer-respondents, Claveria, Misamis Oriental, Philippines

Category	Number	Percent
Adopter	165	86
Non-adopter	27	14
Total	192	100

Table 4: Distribution of tree-based systems adopters by length of adoption, Claveria, Misamis Oriental, Philippines

Length of adoption (years)	Number	Percent
5 and below	81	49
6-10 years	48	29
11 and above	36	22
Total	165	100
Mean (SD)	6.64 (5.11)	

While the proportion of tree-based system adoption was high, the extent of adoption was considerably low. Tree-based system adopters allocated only a relatively smaller share of their farms to timber and fruit trees than to maize and other annual crops combined (table 5). For instance, *Gmelina arborea* has been planted by about 58 percent of the adopters but average current land use share was only 4.8 percent, which is equivalent to 0.11 hectare. Average land use share for other tree species was also at minimal level (0.07 percent to 3.7 percent). Nonetheless, the average land use share reported for gmelina could be considered underestimate of actual land use share as it includes all tree-based adopters in the calculation even those without gmelina in their tree-crop portfolio. When only those adopters with gmelina are considered, the average land use share ranged from 10 to 15 percent. This conforms to the findings of Nelson et al. (1996) and Shively (1996) that an optimal share of trees or hedgerow component in a tree-crop portfolio has been found to be 10 to 20 percent.

Table 5: Mean current land use allocation of adopters and non-adopters of tree based land use systems, Claveria, Misamis Oriental, Philippines

Land use	Adopter		Non-adopter		All	
	Land share (percent)	Area (ha)	Land share (percent)	Area (ha)	Land share (percent)	Area (ha)
Maize	58.12	1.302	67.94	0.734	59.12	1.230
Lowland rice	4.65	0.104	5.28	0.057	4.21	0.088
Upland rice	1.80	0.040	0.28	0.003	2.18	0.045
Cassava	2.32	0.052	1.94	0.021	2.48	0.052
Gmelina arborea	4.80	0.108	0.00	0.000	4.11	0.085
Eucalyptus deglupta	0.95	0.021	0.00	0.000	0.81	0.017
Acacia mangium	0.07	0.002	0.00	0.000	0.06	0.001
Sweitenia macrophylla	0.28	0.006	0.00	0.000	0.24	0.005
Fruit trees and other trees	3.66	0.082	0.00	0.000	3.82	0.079
Coconut	2.47	0.055	0.00	0.000	2.12	0.044
Coffee	0.56	0.013	0.00	0.000	0.48	0.010
Vegetables	3.96	0.089	5.96	0.064	4.54	0.094
Fallow (natural/improved)	9.73	0.218	7.59	0.082	8.32	0.173
Pasture/Grazing	1.45	0.032	1.11	0.012	1.40	0.029
Banana	4.16	0.093	9.95	0.107	5.78	0.120
Peanut	0.18	0.004	0.00	0.000	0.16	0.003
Watermelon	1.15	0.026	0.00	0.000	0.89	0.019

Multiple responses possible

In terms of annual crop production, on the average, tree-based adopters allocated a relatively smaller land use share for maize production (58 percent) than their non-adopter counterparts (68 percent). This is primarily because adopters devoted some of the farm parcels to fast-growing timber tree species (e.g. *Gmelina arborea*, *Eucalyptus deglupta* and *Acacia mangium*), fruit trees and other cash crops in combination with maize crop or upland rice. Since tree-based system adopters have relatively bigger farm size than non-adopters, the smaller percentage has translated to a larger area devoted to maize production for adopters compared with non-adopters.

Besides trees and annual crop production, banana production constituted the next highest average land use share in the whole farm portfolio for both adopters (4 percent) and non-adopters (10 percent). This was followed by the fallow system (10 percent for adopters and 8 percent for non-adopters), which is aimed at restoring soil fertility.

Economic impacts

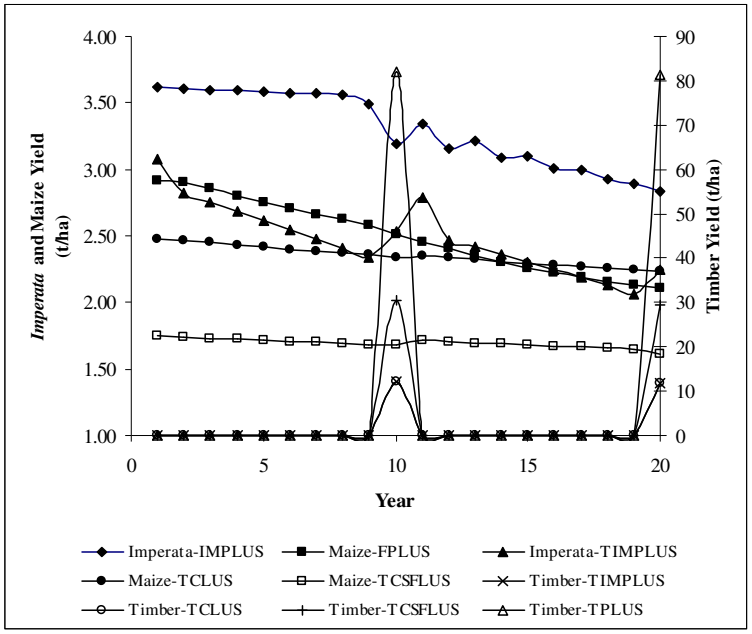
Predicted yield of imperata, maize and timber

The productivity of various land use systems was not directly comparable in terms of yield since each system has different outputs and/or harvested products. However, the pattern of herbage, maize and timber yields was explained by the rates of soil loss

predicted and consequently the predicted soil quality in terms of carbon, nitrogen and phosphorus associated to each land use system. For instance, maize yield declined more rapidly under current practice of maize cropping without tree component (FPLUS) than the system with trees (TCLUS and TCSFLUS) throughout the simulation period (figure 2). Relative to initial maize yield, the rate of maize reduction was about 28 percent under FPLUS systems while maize yield under TCLUS and TCSFLUS declined only by 10 percent and 8 percent, respectively after twenty years.

Predicted herbage yield of imperata declined at a much lower rate in the imperata-animal grazing system (IMPLUS) than under silvopastoral (TIMPLUS) system. This is most probably caused by the competition effect of trees and grass in terms of light capture and nutrients uptake (figure 2). Meanwhile, all the tree-based systems exhibited a slower yield reduction over the two rotation intervals than in other land use systems but the least reduction in timber yield of 1 percent was observed under TPLUS system. This result could be explained by the lower rate of soil loss under this system.

Figure 2: Predicted yield of the alternative land use systems, Claveria, Misamis Oriental, Philippines



Financial profitability of alternative land use systems

The results of the BCA are presented in table 6. With a discount rate of 25 percent, all land use systems have positive NPV, which implies that they were all profitable at this level of the cost of capital. The timber plantation system (TPLUS) obtained the highest NPV (PhP.241,170/ha) followed by TCSFPLUS (PhP. 98,121/ha) and the lowest NPV (PhP. 271/ha) was realized by the imperata-grazing (IMPLUS) system. The current farmers' practice of annual maize cropping (FPLUS system) predicted a relatively higher NPV (PhP. 21,161/ha) than IMPLUS system but lower than TIMPLUS system (PhP. 35,031/ha), TCLUS system (PhP. 56,074/ha), and TCSFLUS system (PhP. 98,121/ha). Consequently, the TPLUS system predicted the highest annualized net benefits (PhP. 60,996/ha per year) to farmers and the lowest annual net benefit (PhP. 69/ha per year) was from IMPLUS system. These results indicate that it was financially profitable to retain imperata grassland for animal grazing purposes; however, it was not the most efficient type of land use. Conversion of imperata grassland into tree-based systems appeared to be a more efficient land use than other land use systems. Among the timber-based systems, the most efficient land use was observed on the TPLUS system because of the high value of harvested timber in addition to having lower predicted soil loss due to erosion and high level of soil nutrients sustained as shown in the discussion of environmental impacts in the succeeding section.

Reducing the discount rate to 10 percent had no effect on the relative ranking of the alternative land use systems in terms of NPV and annualized income. Instead, it just reinforced the financial profitability of the tree-based systems since a lower discount rate over longer periods increased the present value of sustained future yields for both crops and timber trees. With the reduced cost of capital, the NPV of tree-based land use systems increased to a range between PhP. 149,459/ha and PhP. 1,019,206/ha. Over twenty years, the highest benefit was realized from TPLUS system and then followed by TCSFLUS system. The NPV for annual maize cropping system (FPLUS) increased only at minimal level (PhP. 30,913/ha) due to increasing value of productivity losses of future yields resulting from high soil erosion.

Table 6: Private NPV (PhP./ha) and annual income (PhP./ha per year) of alternative land use systems over twenty years at 25 percent and 10 percent discount rates, Claveria, Misamis Oriental, Philippines

Land use system	NPV (PhP./ha)		Annual net benefits (PhP./ha per year)	
	25 percent	10 percent	25 percent	10 percent
IMPLUS	271	498	69	58
FPLUS	21,161	30,913	5,352	3,631
TIMPLUS	35,031	149,459	8,860	17,555
TCLUS	56,074	185,762	14,182	21,819
TCSFLUS	98,121	381,466	24,816	44,807
TPLUS	241,170	1,019,206	60,996	119,716

It is interesting to note that while FPLUS system was not the most financially profitable option for imperata grassland at current prices and technology, survey results have shown that farmers still continue to practice this system. In contrast, tree-based systems were found to be the most profitable option but the extent of adoption was low relative to annual crop production. As observed, if ever adoption takes place tree-growing investments are usually done in combination with annual crops and other cash crops. But why are smallholders hesitant to increase investment in tree-based farming systems? One possible reason is that smallholder farmers with limited resources and opportunities may need to have a minimum cash flow each year to sustain their families. While tree-based land use systems have higher NPV but a low cash flow each year, the farmer might consider these as an inferior option to investing than annual crops that has a lower NPV over the same number of years as the tree growing, but with a higher annual cash flow. This minimum cash flow consideration is a rational decision by farmers because of risk associated with the value of one's investment tied up in a long cycle crop such as tree crop where prices years from now may be uncertain.

Another reason is that farmers may be risk averse to trade production risk associated with subsistence crop for three other risks: yield risk for timber, price risk for the timber, and price risk for the purchased staple food. As a risk-coping mechanism, farmers may want to diversify their investments, and hence income. Diversification is simply captured in the principle of not putting all eggs in one basket (Pandey 2000). The risk of income shortfall is reduced by growing several crops that have negatively or weakly correlated returns. The effect of price risk on profitability of alternative land use systems is examined in the risk analysis section.

Social profitability and the value of carbon sequestration

The social profitability of each system was assessed using a social discount rate of 10 percent plus the imputed value of carbon sequestration but the other benefits and costs were still evaluated at market prices. When the value of carbon sequestration was accounted for, the values for tree-based land use systems increased but the relative ranking of alternative land use systems remain unchanged with the TPLUS system realizing the highest benefit from biomass carbon payments of about PhP. 42,321/ha for a period of twenty years (table 7).

Table 7: NPV (PhP./ha) with imputed value of carbon sequestration of alternative land use systems over twenty years at 10 percent discount rate, Claveria, Misamis Oriental, Philippines

Land use system	NPV without C (a)	Annual net benefits without C (b)	NPV of biomass C (c)	NPV of soil C (d)	NPV with biomass C (e=a+c)	Annual net benefits with biomass C (f)	NPV with biomass and soil C (g=a+c+d)	Annual net benefits with biomass and soil C
IMPLUS	498	58	0	264,782	498	58	265,280	31,160
FPLUS	30,913	3,631	0	243,113	30,913	3,631	274,026	32,187
TIMPLUS	149,459	17,555	10,866	261,138	160,325	17,007	421,464	44,709
TCLUS	185,762	21,819	14,282	259,660	200,043	21,220	459,703	48,765
TCSFLUS	381,466	44,807	21,472	259,291	402,938	42,743	662,230	70,249
TPLUS	1,019,20	119,716	42,321	265,643	1,061,527	112,606	1,327,170	140,785
Marginal benefit								
FPLUS-IMPLUS	30,415	3,573	0	-21,669	30,415	3,573	8,747	1,027
TIMPLUS-	148,961	17,497	10,866	-3,643	159,827	16,949	156,184	13,549
TCLUS-IMPLUS	185,264	21,761	14,282	-5,121	199,545	21,162	194,424	17,605
TCSFLUS-	380,968	44,748	21,472	-5,490	402,440	42,685	396,950	39,089
TPLUS-IMPLUS	1,018,70	119,657	42,321	861	1,061,029	112,547	1,061,890	109,626

The inclusion of soil carbon payments increased the values significantly relative to the biomass carbon payments only. The lowest value of biomass carbon was predicted under TIMPLUS system while zero payment was received for both IMPLUS and FPLUS systems since they do not accumulate standing biomass over time. For soil carbon payments, the TPLUS system obtained the highest NPV and the lowest was that from FPLUS system. This occurs because of high carbon losses through erosion and lower decomposing organic matter from leaf litters under FPLUS system.

The NPV increased further when all carbon pools were valued and accounted in the analysis. Like in the previous scenario, TPLUS system earned the highest NPV (PhP. 1,327,170/ha over twenty years) and annualized income (PhP. 140,785/ha per year). For this system, carbon sequestration benefits helped reduce the period with negative net returns. However, the amounts were still insufficient to cover the deficit incurred from establishment cost and maintenance costs before harvest. In the case of TIMPLUS and TCSFLUS systems, the value of sequestered carbon reduced the deficit period to only one year. The results clearly illustrate the importance of carbon payments in reducing income risk involved in tree growing to enhance investment in timber-based systems and consequently influence the climate mitigation policy that would support smallholder farmers' provision environmental services such as carbon sequestration.

The marginal benefits from switching land use would be more meaningful since the opportunity costs of existing land use are taken into account. This is particularly relevant in the imputed value of carbon sequestration since the net effect on carbon storage of implementing a tree-based system depend on the carbon content of the land use practices that are replaced. On the basis of this perspective, a switch in land use from IMPLUS system to TPLUS resulted in the highest marginal benefits of PhP. 42,321/ha from biomass carbon and PhP. 861/ha per year from soil carbon. Thus, the highest

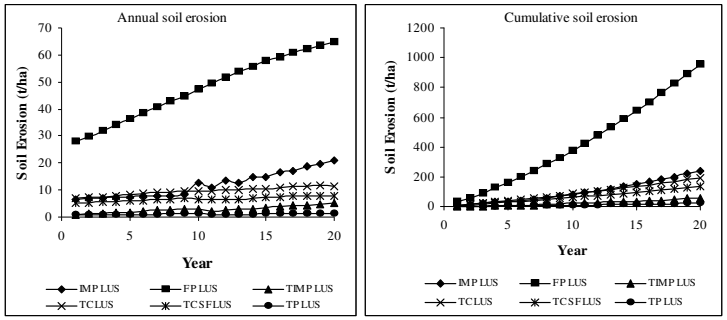
marginal NPV with biomass and soil carbon payments occurred under TPLUS system (PhP. 1,061,890/ha), which is equivalent to about PhP. 109,626/ha of annualized income.

Environmental impacts

Soil erosion

The annual and cumulative soil erosion of the six land use systems, predicted over twenty years, is graphically presented in figure 3. It was observed that predicted soil erosion has increased over time in all of the land use systems. This occurs most rapidly under FPLUS system with the highest average soil erosion of 48 t/ha per year over twenty years (table 8). Predicted soil erosion under timber based systems averaged 1-10 t/ha per year; the lowest has been observed under TPLUS system and it was significantly lower than average soil loss observed from IMPLUS and FPLUS systems. However, land use systems with imperata have relatively lower soil erosion than FPLUS system. This may be due to some protection from topsoil loss afforded in these systems because of the surface cover provided by imperata grass throughout the period since in the model not all biomass consumed by the grazing animals.

Figure 3: Predicted annual and cumulative soil erosion (t/ha) over time of alternative land use systems, Claveria, Misamis Oriental, Philippines



The cumulative soil loss under FPLUS system in the final year of simulation period was about 953 t/ha compared to 241 t/ha under IMPLUS, 58 t/ha under TIMPLUS, 192 t/ha under TCLUS, 134 t/ha under TCSFLUS, and 21 t/ha under TPLUS systems (table 8). Conversion of imperata grassland to tree-based land use systems reduced the rate of soil erosion between 20 and 91 percent. In contrast, the rate of soil loss increased by 75 percent for land use change from imperata grassland to current farmers practice of continuous maize cropping. The results strongly indicate that tree-based land use systems

were effective in minimizing soil erosion. Incorporating timber trees in any land use would help reduce soil erosion even in the most erosive farming practice.

Table 8: Summary of biophysical results from SCUAF simulation of alternative land use systems, Claveria, Misamis Oriental, Philippines

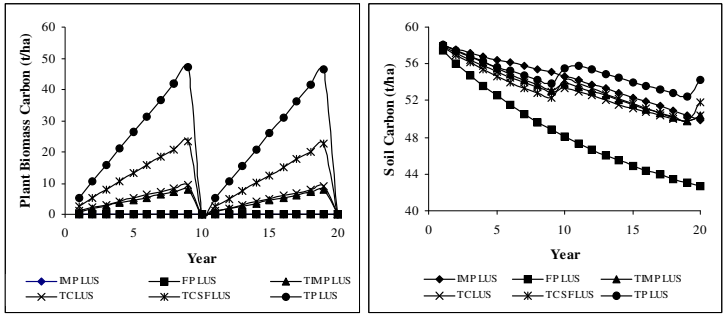
Land use system	soil erosion (t/ha)		carbon (t/ha)		soil nutrients (t/ha)		Net carbon flow (NCF) (t/ha)
	Annual	Cumulative soil erosion	Biomass	Soil	Organic nitrogen	Organic phosphorus	
IMPLUS	12.06	241.25	0.00	54.19	5.99	3.93	0.00
FPLUS	47.67	953.35	0.00	48.55	5.36	3.52	0.00
TIMPLUS	2.88	57.69	4.01	53.41	5.92	3.87	1.47
TCLUS	9.60	192.00	4.59	53.11	5.89	3.85	1.96
TCSFLUS	6.70	133.97	11.58	53.23	5.90	3.86	2.98
TPLUS	1.06	21.20	23.46	54.94	6.10	3.98	5.95

Changes in biomass and soil carbon

The time-trajectory of above-ground biomass carbon and soil carbon are presented in Figure 4. Predicted above-ground biomass carbon under tree based land use systems (TIMPLUS, TCLUS, TCSFLUS and TPLUS) increased and accumulated during the growth period of timber trees (i.e. for the first nine years) and then dropped to zero in the tenth year, which was a cut year or harvest time of each rotation. Among the tree-based land use systems, the TPLUS system produced the highest accumulated biomass carbon because of the fast growth of timber tree species being planted and the entire system area was devoted to timber trees whereas only 40 percent in TCSFLUS and 15 percent for both TIMPLUS and TCLUS systems (table 8). On the other hand, predicted annual biomass carbon under IMPLUS and FPLUS systems was zero throughout the simulation period since annual harvesting of aboveground biomass has been specified on these systems and hence, plant carbon was reduced to zero at the end of each year.

Simulation results of the changes in soil carbon showed that predicted total soil carbon decreased throughout the simulation period for all land use systems (figure 4). The rate of reduction in total soil carbon was slowest in timber plantation system (TPLUS), with a 7 percent reduction only over twenty years. Current farmers' practice of maize cropping (FPLUS) had the highest rate of soil carbon reduction, amounting to a 26 percent reduction of the initial total soil carbon content. The predicted decline in total soil carbon under tree-based land use systems was influenced by the interaction of soil erosion and organic matter recycling. The level of soil carbon was sustained under TPLUS systems because soil loss was low while the amount of organic matter recycled was high.

Figure 4: Predicted carbon stocks in above-ground biomass and soil (t/ha) over time of alternative land use systems, Claveria, Misamis Oriental, Philippines

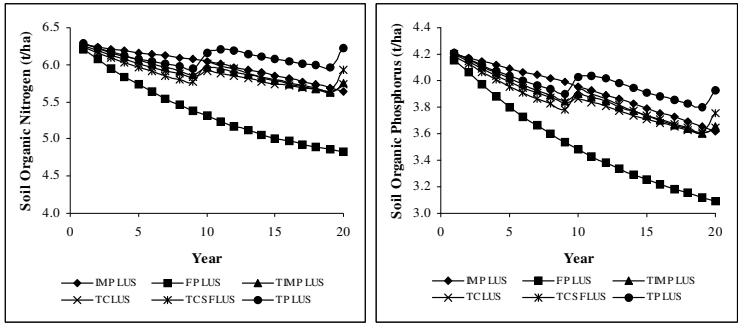


The severe soil loss under FPLUS system could have resulted in a sharp decline in soil carbon over time. It is also interesting to note that the level of total soil carbon under TPLUS system was lower than those under IMPLUS system during the first nine years of the simulation period. This is because systems with steadily growing trees may have had greater loss of carbon from the soil to support increasing standing biomass (Young et al. 1998). As a result, the average total soil carbon under tree-based land use systems (53.4 to 54.9 t/ha) was almost similar than those under IMPLUS system (54.2 t/ha) (see table 8).

Changes in soil organic nitrogen and phosphorus

Predicted total soil organic nitrogen declined more slowly under the tree-based land use systems (TIMPLUS, TCLUS, and TPLUS) than under current practice of annual maize cropping (TCLUS) system (figure 5). Predicted soil organic nitrogen was highest under TPLUS system because of the nitrogen and organic matter cycled through leaf litter and pruning during the first year of the rotation. Although there was a decline in soil organic nitrogen during tree growth, it increased at a higher level after timber harvest, though not of the same level as the initial soil nitrogen content. The soil total organic nitrogen slowly built up after harvest due to addition of organic matter from plant residues. Similar pattern was observed under IMPLUS system but soil nitrogen slowly declined in a continuous and linear fashion throughout the simulation period and at a much slower rate compared to those under FPLUS system. The average total soil nitrogen under FPLUS system was 5.4 t/ha compared to 6.0 t/ha under IMPLUS, 5.9 t/ha under TIMPLUS, TCLUS and TCSFLUS systems, and 6.1 t/ha under TPLUS system (see table 8).

Figure 5: Predicted soil organic nitrogen and phosphorus (t/ha) over time of alternative land use systems, Claveria, Misamis Oriental, Philippines



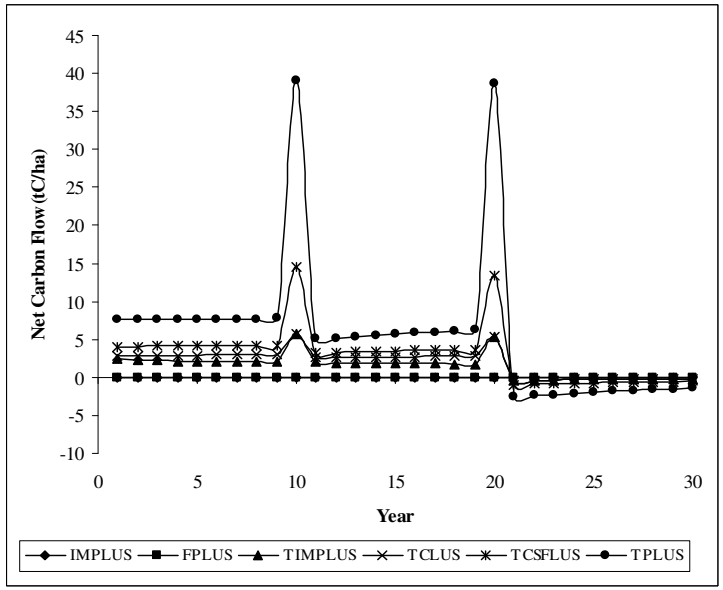
As in total soil nitrogen, predicted total soil organic phosphorus exhibited a downward trend over the simulation period (figure 5). The lowest decline of soil phosphorus occurred under TPLUS system while the greatest was under FPLUS system. IMPLUS system has sustained the soil phosphorus at a level similar to the systems with trees component. The average total soil phosphorus over twenty years under TPLUS (3.98 t/ha) was almost similar to those under IMPLUS (3.93 t/ha), TIMPLUS (3.87 t/ha), TCLUS (3.85 t/ha), and TCSFLUS (3.86 t/ha) systems but relatively higher than under FPLUS system (3.52 t/ha) (see table 8). The results indicate that tree-based systems would able to sustain soil nutrients at higher levels over time than current farmers' practice of annual maize cropping.

Net carbon flow

The annual net carbon flow (NCF) is the summation of the annual carbon flow in the plant soil system and the amount of carbon locked up in the timber products used in durable products such as furniture less the amount of carbon emission from the gradual decay of woods in the durable products. Alternatively, NCF is the net incremental amount of carbon sequestered over time used in the analysis to impute the value of carbon sequestration for each land use alternative. The pattern of predicted NCF was similar to that of aboveground biomass carbon for all land use alternatives (figure 6) since NCF is the incremental value of carbon accumulation in standing biomass with adjustment from erosion and oxidation losses, and emission. The average NCF for 30 years under TPLUS system was about 5.95 tC/ha per year compared to 2.98 t/ha per year for TCSFLUS, 1.96 tC/ha per year for TCLUS, 1.47 tC/ha per year for TIMPLUS, and zero tC/ha per year for both IMPLUS and FPLUS systems (see table 8). Timber plantation system (TPLUS) had the highest net carbon sequestration and fixation because of huge biomass production and higher timber yield. The imperata-grazing system

(IMPLUS) and current farmers' practice of annual maize cropping (FPLUS) have zero carbon sequestration because there is no accumulated standing biomass over time on these systems due to annual and seasonal harvest of grasses and maize crops, respectively.

Figure 6: Net carbon flow (tC/ha) over time of alternative land use systems, Claveria, Misamis Oriental, Philippines



Risk analysis results

Incorporating risk into the analysis allows us to consider how variations in output price might affect the point estimates of NPV obtained above. The expected mean NPV estimated with output price risks taken into account were slightly higher than the point estimates obtained from deterministic results except those from IMPLUS system (table 9). The expected mean NPV estimates under tree-based systems ranged from PhP. 152,352/ha in TIMPLUS system to PhP. 1.39 million/ha in TPLUS system. For FPLUS system, the expected mean NPV was about PhP. 31,007/ha and PhP. 488/ha for IMPLUS system. The relative ranking of alternative land use systems did not change under the stochastic results. TPLUS system obtained the highest expected NPV and the lowest was also realized under IMPLUS system.

Table 9: Expected and probability distribution of NPV of alternative land use systems at 10 percent discount rate, Claveria, Misamis Oriental, Philippines

Land use system	Expected NPV (PhP./ha)			Probability (percent)		Coefficient of variation
	Mean	Min	Max	NPV≤0	NPV≥ point estimate	(percent)
IMPLUS	488	-133	1,224	1.09	51.53	46
FPLUS	31,007	22,313	40,163	0.00	48.33	10
TIMPLUS	152,352	-4,959	3,724,745	3.97	76.33	205
TCLUS	188,727	28,088	3,734,460	0.00	76.24	164
TCSFLUS	388,403	12,978	8,856,102	0.00	76.26	191
TPLUS	1,038,894	-29,577	25,288,820	3.37	76.32	204

Risk analysis not only provided mean estimates, but also the entire distribution of the NPV estimates. The NPV of various land use alternatives can lie within a wide range of values; for example, the expected NPV of TPLUS ranged from a low value of PhP. 29,577/ha to a maximum of PhP. 31.4 million/ha. There were about 4 percent and 3 percent probability of obtaining negative NPV for IMPLUS and TPLUS system, respectively. IMPLUS system has only 1 percent probability of incurring a negative NPV while other land use systems have zero probability of incurring a loss.

For all tree-based systems, there was greater than 70 percent probability of the NPV to be higher than their deterministic results while it was more than 40 percent probability for FPLUS and IMPLUS systems. There was also a high variation on the expected value of NPV across land use system alternatives based on the coefficient of variation results. It is interesting to note that while timber-based systems obtained the highest NPV, they seemed to be the most risky options as reflected by the high coefficients of variation that ranged from 164 to 205 percent.

CONCLUSIONS, POLICY IMPLICATIONS AND RECOMMENDATIONS

Conversion of degraded forest margins dominated by imperata grassland into tree-based land use systems can provide significant improvements to a range of on-site and off-site benefits. Tree-based land use systems (especially timber plantation systems) appear to be superior compared with the current farmers' practice of farming because it had the least cumulative soil loss, highest biomass and soil organic carbon retained in the plant-soil system, greater amounts of nutrients conserved in the soil.

Smallholder farmers are however, driven by economic imperatives. For smallholders to consider changing to a significantly different land use system, the new system must be more profitable than the existing system. Benefit-cost analysis has shown that, at current prices, the tree-based systems are substantially more profitable than the imperata system and farmers' current farming system. In addition, there are substantially high social benefits from carbon sequestration for tree-based systems. While there is an economic incentive for smallholders to transform degraded forest margins to tree-based

systems, the time horizon of smallholders is important. Investments in tree-based systems will expose smallholder farmers to some minimum income constraints and risks (and consequently consumption risk) as they will incur a loss before timber harvesting. While payments to farmers for environmental services related to carbon sequestration would help reduce the risks of negative returns, smallholders are less likely to adopt tree-based land use systems unless they are capable of accepting negative profitability in the first nine years of tree growing.

Finally, it is important to emphasize that conversion of imperata grassland to tree-based systems is environmentally sustainable and economically efficient (though not a fully risk-efficient) option to undertake either for smallholder investment or for a government poverty reduction program. This clearly illustrates the case of a win-win strategy for improving productivity of degraded forest margins and agricultural sustainability, which lend strong support to the hypothesis that there is no trade-off between economic growth and poverty reduction objectives in pursuing smallholder-based strategies. A caveat for the findings of the study is that the analysis was based on the assumptions of tenure security and effective fire control.

The following policy implications and recommendations were drawn based on the findings of the study. First, tree-based land use systems provide greater environmental and economic benefits to smallholders and the society than current farming practice. This implies that wide promotion and adoption of these technologies in a large number of areas in the Philippines with similar settings as the study site would help reduce poverty among smallholders and sustainable resource management in the uplands. Second, since tree-based systems are associated with high-income risk, there is a need to assist farmers in price risk management. One way of doing this is to provide farmers access to timely and accurate price information of relevant products. The possibility of providing smallholder tree growers with price risk insurance is also warranted. Third, to encourage smallholders to improve their present farm management practices, particularly those that provide environmental services like carbon sequestration, a policy that will provide payments for said environmental services is warranted. The implementation of the clean development mechanism identified in the Kyoto protocol for carbon offset is one such mechanism for effecting environmental services payment.

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APPENDIX 1: DERIVATION FOR CALCULATING NET CARBON FLOW

From SCUAF simulation, the predicted changes in plant-soil system carbon at time t can be expressed as:

$Cf_t = (Cp_t + Ca_t) - (Ch_t + Cb_t + Ce_t + Co_t)$ (1)

where: Cf_t = annual carbon flow; Cp_t = carbon from biomass growth, calculated as the annual net biomass accumulation multiplied by 0.50 (the proportion of carbon in the biomass, Young et al. 1998); Ca_t = carbon from organic material additions; Ch_t = carbon losses from harvest; Cb_t = carbon losses from burning; Ce_t = carbon losses due to erosion; and Co_t= carbon losses from oxidation. If harvesting follows a clear cutting regime, C_p at time t can be calculated also as the carbon difference between the biomass of the stand at the end of period t (i.e. at the start of period t+1), C_{t+1}, less the biomass of trees at the start of period t, C_t, that is, $Cp_t = 0.50*(C_{t+1}-C_t)$.

When biomass is harvested, most of the sequestered carbon will ultimately be emitted back to the atmosphere either through decay or burning. Carbon emission was specified as a function of the decay rate of harvested biomass and the end-use of its products and residues. Thus, the fate of carbon for the harvested biomass was traced through a simple products' end-use equation. Let Cw_t be the net carbon storage from all harvested products at time t. By definition

$$Cw_t = \sum_{i=1}^{n} \rho_i Ch_i - \sum_{i=1}^{n} We_{it} \quad ; \quad i = 1,2,...,n \quad \text{(outputs)} \qquad (2)$$

where: Ch_i = carbon from i harvested output; ρ = proportion of harvested biomass used in the final product; We_{it} = carbon emission from product i at time t.

An exponential decay function was applied to estimate the CO_2 emissions from harvested biomass. Following Barson and Gifford (1990), a lumped parameter exponential decay function has been specified which varies according to the half-life (after harvest) of product's end-use:

$$W_{t_t} = W_0 e^{-\lambda t} \qquad (3)$$

where: W_{rt} is the weight of carbon remaining after decay for time t; W_o is the weight of carbon sequestered by the forest (timber) at time of felling or harvest; λ is the decay constant. Using this approach, biomass was depreciated with a constant proportion of the remaining biomass. The decay constant for timber products was derived according to their half-life period using the relationship:

$$t_{1/2} = \frac{\ln 2}{\lambda} \Rightarrow \lambda = \frac{\ln 2}{t_{1/2}} \qquad (4)$$

From this equation, the emission at time t from product i, We_{it}, was computed as the difference between the weight of carbon remaining after decay for time t-1 ($Wr_{i(t-1)}$) and at the current time t (Wr_{it}):

$$We_{it} = Wr_{i(t-1)} - Wr_{it} \qquad (5)$$

Using the above relationships, the net carbon fixation at time t (NCF_t) from plant-soil system and product's end-use was calculated as:

$$NCF_t = Cf_t + Cw_t \qquad (6a)$$

By substituting equation (2) into (6a), NCF_t becomes:

$$NCF_t = Cf_t + \sum_{i=1}^{n} \rho_i Ch_i - \sum_{i=1}^{n} We_{it} \qquad (6b)$$

CHAPTER TWELVE

REVIVING THE PHILIPPINE WOOD INDUSTRY WITH FARM-GROWN TREES: EVIDENCE FROM NORTHERN MINDANAO

Manuel G. Bertomeu

ABSTRACT

In many countries of South and Southeast Asia trees planted on farms are becoming the most important source of wood. In the Philippines, increasingly larger volumes of the timber traded and consumed come from trees grown on small farms in the sloping uplands. For more than a decade, small-scale farmers in Northern Mindanao have been generating a significant marketable surplus of fast-growing timber trees, and viable farm forestry industries have emerged in the region as a result. However, the Philippine government has not duly acknowledged yet, the importance of timber production by smallholder farmers and their contribution to sustain the wood industry. Existing policy disincentives constrain the establishment of tree farms and commercialization of farm-grown timber. This paper has two objectives. First, to describe how timber produced by farmers is reaching the market, the structure of this market and the end uses of farm-grown timber in the province of Misamis Oriental, Northern Mindanao. Second, to estimate the importance of timber production by smallholders and explore its potential to sustain the wood industry. The study was conducted among wood processing plants located in Cagayan de Oro City and its neighboring municipalities. Although in the past years the forestry sector output has been declining due to depletion of forest resources, the forest- and wood-based industry is the second most important industry sector in the region. Nowadays, there are in Northern Mindanao 135 small-scale sawmills exclusively supplied with farm-grown timber. These have an estimated log utilization potential of 111,064 m^3 yr-1 and a sawn timber production potential of 76,596 m^3 yr-1. Planted trees also represent a large percentage of the national and international production and trade of tropical timber in the country. Forestry statistics indicate that in 1999 up to 70 percent (500,000 m^3) of the country log production came from planted trees. This study provides evidence that most probably a large share of this timber is produced on-farm. This demonstrates that smallholder farmers can produce large quantities of timber and efficiently supply local and national markets. The Philippine government and the wood industry sector should recognize the role of smallholder farmers as land managers and efficient producers of many important agricultural commodities, including timber.

INTRODUCTION

Since 1950, the forest area in the Philippines has declined at a rate of 2.2 percent annually. By 1987 only 6.6 million hectares of the country (i.e. 22 percent of the total land area) remained forested (Kummer 1992). Rapid deforestation has had dramatic economic and environmental consequences. It is estimated that 5.1 million hectares (i.e. 17 percent of the country's land area) are grasslands dominated by *Imperata cylindrica* (Garrity et al. 1997). The forestry sector's contribution to the Gross Domestic Product

has dropped from 12.5 percent in 1970 to just 2.3 percent in 1988 (PCARRD 1994), and 1.3 percent in 1990 (ADB 1994). The Philippines is now a net importer of timber (ITTO 1996). Timber imports are draining the country's foreign currency reserves at a rate of PhP. 14 billion per year (Orejas 2002).

For more than three decades, tree planting has been promoted as the solution to the negative effects of widespread forest destruction. However, reforestation efforts have had limited success. Timber License Agreement (TLA) holders, who were required to reforest an area of denuded land equivalent to that selectively logged and to engage in industrial tree plantation, did not significantly contribute to the reforestation efforts due to corruption (Vitug 1993). Large government- and donor-funded reforestation and industrial plantation programs over large tracts of land created social conflicts due to farmer evictions and imposed restriction on farmers' livelihood activities on land they traditionally managed (Carandang and Lasco 1998; Lasco et al. 2001; Nimmo-Bell & Company Ltd. 2001). In addition, the wood industries associated with industrial forest plantations have struggled for economic survival (Philippine Daily Inquirer 2000). As with other tree crops, such as coffee, cacao and rubber, scale economies may not exist in the production of timber since neither large-scale machinery nor central management is required for the production of these tree crops (Hayami et al. 1993; Barr 2002). Social forestry programs and initiatives that started in the early 1970s have not been more successful. According to Pasicolan (1996) between 1988 and 1992 the Contract Reforestation Program successfully reforested only 10 percent of its 225,000 ha target. The program was very expensive to implement, and its assumptions that the mere participation of rural communities in planning and implementation of time-framed, target-oriented programs would be sufficient for success proved too simplistic.

In contrast, as a result of favorable market conditions and the promotion of a tree planting culture among upland farmers during the past two decades, smallholder tree farming has emerged as a profitable farm enterprise and as a viable alternative to industrial forest plantations and costly government-driven reforestation (Garrity and Mercado 1994; Pasicolan et al. 1997). Paradoxically, small-scale tree farms in the Philippines were first promoted in the early 1970s under the smallholder tree farming contract scheme of the Paper Industries Corporation of the Philippines (PICOP), one of the first major industrial forest plantation initiatives established to supply a pulp and paper mill at Bislig, Surigao del Sur. From 1972 up to 1994, PICOP established in its forest concession area 33,200 ha of *Paraserianthes falcataria* and *Eucalyptus deglupta* (ADB 1994; Jurvélius 1997).

Tree farms developed under this scheme quickly spread. In 1997, there were 15,000 ha of tree farms located nearby the PICOP mill site and another 29,000 ha further away but selling wood to PICOP (Jurvélius 1997). The high price of timber and the demonstration effect of the PICOP tree farming scheme, as well as the development of other successful tree planting programs, supported the spread of tree farming throughout the country.

Unfortunately, tree farming has been promoted on the promise of huge economic returns, based on overoptimistic yields of fast-growing trees in favorable tropical humid conditions and unrepresentatively high timber prices at specific times and locations. The slogan *Kahoy karon, bulawan ugma* (trees today, gold tomorrow) popular among Filippinos in Northern Mindanao exemplifies the expectations put on tree farming. A

local newspaper reported that one hectare of *Eucalyptus deglupta* could yield PhP. 14,000 per tree or PhP. 10.5 million per ha (Fonollera 1996). In the past few years, lower than expected returns from tree farming, particularly with *Gmelina arborea* (hereafter referred to as gmelina) and *Paraserianthes falcataria* (hereafter referred to as falcata), has caused disenchantment among upland farmers (Caluza 2002). As planted trees reached harvestable age, prices fell drastically due to market saturation. In 1997, the price of gmelina on stumpage averaged PhP. 4 per board foot (bdft.), (i.e. 33 US$ m^3), a 60 percent decline with respect to prices in the early 1990s. Moreover in the smallholder context, timber yields may be lower than predicted as a result of adverse soil conditions and farmers' poor management practices (e.g. excessive pruning and lack of thinning).

In spite of these setbacks, a field survey conducted in the upland municipality of Claveria, Northern Mindanao, among 112 farmers revealed that 55 percent wanted to plant more trees and were interested in trying new timber species (Bertomeu 2004). In addition to the benefits provided to rural families, including fuel wood, construction materials, protection against erosion, shade and shelter, farm-grown trees are taking an increasing share of the timber industry and trade in the Philippines. The existence in Region 10 of 135 small-scale sawmills exclusively supplied with farm-grown timber (DENR 1996b) demonstrates the extent and importance of tree farming in the region and provides evidence that growing timber trees on farms is still considered a viable livelihood alternative and an activity with an importance to the wood industry sector.

In many countries and regions of South and Southeast Asia trees planted on farms are becoming the most important, if not the only, source of timber. In Punjab, India, farm trees account for 86 percent of the province's growing stock. In Sri Lanka, trees outside the forest represents over 70 percent of industrial wood. And in Pakistan, trees on farms account for 23 percent of all timber growing stock. Even in Indonesia, a country that still has vast forest resources, some 20 percent of the total wood consumed is derived from trees outside the forest (FAO 1998). In the Philippines, increasingly larger volumes of timber consumed come from planted trees as well. Most of these are grown on small farms in the sloping uplands. This paper describes how the marketable surplus of timber produced by farmers is reaching the market, the structure of this market and the end uses of farm-grown timber in the province of Misamis Oriental in Northern Mindanao. Then, it shows the importance of farm-grown trees to sustain the regional wood industry and outlines timber producers' concerns about the future of the industry. By providing evidence of the contribution of farm-grown trees to the wood industry, I aim to highlight that timber generated on small farms, far from being anecdotal, has the potential to be a viable and reliable supply for the wood industry.

MATERIALS AND METHODS

The study was conducted among smallholder farmers in Claveria, Misamis Oriental, and wood processing plants located in Cagayan de Oro City and its neighboring municipalities. Cagayan de Oro is the capital city of Misamis Oriental, one of the four provinces of Region 10 in Northern Mindanao. Region 10 of Northern and central Mindanao is composed of the provinces of Misamis Oriental, Misamis Occidental, Bukidnon and Camiguin. Although the forestry sector output in the region has been declining in recent years due to depletion of the resource and the reduction in legal TLA

(Louis Berger International 1999), the forest- and wood-based industry is the second most important industry sector after processed foods and beverages (Provincial Capitol 1997). According to the Cagayan de Oro-Iligan corridor master plan, in 1998 the agriculture, fishery and forestry sector was an important contributor to the corridor's economy, accounting for a combined share of PhP. 3.3 billion or 18 percent of the gross service area product of the two provinces of Misamis Oriental and Misamis Occidental. Consequently, the establishment of industrial crops, such as forest trees, rattan and rubber, is one of the economic sectors proposed for development (Louis Berger International 1999). The Department of Environment and Natural Resources (DENR) reported that in 1996 there were in Region 10 six sawmills, five re-sawmills, three veneer and plywood plants and 135 mini-sawmills. Wood sources to these industries are TLAs from eastern and southern Mindanao, planted trees from Region 10 and adjacent regions, and imported timber from USA, Malaysia, UK and Singapore (DENR 1996b).

In the year 2000, seventeen farmers who harvested trees, sixteen owners of mini-sawmills and three managers of large-scale wood industries of Misamis Oriental were interviewed. The survey technique consisted of structured and semi-structured questionnaires with major topics of discussion concerning timber supply and demand, processing and production, uses of farm-grown timber, marketing system, constraints to the industry and trends, and future expectations. Important information was also gathered during several study tours to wood processing plants and training and research activities conducted in collaboration with tree farmers and a plywood company at Tagoloan, Misamis Oriental. These activities were part of the Landcare agroforestry extension project funded by the Spanish Agency for International Cooperation (AECI) and implemented by the World Agroforestry Center (ICRAF). Additional data on timber trade and marketing have been collected from published reports, secondary sources, the National Statistics Office (NSO) and local agricultural statistics.

Limitations of the study

I used the best statistics on timber production available from several sources, including local governments, national agencies and international organizations. However, because of the lack of transparency, so common in the forestry sector, and/or the absence of proper market information systems, there are probably large discrepancies between the actual amount on timber produced, traded and consumed and those reflected in the statistics. For example, there are no estimates of the large volumes of timber locally consumed in raw form (i.e. as poles, posts, or lumber), or processed (e.g. furniture, wooden crafts etc.). Also, although small-scale wood processors know well the production capacity of mini-sawmills, including recovery rates, most of them did not keep records of total production or were reluctant to share this information. It should be noted as well that given the species and the size and quality of the logs produced, farm-grown timber cannot be a substitute for wood originating from large diameter and quality logs coming from natural forests. Therefore, comparisons between farm-grown timber and other timber produced, traded or consumed should be interpreted with caution.

RESULTS

Supply, demand and uses of farm-grown timber

From the late 1980s and throughout the 1990s an increasing number of small-scale sawmills were established in Misamis Oriental for the processing and commercialization of farm-grown timber stocks. According to the DENR, in 1996 there were 135 small-scale sawmills in Region 10 of Northern Mindanao (DENR, 1996b). All the small-scale sawmills are mainly supplied with logs of gmelina and falcata. Other species milled, though in much smaller volumes, include *Acacia mangium* (mangium), *Swietenia macrophylla* (mahogany), *Eucalyptus deglupta* (bagras), and *Spathodea campanulata* (African tulip). Wood processors indicated that trees are mostly grown by smallholder farmers, although sometimes falcata originates from the large-scale forest plantations of eastern Mindanao. The average farm area managed (farm area managed = farm area owned + farm area rented) by those farmers interviewed was 5.7 ha, the average number of trees planted was 995 trees (SD=1,351) and the number of trees harvested was 232 (SD=519). Although studies conducted in Claveria show that small farm size do not prevent timber tree planting (Bertomeu 2004), results of this survey indicate that smallholders with larger farms (i.e. above the average size in Claveria of 2.5 to 3 ha), are more likely to be those market-oriented timber producers.

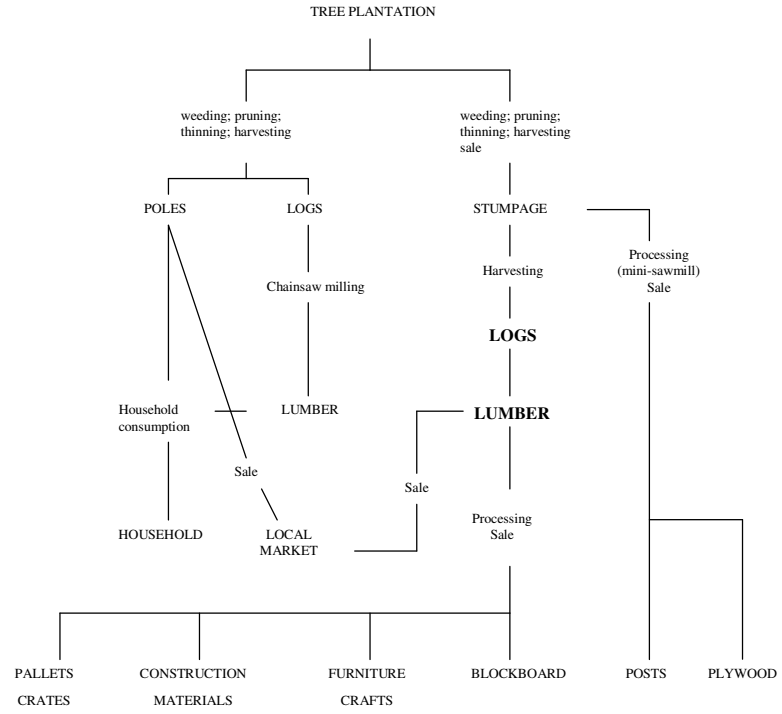
All farmers interviewed sold their trees on stumpage (i.e. standing on the stump). Fifty percent of the small-scale sawmills owners interviewed look themselves for plantations, buy the standing trees stumpage value, and haul the logs to the sawmill. For the other 50 percent, trees are harvested and delivered to the sawmill by farmers or middlemen. Gmelina is mostly purchased from municipalities within the province of Misamis Oriental, whereas falcata is bought in truckloads coming from localities of the neighboring provinces of Agusan and Surigao, as far as 200 km. This shows that farm forestry is a viable option for smallholder farmers even in remote areas.

About 50 percent of the small-scale sawmills owners experience slight fluctuations in the supply and demand of farm-grown timber throughout the year. They reported that there is more supply of timber from smallholder plantations during the dry season (i.e. from February to June), as this is the agricultural slack period and farmers need income for household consumption and to pay school fees. Moreover, during the dry season farms are more accessible and hauling and transport of heavy logs easier. The rest of the year, farmers are busy planting and harvesting field crops and therefore, it is more difficult to find trees for sale. By contrast, demand is lower during the first semester of the year and higher in the second as consumers have more cash to spend towards the end of the year due to extra payments and the harvest of agricultural crops. In spite of this, all but two interviewees responded that fluctuations in log supply and timber demand are not as marked so as to cause fluctuations in the price of timber.

Figure 1 depicts the most important transformations and end uses of farm-grown timber in Misamis Oriental. The great bulk of logs produced by farmers are sawn in small-scale sawmills and either sold for further processing to medium- and large-size wood industries, or sold to retailers (lumber yards, carpentries, furniture shops) and individuals. Wood industries use falcata planks and veneer as core stock in the production of ply board (also called block board) and plywood. Gmelina is mostly used for furniture,

house construction (window jams, doors, floor- and wall-tiles) and wooden crafts. Low quality wood and small size pieces are used for pallets, crates and wooden boxes. Due to the smaller size and lower quality, farm grown timber cannot be a substitute for timber originating from natural forests. However, according to the respondents, several premium timber species planted on farms, such as mahogany, have the potential to capture the market niche currently under the premium commercial timbers (veneer and large size, quality wooden planks). Unfortunately, although widely cultivated throughout the Philippines, mahogany stocks growing on farms in Northern Mindanao are not sufficiently large yet so as to supply the wood industries with sufficient quantities of timber.

Figure 1: Production and marketing system of farm-grown timber in Misamis Oriental, Philippines: producers' decisions, product transformation and end use



In the early 1990s, the price of farm-grown gmelina on stumpage was high, varying between PhP. 7 to 9 bdft-1. But since 1997, the average price is only PhP. 4 bdft-1. Tree planters have a good understanding of the reasons for the current decline in the price of farm-grown timber. Farmers reported that the market is likely to be saturated as plantation stocks rapidly increased when prices were high. In addition, lower demand and low timber quality are also contributing factors. Although some farmers indicated market control by exploitative middlemen as the reason for the current low timber price, there is no substantive evidence of the presence of a timber cartel since good market access and the existence of many buyers make the trade of farm-grown timber fairly competitive. Other factors influencing the price of farm-grown timber are the size and quality of the log, which ultimately determine the end use. According to the owners of small-scale sawmills interviewed, the price has declined because of the existence of large stocks of undersized and low quality timber. Small-scale sawmills require logs with a minimum length of 4 ft (although 3 ft can be accepted but at an even lower price) and 12 cm small-end diameter. However, 37 percent of the respondents reported that they are willing to pay farmers a stumpage price one to two PhP. per bdft-1 higher for straight logs with 16 to 18 cm small-end diameter and 8 ft long. Timber planks of this size are used for furniture and house construction. Sawn timber, used for furniture and house construction, is graded into three categories: A (planks 8 ft long without knots), B (6 ft long with some knots), and C (4 ft long, knotty). Prices vary accordingly: 11 or 12 PhP. for category A; 9 or 10 PhP. for category B; and 7 or 8 PhP. for category C. For veneer, timber price also depends on log size. In the year 2002, prices ranged from 3 PhP. per bdft-1 for logs 26 to 28 cm in diameter, to 6 PhP. per bdft-1 for logs with diameter 60 cm and larger. There is no price premium for quality timber that is bought by truckload. In the region, there is no active cooperative or local organization engaged in timber marketing. This is unfortunate as farmers and sawmill owners interviewed reported that the price of round timber at mill gate is around 50 percent higher than the current average stumpage price of 4 PhP. per bdft-1. As Anyonge and Roshetko (2003) indicated, tree growers would certainly benefit from the development of cooperatives and farmer groups that transfer economies of scale of timber production to smallholdings by facilitating the marketing of farm-grown timber.

Farm-grown timber: increasing the share of the wood industry

The Philippine government has not duly acknowledged yet the importance of timber production by smallholder farmers and their contribution to sustain the wood industry. For example, The Philippine year book 1999 reports the existence in 1996-1997 in Region 10 of only two active sawmills with an annual log requirement of 56,800 m³ (NSO 1999). However, the sixteen small-scale sawmills surveyed had a total of sixty-five operational mini-sawmills. A mini-sawmill is a sawmill consisting of a single head rig with a flywheel diameter not exceeding 106 cm, a band saw blade with thickness not exceeding 3 mm and width of not more than 27 mm, with or without a carriage, and a daily rated capacity of no more than 18 m³ or 8,000 bdft of lumber per eight hour shift (DENR 1996a). The majority of the small-scale sawmills (56 percent) had small capacity, with only one or two mini-sawmills, 32 percent had three or four and only one small-scale sawmills was operating on a large scale with thirty mini-sawmills. According to the

survey respondents, in a regular eight hour working day and with an average recovery rate of 45 percent a mini-sawmill produces between 700 to 1,000 bdft of sawn timber of gmelina or 1,000 to 1,600 bdft of falcata. Considering that of the sixteen small-scale sawmills visited only 45 percent operate continuously and using an average production of 1,000 bdft of sawn wood per mini-sawmill per day, with the existing sawmill capacity (135 mini-sawmills) an estimated 45,000 to 53,617 m³ of farm-grown sawn wood was produced every year in Region 10 since 1996. And with the reported average recovery rate of 45 percent, a conservative estimate of smallholder log production in Region 10 is from 65,250 to 77,745 m³ per year-1. Assuming a continuous operation of mini-sawmills, the potential annual log utilization would be 111,064 m³ per year-1, and the potential sawn timber production 76,596 m³ per year-1. If compared to the available statistics of the sawn wood exports from the Cagayan de Oro port (table 1) and considering that, unknown, but probably large volumes of sawn timber are consumed locally, we can conclude that these are very conservative estimates of the contribution of smallholder farmers to the wood industry in the region. Nevertheless, it represents about 10 to 14 percent of the domestic consumption of tropical sawn wood timber in 1996 (539,000 m³) reported by ITTO (1996).

Table 1: Exports of falcata sawn wood from Cagayan de Oro Port, Philippines

Year	Volume* (m^3)	Value (million PhP.)
1994	22,863	87.218
1995	30,971	142.614
1996	42,361	237.924
1997	25,175	165.421
1998	1,795	43.144
1999	113	1.127

Source: Regional statistical year book 2000, NEDA Region 10 and 1995-96 Misamis Oriental provincial socioeconomic profile.

**Volume adjusted from weight assuming the conversion factor for sawn wood of 1.43 m³ ton-1 (ITTO, 1996).*

Smallholder tree farming enterprises are also contributing substantially to employment generation in the region. In the small-scale sawmills surveyed, for every mini-sawmill an average of five workers (considering part time and full time workers) are employed in the various activities involved, from tree harvesting and processing to business management. Thus, around 675 people may be directly employed by the mini-sawmill industry in Region 10 in 1996. Even if this estimate does not consider the many people involved in associated activities such as transporting and further processing and marketing, it represents 6 percent of the work force of all processing mills (i.e. sawmills, veneer and plywood mills) in the country reported by ITTO (1996).

Planted trees also represent a large percentage of the national and international production and trade of tropical timber in the Philippines. According to ITTO (2001): "as of 1999, logs coming from plantations made up to 70 percent of the log production of 712,000 m³" (i.e. 500,000 m³ of the total log production comes from planted trees). In 2000, log production registered an increment of 9.6 percent over the previous year primarily due to harvest of planted trees within private land (Dy 2002). And in 2002, log

production was 398,196 m³, of which 46 percent was falcata, 13 percent gmelina and 4 percent mangium (ITTO 2003). Considering that in the Philippines sawn wood exports are restricted to those arising from planted trees or from imported logs (ITTO 1996), between 1995 to 1998, 40 to 45 percent of the total sawn wood exports would have come from planted falcata trees (table 2). This figure is probably higher considering that eight owners of small-scale sawmills and medium size wood industries interviewed reported exporting sawn timber of gmelina to other Southeast Asian countries. Although, it is not clear whether the produce comes from industrial forest plantations or from smallholder farms, based on the evidence provided in this study, it is reasonable to believe that a large share of the log production and sawn wood exports comes from smallholder farm forestry.

Table 2: Planted trees such as *Paraserianthes falcataria* (falcata) account for a large percentage of the total sawn wood exports of the Philippines.

Year	Volume exported (x 000 m³)		
	Total*	**Falcata***	**percentage**
1994	38	47	
1995	84	44	52
1996	145	67	46
1997	141	63	45
1998	41	15	37
1999	69	4	6
2000	120	15	13
2001	97	2	2
2002	91	10	11

**Source: ITTO Annual review and assessment of the world tropical timber situation*

The Philippines, like many other Asian countries, is a major importer of timber. In the year 2000, imports accounted for 40 percent of the total supply of logs, 70 percent in lumber and 20 percent in plywood and veneer (Dy 2002). Until recently, growing domestic demand of timber has been met, to a large extent, by imposing low tariffs on imported logs (3 percent) and protecting wood processors from international competition by high tariffs on sawn wood (30 percent) and veneer and plywood (50 percent). But local wood processors interviewed showed concern about competition from imported timber, as the Philippine government is required to substantially reduce tariffs in compliance with the ASEAN common effective preferential tariff agreement signed in 1992 (Shimamoto 1998). Signatories of the agreement are required to reduce tariffs to 20 percent within five to eight years from 1993 and less than 5 percent thereafter within a seven year period (Shimamoto 1998). Current tariffs are 7 percent for sawn wood and veneer and 15 percent for plywood (ITTO 2003). Encouraged by new processing technologies that allow timber production from small diameter trees and the use of a wider range of species, the wood industry is realizing that farm forestry has the potential to be an important source of cheap timber. Domestic producers have begun actively looking for other tree alternatives in order to meet domestic demand and reduce their present dependence on imported timber. During the last few years, a plywood company near Cagayan de Oro City has been testing the veneering potential of more than thirty tree species commonly-grown on farms. Of these, five native pioneers, *Endospermum*

peltatum (gubas), *Artocarpus blancoi* (antipolo), *Octomeles sumatrana* (binuang), *Duabanga moluccana* (loktob) and *Trema orientalis* (anabiong), were identified as suitable for face and back veneer and several others for core stock. Also, in 2001 they satisfactorily tested, in collaboration with tree farmers from Claveria and Lantapan (Bukidnon), the veneering properties of three exotic species recently introduced for farm forestry, *Maesopsis eminii* (mosizi), *Eucalyptus robusta* and *Eucalyptus torrelliana*. For several years, the company has been already using falcata for core veneer, again demonstrating the market potential of trees grown on-farms. These initiatives led by farmers and the industry to find new tree alternatives are an indication that facilitating access to a wider range of tree species could prove to be a simpler and more successful reforestation strategy that would satisfy the needs of farmers, the industry and the society.

Domestic demand for sawn wood in the Philippines for the year 2010 has been estimated at 1.646 million m³, with a log requirement to meet this demand of 3.418 million m³ (Sanvictores 1994). If fast growing trees were planted on small farms yielding just 6 m³ ha-1 year-1 on rotation periods of ten years, the log requirement to meet domestic demand for sawn wood in 2010 could be produced if 56,967 has of tree farms had been established in the year 2000. This represents just a small fraction of the land potentially available for agroforestry and farm forestry in the Philippines.

Unfortunately, existing policy disincentives constrain the establishment of tree farms and the use of trees by the wood processing industry. Although, recent legislation exempt owners of planted trees from paying forest charges, farmers are required to apply for a certificate of registration of the plantation and a certificate of verification to show that trees are ready to be harvested (GOLD 1998; DENR 1999). Moreover, at the village level a lot of confusion exists on whether certain fees have to be paid or not. Field inquiries revealed that many farmers are required to pay harvesting fees to local officials, although there is no legal basis for such fees. The owners of small-scale sawmills interviewed also complained about the many restrictions and permits required to operate. These include, in addition to the licenses required to any business or industrial activity, harvesting permits from village governments (barangay), transport permit (certificate of origin) (Andin 2002) and frequent road check points by the DENR, and probably further restrictions to the establishment of small-scale sawmills as stated in the general objective of the five year mini-sawmill rationalization plan (DENR 1996b). Incentives to encourage forest plantation establishment, like income tax holidays, tax and duty free importation of capital equipment, and exemption from contractors' tax (ITTO 2001), are, however, better suited for industrial plantations and have limited application to smallholder farmer conditions. By giving large industrial plantations such incentives, they function as *de facto* disincentives for smallholder timber producers. What is required in forestry policy is a paradigm shift that recognizes the legitimate role of smallholder farmers as contributors to national timber production (Noordwijk et al. 2003).

CONCLUSIONS AND RECOMMENDATIONS

In the past two decades, small farms in Northern Mindanao have generated a significant marketable surplus of fast-growing timber trees and viable farm forestry industries have emerged in the region as a result. The volume of farm-grown timber harvested, processed and traded in the past few years, proves the success of smallholder upland farmers in tree

growing and marketing, demonstrating that they can produce large quantities of timber in their smallholdings and efficiently supply local, national and international markets.

However, current produce is not a practical substitute for timber products requiring large diameter and quality logs. Therefore, the Philippines is still largely dependent on imported timber to meet its increasing domestic demand. Wood processors have been protected from international competition by high tariffs on imported processed timber. But presently, in compliance with signed international agreements, the government is required to substantially reduce tariffs on imported timber. The wood industry is realizing that farm forestry has the potential to contribute to import replacement but several constraints remains that limit further development of the wood industry based on locally produced farm-grown timber. First and foremost, the Philippine government should remove policy restrictions curtailing the use of planted trees and provide incentives appropriate to smallholder farmers. At the same time, farm forestry extension programs should provide quality germplasm, promote the use of a wider range of tree species, and invest in training programs aiming at improving management and marketing. The Philippine government and the wood industry sector should recognize the role of smallholder farmers as land managers and efficient producers of many important agricultural commodities, including timber.

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CHAPTER THIRTEEN

POTENTIALS OF SUSTAINABLE FORESTRY CERTIFICATION FOR SMALLHOLDER TREE GROWING

Helias A. Udo de Haes

ABSTRACT

Sustainable forestry certification can be important for different stakeholders in the value chain of wood and wood products. Final consumers are enabled by certification to choose for a more sustainable behavior. For the manufacturing industry, certification can help to improve their image, and on the long run to assure their resource input. For the producers of the wood resources, certification can help in marketing and can be the basis for long term sales agreements. There are quite a number of certification systems for sustainable forestry, some of them working at a global level. An example concerns the Forest Stewardship Council (FSC), setting requirements on environmental, social and economic performance. These systems include principles, criteria, indicators and norms. There is a specific program included in FSC, dealing with group certificates, thus particularly aiming at production by smallholders (FSC-SLIMF). Before starting a process of certification, the costs and benefits along the chain need to be carefully examined, including the market perspectives. In general, certification is only useful for an international market. This amongst others sets also requirements on the choice of the tree species and wood quality involved. As a case study, special attention is paid to forestry plantations in the Philippines.

INTRODUCTION

The general question of this chapter is what role sustainable forestry certification can play in the conservation of the forests. Certification typically is a communication instrument, providing information between stakeholders in a given value chain. Compared with the legal and financial instruments it may seem to have a less strong character, but it may be quite effective in improving environmental management nonetheless.

First an overview will be given of the different types of certification which do exist, related to forestry, but in the broader context of certification of natural resource management in general. Thereafter, in paragraph three, the potential benefits of certification will be addressed of different stakeholders in the value chain. In paragraph four, an overview is presented of the developments of forestry certification world wide. Paragraph five more specifically goes into the requirements set by certification under the authority of the FSC, the oldest global initiative in this area. Thereafter, in paragraph six, specific attention is paid to the development of requirements set for forest plantations, with an example in an industrialized country (the Netherlands). Paragraph seven discusses the barriers towards certification, followed in paragraph eight by the description

of a new program which of FSC, which focuses on small and low-intensity forest management, addressing a number of the existing barriers. This paper is concluded with a case study on the perspectives for forestry certification in the Philippines.

ENVIRONMENTAL CERTIFICATION AND SUSTAINABILITY CERTIFICATION

Regarding certification systems, a main distinction can be made between two main types: (1) environmental certification and (2) sustainability certification. Environmental certification focuses on the environmental performance of the production processes of the resources and of the products which do result thereof. According to the triple-bottom-line approach (Elkington 1997) sustainability certification has a broader scope, including requirements on the social, environmental and economic dimensions.

The most well known environmental certificates are founded in the standards of the private International Organization for Standardization (ISO). Firstly, there is the well known 14000 series, with the 14001 standard underlying the certification of environmental management systems of industrial companies (ISO 1996). There is the 14020 series with three types of product labeling: (1) the well known product labels with third party verification - type I labels according to ISO 14024 (ISO 1999a), (2) product claims by the companies themselves - type II labeling according to ISO 14021 (ISO 1999b), and (3) product declarations, or in fact information sheets, comprising environmental specifications of the product and its upstream processes - type III labeling according to ISO 14025 (ISO, 2000). And there is the 14040 series dealing with life cycle assessment, which is required for the underpinning of type III labeling and which can also be used to support type I labeling (Mungkung et al. in press).

Sustainability certification has its primary focus on resources. Thus, there are certificates for sustainable forestry, including for instance the certificates under authority of the FSC (www.fsc.org), and for sustainable fisheries, including for instance certificates under authority of the Marine Stewardship Council (MSC) (www.msc.org). There are ongoing activities to bring the mining and metals industries under the framework of sustainable development, initiated by the International Council for Mining and Metals (www.icmm.com). And there is the Sustainable Agriculture Initiative (www.saiplatform.org), aiming at the development of certificates for sustainable agriculture, with the environment-oriented organic agriculture as one of its roots. Global forestry certification, like under FSC, and fisheries certification like under the MSC, also involve verification by a third party, and therefore can also be regarded as a form of the above mentioned type I labeling.

These different types of certificates need not be exclusive. For instance, there are sound reasons that larger forestry companies aim at an FSC certificate combined with an environmental management system certificate according to ISO 14001 (Hortensius 1999). The focus of the further chapter will be on sustainability certification of forestry.

POTENTIAL BENEFITS OF FORESTRY CERTIFICATION

Sustainable forestry certification has a number of benefits, or rather potential benefits. These differ between the stakeholders in the value chain, mainly consisting of producers of the wood resource, product manufacturers, retailers and consumers. In the full life cycle of a product also the waste managers do play a role, but these are not at stake here. We start at the downstream end, with the consumers, who are the real drivers for certification. It is their choice for sustainable production and consumption, and certification of wooden products is a precondition for that. It can be mentioned in this context, that the demand for certified wood is higher than its supply. The influence of the consumer may be direct or indirect. A direct influence means that it is the consumer him or herself who makes the choice for a sustainable product. An indirect influence means that he or she chooses to go to a retailer which aims at selling sustainable materials and products.

Herewith we come to the stakeholders upstream of the consumer, retailers and manufacturers. Often product labels primarily aim at these target groups, rather than at the final consumers. The benefits for these actors are mainly the improvement of their image, thus supporting their license to operate. Main examples of retailers and manufactures include Ikea, Brico, Gamma, B&Q and The Home Depot (the world-largest do-itself market). These companies can also have a more specific aim, namely the long term assurance of their resources. Like for wood, this also counts for fish. Thus Unilever strongly contributed to the establishment of the MSC, in part to ascertain long term availability of their fish resources.

Finally, there are the producers of the wood, the forest managers, and the main target group here. For them the main potential benefits are access to markets and long term sales agreements. There can also be a price premium on the produce, but that is quite variable, usually accruing to 10 to 30 percent above the general market price (Anonymous 2005), and may not necessarily compensate for the higher costs involved. In addition, the producers of the resources may also have some indirect benefits of certification, due to the fact that the certification process is often supported by some international donor organization. Such indirect benefits may well include the option to become a serious player in forest policies and debate, to achieve a legitimate role in forest management, to achieve improved labor conditions, to achieve better tenure rights, to receive technical support or to benefit from increased employment.

It is important to take the whole value chain with all stakeholders and their interests into account. Here a link can be made to the chapter in this book from Rodel Lasco, discussing the reforestation value chain for the Philippines (chapter four this volume). He proposes a holistic approach, which addresses the whole chain of activities from the securing of land tenure towards the marketing of the final wood products. The author infers that reforestation can only become a success if all activities in the chain are functioning well, each of them adding value. He advises to identify the key activities in the chain which should primarily be analyzed and specifically addressed. In this context it is important to point at the distinction between two levels of certification: (1) the certification of sustainable forestry management itself, and (2) the so-called chain of custody certification. The first sets requirements for the activities in the first half of the chain, including land tenure issues, seed and seedling production, and tree planting and

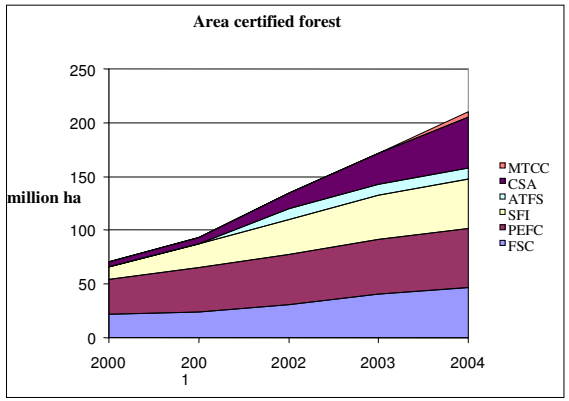
maintenance. The second has the task to ascertain that marketed final wooden products, which bear a sustainable forestry certificate, indeed consist of wood which stems from certified forestry.

DEVELOPMENT OF SUSTAINABLE FORESTRY CERTIFICATION

Globally, there are six important forestry certification initiatives which work on basis of independent (third party) verification. These are: (1) the FSC, (2) the Program for Endorsement of Forest Certification schemes (PEFC), (3) the Sustainable Forestry Initiative (SFI), the Canadian Standard Association (CSA), the American Tree Farm System (ATFS), and the Malaysian Timber Certification Council (MTCC). A short description of these programs and organizations is given below. Figure 1 presents the increase of forests certified under these initiatives for the period 2000 to 2004.

FSC, an international, non-profit, non-governmental organization (NGO) founded in 1993, housed in Bonn, is an association of representatives from environmental and social groups, timber trade and forestry profession, indigenous peoples' organizations, community forestry groups and forest product certification organizations. Certification systems under FSC are divided over sixty-two countries (www.fsc.org). PEFC is also an independent, non-profit NGO, founded in 1999. It started as a European forest certification program, with the aim to create a simpler alternative for FSC. But now it also has a global reach and consequently has changed its name. It is an umbrella organization which covers national schemes from all over the world, at present divided over eighteen countries (www.pefc.org). SFI is a program of the American Forest and Paper Association. Adherence to the principles of this program is a condition for the members of this association. It was founded in 1994. SFI is now aiming to bring its scheme under the umbrella of PEFC (www.sfiprogram.info). CSA is an independent non-profit organization for standards writing. The CSA sustainable forest management project is part of it and initiated in 1994, supported by the Canadian forest industry. Its certification scheme is modeled in line with the ISO 14000 series (www.csa.ca). ATFS is a program of the American Forest Foundation, a national non-profit organization. The ATFS was founded in 1941, and thus is the oldest third party forest certification system. It is focused on family forest owners, of whom 51,000 do participate (www.treefarmsystem.org). MTCC is an independent Malaysian non-profit organization for forestry certification. Like FSC is also has a chain-of-custody certification. The criteria are in line with the FSC criteria and adopted in 2002. Its board includes representatives from academic and research and development institutions, the timber industry, NGOs and government agencies (www.mtcc.com.my).

Figure 1: Development of certified forestry area under six different schemes (2000-2004).



In order to put the data of the above figure into perspective, a comparison can be made with total forest areas. The global total natural forest area is for 2000 estimated at 3,682 million ha (FAO 2001). This means that in 2004 nearly 6 percent of this area was certified by one of the above schemes. One may more specifically relate the certified area to the global actively managed forest area, which is estimated at 700 million ha in 2004 (Anonymous 2005): then certified area amounts even to 30 percent.

The certified areas are not equally distributed over the world. At the end of 2000, about 92 percent of all certified forests worldwide were located in the United States, Finland, Sweden, Norway, Canada, Germany and Poland. At the same time, only four countries with tropical moist forests (Bolivia, Brazil, Guatemala and Mexico) were listed as having more than 100,000 ha of certified forests, for a combined total of 1.8 million ha (FAO, 2001). In the following we will further focus on certification under the authority of FSC.

REQUIREMENTS ACCORDING TO FOREST STEWARDSHIP COUNCIL

In order to certify a forest area under the FSC certification scheme, a number of requirements must be met. In principle these pertain to the three dimensions of sustainability (people, planet and profit) but in practice they have a focus on environmental and social conditions. The requirements are laid down at four different levels: (1) principles, (2) criteria, (3) indicators, and (4) norms.

The principles concern the highest level and pertain to the following (in part indeed given as principles, in part just as issues): (1) compliance with laws (certification must not be illegal according to the national laws in question). (2) tenure and use rights, (3) indigenous people's rights, (4) community regulations and workers rights, (5) benefits

from the forest, (6) environmental impact, (7) management plan, (8) monitoring and assessment, and (9) maintenance high conservation value forests, (10) plantations.

An example may clarify how the four levels relate to each other. Under the sixth principle, environmental impact, protected areas are included. In line with this, the description of a criterion under this principle includes the clause: "protection areas shall be established". One level lower, it is specified that the indicator for protected areas concerns their size. Finally, at the lowest level, a norm for instance specifies that of a plantation at least 10 percent must be managed as a protected area. It should be added here that the description of principles and criteria is worldwide; indicators and norms are established in regional (or national) standards. This implies for instance, that the above given norm of 10 percent protected area in a plantation is not a global requirement, but is included in some of the regional standards. We will now turn to the requirements which are specified for plantations, a core topic of this chapter.

CRITERIA AND INDICATORS FOR PLANTATIONS

In 2000 there was a total of 187 million ha of plantations worldwide, compared with the 3,682 million ha of natural forest, or about 5 percent of the total forest area of 3,869 million ha (FAO 2001). In 2005 the total area increased up to about 200 million ha (FSC 2005). More recent data are not easily available. Certification of plantations constitutes a contentious issue. On the one hand they are a large source of wood; with their 5 percent of forest area they produce about 35 percent of all wood harvested, which in the year 2020 is expected to have increased up to 44 percent (FSC 2005). By this intensive form of forestry, the pressure on natural forests can be alleviated. Plantations also significantly contribute to carbon sequestration, and can increase biodiversity when established on degraded land. And important from a social point of view is the local employment they create.

These positive facts are balanced by a number of negative impacts. Plantations often are the result of intensive exploitation of natural forests and go in line with biodiversity loss, and disruption of soil hydrology and nutrient regimes. Further much controversy stems from conflicts over land use, particularly between the owners of a plantation and the traditional use of the land by local people. In absence of land tenure, local people may be displaced, leading to increased deforestation elsewhere.

Despite these negative effects, FSC sees it as its mission to certify forest plantations. This mission is well expressed in the following: "While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests" (FSC 2005). This role in supporting the conservation of natural forests is clearly expressed in the criteria which have been defined. These criteria were finalized two years after completion of the criteria for the principles one to nine, and must be seen as additional; plantations must meet the criteria for all ten principles.

The criteria which specifically pertain to plantations, included in the international FSC standard, are the following (shortened): (1) the objectives of the plantation should be laid down in a management plan, (2) the plantation should help to conserve or restore the natural forest, (3) the plantation should be diverse regarding tree species, and the age and

size of the trees, (4) there should be a preference for native species; monitoring of exotic species and their impacts, (5) part of the plantation should be managed to restore the natural forest, (6) the management of the plantation should aim at soil conservation and good water quality, (7) the management should aim at integrated pest management, (8) the ecological and social impacts of the plantations should be monitored, and (9) the plantation should not be established in areas converted from natural forests after November 1994.

Next, these criteria are expressed in a number of more specific indicators, which in fact constitute the core of the requirements. These have not yet been developed for all regions. For instance, the certification of the MTCC, which is closely connected with and follows the structure of the FSC requirements, has not yet developed indicators for plantations. In table 1, for each of the criteria for plantations of the international FSC standard, the indicators are presented according to the Dutch national standard as example (FSC/NL 2004). These are all so-called hurdle indicators which set pass/fail requirements which all have to be met; this in contrast to so-called weighting indicators which combine different requirements which as a group have to be met at a sufficient level.

Table 1: Indicators for plantations for each of the criteria of the international FSC standard, according to the Dutch FSC standard (FSC/NL 2004; see also: www.fscnl.org).

International criterion	Dutch indicators (shortened)
1	The objectives of the plantation shall be explicitly stated in the management plan and demonstrated in its implementation
2	Plantations not established on land with high natural values No negative effect on adjacent forests Areas with high natural values are identified and recorded on maps Mosaics of stands must be identified in the management plan
3	Plantations smaller than 25 ha consist at least of two tree species; larger plantations are divers in species composition and age Individual forest stands should not exceed 2 ha
4	No species planted on large scale, unless proven well-adapted, non-invasive and without negative ecological impacts At least 10 percent of plantation is planted with native species For exotic species proof of monitoring must be available
5	At least 10 percent of plantation is planted with native species At least 5 percent of the plantation will not be harvested
6	Management plan shall describe measures taken for soil and water conservation
7	Proof of monitoring available of pests, diseases, fire and invasive plants; evidence of measures taken against these Aim to control pests without chemical pesticides and fertilizers Chemical pesticides and fertilizers only permitted if no biological alternatives available of effective; manager must prove the need
8	Monitoring of negative effects on plantation and its surroundings Management plan shall include impacts of plantation on local welfare and social wellbeing
9	Only recent forests (planted after 1975) can qualify as plantation, older plantations are regarded as multifunctional forests

At the moment, in total about 6 million ha of plantations, and a further 17 million ha of mixed plantation and natural forest have been certified under FSC (FSC 2005). Of the plantations, in the average 12 percent is covered by natural forest, thus clearly scoring beyond compliance with regards to indicator five. However, due to the contentious nature of the plantations under FSC, and the need for further learning in this area, a global process has recently been started aiming at a review of the implementation of the principles and criteria.

BARRIERS TOWARDS FORESTRY CERTIFICATION

As indicated in paragraph six, rather large areas have been certified already; moreover, a strong increase appears to be present. This should not obscure the fact that quite some barriers do exist for forestry certification. Focusing on the role of communities, these barriers were discussed in a report from Molnar (2003), which served as input for this paragraph.

First, there are policy and regulatory barriers to extract and process forest products. In this context it is important to point at the first principle of FSC, which requires compliance with existing laws. In particular, a problem can lie in the prohibition of all logging in protected areas. Of course, a well functioning prohibition of these areas should be the ultimate aim, but many protected forests suffer from severe illegal logging. Then sustainable forestry may, under conditions create an effective counter force. But precisely this can be hampered by the existing laws. An example where such laws are being lifted in close consultation with conservation agencies, concerns agreements with indigenous peoples to use their native forests in protected areas. Unfortunately, the resulting activities are difficult to control and increasingly appear to lead to disappointment. Still, formal but non-functioning laws can constitute an undesirable barrier.

Then there are a number of economic barriers. Thus there are the high costs which are associated with the yearly required assessment procedures and with the implementation of recommended actions, aiming to repair shortcomings in the management. Price premiums are in general estimated at 10 to 30 percent, but that is not a given fact. Moreover, it can be difficult to meet the high requirements which must be met with respect to quantity and quality of the produce for achieving the given price premiums. And the higher market price may not be realized in practice, just because of a lack of markets which specifically deal with certified wood, or with products made from certified wood. This may particularly hold true in remote areas. Such economic difficulties can in principle be overcome through support from donor organizations, which are willing to pay for the initial costs. But it is not always easy to find such an organization, again, particularly for producers in remote areas who do not have easy contact with the world of such organizations.

Third, there can be cultural and organizational barriers. Certifiers from schemes like FSC or PEFC, asking for explicit formal plans and for strict yearly auditing measures, come from another planet compared with smallholders or communities in developing countries managing a plantation. And there will often be internal constraints in these communities to make the necessary organizational changes towards a proposed more profitable business model.

Finally, it is inferred that the sustainable use of natural forests meets difficult competition by the cheaper plantations. This might then be a positive point for the plantations. But, one step further, it is the plantations which meet difficult competition by the still cheaper unsustainable logging in natural forests.

These barriers are particularly at stake for developing countries, thus explaining the lagging behind of sustainable forestry certification in the south, as discussed above. FSC is recently introducing a new program which aims to address most of these problems.

THE FOREST STEWARDSHIP COUNCIL SMALL AND LOW INTENSITY FOREST MANAGEMENT PROGRAM

Under the authority of FSC the Small and Low Intensity Forest Management (SLIMF) program is in development. This program aims to allow certification bodies to use streamlined certification procedures for small forest management units, low intensity management units and groups of these units (FSC 2004a). Small units are all forest areas under 100 ha, and under conditions maximally 1,000 ha. Low intensity units are units with operations such as non-timber forest product harvesting. Groups of management units enable certification by communities, where each of the members has its own private unit. This enables that many costs and efforts can be born by the group of companies together, thus dividing the efforts and costs. International criteria for the small and low intensity units are defined (FSC 2004b). These build on field trials which are ongoing (FSC 2003). Further, the project allows for the development of national or sub-national criteria. Indicators and norms (together with means of verification) for the program are in development.

The streamlining of the process particularly concerns the field audits, the methodology for the field checks and the way of reporting. In the main FSC program a yearly site audit is required. In SLIMF the yearly surveillance can be based on documentation audits; during the period of the certificate a minimum of one site visit must take place, which may take place in one day only. Also the reporting as basis for the surveillance is simplified, as it can be written in any language. For small management units no peer review of the report is required.

Furthermore, certification itself has become a stepwise process. For a five year period, wood from forestry-in-transition will get a preferential treatment on the market, be it under the condition of a shortage in supply in the market as a whole. At the moment it is still too early to assess the effectiveness of this SLIMF program.

PERSPECTIVES FOR CERTIFICATION OF PLANTATIONS IN THE PHILIPPINES

Plantations have had a varied history in the Philippines. In the last decades many policies have been launched to stimulate them, on the whole with remarkably low success. Between 1988 and 1992 alone, a total of US$ 621 million was loaned by the Philippine government from amongst others the Asian Development Bank (ADB) for reforestation; another US$ 200 million was loaned from the same bank between 1993 and 1995. This huge budget was invested in various schemes, both under full governmental authority and by stimulating private initiative, but their results severely lagged behind expectations. Of

the trees planted, only 10 to 15 percent survived (Pasicolan 1996). In this study, also the reasons of the disappointing results were analyzed, comparing pair-wise successful with unsuccessful plantations run by communities. Important factors appeared particularly to include the need for intercropping, so that the land continued to have its productivity for direct needs, an interest of the community in the produce of the plantations, clearly established property rights of the communities over the plantations, a good organization of the community co-operation, a good financial situation of project participants and the prospect of a good wood market.

In contrast to subsidized tree growing, also spontaneous tree growing is taking place, implying the growing of small plantations by individual farmers for fuel wood, without any clear help by the government (Pasicolan 1996). In the first of these studies main drivers appeared to be an enterprising attitude of the farmers, and good market conditions. Since the mid 1990s this development has taken larger shape. At present it in fact seems to offer the best perspectives for increasing plantations, be it under some governmental support such as particularly the provision of free seedlings.

What can be the perspectives regarding the application of sustainability certification for plantations in the Philippines? Is must be clear that this should involve a well planned process; too direct actions which do not involve the whole chain can easily lead to disappointment.

A first point to acknowledge is that certification only will pay back on an international market. The reason is that the buyers who are willing to pay a price premium can only be found on the international (in fact largely European) market.

Further, a crucial requirement concerns a constant high quality and sufficient quantity of the wood products. This sets limits to the use of a softwood species like gmelina (*Gmelina arborea*), the species which is most often grown in the spontaneous tree plantations of individual farms. In contrast, the national, but even more the international market asks for hardwood species such as narra (*Pterocarpus indicus*) or tindalo (*Paludia rhomboidea*). The main reason for the choice of gmelina depends on the high growing speed, allowing harvest after seven to ten years (between seven and ten years, the production per tree doubles). Hardwood species can only be harvested after forty to fifty years, rendering use in private plantations nearly impossible. A solution can possibly be found in the improvement of the quality of gmelina wood, for instance by drying it in kilns instead of in the sun. Here lies a first priority point for further investigation, focusing on the required product quality.

A next point concerns the economic side: the market prices along the value chain for different kinds of wood quality, and the potential price premiums that can be achieved due to certification. An exploratory field study by the author, comparing wood and a wood product from narra and gmelina along the value chain, shows that the image of the hardwood narra is, like that of other hardwood species, very high. In contrast, the image of a softwood species, like particularly gmelina, is low. This shows itself already by the tendency in furniture shops to paint light colored gmelina furniture red. But of course, this is also clear from the price (table 2). The question is, whether the low price of gmelina in fact is prohibitive for certification. Indeed, if we compare the price which farmers or loggers do receive from middlemen, there is a large difference: about PhP. 45 per board foot for narra and PhP. 4 per board foot for gmelina (€ 272 and € 24 per m^3, respectively). That is about a factor seven to eight difference. But if we go down the

value chain, we observe that for a carved and varnished rocking chair, the leading product in Luzon, the price difference has decreased to less than a factor two. Due to the larger added value along the chain, gmelina therefore seems to present itself as a competitive product open for certification.

Table 2: narra and gmelina prices

	Narra	**Gmelina (Isabela)**
Wood from farmer to middleman	45 PhP. per bdft	4 PhP. per bdft
Sawn wood, high quality	65 PhP. per bdft	18 PhP. per bdft
Unfinished chair (minimum)	PhP. 1,500	650-900
Finished rocking chair with carvings (maximum)	PhP. 2,000	1,200

It can be concluded that high quality gmelina furniture shows a much smaller price difference with comparable hardwood furniture, than gmelina and narra wood at the level from producer to middleman. The tentative conclusion is that, in view of the high added value in the chain, the choice of the fast growing species is not prohibitive for a certification endeavor. An export line of gmelina wood to Sweden has been opened recently, so information about that initiative can be a starting point (www.filtra-inc.com).

Finally, then there are a number of organizational questions, including the establishment of a local or regional smallholder organization, the link to a Philippine or regional umbrella organization, the choice of the most fitting certification scheme, and the finding of a possible donor organization. Probably, a most direct first step should involve a more close investigation of case studies about the use of certification in comparable situations.

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CHAPTER FOURTEEN

DISTRIBUTIVE IMPACT OF THE DEBT FOR NATURE SWAP AGROFORESTRY INITIATIVE PROJECT IN QUIRINO, PHILIPPINES

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ABSTRACT

Many agroforestry projects aimed to promote some kind of distributive gains in the rural communities such as job creation and income improvement for small farmers. In fact, many of these projects are partially justified on distributive grounds. Adoption of agroforestry innovations therefore can be assessed to determine the distributive effects of the particular goods and services to members of the local community that adopted the same. The Debt for Nature Swap Initiative Program (DfNSIP) had agroforestry as one of its main components in the attainment of its goal on the protection and preservation of the forests in Quirino province. In the village Jose Ancheta, particularly, a number of households participated in agroforestry activities, planting tree species (i.e. gmelina, and mahogany along with mango, coconut and other fruit tree species). The paper deals on the analysis of the distribution of gains in the adoption and diffusion of agroforestry innovations brought about by the DfNSIP to affected communities. The analysis focuses on the choice of goods (wood, food, fodder, *etc*.), the household budget, adoption behavior, and risks and uncertainties. These data give insights on the rate of technological diffusion as well as the household budget share and income that would provide indications of the distributive impacts of the agroforestry activity for individuals or community groups.

INTRODUCTION

Since the Earth Summits, various perspectives and instruments have been deployed that foster synergies among intergovernmental agreements that impact on forests. This include a range of technocratic approaches used around the world to address extra-sectoral problems such as foreign debt, investments, trade rules, etc. that can be dealt with by governments. A valuable contribution to the politics of forestry is getting the people around the negotiating table where some very grand acts have been established.

Along this line, the DfNSIP was conceived in the Philippines in 1992 through a Memorandum of Agreement signed between the Government of the Philippines (GoP) and the Federal Republic of Germany with regards to the consolidation of the external debt of the Philippines. By 1996, an agreement was made between the two countries to cancel the debt of the Philippines to Germany (Deutsche Mark 12,775,004.82 = US$ 8,620,111.2) in case the GoP disbursed 30 percent of the amount for a DfNSIP to be implemented in 2001. This implies that both parties can achieve the capacity to protect their interests in the long term by creating finance agreements.

The underlying goal of the financial arrangement is for both parties to attain their action agenda on forests. The project has two objectives: (1) for the Philippines to preserve nature and biodiversity and at the same time profit from the overall economic advantages of reduced payments, and (2) for Germany to achieve major objectives of its development aid in nature conservation, forestry and rural development.

DfNSIP is viewed as a major vehicle for reconciling pressures on globalization and localization with internationally agreed elements of agenda. It can provide real incentives for good forestry with improved fit with the local policy, livelihood, and land use realities. There is only a need to ensure that the project is strongly purpose-led and not to become vehicle for other agendas.

Interventions do occur sometimes to act as a brake on large depletion and degradation of forest resources. These provide incentives for adopting sustainable management techniques such as agroforestry because they ensure the right to obtain the future gains that accrue from agroforestry. With proper planning, agroforestry can be based on community management of the resources. In due time, the village group reaps the benefits of management, investment, conservation and protection of the resource.

The DfNSIP in coordination with the RP-German Community Forestry Project-Quirino worked from July 1999 to March 2003. One of the many activities of the DfNSIP in Quirino province was the provision of agroforestry inputs in selected sites. Agroforestry was thought to be one of the means in conserving biodiversity and improve the economic development of individual households. The project had reportedly developed 900 ha of agroforestry in ten barangay recipients of the project planted with two-hundred fifty thousand fruit trees and other tree species.

Conceptual framework

Installing agroforestry as a focus will require a reorientation away from forest area and towards securing the forest goods and services that people need. It has been recognized that the future of many forest goods and services is no longer to be found in large blocks of natural forest but in farm-forest landscapes. These landscapes ultimately need to be sustained within rural economies which have unified social and environmental objectives.

Many community forestry projects are designed to provide distributive gains such as job creation for the poor and income improvement of rural households. These distributive effects are determined in part by the goods and services produced and the adopters of innovations. The choice of goods determines the distribution of gains among consumers while adoption and diffusion of innovations derive insight on gains to producers.

Distribution of gains among consumers depends primarily on the relative share of the household budget that the goods represent. An agroforestry project that emphasizes production of goods with both high prices and high income elasticity for consumers is likely to continue to produce distributive gains.

Despite the genuine efforts of many governments, success in many countries reportedly was uneven or thin on the ground. Findings are naturally context-specific, but there are also common themes that can be addressed. Case studies at pilot projects such as the village of Jose Ancheta in this study are vital to explore claims, lessons and

impacts by connecting local actions. This study therefore would like to give evidence that community projects improve the lot of the people who depend on forest products and services and whose livelihoods are affected by forests.

Objectives

The main objective of this study was to evaluate the distributive gains from the agroforestry activities of the DfNSIP, five years after its implementation in one village called Jose Ancheta in Quirino in terms of the following: (1) the choice of goods and services, (2) household income gains, (3) changes in adoption, and (4) the risks and uncertainties encountered by the project participants.

METHODOLOGY

Site description

Quirino is a landlocked province in the northeastern Luzon, Philippines straddled by the long stretch of the Sierra Madre mountain range. The village of Jose Ancheta lies within the boundaries of the municipalities of Nagtipunan and Maddela. Thick residual forests are still in the vicinity of the village. The forests have been preserved even if the settlers use some land for their farms. Good water sources and drainage are conditions for settlement and farming.

Data collection and analyses

Field surveys followed a descriptive process using structured questionnaires as guide and checklist of information to be gathered. Seventy-seven farmers were interviewed. Both men and women who were equally involved in the agroforestry activities were interviewed. Respondents were often approached in the field. This enlivened the interviews and effectively generated valuable insights from the field. Secondary data was collected from reports and documents made available from the project management office and from the Department of Environment and Natural Resources (DENR). Data obtained were tabulated and analyzed.

RESULTS AND DISCUSSION

The key in the implementation of the agroforestry project in the village of Jose Ancheta was the composition and attitude of the people who will gain from the project. The village is inhabited by Ifugao (90 percent), a migrant group from the Cordilleras located in nearby Northern central part of Luzon. The Ifugao are known to have spread and moved to the Northern Sierra Madre in search for land. This highly homogeneous group responded to the development intervention that DfNSIP offered.

Who chooses to adopt

Integral in the project implementation was the people's involvement. Eventually, a people's organization (PO) was formed named Mataga-ay Sustainable Resources Development and Conservation Association (MASREDECA). Men and women share in farming responsibilities, although they have their specific concerns (table 1).

Table 1: Decision makers in adopting agroforestry/farming concerns

Concerns	Father	Mother	People's organization
Crops to grow	X		
Cropping system	X		
Price of product		X	
Market outlet		X	
Technology to adapt	X		
Source of funds	X	X	
Source of technology			X
Cultural practices			X

Generally, the motivation to adopt was high at the start of the project. Considering that aid or sort of incentives could be provided, family beneficiaries and the cooperative were mobilized. Farmers were already undertaking substantial on-farm tree planting on their own and needed only to continue what they had started. The wealthier farmers were at the forefront of adoption, with the usual wait and see attitude of some others.

As reported, there were obstacles to adoption. For instance, the principal obstacle to farmer involvement in tree cultivation was the lack of planting stocks and absence of motivation. It was also pointed out that farm labor was a factor limiting profitability. Likewise, the activities would depend on the seasonal demand for labor. Meanwhile, high prices of farm goods continue to serve as incentive.

Technology diffusion

Almost all the residents of the village perform reforestation and agroforestry activities. In fact, many members of MASREDECA maintain their own nursery for agroforestry and reforestation purposes. The active leaders of the PO impart rich knowledge on agriculture and forestry since the chairman is a forester by profession and all the leaders and members have undergone trainings on agroforestry and biodiversity conservation through the RP-German project.

Agroforestry farms established

The establishment of agroforestry made possible through aid surely was a welcome fete for the cash-starved farmers in the area; most local communities do not have the investment capital needed for establishing agroforestry.

The number of farmers that established agroforestry farms increased after just one year of project operation from 2000 to 2001 to 65 percent with a total agroforestry area of 100.48 ha (table 2). Some farmers (40 percent) though, tend only about 1 to 1.5 ha followed by 33 percent that own less than 1 ha. This indicates that the farmer beneficiaries are really smallholder farmers. However small the land were, these hardworking farmer beneficiaries expected big gains and benefits from their farms.

Table 2: Established agroforestry farms within the first two years of the project

Agroforestry area (ha)	2000		2001		Total	
	No. of farmers	Percent distribution	No. of Farmers	Percent Distribution	Total	Percent distribution
< 1	6	30.00	19	33.33	25	32.47
1.0 – 1.5	10	50.00	23	40.35	33	42.86
1.6 – 2.0	2	10.00	6	10.53	8	10.39
2.1 – 2.5	0	0	4	7.02	4	5.19
2.6 – 3.0	0	0	3	5.26	3	3.89
3.1 – 3.5	2	10.00	1	1.75	3	3.89
3.6 – 4.0	0	0	0	0	0	0
4.1 – 4.5	0	0	1	1.75	1	1.29
Total	20	100.00	57	100.00	77	100.00
Mean	1.25		1.27		1.26	

Note: total area of agroforestry in Jose Ancheta is 100.48 ha

Choice of goods (products)

Before the debt for nature swap initiative program

The plantation species that already existing before the project in 1999 were coffee and cacao (table 2). Previous reforestation projects chose these species for income purposes to veer the upland dwellers away from the forests. Coffee and cacao were planted within the reforestation sites because of the belief that these goods will command a high price

and provide a good income for the farmers. However, at present, these were not harvested as there was no market.

Fruit trees in agroforestry systems

With the DfNSIP, certain elements of indigenous local practices were retained in the sites such as the choice of fruit trees. Because of climatic suitability, the local people themselves initiated orchard establishment. Fruit tree species planted within their agroforestry sites were varied, including endemic cultivars of mango during the first year and coconut in the second year (table 3). To ensure the availability of these seedlings, initiatives were made to support the establishment of nurseries by the farmers themselves. It is understood among these farmers that orchard lands will be recognized as permanent cultivation. With the availability of large number of mango planting materials, the number of respondents who planted mango ranked one (table 4). During that time, mango became popular in Cagayan Valley region as pushed by the Department of Agriculture (DA) regional office. The choice of coconut during the second year was accordingly a practical choice.

Table 3: Fruit tree species, total number and percent distribution before and during the project

Fruit Trees	Total number	Percent distribution
A. Old plantations (before DfNSP)		
Coffee	3,350	64.79
Cacao	1,820	35.20
Total	5,170	100.00
B. Planted in 2000*		
Mango	1,432	28.85
Citrus	1,280	25.79
Pomelo	1,282	25.83
Lanzones	419	8.44
Rambutan	423	8.53
Pili nut	127	2.55
Coconut	0	0
Total	4,963	100.00
C. Planted in 2001*		
Mango	2,790	27.70
Citrus	750	7.44
Pomelo	1,602	15.90
Lanzones	371	3.68
Rambutan	1,359	13.49
Pili nut	0	0
Coconut	3,199	31.76
Total	10,071	100.00

** 27 percent mortality due to successive typhoons in December 2004*

Table 4: Number of respondents who planted fruit trees

Fruit trees planted	Number of respondents*	Rank
Coffee	48	4
Cacao	39	5
Mango	62	1
Citrus	26	8
Pomelo	36	6
Lanzones	28	7
Rambutan	57	2
Coconut	51	3
Pili Nut	10	9

Note: multiple responses possible

Choice of tree species

The interest in tree crops among the villagers has not increased. The choice of tree species planted along with fruit tree species in the smallholder farms was limited: gmelina or mahogany (table 5). These are considered small trees for small people.
The choice was not influenced at all by demands but by the availability of seedlings supplied by the project. Particular needs may have not been the criteria for choice, but more of the availability and the small costs. Farmers cannot afford seedlings. There is a need to produce seedlings that people want and are prepared to pay for.

Normally, most farmers have inadequate farmland and are constrained by labor, hence opted to limit the number of planted trees. More efforts had to be made to speed up tree establishment or a higher initial tree density into the system.

Table 5: Tree species grown within the farm

Tree species planted	No. of respondents	Percent distribution
Gmelina	56	74.66
Mahogany	19	25.33
Total	75	100.00

Choice of cash crops

The farmers' choices for home consumption and for cash are shown in table 6. Corn ranked first followed by vegetables. Corn has a good market, is easy to trade and of has short duration. The choice of banana that used to be a popular upland cash crop was hampered by the increasing infection of banana bunchy top disease raging during that period in Quirino.

Table 6: Cash crops grown in agroforestry farms (2000-2001)

Cash crops	Number of respondents	Rank
Corn	49	1
Sitting beans	31	2
Banana	7	5
Ginger	10	3
Squash	8	4
Peanut	6	6
Eggplant	5	7
String beans	4	8

Note: many farmers plant more than one cash crop in their farm

Cropping systems

The concept of developing agroforestry is still generally unrecognized by the farmers in the area. And yet, the value of diversification in farms among the farmers can be gleaned in their cropping patterns namely: (1) monocropping annual crops, (2) intercropping systems with fruit trees in a productive role, and (3) annual crop systems with trees in a supporting (less dominant) role (table 7).

The choice of species combinations appeared to be primarily linked to local conditions (i.e. ecology, local tradition and knowledge, and market conditions). They have mastered the matching of crops grown together in space or in time. A few farmers (15 percent) preferred monocropping especially for very small farms, although, they recognized the limitations of a pure-food cropping approach.

An intensive relay/intercropping systems based on corn followed by legume crops could be productive and sustainable over the years. Corn was specified to be present as intercrop for three years following tree planting. Some farmers claimed to practice relay cropping to avoid insect pests and diseases and when farm inputs and labor was scarce.

The logical and coherent integration of trees and crops in temporal dimension were maintained on the grounds of optimizing the use of farm resources. Popular fruit trees have such dense foliage that weeds are shaded out, but possibilities for food crop production are small. Only coconut plantations have an open canopy at normal plant spacing. Fast-growing trees such as gmelina were employed as nurse trees in establishing cash perennials. Their inclusion is intended to create a favorable microclimate and reduce soil erosion. Gmelina tree canopies establish rapidly and create shade. Pruning of tree branches allows sunlight to penetrate through the crops.

Table 7: Cropping systems adapted in agroforestry farms

Cropping systems	No. of respondents	Percent distribution
Monocropping	15	20.00
Intercropping	49	65.33
Relay cropping	11	14.66
Total	75	100.00

Labor requirement

Farming is the way of life in the village. Naturally, time spent by the farmers in the various farm activities accounts much of their time. Farm household size is often six or more people and the number of farm workers is usually no more than one or two fulltime equivalents. In general, men and women are equally involved in agricultural activities.
Labor for clearing an area is not easily available. Primary tillage is even more laborious. Mostly, members of the family do the clearing of the area. At the peak of farming activities or when labor is necessary, relatives, hired labor and sometimes the *bayanihan* spirit were sought to accomplish the farm tasks (table 8).

Harvesting accounted for higher instances of hired labor or *bayanihan* followed by hauling. The least labor requirement came from farm care and maintenance. With the lack of basic data on labor requirements under on-farm conditions, labor costs of agroforestry (specifically the intercropping of trees and crops) were assumed to be uniformly spread throughout the year. Trees are regarded as growing on an eight-year cycle, hence, labor requirement relating to tree harvests are still unknown.

Table 8: Different farm activities and labor sources

Farm activities	Family	Relatives	Hired labor	*Bayanihan*
Clearing of area	75	56	31	20
Land preparation	71	12	36	6
Planting	73	10	29	8
Fertilization	75	9	16	5
Care and management	75	29	0	0
Harvesting	75	16	74	21
Hauling	75	12	41	0
Marketing	75	0	0	0

Choice of services

The choice of goods (fruit trees, tree species and cash crops) by the farmers are influenced by direct use values (values derived in consumptive manner). These in return give them the services required from each good, or simply the benefits they know can be obtained from that good (table 9).

Preserving the fertility of the soil is the foremost service the farmers valued in planting trees in their farms. Intensive relay and intercropping system maintain a dense soil cover, especially where leguminous cover crops are included in the crop cycle. Perceived soil fertility regeneration benefits by leguminous plants were known. In corn fields corn stacks serve as mulch that prevent soil moisture evaporation, control weeds, and source of organic fertilizers. According to the farmers, they will do more to enhance the fertility of their soil and the rest of the benefits of planting trees will follow. Land degradation is regarded as relatively insignificant under tree crops or agroforestry when compared to cropping.

On the other hand, fruit trees selected were seen first if they can survive on their land. Adaptability to their conditions would reveal robust growth and good harvest. The same is true with cash crops. They will plant crops that are best suited to their soil to ensure good harvest. Knowing that fallow rotation reduces soil fertility decline, especially on sloping farmlands, conservation farming practices are necessary to sustain annual cropping. Marketability values comes after the sustainability measures are assured. This shows that the demand-side forces cannot send signals to producers. The farmers are fully aware of the environmental goods and services that are produced in their sustainable farming systems.

Table 9: Reasons for the choice of tree species, fruit trees and cash crops

	No. of farmers	Rank
A. tree species		
1. Fast growing	58	2
2. Adapted to locality	41	4
3. Preserve soil fertility	62	1
4. Prevent erosion	56	3
5. Wildlife sanctuary	12	6
6. Watershed	28	5
B. fruit trees		
1. Prevent soil erosion	29	5
2. Preserve soil fertility	32	4
3. Promising income	67	3
4. Available market	71	2
5. Adapted to locality	73	1
6. Available technology	24	6
C. cash crops		
1. High price	43	3
2. Ready market	51	2
3. Short growing period	22	5
4. Suitable to soil	69	1
5. Direct consumption	37	4

Income and gains

The potential of income generation in community forestry is widely recognized and accepted. This allowed for a wide range of prospective perennial choices for specific local circumstances and the need of smallholders to diversify their tree-crop enterprises.

During the first two years of the establishment period, pressures on farmland made farm income inadequate. With more things to establish, and the need for various farm inputs, cash availability has always been a great constraint to production. Fruit trees that bear regular production with a market value and cash crops that can immediately give returns were highly sought after. However, the potential economic attractiveness of tree growing by smallholders is confirmed not a practice that tree growing maybe a slow process. Income shares are still low for each land size bracket (table 10). Monetary benefits still fall short during the early years. Non-monetary values were high in terms of

food, fuel wood, lumber needs for house and other construction needs. As reported, one of the valued secondary benefits was the availability of a large range of by-products for household consumption (i.e. fuel wood is available in large quantities).

Due to lack of valid data, the economic consequences of intercropping compared to monocropping are still inconclusive. But with the enhancement of cool climate, biodiversity in the farms and other ecological enhancement, the benefits for the community and the society at large with environmental improvements, far outweigh the financial costs. It is presumed though, that income gains will be more pronounced when the long duration crops such as fruit trees start to produce.

Table 10: Benefits and income derived from agroforestry farms

Benefits	No. of farmers	Percent distribution
Non-monetary benefits for trees (for houses)	75	100.00
Coffee, cacao and citrus (latest harvest)	12	16.00
Below PhP. 10,000	11	14.66
PhP. 11,000 to PhP. 15,000	10	13.33
Did not harvest**	45	60.00
Total	75	100.00
Cash crops (per cropping)		
For food	5	6.66
Below p10,000	9	12.00
PhP. 11,000 to PhP. 15,000	16	21.33
PhP. 16,000 to PhP. 20,000	12	16.00
PhP. 21,000 to PhP. 25,000	6	8.00
PhP. 26,000 to PhP. 30,000	9	12.00
PhP. 31,000 to PhP. 35,000	5	6.66
PhP. 36,000 to PhP. 40,000	4	5.33
PhP. 41,000 to PhP. 45,000	5	6.66
PhP. 46,000 to PhP. 50,0000	2	2.66
PhP. 50,000 and above	2	2.66
Total	75	100.00

** Low price at PhP. 5.00/kg fresh weight*
*** Did not harvest due to low price and the labor cost is high*

Risks and uncertainties

The distribution of benefits of a project among producers depends on how prepared the participants are. Distributive gains are most likely to flow to the farmers who are willing to bear the initial risks. Frequently, those willing and able to take chances are the ones who already have a privileged position. Although income generation from agroforestry systems has much potential, the need for documentation, training and free exchange of information and ideas are essential in the long run.

For income generation purposes, the kind of farming systems with good access to markets is deemed very important. A case in point is the coffee and cacao plantations where in the economic value decreased when prices fell; a common feature of commodity markets that led to the abandonment of the plantation. Here, the farmers should not be left alone in dealing with failing markets. The development projects must be prepared to face fluctuations in the market and recognized the hazards of producing for a market-based economy. This only showed that the farmers should be trained on this aspect of understanding the concepts and processes of marketing the products and to its sale, and not just be regarded as providers of the products.

Other issues were identified (table 11). There is a need to pay more attention to smallholder forestry. Considerable technical problems of integrating timber and forest trees with agriculture need to be addressed. For one, the farmers could not grow other crops within the canopies of coffee and cacao since the area became covered by thick seedlings.

Other risks are predictable but grounded. When some farmers begin to shift land use by clearing residual forests to accommodate for the growing of cash crops this become alarming. Instead of achieving protection through agroforestry, the desire to establish more at the expense of the forests through the age-old practice of *kaingin* would defeat the whole purpose of the system.

How to deal with change and risks when land resources and other types of resources, including information become limiting would require a lot of strategies? At first, risk reduction should be seen in the context of the whole farming system. Then, the component elements of the system need to be re-evaluated, valued and priorities examined.

Table 11: Risk and uncertainties

Perceived risks and uncertainties	No. of farmers	Rank
Absence of good market for coffee and cacao	30	3
Pest and diseases in fruit trees	7	6
Typhoons and heavy rains	75	1
Drought	10	5
Source of capital	71	2
Accessibility of farms	26	4
Technical assistance	5	7

Note: multiple responses to some items possible

CONCLUDING REMARKS

The success of an internationally donor-driven agroforestry initiative in the village of Jose Ancheta in Quirino province was examined in terms of the distributive effects. First the efficiency objective of optimizing the use of resources was determined in large part by the particular choice of goods and services adopted. The optimal land use consisted of a mixture of trees (two species), fruit trees (dominated by mango, coconut and citrus) and cash crops (corn and beans) in order to maximize returns from farm labor as well as farm land. The most profitable mix of land use ranged through a spectrum of pure tree stands, fruit trees planted in conjunction with corn, and corn and other cash crops planted in a fallow with no trees at all.

Meeting the distributive objectives of the agroforestry design was addressed through the analysis of how the distribution of benefits was affected by: (1) the characteristics of the adopters of agroforestry innovations, (2) the choice of goods and services and (3) the risks and uncertainties encountered by the adopters. Adoption behavior and diffusion of information was high with the increased extension efforts by the project implementers, the catalytic role of the people's organization, the good educational background of village leaders and the homogenous ethnic background of the people in the area. The tree planting component consisted of the project driven choice of species (gmelina and mahogany) whereas the fruit tree-crop combinations were farmer's choices. The cropping patterns were defined by farm size, labor availability, input requirements and some risks.

The full distributive impacts of the project are not yet fully realized in the early years of the project, especially in income generation. Initial gains were achieved, though, in substantial secondary benefits of adopting agroforestry as a land-use technology. Still, some larger policy issues need to be addressed such as the effect of market failures in products produced, and the need to increase farmlands through the slash-and-burn method.

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CHAPTER FIFTEEN

SMALLHOLDER CACAO PRODUCTION IN THE PHILIPPINES: CONSTRAINTS AND POTENTIALS FOR SUSTAINABLE DEVELOPMENT

Josephine V. Ramos and Alfons Urlings

ABSTRACT

Environmentally and socially sustainable cacao production begins with farmers' conscious adoption of environmental friendly cultivation practices and pests and diseases management, and should be coupled with an effective producer-market link system. While the Philippines has centuries of exposure and experience in cacao growing and consumption, the domestic industry has barely taken advantage of the inherent strengths and opportunities the cacao sector can offer: (1) the availability of suitable land areas for cacao production throughout the country, and (2) the high domestic demand for cacao products for saccharine delights of chocolates. The Philippines promotes sustainable management of the country's forest resources by encouraging tree crop production wherein cacao qualifies as a working tree crop. The promotion of cacao has important environmental benefits, as the trees protect areas previously vulnerable to land clearance, and allows farmers to preserve traditional tree crops that serve as shade trees for cacao. In addition to promoting sound environmental management, cacao could also increase income for a good number of farm households. Cacao has been identified as a suitable crop under coconut because of its low light requirement. Several studies conducted by the Philippine Coconut Authority (PCA) together with other research and academic institutions have shown the economic benefits and agronomic compatibility of cacao and coconut intercropping system for the farmers. Notwithstanding these facts, the sustained promotion to improve and expand cacao production in the Philippines has lagged behind due the lack of focus on industry development that should coordinate systems of extension, technology and marketing, especially when dealing with smallholder production systems. In search for workable approaches to effectively disseminate technologies and establish market linkages while maintaining ecological harmony, the smallholder cacao production strategy was developed as a result of various consultations with the cacao industry stakeholders. This paper intends to share information on the cacao industry in the Philippines, the current initiatives, and constraints and opportunities for sustainable development.

INTRODUCTION

Cacao was introduced into the Philippines in the 1670s to supply the cravings for chocolate among Spanish officials, friars and high society. The passion for chocolate, initially as beverage, was taken over by the Philippine population and later on, became engrained into Philippine culture. The cultivation of cacao spread over backyards in the country where it was cultivated mainly for household consumption and this practice continues until present days. The demand for chocolate among Filipinos grew bigger with the introduction of chocolate bars and candies as part of the U.S. military supply and relief goods during the past World Wars. Cacao production in the Philippines has always been on a relatively small scale and has been mostly been practiced by smallholders. Often, low numbers of trees are maintained on farmers' field along with other crops, or cacao is cultivated in the home garden where it is combined with numerous other perennial and seasonal crops. In the past, initiatives have been undertaken by the Philippine government to promote commercial scale production of cacao beans in order to capitalize on the growing domestic demand for cacao and its export potentials. Cacao processing facilities were established in the mid 1950s. However, widespread pests and the high cost of their control hampered the expansion of cacao plantings. Nevertheless, with the operation of cacao grinding facilities, the Philippines were able to establish export markets for its processed cacao products. In 1977, the Philippine investment priorities plan provided incentives to investors in cacao plantation establishments and operations. As a result, commercial farms were established in Mindanao and the increases in the domestic supply of cacao beans attracted additional investments in cacao processing and chocolate manufacturing, which most often took the form of joint ventures with international corporations.

LAND REFORM AND CACAO PRODUCTION

The overthrow of the Marcos regime in the mid 1980s ushered in changes in policies on land ownership. The implementation of the Comprehensive Agrarian Reform Program (CARP) in the late 1980s placed large-scale cacao estates under cultivation and ownership of smallholder farmers. As land reform beneficiaries they became owners of the estates, with average land areas ranging from 2 to 3 ha each. Due to the lack of a sustained and direct support program for smallholder cacao producers, domestic cacao bean production declined from the 1990s onwards. Domestic production of cacao beans averaged about six thousand metric tons per year for the period 1999 to 2003 (figure 1), which does not match the annual domestic consumption volume at approximately thirty-six thousand metric tons in cacao beans equivalent. Short of local supply, a number of processors have stopped grinding operations while others that maintained their domestic operations, relied on importing cacao beans and cacao products. Based on the most recent figures available, Philippine cacao and cacao products import for 1999 to 2003 have an average value of about US$ 48 million per year (figure 2).

Figure 1: volume of cacao dried beans production in metric tons

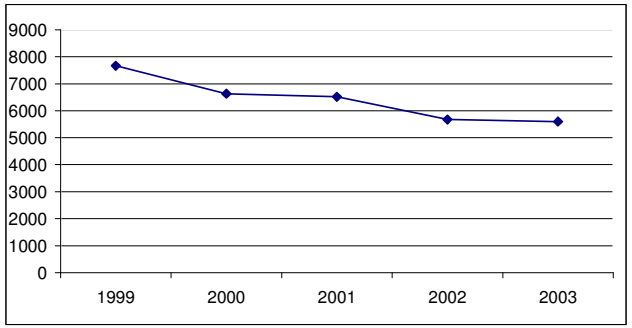
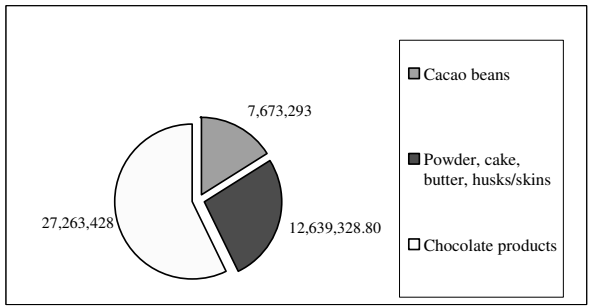


Figure 2: average value of cacao imports 1999 to 2003 (US$)



CONSTRAINTS TO SMALLHOLDER CACAO PRODUCTION

Along with other commodities being traded in the world market, cacao prices fluctuate during and between years. Partly for this reason, smallholders cannot solely rely on cacao production for their livelihood. Moreover, while production loans for farm operations are being offered to smallholders by some government and private financing institutions, unreliable income from cacao sales make farmers more vulnerable to cash flow problems resulting in loan repayment failure. Successful environmentally and financially sustainable cacao production requires smallholders to have access to adequate technology

and (market) information to be able to arrive at sound decisions with regards to their farm enterprise.

Aside from the poor capital-base of smallholder cacao producers, which limits their capacity to sustain the plantation type operation of the former cacao estates, small farmers also lack the technological and marketing skills to make their farm operations successful. In several areas, cacao trees planted in cacao estates have been replaced with other crops, especially when the price for cacao beans in the world market declined, which rendered chemical control of cacao pod borer (a major pest) beyond the financial reach of smallholder producers. Practical cacao farm management approaches, alternative and low-cost mechanisms in combating pests and diseases and improved cacao varieties are available as outputs of research activities in several research and academic institutions. But since the devolution of the agricultural extension support system to the Local Government Units (LGU) in 1990, extension activities in rural areas are largely based on the preferences and priority crops of regional executive government officials (governors and mayors). Furthermore, smallholder cacaos farmers generally lack marketing skills, have to deal with poor infrastructure and lack market information especially on prices. The cacao trade is mainly directed by middlemen and traders who, in some areas, provide credit or advance payments to cacao farmers.

CURRENT INITIATIVES TOWARDS ENHANCED SMALLHOLDER CACAO PRODUCTION

In cooperation with cacao industry stakeholders, a development strategy in order to arrive at a sustainable cacao industry in the Philippines was conceptualized and drawn. The smallholder cacao production concept envisages to address farmers' constraints in terms of investment requirements in the establishment and operation of cacao farms as well as rural poverty and un-sustainability of (some) rural production systems, and to facilitate access to technologies and markets. At the core of the strategy are continuing education and training, extension and effective communication. Farmers' skills on sustainable cacao production, post-harvest, marketing and value adding activities need to be enhanced, and sustained follow-up activities to ensure adoption of environmentally safe technologies are necessary. Smallholder cacao producers have to be mainstreamed in the industry through partnerships and linkages with institutions that provide services and information on technological developments, prices and markets.

The first steps towards sustainable smallholder cacao production are made with the implementation of the SUCCESS Alliance-Philippines Project. The project, which term spans October 2002 to September 2005, is assisted by USAID as primary donor agency, under the global development alliance program. The ACDI-VOCA, a US based non-governmental organization (NGO) manages the project and is responsible for making linkages with processing businesses such as the chocolate manufacturer Masterfoods, as well as with other actors in the cacao sector such as the World Cocoa Foundation, the Cocoa Foundation of the Philippines, Inc. (CocoaPhil) , the local industry associations. ACDI-VOCA serves also as project implementer and works to leverage resources from national and local government institutions, NGOs, and foreign development organizations.

THE SUCCESS ALLIANCE CACAO PROJECT

A major component of the project is constituted of the extension activities that promote the ecological and the economical sustainability of cacao farm units through collaborative efforts among participating farmer groups, LGUs, processors and buyers, and public and private institutions, both domestic as well as foreign. The project focuses on developing farmers' skills to optimize their labor (including their families) and their lands potentials in establishing a sustainable source of income. The project aims to be gender sensitive by striving for female participation in undertaking project activities and to underline the role of women in the sustainable development of Philippine cacao industry.

The SUCCESS Alliance-Philippines project encourages planting of one hundred to three hundred cacao trees per farm family in secondary forests, home gardens or forest gardens or as intercrop under coconut in Northern Luzon, Zamboanga Peninsula, Basilan, and in the province of Palawan. The major components of the project include: (1) Training of Trainers (TOT), (2) training of farmers with the application of Farmers Field School (FFS) concept, (3) establishment of nurseries and bud wood garden sites, and (3) propagation and distribution of improved cacao planting materials.

Local agricultural extension agents, provincial or municipal agricultural officers, farmer leaders or those already serving as technicians of farmers' federations, cooperatives attended the training for trainers. The training program consisted of participatory discussions and hands-on exercises on themes as planting materials propagation, cacao farm establishment and basic knowledge on maintenance and rehabilitation, and alternative mechanisms on the management of cacao pests and diseases. Each TOT program culminated into a workshop wherein the participants prepared the work plan of activities for their respective area of operation. The plans indicated the targets and schedules of farmers training sessions and the propagation and distribution of cacao planting materials.

The project approached farmers training activities in the context of the FFS concept. The TOT graduates serve as the facilitators of the farmers training sessions. Each session tackles key learning areas such as: cacao planting materials propagation techniques such as pruning, and alternative environmentally sound mechanisms to combat pests and diseases.

The establishment of nursery sites and the propagation and distribution of planting materials have been undertaken with the participation of the farmers who attended the training sessions. They also established bud wood gardens. These gardens are composed of a collection of at least five selected cacao clones/varieties that would serve as the source of scions or bud sticks to be used in the propagation of planting materials or in improving the existing or old cacao trees. The nurseries and bud wood gardens provide easy access for farmers to genetically improved cacao stocks.

The intended recipients of the propagated planting materials are those farmers who have participated and completed the farmers training on sustainable cacao production. The project distributes an initial one hundred seedlings for each farmer to start up a cacao farm. Since the farmers have been enabled to propagate cacao planting materials through their participation in the training sessions, they would be capable to

independently expand the area under cacao or to increase the number of cacao trees in their farm. This approach allows the farmers to further develop skills in planting materials propagation, which later on may become a new source of income if seedlings are sold to other interested groups.

ACHIEVEMENTS UNDER THE SUCCESS PROJECT

Activities under the SUCCESS Alliance-Philippines project to date have generally exceeded initial targets. Almost three hundred farmer leaders and government extension agents have been trained as trainers. These trainers have trained over 4,300 farmers (35 percent women). Even though only fifteen nurseries were planned under the program, sixty-four sites have been established and over 440,000 seedlings produced. Farmers have received and planted over 200,000 seedlings (table 1). The promotion of smallholder cacao planting in several parts of the country has gathered resounding enthusiasm among farmers, NGOs, and LGUs.

Table 1: SUCCESS Alliance-Philippines project

Components	**Target**	**Accomplishment as of 31 March 2005**	**Actual target (percent)**
Signed memorandum of understanding	15	31	206
TOT	13	10	77
Nursery sites	45	70	156
Propagated seedlings	300,000	443,728	148
Trained farmers	2,500	4,365	175
Distributed seedlings	300,000	234,836	78.3
Farmer recipients	2,500	2,324	93

The project is well under way to plant cacao trees in forest base areas and as intercrop to coconut trees in Brookes' Point, Palawan. Planting and rehabilitation activities are currently being undertaken by the members of farmers groups who have undergone training on sustainable cacao production techniques. The farmers, who in the past neglected their 3 to 6 ha cacao farms, are now rehabilitating their cacao trees. Home-based satellite nurseries have been established in sixty households nearby the forest reserve area. Farmers who are participating in this area are mostly coming from an indigenous group whose livelihood (used to) depend largely on timber products and on agricultural cultivation of hilly lands.

In the Cordillera Region, the Cordillera People's Liberation Army (CPLA) promotes cacao planting as part of their livelihood projects. The CPLA brigade commanders and officers are TOT graduates and are now conducting trainings on sustainable cacao production for around five thousand CPLA members. They have established thirteen nursery sites in Apayao, Kalinga, Abra, Ifugao, Benguet and Mt. Province and distribution of seedlings is ongoing. A farmer entrepreneur in Conner, Apayao who is also a TOT graduate is now enlarging the scale of operation of his post-harvest processing facility of chocolate. This farmer has formed a cooperative with nearby farmers with whom he shares his knowledge on sustainable cacao production and processing.

In Zamboanga City, the Community Based Forest Management (CBFM) areas are being given assistance with the active support of the city government. Through the office of the city agriculturist, the farmers who participate in the project are given three bags of organic fertilizer aside from the extension support that the city usually provides. The city of Puerto Princesa has established six satellite nursery sites to reach out to about seven hundred farmers in the forest base areas. The city government distributes vermicompost materials to farmers who are planting cacao both in the forest base and in the coconut areas. The authorities and citizens of the province of Palawan emphasize that cacao production supports their long-term commitment to environmental preservation. In the municipality of Siay, Zamboanga Sibugay, eleven sites have been established for seedling propagation. Distribution of planting materials to around five hundred farmers in the area is on going. The provincial government of Cagayan through the office of the provincial agriculturist has been conducting massive information dissemination on cacao cultivation in several municipalities through local television and radio programs. Besides this, they are undertaking farmers training activities and propagation and distribution of cacao seedlings to trained farmers.

During the first three years of implementation, thirty-one memorandums of understanding have been signed within the framework of the SUCCESS Alliance program, illustrating the growing linkages between the LGUs, farmers, the private sector, and universities on promoting cacao in the Philippines. The University of Southern Mindanao (USM) has been a key provider of both technical assistance and genetic materials for the propagation of registered cacao clones in the Philippines. The demand for technical support and training is very high; the SUCCESS Alliance is continuously receiving requests from LGUs, farmers' organizations and NGOs from around the country.

CONSTRAINTS AND LIMITATIONS

The SUCCESS Alliance-Philippines project will end its term in the third quarter of 2005. Until now, the project has focused mainly on promoting planting and management of cacao in certain areas in the Philippines. The small geographical scope of the project is due to the limited resources available for project implementation. The current project has made significant in-roads into the development of profitable and environmentally sound cacao production in the Philippines. However, the impact of the project will be enhanced

if technical and marketing assistance can be sustained throughout the full production and processing phase of the cacao enterprise.

The TOT graduates have been able to impart some acquired knowledge and skills to farmers, but it remains necessary to provide them with refresher courses or follow-up training to be able to guide the farmers throughout the different stages in production to attain high and good quality yield and minimum losses from pests and diseases. Initial training activities for farmers have transferred essential knowledge on the propagation of planting materials and cacao farm establishment. But without follow-up training, there is great risk of farm mismanagement that could result in low survival rates or pest infestation. Most threatening is the spread of the cacao pod borer, which has devastated cacao economies throughout Southeast Asia and is already found in all major production areas in the Philippines.

The main production area of cacao in the Philippines is located in Southern Mindanao, where approximately 3,000 ha of land are planted to this crop. This region could potentially boost Philippine cacao production significantly in a relatively short period of time. However, current producers are facing low productivity due to poor farm management, cacao pod borer infestation and poor market linkages. Furthermore, to combat pests, especially the cacao pod borer, some farmers are spraying chemical pesticides, which have serious environmental implications if it is done without adequate training on minimal, responsible, and safe use of pesticides and alternative pest management techniques.

When production will take off, farmers will be in need of training in other aspects of the value chain, including post-harvest handling and marketing. Some farmers who have been trained under the current project have already organized themselves into associations and cooperatives to gain a grip on output quality and attain scale advantages. These farmer groups need assistance in setting up fermentation and drying centers in strategic sites within the respective production areas. These sites can serve as buying and/or collection centers. The establishment of the centers would facilitate farmers' access to markets while attaining the quality standard required by the market. Both local and international buyers have expressed their interest in purchasing higher quantities of good quality Filipino cacao, yet local farmers are not yet in a position to ensure quantity and quality of production needed.

DEVELOPMENT OPPORTUNITIES

Cacao has been identified as a suitable crop under coconuts because of its botanical characteristic as crop with low light requirement. Data from the Philippine coconut industry show that out of the existing 3.1 million ha planted to coconut, 2.0 million ha are mono-cropped at an average density of 100 trees per ha. Smallholders, tending 2.5 to 5 ha per family, generally cultivate these areas. The available spaces under existing mono-cropped coconuts could easily accommodate 800 to 950 cacao trees planted in two rows at 3 x 3 m triangular distance. Several studies conducted by the PCA together with other research and academic institutions in the past decades have shown the agronomic compatibility of cacao and coconut as well as the economic benefits of this system for the

farmers. Efforts to promote planting or raising crops such as cacao under coconut are underway at the Department of Agriculture (DA).

Executive Order no. 318, promoting sustainable forest management in the Philippines by President Arroyo issued on 9 June 2004 provides policy support for sustainable cacao production. This executive order promotes the production of tree crops and other high value crops as part of the concept of agroforestry in order to address subsistence and livelihood needs of upland dwellers while minimizing their dependence on forest resources. There is also a tree crop program in the Philippines, funded by the World Bank, the Asian Development Bank (ADB) and the Food and Agriculture Organization (FAO), which supports farm enterprises of agrarian reform beneficiaries. The promotion of sustainable cacao production could fit well into this program.

The Philippines is known for growing some of the highest quality cacao in the region. Aside from the domestic market, potential foreign markets, mainly American and European cacao industries, are eager to diversify their cacao sources by providing technical assistance for cacao production in the Philippines. And, Southeast Asia currently experiences serious internal deficits of quality cacao beans. Therefore, major chocolate manufacturers in the region have expressed interest in starting to purchase cacao from the Philippines once production increases. While there is a dearth of information on cacao growing under agroforestry systems in the Philippines, the enthusiastic responses of farmers and LGUs in planting cacao in some secondary forests or forest remnant areas in the country, as well as the experiences of other tropical countries, indicate that prospects for sustainable cacao production are positive.

The ecological and agronomical feasibility of sustainable cacao production in the Philippines, and the potential domestic and foreign markets, warrant a conservative production target of 100,000 metric tons of fermented and dried cacao beans per year. This volume reflects an average additional income opportunity of US$ 750 per year for 200,000 rural families, assuming each family would plant 500 trees and would produce an average of 1 kg of dried and fermented beans per tree.

There are potential socioeconomic gains for the Philippines as a whole as well. The economy could benefit through foreign exchange savings by minimizing, if not eliminating, imports of cacao beans and cacao products. The expanded production could even earn foreign exchange by exporting cacao beans and cacao products. Cacao production and processing might lead to job creation and business opportunities associated with cacao processing and trade in the rural areas could provide additional livelihood opportunities for smallholders. On-farm and off-farm employment could be generated through processing of locally sourced cacao beans by the domestic grinding and chocolate manufacturing sector. In addition, income from cacao could be expanded through value adding for organically grown cacao beans, or by processing cacao beans into *tableas* and other delicacies, hence creating small businesses in the rural households. Sustainable cacao production in the Philippines provides an opportunity to arrive at effective land use leading to economic wealth for the country and the people while simultaneously protecting the environment.

CONCLUSION

Low density cacao planting allows farmers to maximize utilization of existing land and farm areas such as coconut farms and forest base or forest remnant areas and derive additional income from it. Farmers would be able to establish a cash flow out of cultivating three or four crop species that would also help minimize costs on crop protection since diversity in trees and crops planted can be effective in pest and disease prevention and thereby maintain an ecological balance. The smallholder cacao production approach would also minimize the impact of price fluctuations for cacao beans in the market to the farmers.

Thus, the smallholder cacao growing strategy could contribute to sustainable development in rural areas in the Philippines. Recent government policies and programs are in line with the approach adopted by the SUCCESS Alliance project. Also, LGUs have recognized that current efforts devoted to sustainable cacao production could bring new sources of revenues for their municipalities without disrupting current crop production levels. This is evidenced by the resources LGUs are contributing as counterpart share, to the implementation of the SUCCESS Alliance project.

While the result and impact of the strategy have yet to be determined, initial achievements reflect the effectiveness and significance of establishing and strengthening partnerships of stakeholders, in this case, the cacao producers, the industry, the government, research/academic institutions, NGOs, and consumers. These strategic partnerships are at the core of the SUCCESS Alliance sustainable cacao strategy. The obvious need therefore, is to work towards a more comprehensive and sustained collaborative effort with the industries' stakeholders, including national and LGUs, and other institutions, both local and foreign, who is working for sustainable development, in order to be able to pursue the path towards a sustainable cacao industry in the Philippines.

CHAPTER SIXTEEN

MAJOR OBSERVATIONS AND SOME CONCLUSIONS

Denyse J. Snelder, Susan H.G. Schuren and Rodel D. Lasco

INTRODCUTION

Smallholder tree growing is increasingly recognized by rural development workers, policy-makers, and planners as an essential component of rural development, sustainable land use, and reforestation and its associated environmental services. Although fairly extensive in some countries, the information on trees grown outside forested areas is still fragmented and often presented by sector. Inventories and assessments of trees in agricultural areas are generally lacking, jeopardizing the development of databases on various tree-related statistics, such as plant densities, types of species, growing and planting techniques, economic value, and social demands of tree products.

MAJOR OBSERVATIONS

During the panel session in April 2005, two major observations were brought forward. First, spontaneous tree planting (in home gardens, on-farm and through natural regeneration) occurs in various parts of the Philippines and also elsewhere in Southeast Asia. In Isabela Province (Northeast Luzon) there is even a tendency towards an increase in tree growing among smallholders. Yet, there is insufficient attention for it and facts and numbers are lacking. Second, in case of project-based tree planting, there is too much focus on short-term goals and consequently too little time and attention for the follow up activities, which results in low adoption of proposed technologies.

Other observations that were made during panel discussions refer to ecological, economic, management and policy aspects of smallholder tree growing, and these are outlined below.

Ecological aspects

Trees in agricultural landscapes are particularly associated with long-term environmental services, like water purification, soil conservation, habitats for flora and fauna, and carbon sequestration. However, when promoting the integration of trees in smallholder farms through research, projects and programs, various ecological and technical aspects tend to be overlooked. Aspects forming a clear barrier to tree integration include: (1) the lack of tree diversity and availability of high quality seeds and germplasm, (2) the lack of silvicultural knowledge particularly about indigenous species and their inclusion in seasonal crop and tree mixtures, (3) the lack of knowledge on trees, and their integration in farm systems, among farmers and little attention to farmers' knowledge, and (4) inadequate technology generation, dissemination and extension.

Economic aspects

Financial instruments to promote tree integration among smallholders are insufficiently addressed by donor organizations, government and non-government institutions. Attention should be given to questions about the role of tree-based micro-credits, risk insurance and the debt-for-nature-swaps.

Another important limitation is the absence of a third-party certification of tree products generated by smallholders. Such a certification could generate many benefits if set up, for example, in the form of a sustainable forestry certification for international markets. The latter will give production insurance and ensure harvesting takes place under environmentally sustainable and socially acceptable conditions. The benefits of certification systems like those of the Forest Stewardship Council (FSC), active since 1993, and those operating at national levels are diverse and not only related to consumers but also to producers, retailers and manufacturers. For example, for the final consumers, it creates the choice for sustainable behavior. For retailers and manufacturers, it will generally lead to an improvement of their image and create resource assurance (e.g. Unilever). Producers will benefit from having access to markets and long-term agreements, and they may receive a price premium on their products (10 to 30 percent).

Public-private partnerships also have potential, linking, for example, smallholder tree growers with branches of tree processing and marketing in the private sector, but are not widely established. There is generally a lack of knowledge of the requirements and problems in such partnerships. Yet, long-term and sustainable partnerships are important, also with regards to the fluctuations in prices.

Management and extension aspects

Donor-funded projects often focus on short-term (three years) rather than long-term activities (five to ten years), which may hamper the success of such projects depending on the lifecycle of the products produced in the project. In addition, many forestry projects and programs lack a more holistic approach and sustainable strategy for reforestation. The reforestation value chain (Lasco this volume) presents such an approach and serves as a guide for reforestation projects from design to implementation to evaluation. It includes a chain of key activities that add value to reforestation, with reforestation referring to all tree planting activities.

Policy aspects

There are various policy constraints to the harvesting and transportation of wood and other tree products grown on-farm. In addition, the costs and efforts associated with the harvest and transport of protected indigenous tree species are even more limiting. Likewise, in countries such as Indonesia, land tenure policies like those referring to limited or no land rights constrain tree growing by smallholders.

CONCLUSIONS

There is clearly a need for more attention to, and support for, spontaneous smallholder tree planting (and natural regeneration) from scientists, foresters, development workers, policy makers and planners. Moreover, reorientation towards more ecologically sound (on-farm) systems of tree growing is crucial, avoiding the sole emphasis on economics and emphasizing environmental services of trees in agricultural landscapes.

One way to shift towards more ecologically sound systems is to put (more) emphasis on indigenous species rather than exotic ones. We know too little of the economic and ecological potential of indigenous species and, hence, investigations of implementation avenues are required.

Another way to enhance the implementation of ecologically sound tree growing systems is to address technical barriers to tree integration and enhance extension services. Some of these barriers (i.e. those related to inadequate marketing channels) could be dealt with by linking smallholder farmers with actors in the private sector and fostering long-term, sustainable partnerships between the public and the private sectors in support of tree integration.

For donor-funded projects it is imperative that they be reoriented towards long-term rather than short-term duration and take into account the whole chain of activities from planting to marketing.

There is further a need to review and revise policy barriers to tree integration, including policies on land and tree tenure (in Indonesia and the Philippines), harvesting of trees and tree products (so that all trees planted by farmers in farms can be harvested) and transportation (e.g. elimination of fees for transportation of farm-grown trees). Farmers often face high costs, when applying for harvesting permits and certifications. Hence, a minimal or no-cost option for the issuance of permits and certifications can be explored.

Finally, more research on various instruments addressing environmental services, such as, tree-based micro-credits, risk insurance and debt-for-nature swaps is required. Likewise, the third party certification needs more investigation, in terms of the potential of different certification schemes for tree products (national and international, high and low requirements) and its role in reforestation and smallholder farm-grown timber and non-timber products.

It is obvious from the conclusions listed above that advances are needed in practical approaches to asses the true contribution of smallholder tree growing to economic needs, social demands, and ecosystem maintenance using both local and scientific knowledge. Such assessments will be instrumental in evolving and implementing effective policies in sustainable development and reforestation programs.

PANEL TWO

ENVIRONMENTAL CHANGE THROUGH SOCIAL CHANGE? TOWARDS UNDERSTANDING THE ROLE OF INDIGENOUS PEOPLES IN THE PHILIPPINES

Tessa Minter, Padmapani L. Perez, Dante M. Aquino and Gerard A. Persoon

CHAPTER SEVENTEEN

INTRODUCTION

ENVIRONMENTAL CHANGE THROUGH SOCIAL CHANGE? TOWARDS UNDERSTANDING THE ROLE OF INDIGENOUS PEOPLES IN THE PHILIPPINES

Padmapani L. Perez, Tessa Minter and Gerard A. Persoon

When the Department of Environment and Natural Resources (DENR) announced the departmental administrative order (DAO) no. 2 in 1993 about the Certificate of the Ancestral Domain Claims (CADC) one of the motivations was that the indigenous peoples were called upon to save the country's environment. A high official of that department even claimed that "the indigenous peoples were the ultimate solution to the country's environmental problems." Seen in this light, the granting of rights to ancestral domains was not so much motivated by human rights or by injustice done to indigenous peoples in the past but it was done with a view to the future: indigenous peoples as the saviors of the country's remaining forests, coastal zones and wildlife.

It has been more than ten years since DENR announced DAO no. 2. In the meantime the Indigenous Peoples' Rights Act (IPRA) has been put in place. Officially it was accepted in October 1997 but because of various legal problems, the act only came into force a few years later. The National Commission on Indigenous Peoples (NCIP) is now implementing this act at various places in the country.

Numerous non-governmental organizations of indigenous peoples have been founded. At the global level the discourse on indigenous peoples has also moved ahead. The Convention on Biological Diversity (CBD) has made major steps forward, the United Nations is still struggling with its draft Declaration on the Rights of Indigenous Peoples and because of the increasing degree of interconnectedness there is of course a lot of interaction and influence between the various levels. Moreover indigenous peoples themselves have become more vocal and outspoken, not only within the country but also internationally. At the same time it has also become clear that the hope of conservationists of improved environmental management by indigenous peoples has not always been fulfilled. There is also an on-going international debate about this so-called natural alliance between indigenous peoples and nature conservation agencies.

That is why we thought it is a good moment to take a critical look at this relationship by reviewing a number of case studies as well as by reflecting on some key notions in this discourse. When we do so it is clear that we not only look at some legal instruments that are put in the hands of indigenous peoples or their representatives. We are also interested in the internal social processes of change among indigenous peoples once they are given a new and explicit role in environmental management. It is also clear that the emphasis some of the indigenous peoples' organizations put on human rights does not always coincide with environmental improvement. This in particular is one of the conclusions that a number of nature conservation agencies have drawn from practical experiences in dealing with indigenous peoples in environmental management.

The Cagayan Valley Program on Environment and Development (CVPED) has always taken a serious interest in this theme of environmental management and the involvement of local people and indigenous peoples. Numerous master and PhD students from the Philippines as well as from the Netherlands have undertaken studies related to the role of the resident indigenous peoples such as the Agta and the Bugkalot, but also with respect to the migrant indigenous peoples in the Northern Sierra Madre such as the Ifugao and the Tinggian.

This part has been organized on the basis of geographical regions. We shall start with the presentations on Mindanao before moving towards Palawan, the Sierra Madre and the Cordillera.

CHAPTER EIGHTEEN

LIVELIHOOD AND EXTRACTIVE ACTIVITIES IN MT. MALINDANG

Alita T. Roxas

ABSTRACT

The Mt. Malindang Range Natural Park in the province of Misamis Occidental is one of the protected areas in the country. However, it is home to some twenty thousand settlers, mainly Subanen or with Subanen lineage, whose activities pose a threat to the park. This paper looks into the resource extraction and livelihood of Subanen in three Mt. Malindang communities: one in the core area and two in the buffer zones. It attempts to assess some elements of the Subanen culture that can be tapped for conserving biodiversity in the park, as well as for promoting the livelihood security and cultural cohesion of the Subanen settlers.

INTRODUCTION

This paper presents data and insights from on-going biodiversity research in Mindanao focused on Mt. Malindang and its environs. It is being conducted under the Philippines-Netherlands Biodiversity Research Program (BRP), a five-year research initiative started in 1999. The BRP was formed to assess the biodiversity status in the Mt. Malindang Range and is the result of the joint mission of the Southeast Asian Ministers of Education Organization (SEAMEO) Regional Center for Graduate Study and Research in Agriculture (SEARCA) and the Netherlands National Development Research Council (RAWOO). It is being funded by the Dutch Government and managed by a joint Philippine-Dutch program committee. The research initiative is traceable to the holding of a national consultation meeting for biodiversity research agenda-setting participated in by environment experts, researchers, government and non-government organization (NGO) representatives from the Philippines and the Netherlands.

The BRP is a participatory, interdisciplinary and development-oriented research undertaking. It adheres to an integrated ecosystems or landscape approach where interactions between the forests, agroecosystems, riparian and coastal ecosystems are studied to arrive at a holistic environmental analysis. The landscape approach also allows depth and appropriateness of policy recommendations.

Recognizing the link between biodiversity and cultural diversity, the BRP investigates the underlying socioeconomic and cultural dimensions of biodiversity loss and integrates these with the biophysical findings.

The study sites include six upland, five riparian, and three coastal barangays which are found in six municipalities of the province of Misamis Occidental. This paper, however, is limited to data obtained from three upland barangays in the municipality of Don Victoriano which are located in the core of the Mt. Malindang Range Natural Park and focuses on livelihood and resource extraction. The study was conducted from November 2003 to April 2004.

The Mt. Malindang Range

The Mt. Malindang range stretches across the Zamboanga Peninsula, comprising the provinces of Zamboanga del Sur and Zamboanga del Norte, both in Region 09, and Misamis Occidental in Region 10. Its core lies in the province of Misamis Occidental and has a maximum elevation of 2,404 m. It had a dense forest cover of about 45,000 ha in 1971, which declined to 27,766 ha in 1975, and was further reduced to 18,000 ha in 2002. It is characterized by rugged terrain and steep slopes. It is volcanic in origin. It has several craters, the biggest of which is an eight ha crater lake known as Lake Duminagat: an outstanding attraction and believed to be sacred by the Subanen. Seventeen major rivers arise from these craters, and from the foothills originate thirty-two smaller tributaries. The mountain range has a mild humid climate and its core has a higher rainfall and lower temperatures, with an average of 15º C, when compared to the surrounding lowland.

Mt. Malindang hosts diverse and rare species of flora and fauna. Two hundred twenty-three plant species in eighty-nine families have been recorded in the park and a substantial number still requires scientific classification. Rare and endangered fauna found in the park include: Philippine Eagle, Flying Lemur, Philippine Deer, Tarsier, Rufous Hornbill and the Giant Scops Owl. In total three hundred thirty-seven mammals, one hundred fifty-eight birds, eleven reptiles and fourteen amphibians have also been recorded. The park's flora and fauna are said to exhibit a high degree of endemism (NIPAP-DENR 2000).

Republic Act 6266 in September 1971 declared some 53,262 ha of the Mt. Malindang Range as National Park and Watershed Reservation. The Mt. Malindang National Park later became a component of the National Integrated Protected Areas System (NIPAS) established under Republic Act 7586, which was passed on 1 June 1992. The NIPAS mandated the revision of the boundaries of the park. This resulted in the reduction of the core protected area to 34,694 ha, and the re-designation of what remained of the original 53,262 ha as buffer zone. These revisions are embodied in Presidential Proclamation 28, which was issued on 2 August 2002. Under this proclamation the park was re-classified as a natural park where extractive activities are not allowed in the core protected area. With the recent passage of Republic Act 9304, otherwise known as the Mt. Malindang Act, on 30 July 2004, Mt. Malindang became a protected area. Highlighting this legislation is the inclusion of some PhP. 7.67 million in the annual General Appropriations Act for the use of the Mt. Malindang Range Natural Park (MMRNP).

The indigenous people of Mt. Malindang: the Subanen

The Subanen are an indigenous people believed to be the first occupants of the Zamboanga Peninsula. Christie (1909) has cited Pigafetta's chronicle of his 1519-1522 journeys and Combes' account in 1663, both of which point to the Subanen occupancy of the lowland and coastal zones of the peninsula. Earlier characterized as river dwellers as they lived near rivers or use rivers in their journeys, these indigenous people have been called Subanen (also known as Subanun, Subanon, Subanu, Suban'on), which means river dwellers. This comes from the root word *suba*, which means river to both the Bisaya

as well as to Muslims in Sulu. *Nen* or *nun* is an adjective suffix indicating origin (Suminguit 1989). The Subanen were given their name by the Moros and the early Christian missionaries. The Subanen flight away from the coasts, settling along rivers, and moving progressively into the hinterlands of Mt. Malindang has been brought about by several factors. These consist mainly of efforts to escape the pre-Hispanic subjugation by co-inhabitants of the island of Mindanao, the conquest of the Visayans, the marauding activities of Muslims, the subjugation of the Spanish government of their coastal villages, the evangelization attempts of Jesuit and Augustinian missionaries even in their inland territories, and the massive in-migration of people from Luzon and the Visayas prompted by the US colonial administration (Pelzer 1945; Suminguit 1989; Rodil 1994; Alegre 2004).

Up to 1939, Misamis Occidental was among the provinces that registered a high population growth as a result of immigration. Between the retreat of the Japanese and 1948 (which was the date of the new census), a steep rise in the number of immigrants was recorded, especially to Misamis Occidental (Noorduyn et al. 2002). The migrants had with them wares and supplies such as whetstone, salt and cigars, which they offered in exchange for Subanen lowland farms. Apparently relying on open access to fertile lands in the mountains, the Subanen accepted the barter and moved to the uplands. In some instances the Subanen were evicted from their lowland farms because the migrants had legal documents for the land. Migrants from Cebu, Bohol, Negros, Siquijor and even from Luzon therefore progressively dominated the coasts and lowlands of Misamis Occidental. They have been collectively called Bisaya; the reference owing to similarities in dialects. To the Subanen they are also called Dumagats or settlers from across the seas.

The study sites

The three barangays studied are located in Don Victoriano Chiongbian, also known as Don Victoriano, a fourth class municipality in Misamis Occidental. Barangay Lake Duminagat lies within the core protected area of Mt. Malindang. The two other barangays, Gandawan and Mansawan, which was renamed to Nueva Vista, lie within the buffer zone. These barangays are contiguous but have varying elevations. Barangay Lake Duminagat has the highest elevation among the three barangays with elevations ranging from 1,440 to 1,460 m. Mountain slopes vary from 19 to 35 degrees. It is a crater valley and has a land area of 909 ha, 60 ha of which are mossy forest. Adjacent to it is barangay Gandawan, a lower crater valley, with elevations ranging from 1,240 to 1,280 m. Its surrounding mountains have slopes from 22 to 26 degrees. Its plains measure about 102 ha. Barangay Mansawan lies next to Gandawan and has an elevation range of 1,269 to 1,303 m with undulating mountainous slopes of 12 to 35 degrees.

Getting to barangay Lake Duminagat from Mansawan, the entry point to the two interior barangays can either be on foot or on horseback. It takes about two and a half hours of walking on steep slopes and rugged terrain to the barangay. Taking the horse cuts the travel time by half an hour. For the settlers, however, the walk is only for an hour. A paved road from Gandawan has been constructed out of Internal Revenue Allotment (IRA) funds in October 2004. Though shortening the walk to about an hour and a half for visitors, the steep road makes the walk difficult. The walk to Gandawan from Mansawan is about an hour for visitors, but settlers take only half the time. In

January 2005 a dirt road passable to four-wheel motorized vehicles has been constructed from Mansawan to Gandawan, but this remains to be used mainly by settlers who still prefer to travel on foot. Only a very few *habal-habal* (motorcycles without sidecars carrying as many as four passengers) carrying visitors have been observed to ply the route. Mansawan, the centro, is accessible to motorized vehicle. Only one minibus services the route three times a week. The usual means of transportation is the *habal-habal*. Mansawan is about an hour away from the lowland town of Mutia, Zamboanga del Norte. The way to the municipality of Don Victoriano is through Zamboanga del Norte as there are no provincial highways that connect Don Victoriano to the rest of Misamis Occidental.

Settlement pattern in the study sites

Oral histories would point to barangays Lake Duminagat, Gandawan and Mansawan as originally Subanen communities. Barangay Lake Duminagat is said to be settled in the 1930s. A Subanen *suruhano* (spirit medium) from the lowland community of Mutia, Zamboanga del Norte, Pedro Mali Villamino, also known as Apo Mali, is said to have been the pioneer in the area. Malindang is said to be a contraction from his name Mali, and his wife, Baindang (Hansel et al. 2003). Descendants of Apo Mali reside in the barangay, including four of his ten children. Apo Mali is held in reverence and tales of his magical powers are widespread in the community.

Among the first settlers in Gandawan was Juan Ubas, known as Gumitao in the 1940s. His son, Timuay Digo Ubas, now in his early seventies, retells the story of Gumitao settling in the once heavily forested area with his family and relatives just before World War II (Hansel et al. 2003) Two *lumads*, identified as Apo Tuminolog and Apo Bata, were also reported to be among the first settlers there. The first settlers came from the neighboring provinces of Zamboanga del Norte and Sur and from nearby municipalities of Misamis Occidental.

In Mansawan, the first Subanen settlers hailed from Ariosa, Zamboanga del Sur led by Payad Gumanad and her three siblings. This was also in the 1940s, following the settlement Gandawan. Though settled last, Nueva Vista grew the most in terms of population. It also became the *centro* among the three barangays where a *tabo-an* (a small market place), a barangay high school and a range of micro-scale livelihood activities are available.

All pioneer Subanen to the three communities claimed land from the forests for cultivation and settlement. The abundance of land and its fertility attracted relatives and acquaintances. The earliest and biggest families staking their claims have the largest lands.

Barangay Lake Duminagat has been settled almost solely by Subanen. Only two of the fifty seven households are headed by non-Subanen, a result of intermarriages. In Gandawan, the Subanen settlers were followed by Bisaya settlers in the 1950s and 1960s. Prompting the Bisaya to migrate there was an invitation from the founder of Rock Christ, a religious group, to partake in God's gift of abundant and fertile land. The invitation and subsequent in-migration by the Bisaya resulted in Gandawan having only a 30 percent Subanen household population out of the current seventy households. In Mansawan religion also played a significant role in bringing in settlers, though these were mainly

Subanen in the beginning. Thirty families, all members of the religious group *Piniling Nasud* (chosen people) moved into the community from Zamboanga del Norte and Sur and from the lowlands of Misamis Occidental in 1961 to avail also of abundant and fertile land. Stories about open access to land in Mansawan soon became widespread, and its accessibility to vehicles enabled in-migrants from the surrounding Mindanao provinces, and even those from the Visayan islands of Cebu, Bohol, and Negros, to easily move in. Two hundred seventy-six households are now located in Mansawan, 70 percent of which are Subanen.

The dense forests in the three communities attracted loggers in the late 1950s. Barangay Lake Duminagat was logged first, followed by Gandawan and then Mansawan. The latter two communities were logged starting in the 1960s. Logging continued even after the declaration of Mt. Malindang as a national park and watershed reservation area in 1971. Only in 1982 timber concession permits and licenses in Mt. Malindang were cancelled. From the once heavily forested areas with only a few settlers, what can be seen now are houses clustered around an identifiable centro where the barangay office, day care center, school and the *tabo-an*. Some houses are also dispersed in several puroks. A few fruit trees, such as avocado, jackfruit and pomelo, can be found near some houses and near some farms. These serve as markers to usufruct land, locally called *inangkon*. Most farms in barangay Lake Duminagat are located at the base of mountains, on slopes and near forest fringes. Farms in Gandawan are situated mainly in flat lands. Grasslands and some forest patches can also be found. These are cultivated lands left fallow, but these are getting smaller in area due to the influx of migrants.

A FRAMEWORK FOR ANALYZING LIVELIHOODS AND RESOURCE EXTRACTION IN MT. MALINDANG

Contemporary studies in interactions between poverty, livelihood strategies and environment use an assets-mediating processes-activities framework (Reardon and Vosti 1995). Ellis' (2000) version of this framework is called upon to aid in the analysis of livelihood and extraction activities of settlers in the Mt. Malindang study sites as it relates to the environment. The approach regards the asset status of poor households as fundamental to understanding the options open to them, the strategies they adopt for survival and their vulnerability to adverse trends and events. Assets, also referred to by Ellis as livelihood building blocks, are the stocks of capital (natural, physical, human, financial and social) that households can use to produce, engage in labor markets and participate in reciprocal exchange with other households or engage in market exchange. Assets are referred to as resources by other scholars (Grown and Sebstad 1989) but the two terms have been defined similarly. In this paper, therefore, assets and resources are used interchangeably. Livelihood is defined by Chambers and Conway (1992) as comprising the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. The important feature of this definition is it directs attention to the links between assets and the options people have to pursue alternative activities for survival.

The diagram of the framework for analyzing livelihood and extraction in Mt. Malindang is shown in figure 1. It starts with an assessment of assets that households own, control, claim, or access. Natural capital consists of the land, water and biological

resources that yield products used by households for their survival. These are also referred to as environmental resources. Physical assets, meanwhile, consist of capital created by economic processes as buildings, irrigation canals, roads, power and communications lines, water supplies, farming equipment, fishing gear and the like. They are what in economic terms are called producer goods. Human capital is the labor that households own: its education, skills and health. It is augmented by investments in schooling and training, as well as by skills acquired through experience in one or other occupation. It is likewise rendered more effective by the absence of illness or health problems. Financial capital is the stock of money that households can avail of. This largely refers to savings and access to credit. The usual understanding in economics is that cash savings or cash proceeds of loans are not directly productive assets but are a means of purchasing other forms of capital. In most rural areas where incomes are low and financial intermediaries are absent savings come in substitute forms, such as livestock. Livestock serves as a good store of wealth and buffer against bad times. Though less liquid when compared with cash savings and cash loans, livestock is also converted to cash when sold or can be converted directly to other forms of capital. Social capital pertains to the social claims that individuals and households can harness due to personal and family networks such as the kinship system, as well as participation and membership in political, social, religious and other similar organizations and processes. Swift (1998) states that social capital may be vertical (such as those found in authority relationships) or horizontal (such as those prevailing in people's organizations). Social capital then includes vertical claims on government officials or on the tribal leadership that are expected to be met, especially during difficult times, and horizontal claims on people's organizations, such as farmers' associations, where individuals bond together to pursue common interests.

These five types of assets are substitutable and their translation into livelihood strategies is mediated by endogenous and exogenous factors. Belonging to the former category are social relations, institutions and organizations. The latter category consists of trends and policies, as well as shocks. Social relations refer to the positioning of households within the community taking into consideration kinship ties, gender, age, class, ethnicity, belief system and so on. Institutions are the formal and informal rules, laws, land tenure arrangements or property rights and market forces. Organizations are the groups formed to achieve common goals. In the context of Mt. Malindang, these are local government units, government agencies, farmers' organizations and non-governmental organizations (NGOs). Social relations, institutions and organizations are mediating forces that facilitate or constrain the use of assets by households.

Trends in population growth rates, population density, migration patterns, technological innovations, market trends, and regulatory laws and codes such as NIPAS, as well as shocks or those unforeseen events that disturb livelihoods, floods and droughts for instance, are likewise called the vulnerability context owing to their capacity to reduce or destroy assets. The livelihood strategies that result from the assets and mediating factors may be natural resource based or non natural resource based. The former leads to different land uses and can be classified as farm, off-farm, forest, riverine or coastal activities. Non natural resource based activities include rural trade, rural manufacture, transport operations, other services, public sector employment, remittances, and the like.

The last column shows the outcome of livelihood strategies, classified into livelihood security and environmental sustainability. Livelihood security relates mainly to attaining a level of income and keeping it stable and reducing risks that affect assets. Environmental sustainability refers to the resilience and stability of resources such as land, forests, water, and biodiversity. The livelihood activities, as mediated by factors earlier described, may result in households becoming less vulnerable or more vulnerable in terms of their capability to manage adverse trends or to cope with shocks. Likewise the livelihood activities may ensure environmental conservation and enhancement or degradation.

ASSETS AND LIVELIHOOD STRATEGIES

The initial settlement period

The Mt. Malindang forests represented a vast natural capital for the Subanen settlers. Starting with the initial settlement in the 1930s for barangay Lake Duminagat, and in the 1940s for Gandawan and Mansawan, the forests have been viewed as sources of fertile land with which to farm and to build dwellings on. Trees supplied the materials for house construction and firewood, and even resin to easily start a fire. The forests also provided non-timber forest products as rattan and pandan from which furniture could be made and baskets and mats could be woven. Herbs provided cure for illnesses. Wild berries, giant root crops, honey from beehives, fish, shrimps and edible frogs from Dapitan River, and meat from wild game ensured a varied source of food and nutrition.

Though lacking formal schooling, the early Subanen settlers possessed the level of skills that matched the requirements of subsistence farming. Living among a fellow Subanen, family labor on the farm was augmented by social capital in the form of labor assistance known as *hunglos* or *pahina*. This assistance was called forth when clearing the forest, planting or harvesting crops. *Hunglos* is a type of labor exchange or cooperative community labor based on reciprocal actions. Hiring labor was unheard of and the meager financial assets would not allow it. Only a few draft animals were available as it was common to farm on steep slopes. The tools owned or borrowed from kin and neighbors were limited to the most basic: the ax, bolo, scythe and machete. The tribal elders ensured order and respect for tradition. Men performed tasks requiring greater strength and agility such as the felling of trees for timber, the chopping of firewood, hunting and preparing land for cultivation. Women mainly took charge of household chores and the rearing of children, although they were also involved in farm activities such as planting, weeding and harvesting.

The belief in the spirits as guardians of nature required the performance of *pamuhat* or *kano* (rituals) to ask for guidance in locating endowed sites. Before cutting trees, starting the *kaingin*, and even before hunting and fishing, rituals as the *pailis* and *diwata* would be performed. These rituals sought permission for resource use and supplications for a bountiful yield. These were also performed for other forms of intervention given the uncertainties of life and for thanksgiving. These rituals were previously often accompanied by lavish offerings, called *paghalad*, consisting of boiled rice, unsalted and half-cooked pork or chicken meat, eggs, local bottled wine and some

cigars. Rituals were led by a spirit medium known locally as *balyan* or *suruhano*, who could be a male or female.

Livelihoods revolved around forests, land and rivers as these were the most abundant and easily accessed. Social capital was seen as the next important asset being an all-weather source of support, and because, as Coleman (1990) would say, “people are social animals and within reason get utility simply from having relationships.” It is nurtured by ensuring harmonious interactions, honoring reciprocities, participating in rituals, adhering to norms and engaging in similar social capital augmenting efforts. Human capital, though continuously honed by experience and community exchange of information in the affairs of the farm, initially needed no additional skills as the absence of a road network to the lowlands did not require production of a marketable surplus of traditional crops as *gabi*, *kanaka*, *kamote*, and corn nor heavy extraction of timber and non-timber products for lowland markets. Financial capital was therefore, nil.

The road to changes

Intensive commercial logging that took place in different forests in Mindanao in the late 1950s and unto the early 1980s did not spare Mt. Malindang. This changed the physical and social landscape of the communities. Pilot roads had to be built to allow the transport of heavy equipment and to haul logs. The massive clearing of primary forests that ensued paved the way for more Subanen and Bisaya migrants. Logging companies hired a few Subanen, but the more skillful Bisaya filled up most of the labor requirement. Some of the Bisaya logging workers took Subanen brides and stayed in the mountains to farm when the logging permits were cancelled.

The creation of a physical asset in the form of a road network brought about many changes. An elementary school was constructed in Mansawan and Gandawan in 1963 as the communities became accessible to the provincial government. To the older Subanen formal schooling was not a prerequisite for survival as tilling the land was all it took to gain a living (Rodil et al. 2002). With the opening of schools younger parents started to encourage their children to attend classes and saw in education the opportunity for their children to have better lives. Increased interaction with Bisaya migrants and Subanen relatives from other places yielded information pertaining to the production of new crops suitable to high elevation areas and cool climate; more importantly these new crops faced a stable market demand.

Agricultural diversification followed. High-value vegetables of the temperate variety as cabbage, carrots, Chinese pechay and bell pepper thus started to be produced for the market in the 1970s and became widespread in the 1980s. Spring onions and chayote were also cultivated. These crops were found to command a good price and slowly the settlers in the core of Mt. Malindang were drawn into commercial agriculture. Notwithstanding Republic Act 6266, declaring Mt. Malindang as a national park and watershed reservation area, the settlers went ahead with their practice of *kaingin* to secure fertile farms. The shift toward the commercialization of agriculture caused alterations in the rural scene. The *uma* (farm) for traditional crops was slowly overtaken by vegetable gardens. The financial capital that was generated by sales of vegetables made possible house repairs and extensions although trees still had to be felled from the forest. Nipa or cogon roofs were replaced with GI sheets bought from the lowlands.

The traditional crops continued to be produced to hedge against possible cash crop failure. Gabi, kanaka and kamote served as the staple food when there was not enough cash to buy rice or corn. The peelings were also fed to chicken and pigs. The cash generated from spring onions, cabbage and other new crops provided the motivation to produce surplus traditional crops for the market. The absence of a road network from barangay Lake Duminagat and Gandawan, however, raised the cost of sales of the traditional and cash crops as a horse was needed to bring these products down to the Mansawan market. On the plus side opportunities opened up for some households to invest in horses and have these hired for the hauling of produce. A diversification of income sources was thus being created.

The closure of logging companies in 1983 meant lost cash income to its workers. Affected Subanen and non-Subanen settlers in the park had to replace the lost cash income by engaging also in cash cropping. This meant additional clearing of forests for garden plots. Others tried their luck in the lowlands. Lacking the skills, they were absorbed in the informal sector but the low pay vis-à-vis the cost of lowland living drove most of them back to the farm. A little later, however, young men and women who had some years of secondary education also sought employment in the informal sector in the lowlands. Access to the road network increased participation in wage employment. Those who were lucky would send remittances to their families in the uplands, albeit meager and very far between. Remittances from informal sector employment, for example as domestic helper, are therefore poor sources of additional cash for the upland families' consumption or farming needs. Those who simply could not supply the required skills nor cope with the nature of the lowland jobs had to go back to the uplands to farm. In the context of the sites studied, the farms absorbed people that could not be employed elsewhere.

The road network continued to cause further migration to the park. Moreover, rebel and military skirmishes in the late 1980s drove lowland settlers to the uplands. Mansawan was the migration area of choice, the community being the most proximate to the lowland municipal centers. Bisaya migrants, however, settled in Gandawan to avoid the congestion of households in Mansawan. The presence of other Bisaya farmers in Gandawan and its wide plains were also pull factors. Barangay Lake Duminagat, being the most interior barangay and having the coldest climate, was the least preferred area. Mean population growth rates in the study sites in 1995 and 2000 were around 5 and 7 percent, respectively (NSO 2000). This was mainly due to in-migration. Households over the years consist of an average of five members.

While logging contributed much to deforestation of the park in-migration aggravated the situation. Conversion of forests into additional settlement sites and farms by *kaingin* did not prove too difficult in logged-over areas. The NIPAP-DENR (2000) reports that *kaingin*, which followed the closure of logging companies, became widespread. The increasing population also had to source the timber for building houses. Cutting of trees for firewood likewise increased.

Government legislation and land intensification

The decade of the 1990s witnessed more changes in the park's landscape. The legislation of the NIPAS in 1992 in response to the growing demand for laws to address issues on

biodiversity conservation, protected area management and sustainable development, attracted attention to Mt. Malindang: one of the core components of the NIPAS. It was in the mid-1990s, however, when concrete moves to make it known and have it enforced in the park took off the ground. Before that, the park settlers took notice of diminishing vegetable produce; a bad thing as it reduced cash income. Lands have started losing their fertility due to continued use. And as if this was not enough, pest infestation occurred in mono-crop gardens. Developing new swidden farms from the forest would have been a way out of this malady were it not for early efforts aimed at the enforcement of NIPAS. By account of the protected area supervisor Rolando Dingal (pers. comm.) about 100 ha of forest was lost to *kaingin* annually prior to 1995. This was drastically reduced to less than 10 ha per year after that year.

Only trees that have naturally fallen are allowed to be used as fuel wood, but the DENR has compromised in allowing the cutting of trees from the forest to build houses of settlers. But as naturally fallen trees could not be so many and cutting of branches would not be enough, the cutting of trees for firewood persists as there are no alternative sources. Forest protection is also constrained by the severe lack of forest guards and logistics. Rough estimates made with the participation of Subanen of the number of trees cut for a single dwelling amount to fifteen to twenty-six trees (at 15 to 20 cm diameter at breast height and 5 m long), or about 37.31 to 66.57 board feet (bdft) of timber. An estimate of average household consumption of firewood per week is 0.192 m^3 or the equivalent of 2.2 trees per week. Community validation results hinted at an underestimation of actual volume of extraction.

The prohibition to further clear forests resulted in the substitution of swidden farming by sedentary farming. New orientations and practices evolved. Land intensification is one of them. The application of inorganic fertilizer was initiated by Bisaya settlers; this was followed by the application of commercial pesticides. Many Subanen continued with their traditional farming practices which were previously proven efficacious. These include the decomposing of grass and cuttings and leaving or burning to nourish the soil (*pagsilab*), the skipping of a plot in a series of plots (*sal-ang*) and let it lie fallow (*paanutan*), and the alternate planting of sweet potato in lieu of spring onions after two years of continuously harvesting the latter to replenish soil nutrients. The spring onions are replanted when the soil is observed to have gained fertility. The practice of rotating crops may have been imbibed from Bisaya practices as it is not the norm in migratory farming. On the other hand, concoctions made out of *tubli* (*Derris* spp.), hot pepper (*sili*), tobacco, and horse manure served as pesticides.

It did not take long for the Subanen, however, to blend traditional practices with the new technology presented by commercial fertilizers and pesticides to meet market requirements. A boost in yield occurred even as cost of production increased. The flow of cash income generated demand for other goods, which presented opportunities for rural business and other non-farm activities that have low barriers to entry such as micro-enterprises consisting of sari-sari stores, bakeries, eateries, entertainment joints for video showing, sing-a-long and even street gambling. These were resorted to alongside farming activities such as backyard poultry and livestock raising.

Non-timber forest product gathering was done together with farming but *nito* and rattan gathering has been replaced with the gathering of medicinal herbs and ornamentals (wild orchids and million flowers) as they have grown scarce. The herbs and ornamentals

have been domesticated and sold to lowland markets. Off-farm activities such as *panungha* or rendering labor on other farms replace the *hunglos* or *pahina* as the farm produce is sold, in contrast to the previous goal of meeting only subsistence needs. Unstable weather that has increasingly characterized the communities, due to disturbances in the watershed key informants say, has also rendered the *hunglos* or *pahina* impractical as farmers prioritized working on their farms when the weather is favorable. *Panungha* has become a good source of supplemental income for those with small plots but surplus labor time. A strong trend towards diversification of income sources is indicated. Presently, of the one-hundred thirteen respondents in the study sites, 59 percent was found to have diversified their incomes from farming. Honoraria from serving as barangay official or from temporary engagements in programs of government agencies and NGOs also offer substantial supplemental income.

Social capital and livelihoods

The late 1990s to the present are marked by the presence of local and foreign-funded programs in the Don Victoriano sites. These served as intervention mechanisms to meet the requisites of a full protected area that the core of Mt. Malindang has become. These include coming up with a general management plan of the protected area, core zone delineations, information education communication campaigns, capability-building for biodiversity conservation and alternative livelihood, infrastructure, logistics and personnel support. The Department of Agriculture also introduced sloping agricultural land techniques (SALT) and integrated pest management (IPM). The labor intensiveness and initial high financial investments in SALT, however, failed to draw adherents. There were also no model farms or any follow up for IPM.

The linkages formed with NGOs and international organizations implementing the development programs represent social capital to develop community social capital. These linkages serve as powerful tools to address vulnerabilities, especially that barangay governments still have to work on their efficacy. The provision of cheap credit for alternative livelihood appears to be the assistance of greatest utility and provides the initial attraction of both the barangay government and other beneficiaries to development programs. Alternative livelihood reduces pressure on the forests and on land, given the protected area status of the communities. As experiences show that credit is meaningless if the absorptive capacity of borrowers is not enhanced, NGOs provide credit together with a package of other assistance. These include enhancing the skills of borrowers in their proposed livelihood undertaking such as fund management, the use of the formal banking system and even values formation. Marketing assistance and equipment are also provided. From these efforts now grow coffee and abaca in the study sites, an indication of venturing towards permanent cropping. More recent projects involve goat and cattle dispersal. The initial supply of cheap credit, however, had to be allocated as it faces a large demand. Alternative livelihood programs in the sites follow the scheme of recycling loan repayments to the next group of borrowers. Infrastructure development also form part of the assistance program to the communities.

Households are also encouraged to plant trees, and to this effect, program beneficiaries are given seedlings of species endemic to the sites, provided with fertilizer, and paid for the labor spent in holing, staking and planting. As the absence of tenurial

rights over claimed lands emerged as one of the reasons for the earlier failure to plant trees, the Department of Environment and Natural Resources (DENR) collaborates with NGOs to encourage settlers who have been in the park five years prior to NIPAS to file for their certificates of stewardship. Assistance for the Subanen to file for ancestral domain claims with the DENR as embodied in the DENR department administrative order no. 2 series of 1993 also came from a congregation of nuns. This was overtaken by events, however, with the promulgation of Republic Act 8371, the Indigenous Peoples' Rights Act (IPRA) of 1997.

IPRA is another landmark legislation affecting the Mt. Malindang communities. Aimed at promoting and protecting the rights of indigenous cultural communities and indigenous peoples, it is particularly important to the management and conservation of Mt. Malindang, it being home to the Subanen. Under IPRA, ancestral domain claims have to be filed with a newly created agency, the National Commission for Indigenous Peoples (NCIP). Generally, however, the Don Victoriano Subanen have not been reached by information dissemination of IPRA, neither by government agencies nor by Subanen groups. By account of Subanen elders in the Don Victoriano study sites nothing concrete has taken off the ground in their communities in as far as IPRA is concerned.

Continuing vulnerabilities and adaptive responses

Despite IPRA, the number of non-Subanen population in previously distinct Subanen communities in the Don Victoriano study sites has increased resulting in an ethnic mix. Constant interactions of the Subanen with the non-Subanen hastened the process of their acculturation. The opening of roads, upland-lowland flows of communication, market demand and government legislations have brought about new patterns of livelihood and have led to new relations of production.

The declaration of Mt. Malindang as a full-pledged natural park to protect its biodiversity has rendered the Subanen hold on their ancestral lands precarious given the prohibitions and guidelines (Roxas and Duhaylungsod 2004). This has significant implications on their means of survival even as some forms of assistance are starting to trickle in. The substantial reduction in their access to natural capital results in the traditional swidden farms being supplanted with sedentary farms. Though IPRA provides for the right of indigenous people to regulate the entry of migrants and other entities, the Don Victoriano Subanen lack of awareness of the legislation and the lack of cohesiveness of their tribal association (unlike what can be found in Subanen communities along Misamis Occidental's Layawan and Langaran Rivers) have not put the IPRA provision in the service of the Don Victoriano Subanen. This indicates some weakness in social capital. Participant observation has led the researchers to characterize the Don Victoriano Subanen as harmonious and generous, lending land for farming as well as for settlement to new migrants until they are able to clear land. The generosity may have its roots from the Subanen psyche that land is a common resource that can be manipulated to gain a living. But as this is counter-indicated by government prohibition, pressure from a growing population on a fixed resource mounts just as new orientations are being formed. The shift from extensive to intensive land use with shorter fallow period is becoming widespread. Communal land is increasingly being viewed as private property. Recent surveys reveal that up to 72 percent of respondents have plots which have been

fragmented with the increase in population. Plots now range only about less than 0.5 ha to 2 ha. The Subanen and the migrant Bisaya now look forward to a promise of the NIPAS Act that those who have been tilling the land five years prior to its approval shall be regarded as tenured migrants. To this effect applications for certificates of stewardships have been filed with the DENR.

Land intensification, while resulting from reduced access to natural capital, also results in poorer natural capital as the soil looses its fertility. Additional funds for farm inputs such as fertilizers and pesticides therefore become necessary. For the impoverished study sites households, where mean monthly cash income from all sources is only PhP. 2,050, PhP. 2,658 and PhP. 4,350 for barangay Lake Duminagat, Gandawan and Mansawan respectively, these funds could only come from informal loans as formal financial intermediaries are non-existent. The very few surplus units in Mansawan, it is significant to note that these are those with engagements in the non-farm sector, see an opportunity in the circumstances to sustain the increases engendered from non-farm earnings by reinvesting these in money lending. Informal credit despite certain disadvantageous terms as high interest rates (10 to 20 percent a month) prop the local economy.

Aside from new relationships found in debtor-creditor arrangements, the farmer-*comprador* (trader) relationship also emerged. *Compradors* either hail from the lowlands or are settlers in Mansawan who borrow funds from local moneylenders to buy the produce of farmers. The produce are sold to bigger *compradors* in lowland markets of Misamis Occidental who would then either sell only in the province or to the neighboring provinces of Zamboanga del Norte, Zamboanga del Sur and Lanao del Norte. Women are increasingly drawn to the trading of produce triggered by the need to better secure loans from moneylenders as well as proceeds from sales. Many local *compradors* are women.

The diverse set of activities that are increasingly being employed to improve livelihoods suggest that households use multiple paths to get out of poverty. Compromising these efforts, however, is the continuing degradation of the environment which renders livelihoods unsustainable. The application of fertilizers in land intensification is done without the benefit of expert advice. Due to lack of training, the farming skills of the Subanen failed to catch up with the requirements of commercial crop growing. Continuous soil degradation and low crop yields are the result, as nutritional imbalances occur when nutrients required by crops are not matched by those supplied by the soil and fertilizers. Pest infestations have reportedly increased, and this may be due to a pest-pesticide mismatch. The resulting pesticide overuse poses a threat to the fragile Mt. Malindang ecosystem, as well as to the health of farmers and consumers. Soil erosion and surface run-offs may also affect rivers and streams, and ultimately the coasts, affecting other livelihoods in the process. The on-going extraction of trees from the forests for firewood further destroy faunal habitat, several of which are already classified either as threatened or endangered. Many trees being cut also face the same conservation status.

Efforts at raising the environmental consciousness of the Subanen and other stakeholders of the Mt. Malindang range are substantial and made possible largely with foreign assistance. These make use of multi-media approaches and include a regular radio program, flyers, newsletters, comics, film-showing, exposure trips and curricular intervention in the elementary and high school levels. These however, are disseminated

mainly in the lowlands. Access to the interior communities still poses a constraint and the absence of electricity and lack of access to steady telecommunications signals almost always require a physical journey to relay a message.

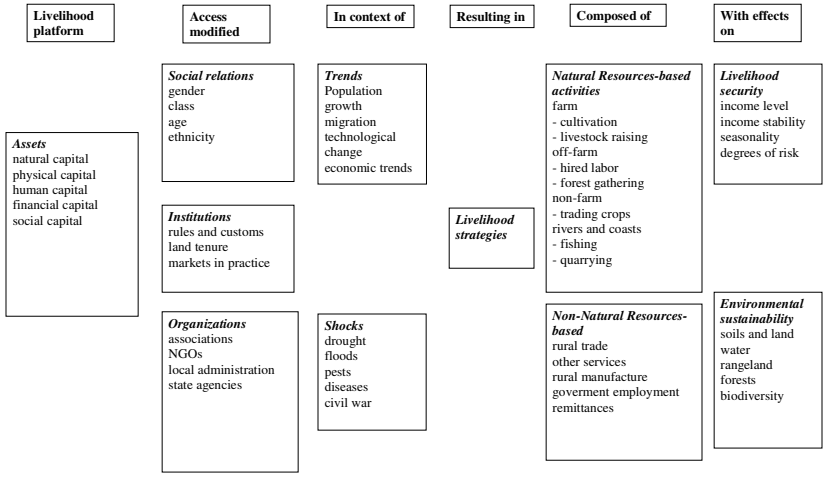
Difficulties notwithstanding, joint NGO-government efforts to partner with the communities to manage and enhance the latter's resources have come to fruition as the Mansawan and Gandawan farmers organizations formed the Protected Area Community-Based Resource Management Association (PACBRMA) and have applied for its recognition by the DENR. PACBRMA is a scheme where the community co-manages resources with the government, represented by the DENR, for a period of twenty-five years. Eligible for this scheme are people's organizations whose members are qualified tenured migrants and interested indigenous people who commit themselves to participate in community-based projects within the protected area. The application of the Mansawan Planters' Association is for 667 ha of land to co-manage, while that of the Gandawan Planters' Association covers some 331 ha.

CONCLUSIONS

Territories and their environment serve as bases for establishing and maintaining the cultural identity and livelihood of indigenous people. Territoriality, however, has been historically tenuous for the Mt. Malindang Subanen (Roxas and Duhaylungsod 2004) due to intrusions of migrants in search of land. As a result, their homes and farms have been continuously relocated, starting from the coasts, to the hills and finally to the hinterlands. Now they are in the last frontiers of accessed land as legislation curtails their use rights over forests based on their traditional system. With the swidden farms being replaced by sedentary farms, conditions that require their cultural practices are disappearing. Social relations engendered by traditional means of farming have likewise been steadily waning as a result. Their current livelihoods bring to the fore new relationships and orientations and while treading uncommon ground adds to their vulnerability the Don Victoriano Subanen have shown their resilience by adapting to changing circumstances, experimenting in the process even as these are proven costly to the environment and to their survival. Timely interventions geared towards creating synergies between the Subanen traditional ways and technological innovations will be beneficial to them and to Mt. Malindang.

Efforts toward the realization of co-management schemes, over and above the provision of alternative livelihood, will provide the Don Victoriano Subanen with higher level of social capital as they are able to take collective and informed actions that avoid the dire consequences of overexploitation or weak conservation of common pool resources. Sustainable management of resources will allow the Don Victoriano Subanen and other settlers to continuously draw on these resources for their livelihood.

Figure 1: Framework for analyzing livelihoods



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CHAPTER NINETEEN

TRANSFORMING LIVES AND RECREATING THE ENVIRONMENT BEYOND THE SUSTAINABLE DEVELOPMENT PARADIGM: REFLECTIONS FROM THE EXPERIENCES OF A HIGAONON COMMUNITY IN NORTHERN BUKIDNON, MINDANAO

Maricel Paz Hilario

LOCATIONS, ORIENTATIONS, AND TRAJECTORIES

Immediately after the United Nations Commission on Environment and Development issued the study Our Common Future in 1987, sustainable development became the cornerstone of the development policy in the Philippines. It was ingrained as an imperative in a country enmeshed in a vicious cycle of poverty, threatened by depleting natural resources and confronted by environmental problems. Generally, sustainable development was presented as the alternative to modernization and the development model, which for more than thirty years was fraught with stories of anger, pain and suffering over displacement, loss of livelihood, militarization and human rights violations, dismissal of indigenous knowledge systems and practices and unequal distribution of benefits. As sustainable development recognizes indigenous peoples' epistemologies in sustaining the environment (Redclift 1992), this framework became dominant in the discourses of government agencies, funding donors, non-government and church organizations and various indigenous peoples' formations nationwide.

By sharing the experiences of a socially fragmented and changing Higaonon community in the village of Mintapod, barangay Hagpa, Impasug-ong municipality, Bukidnon, Mindanao, with sustainable development projects, I will comment on development as a paradigm in relation to the goals of environmental conservation. Most ethnographies previously done on development and indigenous peoples worked on the assumption that indigenous peoples are homogenous and unproblematic, and their ways of life are "sacrosanct expressions of an ancient past" (Lieten 2000: p. 573). This practically distilled not only the multiplicities but also the nuances, ambiguities, tensions, and contradictions in the views on development between and among differently positioned community members. The study follows the view that indigenous communities are divided along the lines of gender, age, kinship ties, roles and statuses, geographic origin and contiguity, interests, property rights, access to and control over politico-economic power, social services, and symbols (Bennagen 1979: p. 18), and political consciousness to draw out cultural and external resources to resist interventions (Bennagen 1996). As the paper unfolds, I will demonstrate that development is a cultural system with its own internal rules and logic, of which the applications in a given time and place engender tensions and contradictions. I will also show that the introduction of development has prevented the Higaonon from managing their lives according to their self-generated and self-determined concepts of good life.

The general framework that I will use in this study carries the thoughts of local and foreign researchers engaged in anthropology of development. For further discussion on the contrasts between the anthropology of development and development anthropology see Escobar (1997: p. 500-502). In searching for a framework it was instructive for me to revisit the local literature since the 1970s (Bennagen 1977, 1979, 1980, 1996; Bennagen et al. 1993; Cariño et al. 1979; Dorall 1979; Parpan-Pagusara 1983; Regpala 1990; Abaya 1991; Contreras 1991; Duhaylungsod 1993, 1996; Alejo 2000). Their musings about the need to study the historicity of development practices, its dynamic with construction and

representation of identity and social reality, embeddedness in political economy, and contingency to the exercise of power still resonate today. They also foreground the current theoretical formulations following the post-structuralist perspectives that development is a discursive and negotiated field and should be analyzed vis-à-vis the dynamics of discourse, political economy, and institutional ethnography. They underscore that to understand how development operates entails studying the relationships of language, history, and practices of development, the rules and justifications by which it was constructed and deployed by developers, as well as how it was interpreted and responded to by those to be developed (Escobar 1995: p. 5-6; Gardner and Lewis 1996: p. 164).

By attending to local discourses, I will characterize the workings of cultural politics in its various forms and manifestations between the Higaonon and the Father Vincent Cullen Tulugan Learning and Development Center (FVCTLDC). Cultural politics, as used in this study, refers to the encounters of power-laden cultural schemas in contestations over the definition and management of life circumstances (Abaya 1991: p. 1). Specifically, I will describe, discuss, and analyze the development organization's interpretations of Higaonon identity and reality, management frameworks and strategies, resources, networks and linkages, results and consequences vis-à-vis the Higaonon local representations of their identity and reality, responses to development projects, and self-generated (hidden, silenced, transformed and emergent) knowledge and practices for achieving good life. I would like to clarify that the Higaonon are not aware of this framework. As with the other development projects introduced to them, they interpreted the FVCTLDC and the Poverty Alleviation Fund 3 (PAF 3) based on the depth of their human experience and imagination of what constitutes good life.

In the end, the paper will argue that indigenous peoples should be critical in using the language of development and see through the different layers of discourse and power that operate in their everyday lives, and how they operate to transform their lives. It will also call the attention of development organizations working with indigenous peoples to re-examine development frameworks and practices and how they affect the lives of the people whom they vow to alleviate from suffering. Finally, it will call them to discover, recognize and respect indigenous peoples groups' historically specific self-generated and self-determined knowledge and practices of good life. This paper is based on the study 'On "development": competing perspectives and practices in a Higaonon community in Northern Bukidnon, Mindanao' that I submitted for my thesis for the degree of Master of Arts in Anthropology at the University of the Philippines in Diliman in July 2004.

The ones doing the looking are giving themselves the power to define.
Merata Mita (1989 cited in Tuhiwai-Smith 1999: p. 58)

The FVCTLDC is a tribal agricultural-based development and learning center principally servicing Higaonon tribal communities in Lompatag plains, Kalabugao, Impasug-ong Bukidnon. It aims to facilitate their self integration into the mainstream Filipino society as tribal community characterized by self-reliance, literacy, enriched culture, security of land tenure, practice of settled sustainable agriculture, and active concern for ecology and environment" (FVCTLDC 1998: p. 1-3).

Beginnings of the project

FVCTLDC began as a dream of the parish priest in the area at that time. His story tells how the project was conceived: "It is part of my nature and my training to initiate development. When I was first assigned here, the Lumad seldom went to church because they had no clothes…So, I vowed to myself to find ways to help them. One time, I held mass. Many children came over. I never saw them before because every time I visited, they just hid in their homes. I was bothered by their images… *Matay*, I said, what kind of live will the children have? Their future will be bleak and hopeless if we do not do anything to change their lifestyles and their views."

Since then, the priest initiated literacy classes in Mintapod with funding from his diocese. The following year, he was able to network and link with development and volunteer organizations from Bukidnon and Cagayan de Oro. Together, they conceptualized the FVCTLDC.

One of the persons who drafted the proposal described that when they were planning the project, among the questions they asked themselves were: (1) do we want them to be culturally isolated? and (2) can we prevent them from being influenced in the future? Since they analyzed that the Higaonon are vulnerable to the influence of the mainstream society, they might as well intervene. Their vision was for the Higaonon to be alleviated from poverty and be able to keep up with the quality of life of people from the mainstream society. They wanted the Higaonon to increase their cash holdings so that they could buy food, send their children to school, and address some of their community's needs like holding rituals. They wanted the Higaonon to be phased into the cash-based economy without them losing their cultural identity. They wanted the Higaonon to stop practicing *pangalawat*, the indigenous economic ethic of helping because they keep on asking but do not do anything to help themselves.

To achieve these goals, they identified five project components, namely: (1) literacy and institution building, (2) marketing and economic development, (3) agricultural development, (4) health and sanitation, and (5) ecology and environment. To ensure that the Higaonon would accept the project, they named it the Father Vincent Cullen Tulugan Learning Center, after the former head of the Tribal Filipino Apostolate whom the Higaonon feel largely indebted to. To ensure funding support, the priest candidly admitted that they identified ecology as one of the program components even if the concept was still very new to them because it was the catchword at that time.

The project received funding support for seven years from Manos Unidas of Spain, Bilance of the Netherlands, and the Asia Partnership for Human Development. Project operations began in 1994 with the Archdiocese of Malaybalay, the Josefa Segovia Foundation

(JSF), and the Gagmayng Mag-uuma sa Parokya sa Kalabugao (GAMAPAKA) as implementers. The project started with eight field staff members. To prepare the field staff for their work, they were given an orientation on the project's vision and mission, alternative culture and lifestyle, personal motivation and values, concept of a person, authentic Christian humanism, community organizing and development work for tribal communities, Higaonon culture, Binukid language and sustainable agriculture (FVCTLDC 1994b).

It is interesting to note one of the pioneering staff's recollections of how he was prepared for his work: "They described and explained the situation in the area. They said that the people there did not know anything at all. No reading, no writing. Although they do not know how to read and write, they have a very rich culture. I was also told that their lifestyle was hunting and gathering. Then, I was told that some people still wore G-strings. At that time, indeed some people still wore them. I was told that the villages were in dire need of help."

Initial reactions of the Higaonon

Initially, the Higaonon were ambivalent about the project. This attitude was reflected in their interpretation of the spleens of ritual pigs and chickens, two key symbols which have deep semiotic meanings in the Higaonon spiritual world. During the ritual for the opening of the project, the shaman predicted that FVCTLDC's implementation would be laden with difficulties because there were still some elders who did not agree with the project activities initiated in Mintapod (FVCTLDC 1994a).

Amay Tangkil, *datu* (leader) in the area said that when the parish priest first came to Mintapod, they welcomed him because he represented the Church of Fr. Vincent Cullen, the priest who extensively helped them reclaim their ancestral domains from the encroachment of the Iglesia ni Kristo in the 1980s. However, Amay Tangkil said they were reluctant about the project because they could not understand how it would benefit them. Moreover, the staff were not sensitive to the Higaonon's cultural protocols and traditional decision-making processes. For example, some of the staff were always in a hurry and would go to the *uma* to discuss their issues and concerns. Amay said that in their practice, anyone who wants to do business with the *datu* should wait for him at the *tulugan* (big house), especially if there was no appointment to see him. The *datu* also does not immediately get down to business until he has ensured that he has something to serve the visitors. It took more than one year before Amay Tangkil accepted the project. However, he tactically invoked their indigenous beliefs and practices to articulate their ambivalence. Perhaps not realizing that ambivalence is a "strategy that allows villagers to accept or reject aspects of the program depending on their assessment of the effects of the program on their daily lives" (Abaya 1991: p. 154), the parish priest tagged him as hardheaded.

The Higaonon's ambivalence affected the accomplishment of project targets. The 1994 annual project report revealed that except for the school, all the activities initiated by the FVCTLDC had a lukewarm participation from the Higaonon. Some suspected the JSF field staff to be communists. Consequently, many of the project's proposed targets that year were not delivered (FVCTLDC 1994b).

In 1995, FVCTLDC pursued their projects on culture-based curriculum, basic health education, herbal gardens, and construction of comfort rooms and compost pits. They also initiated the establishment of communal rice fields, and cornfields, fishponds, nurseries and demonstration gardens for high value vegetables. They also started preparing the requirements for the Higaonon's application for a Certificate of Ancestral Domain Claim (CADC) under the ancestral domain claim program of the Department of Environment and Natural Resources

(DENR). Like the previous year, accomplishing these activities had been difficult because the Higaonon's participation was consistently low.

The community members who had been active in various activities began to lose interest because they could not understand the focus and direction of FVCTLDC. The people complained that they were being asked to work everywhere (FVCTLDC 1995b).

The issue worsened when FVCTLDC did not readily respond to initial agreements to build a *tulugan* (long house). For the *datu*, this was the most important project that their community needed because it symbolizes their traditional leadership structures. However, the *tulugan* was not prioritized.

Responses and reflections

FVCTLDC documents reveal that the project staff did not make concrete promises to resolve these issues. Instead, they disciplined the Higaonon to be docile by issuing dismissive statements like: "we will accept our failures, but it does not mean that this will be the reason of our fall", "we need to understand and reflect on what is going on with our surroundings so as to understand what we were doing", "we need to sacrifice and suffer in order for the project to succeed", "if you find something you do not understand, ask in order to have an exchange of ideas", "our misunderstanding should not be a hindrance in our work" (FVCTLDC 1995a).

In hindsight, one of the staff explained that one of the reasons why the Higaonon could not understand the project was that not one of the community members was involved in its conceptualization. It was the project's management and the project staff who planned and conceptualized the details of the activities. In the end, the Higaonon turned out to be beneficiaries: hirelings of FVCTLDC. He revealed that at some point, they paid the community members to work in various activities. Moreover, he described that many of the projects initiated by FVCTLDC were only experimental. Some were intended for generating funds to sustain the project after external funding support run out.

The staff said this subject was never discussed with the community, hence adding to the confusion over the rationale of the activities of FVCTLDC.

Disturbances, disorganization and diversions

Mid 1995, there was an intensive military operation in the Hagpa and its contiguous areas because of New People's Army (NPA) presence in the Agtulawon-Kiudto area.

As these events unfolded, most of the residents from Agtulawon and Hagpa evacuated to Kalabugao and sought help from the priest. Reportedly, only the residents from Mintapod did not evacuate because they did not want to abandon their farms. This compelled the parish to support the evacuees. According to the priest, fifteen of the forty families who were evacuated were project co-operators who expected to be helped by the FVCTLDC. Since the parish was poor, the priest decided to use some of FVCTLDC's funds for their food, meetings, dialogues, and peace rallies. The priest said these efforts paid off because Higaonon leaders from Bukidnon, Misamis and Agusan were able to make peace pacts and agreements that compelled the NPAs to pull out from the area. To help the evacuees recover economically, one of the project staff proposed that FVCTLDC engage in a rattan-marketing venture. The FVCTLDC would buy and sell the rattan poles that the Higaonon gather so that intermediaries would not exploit them. The priest approved the plan and initially shelled out PhP. 290,000 from the project's funds to finance the venture. All the gatherers were allowed to advance consumer goods from the GAMAPAKA cooperative as an incentive. These were payable after the rattan poles had been sold.

Even with abundant harvests, the rattan-marketing venture collapsed. While the official statement of the priest said that the failure of the enterprise was due to bad weather conditions, poor handing and storage practices, and meddling of military officials and DENR personnel, the Higaonon whom I interviewed had different stories. They held that the project collapsed because the people whom the priest assigned to oversee the activity were not knowledgeable about the rattan market. They also betrayed the priest's trust; they always engaged in drinking and frequently went on outing. In the end, the priest got deeply indebted, as hundreds of thousands of the project's funds could not be accounted for. The Higaonon's debts to GAMAPAKA also mounted forcing the cooperative to close shop. It turned out that the project management had no knowledge about the rattan-marketing venture. When the news broke out, the bishop suggested stopping the project's implementation, returning the remaining funds, and apologizing to the funding agencies that the project has failed. However, one of the management members did not agree and encouraged the priest to try writing the funding agencies a letter of explanation.

Despite the doubts created by the diversion of funds, the priest's explanation and promises to pay all the debts and the cash advances convinced the funding agencies to continue their funding support. However, they required FVCTLDC to have an external evaluation of the project before they released the funds. The results of the external evaluation, which was conducted by a non-governmental organization (NGO) based in Davao, were negative. The report said that while the project had successfully initiated activities that helped enhance the lives of the Higaonon, the full realization of its goals and objectives were constrained by problematic needs and resource assessment, poor conceptualization and design, flawed organizational structures, top-down decision making processes, and problematic systems and processes. It endorsed the continuation of the project but recommended that it should be run by a more experienced organization.

Because of the negative evaluation, the funding agencies disapproved the release of the funds. This prompted the project management to clarify some of the issues raised in the report and question the methodologies used by the evaluators. They also appealed the release of funds on behalf of the Higaonon. In response, the funding agencies sent another consultant to re-evaluate the project. As the results were more positive, the funding agencies approved the release of the funds for the next grant period.

Despite the failure of the rattan venture, 1996 marked a change in the Mintapod Higaonon community's appreciation of the project. Some community members said that if not for the project, they would not have been able to send their children to school and establish their rice fields (FVCTLDC 1996). Feelings of debt and gratitude to the priest partly contributed to the sway of the Higaonon's attitudes towards FVCTLDC. Many of the Higaonon I talked with were sympathetic over his going bankrupt in his desire to help them. They said that supporting the project was the least they could do to show their appreciation to the priest. However, the priest was eventually asked to resign from FVCTLDC because of the tensions that resulted from the diversion of funds.

Significant firsts and other accomplishments

Despite the problems and issues that emerged, FVCTLDC's four year accomplishment report boasted to have achieved the following: (1) conducting formation and literacy classes to forty adults and ninety-five children, (2) generating a community-based tribal academic curriculum, (3) holding trainings on sustainable agriculture, basic health education, and ecology and environment, (4) facilitating the acceleration of eighteen non-formal students to various grade levels in the government's formal education program, (5) providing post harvest facilities and services, (6) establishing and organizing a cooperative composed of Dumagat and Higaonon beneficiaries, (7) facilitating the shift of sixty-four core families from traditional swidden farming system to settled agriculture, (8) establishing around 20 ha corn farm, 4,5 ha rice granary, and 2.5 ha fishpond, (9) distributing twenty-one water buffaloes, (10) providing health services and training health workers, (11) establishing a 2.5 ha herbal garden, (12) dispersing and out planting 18,000 forest tree seedlings, (13) providing 84,400 coffee and fruit tree seedlings, (14) identifying areas for preservation, commercial tree plantations, and agro-reforestation, and (15) establishing a community-based nursery.

The FVCTLDC claimed that the Higaonon's shift from swidden to settled agriculture addressed the perennial problem of food shortage in the area. It also reported that the Higaonon's monthly income increased by 60 percent because of the establishment of the corn and rice fields. The most significant accomplishment it reported though was processing the requirements for the Agtulawon-Mintapod Higaonon CADC. FVCTLDC described the Higaonon acquisition of the CADC on 26 February 1998 as the community's greatest achievement. Interestingly, the rattan marketing venture was never mentioned in the report that they tastefully published in glossy paper. The only setbacks reported were lack of understanding of cultural practices, complicated government dynamics, unstable peace situation, isolation, withdrawal of NGO partners who were in charged of major programs, fast turn-over of field staff, scarcity of skilled personnel fit for mission and development work, and difficulty of communication between the project staff and indigenous peoples.

IMPACTS OF DEVELOPMENT: PERSISTENT GOSSIP DURING MY FIELDWORK

Not everything was well among the Higaonon when I arrived to do my fieldwork in October 2000. Contrary to the report made by FVCTLDC, many Higaonon I interviewed lamented that FVCTLDC's interventions had failed to make them food secure. As Amay Tangkil said: "Our priest initiated various livelihood projects… They spent so much money for our food for work. They said they would help the community as long as they are willing to work hard. We really helped in building the rice fields, in establishing the nursery, in planting trees, in making the fishpond. If you would talk about work and perseverance, the people gave so much. We wanted the project to work because it was for our own good. We pity our priest because he had gone bankrupt just to help us. There were so many expenses, but the returns were too little. The people are now tired and frustrated because for all their efforts, nothing."

Aside from these disappointments, the tensions and divisions that engulfed their social relationships with the Higaonon from the other villages also covered by the project affected them. I have picked up from hushed conversations that the sources of division were multifarious. Among others, these included:

First, FVCTLDC produced and reproduced patron-client relationship to solicit support for the project. When the project implementation began, some of the staff convinced Amay Manlingkudan, a Higaonon leader from Pulahon to transfer to Mintapod to help them convince Amay Tangkil to support it. In contrast to Amay Tangkil who was very reserved and reticent, Amay Manlikudan was very receptive to new ideas. Reportedly, Amay Manlikudan accepted the invitation because he had grand dreams for Mintapod. He believed that compared to other Higaonon villages, the Higaonon from Mintapod were the least improved. The Higaonon from Mintapod accepted Amay Manlikudan because his wife was the sister-in-law of one of their elders. As a sign of good will, Mambangkito gave him a piece of land to till and build a house on. However, conflicts emerged when Amay Manlikudan began building rice fields. Amay Tangkil was enraged because he was still spiritually unprepared for lowland farming. He also believed that the spirits guarding the land were not yet ready. Moreover, he had doubts as to whether lowland rice farming was appropriate in their village. The issue was made more complicated because the rice fields that Amay Manlikudan built crossed the boundaries of the ancestral land retained by Mambangkito. In the Higaonon's construction of land tenure, agricultural lands are considered private. They have already been divided between and among different families since the time of their ancestors. Mambangkito sought the help of Amay Tangkil to settle the issue. Apparently, Mambangkito was consumed with fear because in his younger days, Amay Manlikudan sold every piece of his land to Visayan migrants. Amay Tangkil stopped Amay Manlikudan from building more rice fields and pointed out that he was trespassing on the lands of Mambangkito. Amay Manlikudan denied having interests over Mambangkito's land and said he already regretted his mistakes of selling lands. He also clarified that the rice fields that he built were for everybody. He earnestly wanted the people to have something to learn because their subsistence food was still sweet potato. Evidently hurt, Amay Manlingkudan left Mintapod and went back to Pulahon. His leaving created some cleavages in the community because he also has some followers among the Higaonon.

Second, many Higaonon perceived that the distribution of benefits from the FVCTLDC project was unfair. When the FVCTLDC finally constructed the *tulugan* that Amay Tangkil requested, some talks circulated that it should not have been built in Mintapod because most of FVCTLDC's activities were conducted there. They felt that the site for the *tulugan* should have been discussed and decided by the Higaonon from all the villages serviced by the project.

Third, FVCTLDC pursued the ancestral domain claim recognition without clear understanding of the Higaonon's constructions of land tenure and dynamics of power between and among Higaonon leaders. After the Higaonon from Mintapod decided to apply for a CADC, Amay Tangkil informed Amba Palasambag, the highest *datu* within the Northern Bukidnon area about their plans. During that meeting, Kapitan, Amba's eldest son and the leader of the Agtulawon-Kiudto area asked Datu Tangkil if they could hitch on Mintapod's CADC application so that they would not be left behind in the process. Amba Palasambag and Amay Tangkil agreed to conjoin their territories under one CADC application. The leaders decided by consensus that the perimeter of the two contiguous ancestral domains will be identified, delineated, and surveyed as a whole first but will be separated later once the CADC has been approved. The field staff of the JSF supported this arrangement. After the CADC documents had been prepared, fears crept among the Higaonon from Mintapod because the JSF staff inadvertently referred to the claim as "Agtulawon-Mintapod" ancestral domain. Although the documentation was clear that Agtulawon and Mintapod were two different territories that only agreed to apply for one CADC, the name was open to misinterpretation to refer to only one domain. They felt that instead of a dash, the word and should have been used. However, the Higaonon never had the courage to articulate these concerns to FVCTLDC because they did not want to offend them.

Soon after the CADC was awarded, Amay Tangkil asked the staff to begin documenting, delineating, and mapping the boundaries that separated Agtulawon and Mintapod. However, he was reportedly advised to stop worrying; there was no cause for them because the traditional boundaries between the two domains are very clear. He was told that the more urgent task was the formulation of the Ancestral Domain Management Plan (ADMP). Some of the Higaonon community members' concept land ownership patterns shifted with the introduction of the CADC. In 2002, Amay Tangkil and Manaltuhan said that some community members from Kiudto had not respected the boundaries of Mintapod and had started working on the lands of Manaltuhan.

Tensions and divisions in the Higaonon social relationships became more evident when news spread that as a CADC beneficiary Agtulawon-Mintapod was entitled to PhP. 3.2 million from the government's social reform agenda PAF 3. Under the PAF 3 guidelines, funds may be used for preparing the ADMP, developing sustainable livelihood options, implementing environmental resource management activities, and delivering basic social services. The Higaonon from Mintapod decided by consensus to assign Amay Tangkil's nephew, Bayubasan, to represent them in PAF 3 related negotiations. However, the leaders from the other villages watered down this suggestion because they felt that Bayubasan was still very young and was still studying. Instead of having representatives from each of the villages covered by the CADC, they proposed to adopt the structure of a people's organization (PO) and elect a CADC President, Secretary, and Treasurer. Although the Higaonon from Mintapod found this structure alien, they said they could not speak out because leaders from the other villages dominated the discussion.

Social tensions among the Higaonon aggravated because the DENR Provincial CADC coordinator dealt only with Kapitan and did not make conscious efforts to reach out to Amay Tangkil. This exclusion led to confusion among the Higaonon over the issue of who was the leader of the CADC. Perceptions lingered among the Higaonon from Mintapod that Amay Tangkil was a leader in paper only because he did not have any control over decision-making processes in how the PAF 3 funds should be allocated.

Mistrust over financial management also developed among the Higaonon from Mintapod because Kapitan and the CADC coordinator never showed them official receipts on how the funds were spent.

The unending vicious gossip and rumors on FVCTLDC and PAF 3 prompted FVCTLDC to initiate a series of dialogues between and among the Higaonon from the different villages. This is a reaction that can be explained by Scott's writing on the infra-politics of subordinate groups: "the circumspect struggle waged by subordinate groups is, like infrared rays, beyond the visible end of the spectrum. That it should be invisible, is part by design; a tactical choice born of a prudent awareness of the balance of power" (Scott 1997: p. 312). During the dialogue held in February 2001, Amay Tangkil announced that he was willing to abdicate his leadership and his being the head claimant of the CADC if the people no longer recognized and respected him. Humbled by the pronouncement, the people who participated during the dialogue said they did not want him to step down. He would remain as the head claimant of the CADC and represent them in all transactions relating to ancestral domains. Meanwhile, they invalidated the position of the CADC President because they realized that having two leaders is confusing. They signed a resolution to this effect to make the agreements more binding. They sent copies of the resolution to the FVCTLDC and the DENR.

After these issues had been settled, the Higaonon held a gathering for celebration to rejoice over their restored social relations. However, the euphoria was short lived. As months passed, tensions and divisions over the same issues persisted in Mintapod, Pulahon and Kiudto. Meanwhile, the CADC coordinator continued to deal only with Kapitan invoking that in the official documents, Kapitan is the authorized representative of the Higaonon. He said that Amay Tangkil was only confused and seemingly only looking for problems.

Frustrations, embarrassments, and hopes on the ADMP

Since they encouraged the Higaonon to apply for a CADC, the FVCTLDC was bound to support their compliance with the government's requirements for an ADMP. To ensure the proficient writing of the ADMP, FVCTLDC contracted the services of a consultant, who unknown to them, also subcontracted the services of two anthropologists to help him document the indigenous knowledge systems and practices of the Higaonon.

During the workshops that the anthropologists conducted, the twenty-four participants from the five villages identified the following policies that should be followed in their ancestral domain. For land: (1) do not sell or exchange the land, (2) do not allow the entry of migrants, (3) respect the sacred places, (4) respect the traditional boundaries, (5) farm your own land, (6) rights over the land cannot be transferred to another person without the knowledge of the *datu*, and (7) transferred lots cannot be retransferred. For the rivers: (1) protect the rivers from poisoning, (2) cutting of trees is prohibited in headwaters and riverbanks, (3) do not disturb the breeding grounds of the fishes, (4) use only traditional fishing methods, and (5) do not throw unsanitary things in the river. For forests: (1) protect the forests from fire, (2) preserve the remaining primary forests, (3) the sacred places that should be respected at all times are Sanggaya, Sakayan (Mintapod) as well Uhot and Pinabaylan (Agtulawon). For values: (1) parents should teach their children Higaonon customs and traditions, (2) children must listen to their elders, (3) nobody is asked to leave, but if it cannot be avoided, the rights over the land must remain with the Higaonon, (4) preserve old things, (5) respect the decision of the *datu* in conflict resolution, (6) respect the person who had not done anything bad, and (7) do not abuse the generosity of another person. For livelihood: (1) continue helping one another, (2) continue giving each other, (3) women's rights, (4) the women should be listened to, and (5) the women should be helped with their work.

Meanwhile, they named the following needs: (1) farm tools and equipment, (2) livestock raising, (3) sewing and weaving for women, (4) fishponds, (5) training on new farming technologies, financial management and entrepreneurship, (6) roads, (7) water system, (8) irrigation canals, (9) rice, corn, and coffee mills, (10) radio communication facilities, (11) installation of electricity, (12) medicines, (13) forest guards, (14) day care centre, (15) adult literacy classes, and (16) community museum.

Although it was supposedly only a part of the ADMP, the draft produced by the anthropologists became the official document that FVCTLDC submitted to the DENR because the consultant did not submit a report. The DENR remarked that the ADMP lacked information. The CADC coordinator wrote FVCTLDC a memorandum identifying the following requirements for an acceptable ADMP: (1) topographic map of the ancestral domain claim, (2) forest or vegetative map, (3) present land use map, (4) proposed land use map, (5) vision, mission, goals and objectives, (6) demographic profile based on secondary data, (7) details on identified development programs to be undertaken (responsible agency/persons; timeframe and budgetary estimates included), (8) tribal political structures and its functions, (9) outline of indigenous knowledge systems and practices according to socioeconomic, political and cultural aspects, and (10) details on climate and topography. The FVCTLDC forwarded the requirements to the consultant and urged him to finish the ADMP. However, after months of follow-up, the consultant said he didn't intend to finish the document because the amount paid to him was below his current professional rate.

After my fieldwork in October 2000, the coordinator of FVCTLDC shared with me their problems on ADMP formulation and asked me if I could help them finish it. Uncomfortably, I shared with the coordinator that I was skeptical about ADMP formulation. Personally, I believe that the ADMP is an instrument designed by the State to monitor control and access the use of natural resources in ancestral domains. In my interpretation, it is one of the symbols that the State does not fully recognize indigenous peoples' rights of ownership over ancestral domains and rights to self-determination. However, I also recognize that the indigenous peoples can also use this instrument to assert their right to make decisions over their ancestral domain with the State and other interested stakeholders. The crucial factor therefore is that the community knows clearly for whom and for what purpose they are preparing the plan.

Meanwhile, the DENR Administrative Order no 34 of 1996 recognizes indigenous peoples' autonomy in preparing and implementing ADMPs. The ADMP does not need DENR approval, only their affirmation. Moreover, with the passage of the Indigenous Peoples' Rights Act (IPRA), all activities relating to ancestral domains are under the authority of the National Commission on Indigenous Peoples (NCIP). Hence, the local DENR had no business in prescribing ADMP requirements and formats. For the purposes of the community, maybe the policies and projects set by the Higaonon were enough.

However, the FVCTLDC coordinator explained that they should be able to come up with an ADMP regardless of government policies. The ADMP is one of their target outputs. The funding allocation for its preparation had been released and liquidated already, and their funding agency was already asking for a copy of the plan. The local governments had been pressuring them for a copy so that the plans could be incorporated in the Barangay and Municipal Development Plans. The DENR also pressured for the finalization of the ADMP, as it was one of the expected outputs of PAF 3. Furthermore, the coordinator explained FVCTLDC would not take a hard line position and contest the DENR CADC coordinator because the project management maintains an unwritten policy that it should not be confrontational. These remarks disturbed me because I got the impression that FVCTLDC is not critical of the structures and practices of domination and control by the State. They blindly produce and reproduce these processes, and in the process, legitimize and reinforce them.

In March 2001, FVCTLDC sought the help of the Non Timber Forest Products – Exchange Program (NTFP-EP), Anthrowatch Philippines, and the Philippine Assistance for Intercultural Dialogue (PAFID) for technical and financial assistance in preparing the ADMP and for converting the CADC into a Certificate of Ancestral Domain Title (CADT). During the initial planning activities facilitated by Anthrowatch and NTFP-EP, the Higaonon identified the following dreams for themselves: (1) the Higaonon will not turn away from following their good customs and traditions; (2) the children and the youth to finish their education and to become good leaders in the future; (3) appropriate livelihood; (4) not to waste or use our forest carelessly; (5) to maintain good relationships; (6) to have assistance that would strengthen the members of our village; and (7) to make our own decisions.

The plans that the Higaonon from CADC areas identified during the planning activities conducted by NTFP-EP and Anthrowatch were consistent with the plans they identified during the workshops facilitated by the anthropologists. What was striking though was that the male elders named logging and marketing the trees as one of their proposed projects. This quite baffled me because in several interviews, many community members said that although logging could help them fulfill some of their material needs; it does not promote their concepts of *madagway hu kinabuhi* (good life).

The night after the plans were drafted, I asked Amay Tangkil, Naymayhonan and the male elders about the inclusion of logging in their ADMP. I was explained that this logging activity is different because it is going to be owned, controlled, and managed by them. Moreover, they do not plan to cut trees from the primary forests. They would only cut the trees that they planted while the logging company employed them. Lastly, this activity would not be permanent and would be discontinued as soon as they had saved enough money for building rice fields big enough to make all the Higaonon from Mintapod food secure.

After the planning activities, I asked the NTFP-EP head and the FVCTLDC coordinator what would happen now that the community made a plan. How would the FVCTLDC and NTFP-EP take the plans articulated by the community? Would they give funds to support it? The head of the NTFP-EP answered that lack of funding should not hinder planning activities. The most important thing is to clarify expectations as well as to be creative. Notwithstanding, the NTFPP-EP promised to support FVCTLDC in sourcing out funds for the implementation of the plan. The FVCTLDC coordinator remarked that the boundary of the project's commitment to support the community needed to be clarified as the community is the primary actor in implementing the plan, and that the community should not depend on FVCTLDC for funding. After the head of the NTFP-EP had left, the coordinator asked Bayubasan if there were community expectations from FVCTLDC for financial support. Bayubasan confirmed this. Amay Tangkil reportedly told him during the workshop sessions that it was embarrassing to list all their plans because its cost might be too high for FVCTLDC to finance.

When we were alone, the coordinator told me that ideally, FVCTLDC should make the community's plans their plans. However, she didn't know how the project management would react to the plan. She confessed that while FVCTLDC should be planning, doing, and implementing things together with the community, since the beginning of project operations, it was the staff and the project management who had been planning for the Higaonon. Until December 2001, the community had been excluded from evaluating the project. Since her assignment as coordinator in 1996, she had always been asking Higaonon representation in the project management. However, she said, some of the management members told her that the Higaonon are not yet prepared for this responsibility. They might be overwhelmed if they learn how much money is involved in their project operations. While she contested these notions, the coordinator said she is just one of the voices in their organization. Hence her questions remained muted. She also lamented that the project management was supportive of

the CADC conversion and the ADMP formulation. Their primary concern was how to meet their funding commitments so that they could prepare their report and secure their remaining funds. Meanwhile, the project management had been talking about phasing out from the community because it felt that eight years of development intervention had been too long. The project did not have a definite phase-out plan yet, but for her, the plan to phase-out became her personal reason for pursuing the CADC conversion and the preparation of the ADMP despite the perceived lack of institutional support. At least, the community would have a legal document to prove their ownership over their ancestral domains and a blueprint for negotiating with government and non-government organizations on the kind of interventions that they would like for their ancestral domains.

In an interview with Bayubasan, he said that he was very happy that their community had an ADMP. Their experiences with various development projects as well as his involvement in the planning activities made him appreciate the value of having a long-term plan for taking care of their ancestral domain. They had to learn how to think and speak in the language that the government and the dominant society use. Now that they already had a plan, outsiders could not just come in and implement development projects. To be more succinct, he said: "*kung dunay manlupig, dunay ikasukol*" (we have something to fight with against those who wish to oppress us). However, before I left, the support of FVCTLDC for the implementation of the ADMP was still unclear. Considering the funding agencies' warnings against diversion of funds earlier, the project finance officer refused to give in to financial requests for livelihood activities which were named in the ADMP but not cited in the FVCTLDC proposal. Some of the staff members were disappointed over this response. They were hoping that FVCTLDC would find some room to maneuver and support the Higaonon self-generated and self-determined projects rather than continue imposing projects that were largely identified and designed by them.

From the represented shall come that which overturns the representation.
Michael Taussig (1987: p. 135)

The FVCTLDC presupposes that the Higaonon are: (1) poor, helpless, hopeless, (2) stagnant hunting and gathering societies who have a poor diet, tolerance to hunger, and poor health and sanitation, (3) isolated, non-cash using, illiterate societies who are unaware of the outside world and vulnerable to the influence of dominant culture (FVCTLDC 1998b: p. 1-3). These descriptions, which were produced through random and a simple look, listen and learn procedure (Van Maanen 1995: p. 2) have been fundamental in how the FVCTLDC ordered, understood, intervened, and justified their interventions (Crush 1995 in Resurreccion 1999: p. 39) among the Higaonon. It was also constitutive of how the project accessed funds from its funding agencies.

The image of the Higaonon as poor in particular is deeply embedded and naturalized (Fairclough 1985 in Wright 1994: p. 22) in the organization's language. It became dominant in the discourse and practice of FVCTLDC because the structures, procedures, and relationships that it institutionalized were designed to promote and maintain this form of knowledge. Incoming staff were enrolled into this form of knowledge during orientation seminars. Meanwhile, textual documents preserved and reinforced this form of knowledge.

Poverty: material and discursive analysis

Following the dominant definitions of poverty, the Higaonon are, without doubt, poor. The living conditions of the Higaonon that I witnessed in my two years of intermittently living with them (Hilario 2004: p. 71-93) bear parallelisms to the stories told in the World Bank's Voices of the Poor studies (Narayan et al. 2000). It is not difficult to explain why the Higaonon are poor. Historical records and ethnographic accounts show that the Higaonon were not isolated and removed from the dominant society as they were uncritically portrayed. Rather, the Higaonon have been integrated in the world market economy since the turn of the nineteenth century. The exploitation, domination, and inequities in the structures and relationships at the local, national, and global economic processes are evidently the factors that make and keep the Higaonon poor (Hilario 2004: p. 93-107). However, do the people who we perceive as poor think and see themselves as poor?

Indigenous but not indigents: Higaonon views on poverty

Concepts of poverty among the Higaonon are highly contestable. Not all the Higaonon agree that they are poor. Lolita, for example, perceives herself as poor because she lacks decent clothes, she is cash-strapped, and is overworked. She wishes for herself some time off from domestic, productive, and reproductive work without having to worry what would happen to her family if she takes a rest. Her sister, Rosalie meanwhile said: "We are poor because we do not have an alternative source of livelihood from which we could earn more cash. Our main source of cash is only rattan gathering. Me, I only get to have my own income if someone buys my *hinabol* and *kamuyot* (traditional abaca weave). This is my only source of income. If nobody buys my products, I can never hold a single peso in my life." Manong Lando said: "We are poor because we have some inadequacies. We have large tracts of land, we have lots of work, and we work very hard. Yet, our farm yields are too low. They are not even enough for our food. We still lack many things. Nothing changes. We need to know some practices that would enable us to earn some money so that we could have something to send our children to school with." Mambangkito, on the other hand said: "We say we are poor because our houses are only made of barks of trees. Unlike the migrants who have plenty of rice and vegetables, our livelihood is only sweet potato."

However, a number of Higaonon do not agree with these views. Bayubasan asserted Higaonon in their area are not *pobre* or *kabus*. He underscored they do not have an indigenous concept of poverty nor local terms that approximate this concept. He does not perceive himself as poor because he has land and *kabtangan* (heirlooms). Moreover, he said: "Our life is *hayahay* because here in the mountains, we can live even without needing money. Our forests can still sustain us. It remains our marketplace." However, he admits that they need to change some of their strategies in order to adapt to the current reality. He underscores the need for education because the Higaonon need to understand how the state administrative bureaucracy operates.

Irene lamented *krisis* when I asked her how she perceives their situation. Irene's family barely has land holdings left. Whenever I passed by Irene's house, the whole family was uncomfortable to entertain me because they had nothing to offer me except cassava. If Irene's situation viewed in the light of poverty standards, there is no doubt that Irene is poor. However, Irene does not consider herself poor. For her, the poor refers to the beggars and the homeless in urban areas because they do not have the dignity of labor and have no place to go home to. At some point of our conversation though, she reconsidered her views and said that the concept of *pobre* and *kabus* are contextual. She said she feels she is *pobre* and *kabus* whenever she is with people who are *sapian* or have plenty of money. Ronnie explained that even if they have some *kakulangon* or inadequacies, they are not poor because they do not beg for their food. Moreover, they still have the capacity to help others who are in need. Ronnie pointed out that poverty has many dimensions. They may be poor because they do not have money and power. However, they are rich with love and respect from their kindred.

Local terms describing every day life

What are the vernacular terms that the Higaonon use to represent their identities that were hidden and silenced by the hegemonic term poor? Instead of *pobre* and *kabus*, the Higaonon use *kauhol* (hunger), *krisis* (crisis), and *malugon* (difficult). *Permanente agkauholan* (permanent hunger), *krisis gayud* (There is really crisis), and *malugon sa kinabuhi day* (our life is difficult) to describe their life conditions.

Kauhol refers to seasonal hunger or lean months. Food during this time is still available but scarce. Usually the *tigkauhol* falls from January to March. One middle-aged woman said when she was little: "*hadi kay gayud kauhulan*" (they never experienced hunger). Most of their parents and grandparents were *udalan*. A person is considered *udalan* when he or she has much in life. Everything is so plenteous that there is no more space to store it. He or she is able to build and fill a *bugawan* (storage for rice) and make a wide *sad-angan* (storage for corn). He or she also has plenty and robust sweet potatoes, has frequent supply of meat from game and hunt, and has plenty of *binuhi* (domesticated pigs and chickens). A community is *udalan* if it is able to offer plenty of rice, chicken, eggs, and meat during rites and rituals. Traditionally, the Higaonon believe that *udal* comes from one's hard work and religious practice of *pang-ibabasuk*, or the cycle of rituals associated with swidden farming. Currently, however, they are confused because despite all the hard work and the strict adherence to their rituals, their harvests have declined. They describe that *tigkauhol* has become unending and persistent. For Bayubasan, *udalan* and development are synonymous. He said that in Cebuano-Visayan, the term that approximates it is *poglambu*. *Malugon* on the other hand, is an adjective that means difficult. It is also used to describe a person, a family, or a community's difficulty whenever food is scarce or when there is an unresolved conflict or outbursts of violence in the area. When used in a phrase, *malugon sa kinabuhi day* it means life is difficult. Bayubasan said *malugon nga kinabuhi* is not equivalent to *pobre* and *kabus*.

Krisis is an appropriation of the word crisis. For the Higaonon, *krisis* is worse than *tigkauhol*. In times of *tigkauhol*, the staple food is only scarce. In times of *krisis*, staple food is almost depleted and people resort to eating famine food. However, *krisis* has a temporal dimension. It is hurdled when the harvest season comes. *Agkapulog* is the Higaonon term for a cash-strapped person. There are conflicting views whether *agkapulog* approximates the *pobre* and *kabus*. While some believe they are synonymous, others believe they are different because *agkapulog* only talks about one's financial status. It does not mention about status of land ownership. The Higaonon said they do not have a term for a landless person since landlessness is just a recent phenomenon. They have a term for a person who has the largest tract of land though, and this is *kayumadon*. A *kayumadon* however, is not considered rich because he or she can be as cash strapped as everyone else. The Higaonon also have the term *pongadahan* to refer to a person who is unable to sustain his or her family, prepare anything during rituals, and fight back when he or she is maltreated, exploited, and abused. A person who is *pongadahan* needs to be helped. However, this is not equivalent to the term *pobre* or *kabus* because the person may still have landholdings and *kabtangan* (heirlooms).

Despite the differences in perceptions about being categorized as poor, all the community members I have talked with agree that life today is difficult. Among the things that they wish for themselves include *malugay ha aldaw mahaw-as koy ho kalisod* (someday we will be freed from difficulties); *mugawas sad sa circle gamay* (get out of the cycle, even a little); *makaluwas sa mga problema nato* (be liberated from our problems), and *hayahay nga kinabuhi* (good life).

Local notions of good life

The Higaonon concepts of good life are frequently expressed in the phrases *hayahay nga kinabuhi* and *madagway nga kinabuhi*. Hayahay is a favorite adjective among the Higaonon. Although borrowed from Cebuano-Visayan language, *hayahay* has become part of their every day conversations. They have an indigenous word for it, *makahugado*, but this word is seldom used. The meanings of *hayahay* varies from easy, comfortable, relieved, contented, auspicious, productive, *naay mahimo* (can do something or have anything to offer whenever there is a feast), to living a problem-free life. *Hayahay nga kinabuhi* is also synonymous to *madagway ha kinabuhi* (good life) and *madagway ho pagtima* (good living).

The Higaonon concepts of good life are not as simple and uncomplicated as making a choice between modernity and tradition. As was indicated in the projects they identified in their ancestral domain plans, it was geared towards mixing and combining the two. The transformations in terms of how the Higaonon currently look at the future indicate that they have already appropriated some of the language of development into their consciousness.

Local understanding of development

When I first sought their understanding of development, I used the word *kalambuan*, the Cebuano-Visayan word used by government and non-government organizations to refer to development. One of the women I interviewed said she first heard the term from the FVCTLDC staff. She described that *kalambuan* is embodied by the project. *Kalambuan*, she said, means to work hard so that *kauhulan* will not prevail upon. *Kalambuan* is the absence of hunger. Another woman said *poglambu* means farm productivity and less burdensome work. Naymayhonan emphasized that *kalambuan* is just a new term. In their language, it is similar to *udalan*. She also understands *poglambu* as absence of hunger. It means having food to eat every day, having something to serve to their guest and visitors, and having enough harvests that they could sell to be able to buy basic commodities. Mambangkito on the other hand said that *poglambu* means their livelihood is okay. They have plenty of money from selling their produce. *Luminambo* means to grow. A place is *malambu* when it already has plenty of houses.

As was already discussed, Amay Tangkil described that he got confused when he first heard the word *kalambuan* because *lambu* in their language means fat. It was only after he was explained that it was like their concept *mig-uswag* that Amay grasped its meaning. *Mig-uswag* is a Binukid word for improvement or getting better. In the Binukid Dictionary prepared by the Linguistic Society of the Philippines Summer Institute of Linguistics, the listing of *uswag*, the root word of *mig-uswag* read: to raise (something or oneself) higher; to increase (in quantity); to improve (in situation), progress (Ottanes and Wrigglesworth 1992: p. 164). Amay Tangkil said that this specifically pertains to their livelihood. *Mig-uswag hu panginabuhi* if life is *udalan*. *Mig-uswag hu kinabuhi* is a state that is *kabuhayon* and *mabuhay* or life promoting. *Mig-uswag hu kinabuhi* if there is no pitiful person in the territory. Amay Tangkil explained that *minuswag hu kinabuhi* can be achieved through hard work, unity, and grace from God and the guidance of spirits, and last but not least, the *datu* living the *batasan* (value) of *bungkatol ha bulawan daw nangka tasa ha lana ha pinaglaw*. According to the translation of *Sentro Para sa Ganap na Pamayanan* (SENTRO), *bungkatol ha bulawan daw nangka tasa ha lana* is difficult to translate but it refers to "all that is good in Higaonon culture, which is to say the customary laws or rules and standards of the Higaonon way of life; it could be considered as the charter or constitution of the Higaonon" (Kahiusahan sa mga Higaonon not dated). Amay Tangkil explained that *bungkatol* is the most

important attribute that a *datu* should have. It is an embodiment of several values that include: (1) *pabatun-batuna* (helping one another), *pahaon-haona* (loving, caring and freeing each other), (3) *palaglagimowa* (sharing with each other), (4) *pagpasayuda* (open communication), and (5) *matareng and huda daugon* (justice and absence of exploitation).

Aside from *mig-uswag*, the Higaonon also have the term *kabulahanan*. This term, Amay Tangkil said, does not only talk of their livelihood but also their state of mind and social relationships. When there is *kabulahanan*, life is *udalan*, *hayahay*, and *malinawon* (abundant, comfortable, and peaceful). However, *kabulahanan* is currently seldom used in every day life. During my fieldwork, the Higaonon were interchangeably using *kalambuan* and *mig-uswag* to refer to *udalan*, *hayahay*, and *mabuhay hu panginabuhi*. This indicates that the Higaonon have interpreted, reinterpreted, and appropriated *kalambuan* into their language. For me, this appropriation of meanings is problematic because the two concepts follow different cultural systems and operate on disparate rules and logic. I surmise that one factor that accounted for the appropriation of the concept of *minuswag* was that when the concept of *kalambuan* was introduced and circulated among the Higaonon, it was devoid of its political meanings. I infer from my conversations with the Higaonon that *kalambuan* was presented as a natural system that is neutral, apolitical, and unproblematic.

Needing help but not helpless

Do the Higaonon in Mintapod need help from outsiders in their pursuit of their concept of *kalambuan* and notions of *madagway hu kinabuhi*? I was not able to ask this question in any of my interviews but the night after the community prepared their ADMP, three women asked me if we could continue discussing their plans. "*Pangalawat kay inyo ku ino-inohon ha lumambo sa pamulahon day ba? Daw sa pagpauswag mga pamulahon dan ba*" (We want to ask from you what you know about how to develop our crops), one of them said. The other woman explained that they want to learn from me how to improve their crop yield so that they will no longer experience hunger.

The use of the term *pangalawat* underscored the earnestness and urgency of their need for help. *Pangalawat*, according to Biernatzki (1973: p. 43), is a basic economic norm in Bukidnon ethics, which literally means asking: "One who was in need of some item could simply request it of a person who had it, and the latter was required to surrender it. One informant said that for example, someone who needed a pig would take a rope, with which to tie the animal, from the house of someone who owned a pig, and the owner would have to give it to him." A person who comes asking is never refused because the practice of *pangalawat* is deeply embedded within the value of *bungkatol ha bulawan nangka tasa ha lana.* Some people undermine the cultural practice of *pangalawat* and said it is commensurate to begging, is prone to abuse, and is an antecedent for creating a cycle of dependency. However, Biernatzki (1973: p. 43) clarified: "When about to return home with the pig, however, the visitor was expected to invite his benefactor to 'visit me', meaning he would expect him to request a reciprocal favor within the succeeding few months... It seems probable, therefore, that the *datu's* needs might also sometimes be filled by requests to his *sakop*, although considerations of prestige might inhibit him from making such requests."

Amay Tangkil and Naymayhonan affirmed that *pangalawat* frowns upon dependency. There are limits to what one may ask. For example, when the same person keeps asking for sweet potato thrice, they usually tell the person to visit them in the swidden so that they could give him or her some stalks for planting. Naymayhonan likewise confirmed that they also engage in *pangalawat* when they are having difficulties. It is *balus-balus lang* (a reciprocal exchange). This discussion made me realize that the Higaonon need outside help in ensuring

their food security because their traditional knowledge systems and practices could no longer address emerging problems. Their use of *pangalawat* gave clues that the kind of help that they want to receive from outsiders is one that is based on reciprocity notwithstanding the incommensurable differences in age, status, class, educational attainment, wealth, and power. Moreover, they do not want the kind of help that is based on the premise that they are helpless beings. Rather, the kind of help that they want is one that is based on the context of empathy, compassion, love, and caring for a person who is temporarily having difficulties.

Practices of development, as experienced by the Higaonon, are contingent on the exercise of power and control in the arena of constructing and representing identities, in language, in defining concepts and practices of good life, in defining management frameworks and strategies, and in identifying distribution of benefits and impacts. At a quick glance, it appears that sustainable development is a multi-vocal and open-ended process to achieve good life for the Higaonon. However, the Higaonon perspectives and practices remain dominated and subjugated by the perspectives and practices of development organizations.

Development as implemented by FVCTLDC centered on capitalist expansion and locking in the participation of the Higaonon into this cultural system. They masked and veiled this political face of development by presenting it as a well-intentioned, apolitical, and unproblematic concept and practice partial to alleviating poverty and quality of life of the Higaonon. Meanwhile, the Higaonon are largely unconscious and unsuspicious about the political intent and the cultural meanings of development. Hence, practices of development became hegemonic.

The process of domination was made easier by the condition that the Higaonon are socially fragmented and divided over various issues. Therefore, they could not readily organize resistance. Internal organization was made more difficult because FVCTLDC practices of producing and reproducing patron-client relationships to solicit support for their projects produced new leaders, new layers of relationships, and new sources and layers of power. Moreover, their practices of dismissing and undermining the Higaonon self-generated and self-determined knowledge of and practices regarding good life have to some extent, weakened the confidence of the Higaonon in their cultural resources, and contributed to making development appear as an imperative.

In some cases, the Higaonon invoked their identity to resist imposition, domination, and control and assert their self-determined concepts and practices of good life. However, the differently positioned community members' concepts of *madagway hu kinabuhi* reflect that the Higaonon have already absorbed the language of *kalambuan*. How they responded to development projects through time indicates that they appropriate and re-appropriate the concepts of *kalambuan* imposed on them by inserting their self-generated meanings of good life. Meanwhile, the persistence of their indigenous concepts and practices suggest that the socially differentiated Higaonon adapt the framework of development as a tactical move to accrue the benefits that it offers.

As the paper further unfolded, I demonstrated that sustainable development projects had contradictory, double-edged, and paradoxical results in improving the livelihoods of the Higaonon. They promoted some of the Higaonon concepts of good life, and sacrificed others. Moreover, development did violence against the Higaonon as FVCTLDC simplified the social reality and homogenized the identity of the Higaonon and capitalized on these to justify and legitimize their interventions. Finally, development hid, silenced, and transformed some of the Higaonon indigenous knowledge and practices on good life. Before the Higaonon were introduced to the concept and practice of *kalambuan*, the Cebuano-Visayan term used by the government and NGOs to refer to development, the Higaonon had concepts of *minuswag*, *makahugado*, and *kabulahanan*. However, *makahugado* and *kabulahanan* are seldom used now. Meanwhile *minuswag* is often interchangeably used with *kalambuan*.

At the risk of belaboring the point, I would like to stress that the interchangeable use of *kalambuan* and *minuswag* is problematic. The two concepts follow different cultural systems and operate on disparate rules and logic. Hence, the Higaonon should be more discerning about using the terms alternatively. *Minuswag* is predicated on helping someone who is in need in the context of *pangalawat*, the Higaonon economic ethic of helping which is

interrelated with the *batasan* of *bungkatol ha bulawan daw nangka tasa ha lana ha pinaglaw*. *Minuswag* is achieved through hard work, unity, and *kaluoy* (pity) from *Magbabaya* and the guidance spirits. It is grounded on the principles of helping one another, loving and caring for each other, sharing with each other, open communication, justice, and absence of oppression. Furthermore, *minuswag* is based on egalitarian values. It is not geared towards capitalist expansion or integrating the person who is experiencing difficulty and dire need into this system. It does not use another person's identity to justify colonization and domination. The exercise of power is intended to relieve and liberate, not dominate and control.

It is also urgent and important for the Higaonon to empower themselves in negotiating with development organizations who continue to be a part of their social reality. Unequal structures and relationships are already given. While there is time to be silent, there is time to speak and act. They need to shape and reshape a Higaonon identity that favors them especially when confronting structures and processes of domination and control of whatever form. The Higaonon also need to raise their political consciousness beyond the village and inter-village levels so that they may be able to see through the different layers of discourse and power that operate in their everyday lives and how they operate to transform their lives. The Higaonon should not "allow the local elites to control the structures of their local governance" (Bennagen 1991: p. 85). They should also enhance their knowledge of the national and global structures and processes that affect their lives.

Meanwhile, development organizations working with the Higaonon need to re-examine their frameworks and practices, and how these affect people whose lives they vow to alleviate from suffering. It also calls them to be sensitive to the Higaonon self-representation of their identity and social reality, to their responses to development programs and projects, and to their self-determined knowledge and practices of good life. It also calls them to be discerning of the specificity and historicity of the different forms and levels of the Higaonon articulation of their identity, concepts of good life, and perspectives on development. Workers in development organizations should also foster critical thinking within and among themselves, and between themselves and the Higaonon and guard themselves against being docile, passive, and subservient to the structures and processes of domination.

In conclusion, I would like to reiterate the view of Bennagen that the mediating role of a value-driven by individual, group, or institution as well as the high level of political consciousness of the community which allows it to draw on its cultural resources (Bennagen 1996 cited in Abaya 1996: p. 2) opens tremendous spaces and opportunities for the Higaonon to liberate themselves from the cycle of difficulties that they are experiencing and achieve their self-determined concept of good life. These conditions will better prepare the Higaonon to confront any structure, relation, or process of internal and external domination. To borrow Bayubasan's words, "*kung dunay manlupig, dunay ikasukol*."

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CHAPTER TWENTY

THE MAMANUA CULTURAL AND PHYSICAL TERRAIN IN TRANSITION IN NORTHEAST MINDANAO

Quivido T. Oregines and Edvilla R. Talaroc

INTRODUCTION

The Mamanua are a little-known ethnic group in the Philippines, but significant from the perspective of their cultural historical background as well as their current struggle for cultural survival. This present paper is an offshoot of an ongoing larger ethnological study conducted jointly by the Institute for Ethnology of the University of Freiburg, Germany, and the Research Institute for Mindanao Culture of Xavier University, Cagayan de Oro City, Philippines.

Our present paper aims to show the interconnectedness and consequences of the various factors that brought about changes in the Mamanua cultural and physical environment as well as their adaptive responses to these modifications.

GENERAL CHARACTERISTICS AND DEMOGRAPHY OF THE MAMANUA

Generally classified as the first inhabitants in this area, the Mamanua distinguish themselves from their neighbors through their physical appearance, language and culture.

The Mamanua are living in the Caraga Region in the Northeastern part of Mindanao around Lake Mainit. The region comprises the four provinces of Agusan del Norte, Agusan del Sur, Surigao del Norte and Surigao del Sur, with the urban centers of Butuan and Surigao. This area covers vast agricultural lands in the lowlands and mountainous areas, which are still extensively covered by forest and are richly endowed with mineral resources.

The Mamanua utilize various resources from the different environments, by foraging and farming, simultaneously or successively. They show certain socioeconomic behaviors characteristic of hunting gathering bands, such as high spatial mobility in their search for available resources.

Traditionally for the Mamanua, Lake Mainit and the adjacent mountain areas have always been the center of their homeland. From this point, the settlement dispersion of the Mamanua extends to the South in the Cordillera of the Diwata Mountains and to the Northeast in some parts to the coast. The forest remains up to the present a main source for the Mamanua livelihood, for foraging and upland farming, in the same way that the lake offers a rich fishing ground. The Mamanua also show a strong orientation to the rivers, noticeable in their selection of settlement locations, their means of livelihood, and their oral tradition.

The once highly mobile people have now become sedentary and only a few of them are still constantly moving within relatively short distances away from their previous settlements. The present Mamanua settlements are now located either at the town centers or along the towns' fringes. Now most of the houses are patterned after those of their Visayan neighbors. In some places, they keep their traditional circular settlement structure with a vacant space in the middle for social and ceremonial functions.

Out a total of 113 identified settlements recorded by the research team, ninety are with population data altogether having a total of around ten thousand persons. This number comprises more than two thousand households.

Indigenous neighbors: Manobo and Surigaonon

The Manobo

While the Lake Mainit originally was purely a Mamanua domain, the mountainous hinterlands were shared with the Agusan Manobo, especially in the area of Mt. Mabaho, referred to by the Mamanua as Mt. Panlabaw.

The Agusanon Manobo are the closest neighbors of the Mamanua. These groups have a historically ambivalent relationship. The Mamanua and the Manobo shared overlapping territories, although maintaining a certain spatial distance from each other in the settlements. In the past, animosity and constant feuding characterized the relationship of the Mamanua with their Manobo neighbors. Despite their many hostile confrontations, however, both groups had formed alliances against the Moro raiders between the sixteenth and eighteenth centuries. Alliances were also built through intermarriage that produced offspring called *kolibug*: the term the Mamanua use to refer to a child of mixed Mamanua-Manobo parentage. Especially among the *kolibug*, bilingualism in both the Mamanua and Manobo languages is common.

A probable result of this alliance was the role of the Manobo as middlemen in the trading transactions of upland and lowland products. The Mamanua had supplied forest products to traders in exchange for materials coming from the Manobo such as iron tools. Their interactions in various spheres led to some sharing of many cultural traits. For example, a Mamanua head of the band now usually assume the role and title of a *datu* (chief); thus adopting the institution from the more structured Manobo sociopolitical system.

Today, it is common to find the Mamanua and the Manobo living together in the settlements and having joint economic, social, educational and political activities. Thus, the once ambivalent relationship has in the recent years evolved into one that exhibits commonality, solidarity and unity in many domains of life.

Particularly in relation to the other ethnolinguistic groups, a common sense of belonging now exists between the Mamanua and the Manobo, who classify themselves under the *tribu* category. From the outsiders' perspective, such as that of the government or the Christian churches, they are often considered as one group. This feeling of oneness has been reinforced by their recent combined efforts to acquire their ancestral lands as a single group. Thus, through the Indigenous Peoples' Rights Act (IPRA) they were jointly granted the Certificate of Ancestral Domain Claim (CADC). In the Santigao-Jabonga area, for example, they now manage a land area of around 2,000 ha.

The Surigaonon

Culture contact between the Mamanua and the coastal and lowland population in Northeastern Mindanao was already established long before the arrival of the Spaniards.
Around Lake Mainit and in the lowland they shared the habitat with the Surigaonon residents, who were also wet rice cultivators. The Surigaonon consider themselves as the *lumad* (natives, indigenous peoples) of Surigao. They are culturally and linguistically related to the people from the Visayas Islands (Scott 1994: p. 161). However, the Mamanua perceive the

Surigaonon as their culturally closest neighbors, next to the Manobo. They also speak the Surigaonon language as their *lingua franca* in Surigao.

The long relationship of the Mamanua with the Surigaonon could be characterized as stable. Their partnership with them was long established through the exchange of both lowland and upland products and their recognition of each other's resource base and property concepts. Thus, while the Mamanua continue to live a highly mobile lifestyle in accordance with their hunting and gathering means of subsistence, the sedentary Surigaonon gradually established legal ownership of the flatlands primarily through the homestead where they introduced wet-rice cultivation and coconut plantation. This stable relationship has been extended up to the present times through their participation in the lowland market transactions wherein the Mamanua remain to be the dependable suppliers of wood and non-wood forest products. The Mamanua are also often providing labor for farming and household chores of the Surigaonon.

Their economic relationship brought concomitant social relations such as patronage. Many Surigaonon function as baptismal sponsors of the Mamanua as well as the latter's source of assistance for different emergency situations. The few cases of intermarriage generally involved Mamanua women and Surigaonon men.

Chinese traders and early nineteenth century missionaries

Although little is known about the Mamanua, the outside influences of Northeastern Mindanao in history are relatively well documented in old records, providing some useful information about this ethnic group.

Chinese sources from the eleventh century confirm intensive trade activities with Butuan. Boats, the so-called *balanghais* dated from fourth (320 AD) to the thirteenth century (1250 AD), affirm the importance of Butuan as trading place. The Mamanua may have already delivered some of the forest products that were among the exported commodities demanded by the Chinese market.

Sources from the Spanish period report about the Mamanua fleeing to the mountains for refuge because of Moro raids in Northeastern Mindanao from the sixteenth to the eighteenth century. The missionaries in the nineteenth century not only baptized the Mamanua but also (re-)settled them along the lake.

Migrants and settlers

From the 1900s onwards, the Mamanua were slowly pushed back to the mountains due to the influx of Visayan migrants who gradually occupied (either through legitimate or deceitful means) the lowlands along the shore. They continuously arrived in Northeastern Mindanao from the Visayas Islands in small numbers and settled in the Mamanua area. The Mamanua generally classify them under the generic Visayan category although they are aware of the different cultural practices of these diverse ethnolinguistic groups.

Towards the middle and the second half of the twentieth century, due to population pressure, a larger number of Visayan migrants in search of job opportunities or fertile lands came to settle in Northeastern Mindanao. In the beginning, the Mamanua accommodated the Visayan migrants by moving further to the hinterlands and by providing labor in clearing the forested areas. Through friendly persuasion or outright deception, some Visayan gradually acquired ownership of the lands of the Mamanua, thus eventually earning the label of land grabbers. Upon the arrival of the Visayan migrants, the Mamanua men have become constant

source of help for the Visayans. If in the past the Mamanua were hired as assistants only to the Visayan carpenters, now they have become skilled enough to do basic construction activities on their own.

In contrast to the Visayan migrants who came with no or few relatives and therefore had to earn their living mainly for themselves, the Mamanua are guided by the principle of sharing in accordance with their collectivistic orientation. In addition, unlike the Visayans who generally make long-term plans in relation to their complex technology, the Mamanua prefer immediacy in the satisfaction of their basic needs.

OTHER CHANGE FACTORS

Mining and logging

Mines (which started operation in the 1930s) and logging concessions (in the 1940s) also caused further displacement. Many of these companies are now gone but the havoc on the physical environment and on the lives of the Mamanua remained. Moreover, the destruction caused by logging concessionaires resulted in soil erosion and deprived the people of their livelihood. The logged-over areas attracted the land-seeking lowland farmers who eventually pushed the Mamanua away from their ancestral lands.

Despite the denudation of the forest, the Mamanua continue to hunt using traditional hunting instruments and sell the game to their Visayan neighbors. In the middle of the twentieth century, Visayan furniture makers started purchasing rattan poles from the Mamanua. However, Visayan businessmen almost always take advantage of the Mamanua by giving low prices or partial payments in cash or in kind. Today, foreign companies have their buying stations and furniture factories in the Mamanua area. However, rattan has become scarce.

Government and non-government programs and services

Along with the resettlement program of the Philippine government, such as the homestead program that brought landless people to selected areas in Mindanao, individual families also came on their own to settle in Mindanao. Their intrusion brought about tremendous change in many aspects of the Mamanua way of life.

In the sociopolitical sphere, persons representing the local and national governments, non-governmental organizations (NGOs) or the local Christian churches encouraged the Mamanua to become sedentary by highlighting the benefits of education, hygiene and sanitation. The Mamanua are now involved in governance at the barangay level. A few individuals now occupy important positions in the local council or as tribal representative in the local, regional and national levels. Similarly, few Mamanua individuals function as local church leaders particularly among the Pentecostal and Baptist churches and thus exercise some degree of influence among their constituents.

Republic Act 8371 created the National Commission on Indigenous Peoples (NCIP) to administer the affairs of indigenous peoples. In our research area, several NCIP service centers have direct contact and are accessible to the Mamanua and Manobo. This agency provides livelihood programs, occasional medical and legal services, conducts weddings and trainings, recognizes local leaders, facilitates community organizing and conflict resolution,

and stimulates involvement in cultural presentations during big events such as town or city fiestas. The NCIP also assists the tribes in applying for the CADC.

War and insurgency

During the World War II, the Mamanua fled to the mountains to escape from the Japanese invaders. When the war was over, however, many Visayan had claimed the deserted lowland previously occupied by the Mamanua.

In the 1970s during the Martial Law regime, peace and order conditions in the mountains were unstable. Mamanua areas were targets of military bombings and operations, thus driving them out of this region. This situation also resulted in massive evacuation of mountain dwellers to the settlements within the sight of the military and with the military's advice not to return to the danger zones. As a result many Mamanua came down to the lowlands also motivated by the depletion of the forest resources and the desire to educate their children.

Up to the present, the Mamanua area in the mountains of the Caraga Region is widely known as rebel grounds. For some of them, this means being actively involved in the insurgents' activities or operations. However, a handful of Mamanua had also joined the military, particularly the Civilian Armed Forces Government Unit (CAFGU).

The problem of insurgency contributed to the displacement of the Mamanua. Their new settlements are generally located far from the main sources of livelihood. Thus, some people resort to non-traditional means of securing a living such as through begging in the urban centers.

CONCLUSION

Contacts with several groups and the technology these groups brought with them contributed to the alterations of the Mamanua physical environment and way of life. The influx of Visayan settlers and the establishment of infrastructure by the government and private entities in the lowland triggered a rapid modernization process. The changing economic patterns of the Mamanua draw them even much closer to their non-Mamanua neighbors: working as partners with Manobo in managing their ancestral domain, as farm and household laborers for the Surigaonon, and also as hired farm, domestic, mining and logging workers for the Visayan.

Through the years, continuous interactions with these neighbors not only caused significant changes in the Mamanua environment but also had impact on the Mamanua evolving perception of their own identity and sense of group consciousness. Today, the Mamanua are rapidly being incorporated into mainstream Visayan culture, but still retain some indigenous traits. Now sedentary, they creatively interact with their non-Mamanua neighbors, adapting strategies by cementing economic, social and political relationships and utilizing their network of individuals and their linkages to various institutions and stakeholders. They have no choice but to participate in the cash economy: they are involved in the market as suppliers of non-timber forest products to entrepreneurs.

With growing sense of pride of their Mamanua identity and empowered by higher education, some individuals gradually stand out now as articulate representatives of their ethnic group. These individuals stand to assert and exercise their rights to self-determination, ancestral domains, and government services. The Mamanua meet with great flexibility the challenges of their constantly transforming cultural and natural terrain, demonstrating their survival ability.

CHAPTER TWENTY-ONE

SACRED RESOURCES, SACRED FOREST: THEIR RELEVANCE FOR NATURAL RESOURCE MANAGEMENT TODAY AMONG THE BATAK OF THE PHILIPPINES

James F. Eder

INTRODUCTION

Many participants in the current global debate about how best to conserve the world's remaining tropical forests find compelling the notion that indigenous peoples, because of their long association with and dependence upon the land, have evolved ways to utilize forest resources on a sustainable basis and to otherwise live in harmony with their environment. Indeed, conservationists and advocates for indigenous rights alike now find common ground in the position that indigenous peoples must be part of the solution to the proper management of natural resources, and programs that in fact involve indigenous peoples in this fashion today abound.

While the involvement of indigenous peoples in the conservation of biodiversity and other aspects of natural resource management today has wide popular appeal, we in fact know relatively little about native conservation methods and their past or present efficacy in promoting either preservation or sustainable utilization of natural resources over the longer term (Hames 1991; West and Brechin 1991). Still less is known, furthermore, about how well the theory and practice of alleged indigenous conservationists survives the introduction of new technologies for environmental exploitation or expanded market participation (Thomas 1994). The issue, in short, is whether indigenous people are, or at least once were, somehow ecologically wise and, if so, how their wisdom can be utilized in the design and implementation of effective, community-based natural resource management programs; programs that, in today's world, must increasingly take account of the often-dominating presence of non-indigenous peoples and the resulting competition for the resources in question (McNeely 1995; McNeely and Pitts 1985; Redford and Monsour 1996).

This paper addresses some aspects of this issue in the context of one particular indigenous people, the Batak of Palawan Island in the Philippines, currently participants in an ambitious and long-term project, co-sponsored by Haribon Palawan and the World Conservation Union (IUCN): the sustainable utilization of non-timber forest products project. Haribon Palawan is a local environmentalist non-governmental organization (NGO) based in Puerto Princesa City, the capital of Palawan Province, that works with indigenous peoples to develop more sustainable and more productive livelihoods. The focus of Haribon Palawan's joint project with IUCN is the collection and sale of three commercially valuable forest products presently threatened by over-exploitation: (1) rattan, (2) wild honey, and (3) manila copal, a resin produced by the almaciga tree (*Agathis damarra*).

The Batak are a physically and culturally distinct population of several hundred individuals inhabiting the mountains and river valleys of central Palawan Island. Traditionally a hunting and gathering people, they once lived in small, mobile family groups. The Batak evolved an elaborate tropical forest foraging adaptation, subsisting on a wide variety of forest, riverine, and coastal foods, and acquiring manufactured goods and other outside needs through the collection and exchange of non-timber forest products, principally copal, rattan, and honey, with outside trading peoples.

The Batak today continue to pursue many of their distinctive forest food collecting and resource utilization practices, but they do so in greatly changed circumstances. No longer are the Batak relatively isolated from surrounding peoples; everywhere are the homesteads and communities of lowland Filipino farmers who have migrated to Palawan's uplands in search of land and a better way of life. Incorporation with wider Philippine society, and more intensive contact with lowland Filipinos, has reworked all aspects of Batak adaptation (Eder 1987). Nowhere have the resulting changes been more striking than in the Batak economy, where upland agriculture and wage labor for lowland migrants have joined hunting and gathering, and collection and sale of forest products as mainstays of Batak livelihood. And as all of these changes have occurred, the Batak environment has changed apace; and is in need of attention.

Indeed, the Palawan region in general, and Palawan Island in particular, have become a national environmentalist battleground involving efforts by an array of local, national, and international groups aiming to conserve the region's diverse flora and fauna (Arquiza 1996). Palawan's prehistoric land bridge connections to Borneo, and its relative geographic separation from the rest of the Philippine archipelago, created a unique set of evolutionary conditions under which the region's plant and animal life evolved in relative isolation (Sandalo 1996). Among the many of Palawan's rare and endangered fauna species found in Batak territory, those of particular interest to conservationists include the Palawan Peacock (*Polypectron emphanum*), the Palawan Pangolin (*Paramantis culionensis*), the Palawan Bear-cat (*Arotiootis whitei*), the Palawan Porcupine (*Thecarus pumilusi*), the Palawan Stink-badger (*Suillotaxus marches*), the Flying Squirrel (*Hypoletes* spp.), and the Blue-naped parrot (*Tanygnathus lucuinensis*).

While the Batak today are not a pristine people living in harmony with their environment, neither are they totally deculturated; indeed, we have much to learn from them on the subject of natural resource management. And if the Batak today need outside assistance to construct a more remunerative and more sustainable subsistence adaptation, this is a task in which the Batak themselves (and their knowledge, beliefs, and aspirations regarding the environment) must be involved as well, if this end is to be achieved.

The research findings reported here are based primarily on a series of field visits, between March and August 1995, to the Batak communities of Calabayog, on the Tanabag River, and Mangapin, on the Langogan River. These field visits were conducted in the context of my own, part-time participation in the Haribon Palawan/IUCN Batak project, which in turn centered on an agreement that I would prepare for these agencies a brief monograph, recording both for the Batak themselves and for those who would work with them, what Batak knowledge, beliefs and practice regarding the natural environment in fact are (Eder 1997).

This paper was also based on interviews with Haribon Palawan and IUCN project staff, and on a variety of secondary sources concerning the Batak and the issues in question. The present paper focuses on beliefs concerning sacred places, and prospects for biodiversity conservation. It also inevitably reflects some of my own premises and biases about these topics. First, traditional societies are indeed storehouses of information concerning the environment, information that could well contribute to the success of any sustainable development program (Buege 1996). Second, indigenous peoples do not passively blend with their environment; they, too, shape it through their ways of life. And third, while most or perhaps even all indigenous peoples profess a reverence or respect for the environment, this does not necessarily translate into actions that result in sustainable resource management; whether the latter occurs is something to be determined, not assumed (Thomas 1994: p. 16-17).

THE BATAK PLACE IN NATURE

Peoples like the Batak have been called equilibrium or ecosystem people (Bennett 1976: p. 123-155; Dasmann 1991) because they view themselves, and to a degree actually live, as part of an ecosystem, rather than as simply users or exploiters of nature (Bennagen 1993). The Batak believe they live in a world inhabited by a variety of nature spirits and supernatural anthropomorphic beings, and they rely on mediums or shamans to mediate their relationships with these beings. Most nature spirits fall into two broad classes: malevolent *panya'en* or capricious, but benevolently inclined, *diwata*. Visible only to shamans, these spirits inhabit specific trees, bamboo thickets, rocks, caves, and streams; sacred places, in effect, but also the very sorts of places in the natural environment also utilized or visited by the Batak. *Panya'en* and *diwata* are human-like in their lives, actions, and desires. They affect Batak welfare in a variety of ways, but most notably by causing illness when humans provoke them by unwittingly violating their territory, destroying their dwellings, or injuring their families (Shimizu 1983:p. 134).

Thus Batak notions about sacred places are bound up with notions about the *panya'en* and *diwata* believed to inhabit them. These supernatural beings figure prominently in several domains of Batak adaptation, and particularly in curing ceremonies. But from the standpoint of the Batak view of nature and ecosystemic relationships, the key point is that all the various forest and riverine food resources utilized by the Batak belong to the spirits, principally the *panya'en*, and not to humans. (Batak usually employ the term *epet*, here glossed as belonging to, to characterize the relationship between *panya'en* and forest animals. The meaning of *epet* is closer to the notions that the spirits are the caretakers of, or are responsible for, these resources, than to the notion of actual ownership in the western legal sense.)

The relationship between *panya'en* and forest animals is in any case a jealous, protective one; and one that must be acknowledged and respected by humans. There is hence at least potential danger in any human utilization of forest resources. And there is very real danger in approaching or entering the specific sacred places known to be inhabited by particular spirits, although even these latter places are not so much off limits completely as they are places best avoided: a particular rock overhang on a hillside, for example, or a particular stretch of a stream. But as the spirits also recognize that humans have legitimate subsistence needs, everyday patterns of resource utilization that are consistent with meeting only those needs (fishing, looking for honey) do not usually require any specific ritual measures. Rather, there is a generalized, implicit recognition that while forest resources continue to belong to the spirits, the Batak have, since ancestral times, had permission to utilize them; for the spirits, it is said, also pity the Batak, in their struggle to survive.

Where the real risk of danger lies is in wasteful or excessive use of forest resources, intended or not, and even in displays of disrespect toward such resources. Merely laughing at animals, for example, may antagonize spirits, because it implies *dagwa'y galang* (no respect). Most dangerous, however, are those cases where forest resources are collected in large quantities or are collected and not fully utilized. Thus specific ritual actions to propitiate the spirits are called for prior to group fish stunning or group pig hunting episodes, against the possibility that these endeavors may result in large takes. And caution is always called for during pig hunting and honey collecting, less a wounded pig elude capture and wander away to die uneaten in the forest, or part of the hive fall to the ground and be left behind, wasted.

All Batak can cite examples of the sort of retribution *panya'en* may exact on humans who waste or abuse forest animals or other natural resources. One such case involved the Batak Padaka, the grandfather of a current Mangapin resident, and a Muslim man named Amad. It occurred on the Langogan River during the late 1950s or early 1960s, when the

Batak settlement there was located at Bulobulo, downstream from its present location. Padaka and Amad had traveled together to collect copal at Mayboyengaw, a place then-seldom visited about a day's walk upriver. Through use of an explosive device, they obtained about one hundred fifty large fish from the river, far more than they needed or expected. Angered by this display of greed, a *panya'en* caused both men to become feverish and to die soon.

Another case occurred at Babuyan during the early 1960s and involved the Batak Padang, uncle of a current Calabayog resident. He killed a large pig while hunting but left it to spoil in the forest, being too lazy to carry such a heavy animal back to camp. About a year later, he was attacked and killed by a pig in the forest; a pig that was actually the *panya'en* Ageng who had momentarily taken the animal's form.

Some, more recent cases of retribution of this sort have involved ecological misbehavior by lowland migrants, for all humans, not just Batak, are subject to the *panya'en*. At Langogan, for example, one lowlander unwittingly angered a *panya'en* while collecting rattan; he sickened and died two days later. Another lowlander died several years ago in the course of making his *kaingin*. It looked like an accident (he became caught up in some vines, causing the tree he was cutting to fall on him) but it was in fact, it was said, the work of a *panya'en* whose house the unfortunate farmer had disturbed.

In all such cases, retribution by a *panya'en* is very personal: it is directed specifically at the offending individual and not at humans in general (although a partial exception concerns the *panya'en* Ungaw who controls the movements of honey bees; see below). Neither is it up to other Batak to sanction or punish those who misbehave ecologically; this is a matter for the spirits to deal with as they see fit (although children, of course, need to be properly instructed in these matters). There is also, finally, considerable vagueness about what constitutes a (legitimate) need in the eyes of the spirits, and hence about the actual threshold of a particular resource's exploitation, beyond which a Batak risks some sort of punishment from an angered *panya'en*. I return to the important topic of what constitutes legitimate human needs below.

Here I turn to two particular and important subsistence resources, honey and wild pigs, to illustrate how Batak ritual belief is in turn bound up with their substantial ecological knowledge in the traditional resource-use routines of everyday life (see Eder 1997).

Honey

The Batak distinguish between two bee species: *potiokan* and *nigoan*. These bees differ in appearance and in their hive-making habits, and they produce two different kinds of honey during successive but partially overlapping seasons. There is considerable geographical and year-to-year variation in the length of the honey season and the amount of honey available for collection, reflecting (among other things) corresponding variation in climatic and floristic factors. But the *potiokan* season typically runs from January to about the end of May, and the *nigoan* season runs from February or March through August. Most Batak view the two sorts of honey as making approximately equal contributions to subsistence and cash incomes; *nigoan* hives characteristically yield less honey, but they are more frequently encountered and collected.

Essential to successful collection of wild honey is a variety of different kinds of knowledge about bees and their behavior. Bees may locate their hives virtually anywhere, but considerable skill is needed to spot them. In the case of *potiokan*, hives are located in the forest upper story, hanging from lateral branches near the tree tops. *Nigoan*, in contrast, characteristically locate their hives in holes in logs or tree stumps.

Much of what the Batak know about the habits of bees concerns the various flowering trees that bees characteristically visit during the course of the honey season. At least nineteen named kinds of flowering forest trees are said to serve, in turn, as important pollen and nectar sources (see Eder 1997: p. 43).

The Batak also know a considerable amount about the structure and function of the hives themselves, knowledge that is necessary to determine whether a hive is in fact ready for honey collection. Once a Batak has spotted a *potiokan* hive, he may return to it several times to monitor the growth of the *tado* (the honey-bearing section) and to decide if it has reached *keyanene'an*, the point at which pollen and honey are present in equal quantities (for further details about honey collection see Eder 1997: p. 14-16).

All of the practical activity entailed by honey collection occurs within, and is influenced by, a culturally-constructed set of beliefs about how both humans and bees relate to the wider and more powerful parallel world of nature spirits. If the Batak know that bees move around during the course of the honey season according to the flowering schedules of specific kinds of trees, they also know that bee movements are ultimately controlled by the *panya'en* Ungaw, the *apo* (grandfather) of the bees. Ungaw is a caretaker spirit of the sort discussed earlier; he guards his wards jealously and punishes any Batak abuse of bees by sending the bees elsewhere or calling them home, thereby bringing an end to the honey supply.

But Ungaw also granted the Batak permission to collect honey, and he taught them the distinctive *lambay kat taro* ritual needed to restore ritual equilibrium should the balance between humans and bees be disturbed. Should a honey collector accidentally drop a portion of the hive on the ground, thereby wasting its contents, Ungaw may anger to the point that the offending individual is unable to locate further hives or even becomes ill. Should an entire hive accidentally be dropped to the ground and ruined, Ungaw may become angrier still. The hapless collector may sicken and die, having been eaten by Ungaw himself, as a sort of replacement for the wasted hive. Or, alternatively, Ungaw will send the bees away and the entire local group will find itself unable to collect any honey at all. In this latter case, the *lambay kat taro*, or honey ritual, is called for. This interesting ceremonial cycle requires a fifteen day period of collective good behavior, during which the honey search is suspended entirely and all local group members are enjoined to avoid interpersonal conflicts and to only think cleanly about their neighbors. Following a culminating ritual at the close of the fifteen day period, practical knowledge again takes precedence and the search for honey begins anew.

Wild pig

Wild pig meat is arguably the Batak's favorite food. Hunting for pigs, either with the spear and hunting dogs or from blinds with a gun or a bow and arrow (the last is a distinctively Negrito weapon throughout Southeast Asia) occupies much of the men's time and is a subject of much discussion. Wild pigs can be found throughout the year, and Batak efforts to hunt them wax and wane more with need and the competing demands of other subsistence activities than with any factors in the wild pig population. Batak do not appear as knowledgeable about the breeding habits of pigs as about those of bees, apparently because such knowledge does not loom as large in the hunt. The Batak do know that a mother pig delivers and raises her litter in a *dogmon*, a nest or den made in any sheltered and secure location, but only occasionally are *dogmon* encountered while still occupied. Batak also say that wild pigs are prone to gather in large *campo*, or camps, where they may sometimes number in the dozens and remain for months on end, but it was not clear if this was

speculation or based on observation (I interviewed no one who had actually seen such a *campo*).

In any case, considerable environmental knowledge is necessary to know exactly where to hunt for wild pig. The basic issue concerns the feeding habits of pigs and, in particular, where they are most likely to be feeding at any particular time during the year. While wild pigs eat a wide variety of foods, the primary predictable food source is over-ripe fruit that has fallen to the forest floor at a stage in a tree's reproductive cycle that the Batak term *simbolan*. It is near the trees that bear fruit favored by pigs, at the time of that tree's *simbolan*, that the Batak concentrate their hunting efforts.

The Batak identify twenty-one named kinds of fruit-bearing trees that attract wild pigs in this fashion, and at least one such tree is fruiting during every month of the year (Eder 1997: p. 44). Such information is known to every adult Batak, and the order in which the various trees fruit serves as a kind of annual calendar, akin to the calendar that agricultural peoples in Southeast Asia construct around the annual cycle of rice cultivation.

As with honey collection, pig hunting occurs in the context of a set of cultural beliefs about the relationships between humans, animals, and nature spirits. Wild pigs, too, have a specific caretaker spirit (the only other animal besides bees to have such a specific, named caretaker). Generally referred to as *diwata kat baboy* or *apo kat baboy*, his specific name varies with locale: at Mangapin he is called Biolioganen, and at Calabayog he is called Kiodalan. But as with the *panya'en* that controls the bees, the *diwata* that looks after the pigs is quick to punish any ecological misbehavior by erring hunters. In particular, should a hunter kill a pig and fail to use its meat, he will find it difficult or impossible to find additional pigs in the future, until appropriate ritual action is taken.

The most common such ritual action, and one likely to be attempted whenever an unsuccessful hunter is down on his luck or suspects he has fallen in the bad graces of the *diwata kat baboy*, is the *sagda*, or ritual offering. A typical *sagda* for this purpose today consists of a small quantity each of tobacco and alcohol left in the forest, followed by three days of abstinence from hunting, after which the hunter begins his hunt anew. Should most or all members of a local group encounter difficulty finding and taking pigs, Batak may resort to a more ambitious, group ritual action known as *tuarek kat diwata*, a ceremony centered around the trance-inducing Batak dance form known as *tarek* and appealing for relief to the *apo* of the pigs much as the *lambay kat taro* appeals to the *apo* of the bees. Again, the ultimate purpose is to restore the natural equilibrium between humans and other animals.

IMPLICATIONS OF THE SACRED FOR COMMUNITY-BASED SUSTAINABLE NATURAL RESOURCE MANAGEMENT

A substantial part of my research on behalf of the Haribon/IUCN project concerned neither Batak notions about their place in nature nor their empirical knowledge about natural phenomena but, more simply, contemporary patterns of Batak resource utilization (i.e. practice as opposed to belief or knowledge). In particular, I compared and contrasted Batak resource use practices with the more destructive (but highly influential) practices of lowland migrants, in the areas of shifting cultivation, copal collection, rattan collection, and honey collection. This aspect of my research provided a strategic opportunity to gauge the amount of influence that Batak beliefs about the sacred have, in practice, on their everyday economic behavior. I found that despite certain ambiguities about past Batak practice, and certain convergences between Batak and immigrant lowlanders in present practice, the weight of the evidence pointed clearly to this conclusion: the Batak approach to making a living in their environment is overall less destructive for natural resources and ecological integrity than is that of lowland migrants, and this difference indeed owes, in part, to their more respectful and judicious approach to the forest. And yet this is not a brief for simply letting the Batak manage their own resources for themselves. For one thing, Batak material expectations, and hence their own pressure on their resources, continue to grow, and it is unrealistic to expect that this trend can be arrested or reversed. For another, extensive territorial penetration, intermarriage, and other kinds of social interactions with migrant lowlanders, and the additional pressures on resources that these lowlanders bring, are immutable facts of Batak life.

In short, any realistic approach to developing more sustainable natural resource management practices among the Batak must simultaneously involve lowland migrants and take account both of the powerful cultural and economic influences that lowlanders exert on indigenous peoples in the Philippines. I begin by examining, in turn, the weaknesses and strengths that both Batak and lowland migrants bring to the situation, both in terms of what they say and what they do. Then I discuss how some sort of synthesis might be arrived at, that would build on each group's respective strengths, in the interest of designing and implementing an effective community-based management regime.

Surely the traditional Batak system of resource use, and its associated beliefs about sacred places and sacred resources, is an appropriate place to begin this effort. But efforts to build upon this system must recognize that it entails some serious limitations. First, it does not explicitly address possible future resource depletion, either by Batak or by others. At the level of ideology, the *panya'en* (those apparently ecologically well-intentioned caretaker spirits) are not really concerned about the Batak and their future, they are concerned about their own property. True, at the level of behavior, the Batak use resources judiciously, but this is because (or at least they say it is because) they fear the *panya'en*, not because they worry about the future. Certainly, when asked about it, most Batak do not seem to view future resource availability as a problem. Indeed, at least some (perhaps most) seem to view many resources as inexhaustible. Honey, rattan, and copal were all specifically cited by various Batak as resources that could not be used up, whatever the extent of utilization by Batak or by others, because they regenerated naturally (see below, however).

Second, the traditional Batak system of resource utilization does not include a basis for excluding outsiders, either physically or symbolically. The issue is one of legitimate needs, acceptable to the *panya'en*. Lowland migrants, after all, have needs too, and while the Batak recognize that the sort of competition for resources from such migrants they have experienced in recent decades is unprecedented, they continue to maintain that any migrant ecological misbehavior is a matter for the *panya'en* to address.

Finally, there are no obvious social sanctions for ecological misbehavior, whether by lowland migrants or the Batak themselves. Again, these are matters that the spirits will take care of; men or women who abuse resources are not subject to ostracism or some other form of punishment by the group itself. In this regard, the Batak system of resource management traditionally lacked an important element of more developed common property management regimes, based as it was on low-impact exploitation by a limited population.

And yet the Batak also bring some significant strengths to the situation. They have, after all, not significantly degraded their environment despite generations of habitation; moreover, they are quite aware of this fact and justifiably proud of it. In contrast, lowland settlement of Palawan is everywhere associated with deforestation (for data on rates of population growth and forest clearance on Palawan in the twentieth century see Eder and Fernandez 1996: p. 8-13). In particular, living in or near the forest is important to the Batak not only for subsistence reasons but as a valued part of identity and well-being. Upon returning from an NGO sponsored conference in Baguio City, in the mountainous northern Philippines, the president of the Batak Federation spoke eloquently about how much he missed the forests of Palawan and about how the pine-tree covered slopes around the city were no substitute for the tropical forest at his doorstep in Calabayog. Other Batak, too, spoke of close emotional associations with the forest.

Second, the Batak bring to any community-based natural resource management program their profound knowledge about their environment. Much of this knowledge is embedded in their low-impact, multi-dimensional subsistence strategy; itself a form of ecological wisdom. The Batak are reluctant to put all their eggs in the basket of one single subsistence activity. They believe that exploiting lightly a wide variety of different forest resources minimizes the ecological impacts of human exploitation.

Third and somewhat paradoxically, in view of some earlier-noted Batak weaknesses, Batak do, in some contexts, clearly recognize that natural resource depletion is a potential problem and that such depletion (e.g. of almaciga trees, or of stands of rattan) has in fact already occurred. In these same contexts they also recognize that increased exploitative pressures, embodied in growing numbers of lowland migrants to the uplands, are primarily to blame; and need attention by someone.

Turning to lowland migrants, it is important not to read too much of a general nature about their environmental values out of their ecological behavior during what is, for them, a relatively unique encounter with frontier resource extraction. Further, such migrants do not set out to be rapacious shifting cultivators or to otherwise destroy the frontier environment. The vast majority are peaceful, law-abiding folk, whose primary concern is securing a better living for their families. And yet it is clearly a significant limitation in what lowland migrants bring to the situation that many do indeed see frontier resources as something that they want their share of, or perhaps even more than their share of, on the grounds that if they don't get it, someone else will. Many migrants, too, based on their experience elsewhere in the Philippines, view the forest as something that will soon disappear anyway, which makes a get-it-while-you-can attitude toward forest resources all the more plausible and easy to rationalize.

However, there are also strengths, or potential strengths, in lowland migrant attitudes; they too bring a longer view and a commitment to a kind of sustainability. The longer view of migrant farmers is characteristically focused on their immediate family and the (future) good of their children. Indeed, folk expressions about the latter are widely heard throughout the lowland Philippines, typically to explain economic striving by the parents. One such widely-heard expression is to the effect that: "we're doing this so our children won't have to go through what we went through." The activity in question can include all sorts of efforts at economic betterment, including cutting down the forest. As in other rural areas throughout the

world where environments have sustained significant damage due to abuse, especially over the last one or two decades, project area residents have failed to equate the sustainable management of local ecosystems with sustained availability of the products that these ecosystems produce, and upon whose sustained availability their incomes and livelihoods significantly depend.

Associated with this characteristic longer view of lowland migrants is a distinctive lowlander view of sustainability. Whereas the Batak view the forest as something to be preserved and hence exploited judiciously, lowland migrants view the forest as something to be removed, to make way for upland farming systems. For at least some migrants, such systems need to be developed and managed in a sustainable fashion and some migrant lowland farmers are taking impressive steps in this direction (Eder 1996; Abdoellah 1989; Cernea 1992; Mittelman et al. 1993). While at one level, migrants and Batak have quite different notions of what sort of future they desire, at another level they appear to share an important common interest in making that future a sustainable one.

Despite these various strengths on both sides, however, and even though both Batak and lowland migrants do have a stake in conserving the forest and forest resources, the fact remains that individuals on both sides currently engage in non-sustainable practices, in large part because the heavy influx of lowland migrants has significantly altered prior resource management and utilization practices in an area that was once the nearly-exclusive domain of indigenous peoples. Further, an entrenched national concession system for timber and non-timber forest products has facilitated the expropriation of profits from forest extraction by outside entrepreneurs, and has increasingly pressured local, limited resource bases in ways that have effectively contravened any prior rationale for sustainable management by local stakeholders.

Restoring authority to local people to control local resource use is hence a vital first step toward more sustainable resource management within the project area. There are several formidable difficulties here that must be overcome, including legitimatization of the rights of local communities to own and manage their lands and resources, mediation of competing stakeholder interests, forging public acceptance of any resulting sustainable management agreements and, ultimately, institutionalization of the ability to monitor and enforce compliance with these agreements.

But again, already in place are the earlier-discussed bases among local stakeholders on which a local system of sustainable resource management could be revived. On the Batak side, these include (1) traditional environmental knowledge, (2) a low-impact, mixed subsistence strategy, (3) economic ties to, and social acceptance of, lowland migrants, and (4) considerable enthusiasm for the wider goal of reclaiming authority over local resources. On the lowland migrant side, these include (1) the desire to settle permanently, (2) an interest in agroforestry, and (3) the capacity for organization and cooperation. Also on the plus side of the equation is the existence of traditional markets for forest products, and the salutary presence of the outside facilitating agencies, Haribon Palawan and the World Conservation Union, that bring additional strengths to the situation. These include the ability to assist local people in identifying instances of locally unsustainable resource use and undertaking mitigation measures when called for, as well as the ability to present alternative sustainable management options that appear to coincide with local needs and conditions, and so on. Indeed, the continuing assistance of these agencies in developing local capacities, catalyzing local resolve, and synthesizing local sustainable-use assets will be crucial if an effective conservation-based natural resource management scheme is to be established.

CONCLUSION

As they concern natural resource management practices and biodiversity, Batak notions about the sacred take form in two ways. At a general level, the entire natural environment must be approached respectfully and exploited judiciously; at a more specific level, certain places in the environment, and certain resources of special importance to the Batak, are guarded by a class of jealous caretaker spirits, quick to punish unwitting trespass or profligate use. These beliefs about the sacred do exert a beneficent influence on Batak subsistence activities as these impact biodiversity, at the most general level. They encourage the Batak to preserve (rather than to clear) the forest and to manage in a sustainable way (rather than to exploit to local extinction) certain economically important flora and fauna. But migrant lowland settlers and other members of wider Philippine society play by different rules, and such are the direct and indirect pressures that these other parties bring to bear today on the Batak environment that an effective natural resource management scheme could profitably begin with, but could scarcely be limited to, Batak beliefs about sacred places and sacred resources.

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CHAPTER TWENTY-TWO

NOT BY BOUNDARIES ALONE: INDIGENOUS RIGHTS AND ENVIRONMENTAL STEWARDSHIP IN PALAWAN

Melanie Hughes McDermott

INTRODUCTION

It is true that indigenous peoples and their environments are inextricably linked; yet the same could be said of urban-dwellers or any other social group. It is just that while urbanites' experience is dominated by the built-environment, many indigenous groups (those that have not been displaced from their ancestral homelands) inhabit environments much less obviously transformed by human activities. As a result, these environments tend to retain high levels of biodiversity as a part of resilient ecosystems. This species richness and the services that such ecosystems provide (e.g. watershed functions) have come to be highly valued not only by the indigenous inhabitants whose livelihoods and culture are interwoven with them, but by many individuals living far away, some in centers of power. While these people would like to see those environments conserved, other individuals and corporations value them because they would like to claim the land or extract resources from it. Constituencies opposing this drive to development argue that indigenous people should be allowed to stay in place for a variety of reasons: on the basis of unconditional human rights, on the condition that the indigenes serve as stewards of the environment, or on some tenuous combination of both aims.

The former group argues that the right to stay in place derives from indigenousness itself (i.e. from indigenous identity). The latter hold that indigenous people may be allowed to occupy a delimited territory on the expectation that their activities will remain compatible with environmental conservation. Thus, both positions are founded on conceptions of boundaries: boundaries of identity and boundaries of territory.

Boundaries can be seen as representing social relationships, which as such, establish distinctions among categories of people; they may do so on spatial, or territorial, grounds (this place is ours, not yours), or in terms of social groups (this is us, not you). The establishment or reinforcement of these boundaries is frequently the political solution sought by indigenous groups and also the way governments and conservationists frame their policies.

This study finds that, in case of the Philippine ancestral domain policy as implemented in an indigenous community in Palawan, such boundaries proved less decisive than pathways: boundary-crossing relationships. If boundaries represent social relations of inclusion and exclusion from group membership and access to resources, pathways indicate social relations of access and exchange. This inquiry seeks to understand how local responses to changing macro political and economic factors, in particular migration, markets, and state interventions, transform these boundary and pathway relations, and thereby resource use patterns and the environment they shape.

The case study that forms the heart of this investigation is set in Kayasan, an indigenous cultural community of Batak and Tagbanua people living amidst the rain forests on the Philippine island province of Palawan. Here, as elsewhere, growing numbers of migrants are encroaching upon the territory of tribal residents, whose livelihood has historically been based on shifting cultivation, hunting, gathering and trade in forest products. There are two major commercial forest products harvested in Kayasan today: (1) rattan and (2) almaciga resin. The former are woody, climbing palms (mostly *Calamus* spp.) from which cane products are derived. The latter is also known as manila copal, from *Agathis celebica (Koord.) Bl.* also referred to as *Agathis philippinensis Warb.* (Callo 1995) and *Agathis*

dammara (Lambert) L. C. Rich (Conelly 1985). In addition, honey, wild boar, wild fruits, and orchids are sometimes sold. The residents have attempted to defend these boundaries against migrant penetration, in part by making alliances with non-governmental organizations (NGOs) to invite the further incursion of state control. In particular, this community sought and obtained a government-issued Certificate of Ancestral Domain Claim (CADC). This tenurial instrument grants indigenous communities conditional rights over land and resources. The beneficiaries must map the boundaries of their claim and demonstrate they have lived within them since time immemorial. Thus, indigenous residents are changing the meaning of boundaries by engaging in the politics of identity, in order, among other things, to formalize the formerly fluid boundaries of their territory.

The policy on ancestral domains shares certain foundational premises with many other policies not only concerning indigenous peoples but community-based resource management more broadly. These policies either assume the pre-existence, or else aim to institute, many of the features associated with long-lasting common property regimes (Ostrom 1990): clear territorial boundaries controlled by a community of bounded membership that manages resources according to rules governing access, use, and rule-formation.

In fact, what transpired in Kayasan demonstrates that, at least in this instance, territorial boundaries were not historically fixed, singular, linear, or impermeable, and are not congruent with boundaries of membership in a resident community of place. In contrast, access to resources rests on a broader and more diffuse basis of membership in a social identity, which is linked to a home territory, but on a much larger scale. Of even greater significance, the events that followed the award of the CADC demonstrated that pathways may be more important than fences. Thus, if boundary relations change, but other, cross-cutting social relationships of power and control do not, then the latter may prove decisive for patterns of resource access and use and their environmental and social consequences. Critically, in Kayasan debt relations are punching holes in the state-certified territorial and cultural boundaries, through which migrants are pouring in and forest products and profits are flowing out. Hence, while boundaries mediate the effect of trans-local factors of change on resource use practices, boundary-based instruments fail to address other social relations of access to resources, in particular to financial and political capital. However, the process of struggle itself, together with the pathways of alliance with NGOs it has developed, are strengthening the boundaries of indigenous identity and with it the capacity to defend territorial boundaries, exploit commercial pathways, sustain the environment, and, potentially, to build coalitions to pursue deeper structural reform.

THEORETICAL ORIENTATION

At its broadest level, the purpose of this study is to understand how rural localities resist, adapt, and contribute to changing political and economic processes, and how these responses shape natural resource use and thereby the local environment. The scope and objectives of the investigation thus place it among others employing a political ecology approach. Within this broad framework, my theoretical orientation identifies social relations of resource access and control as the key factors mediating local responses to political and economic pressure and opportunities. I classify these relations into two categories: (1) boundaries (or relations of inclusion and exclusion), and (2) pathways (or trans-boundary relations of access and exchange). This perspective reveals important tensions along two conceptual dimensions, which policy-makers generally miss. First, a focus on boundaries neglects the salience of cross-cutting pathway relationships. Second is the tension between spatial and (other) social boundary relations (i.e. between territory and identity). A fuller exploration of the concepts of boundaries and pathways as I have defined them below sets the stage for the case study that follows. The conclusion turns to the policy implications of the case, not only for the Philippines, but beyond.

Boundaries

The circumstances that drew me to the case study site screamed boundaries! When I arrived there, the people of Kayasan were seeking to take advantage of a new policy of the Philippine government that promised to grant limited rights to its indigenous citizens by means of demarcating boundaries on maps and landscapes. By making claims to bounded territories dependent on the assertion of membership in bounded indigenous cultural communities, this policy immediately highlighted the simultaneously spatial, social, and symbolic nature of such boundaries and raised the critical issue of identity. The definition of indigenous rights in territorial terms points to the interrelation, the disjuncture, and the resulting tension between boundaries of territory and identity. My search to understand why this ancestral domain policy at least initially failed to enable locally-desired change led me to develop the idea of pathways, or boundary-crossing relationships of access and exchange.

Boundaries of territories or of social groups may arise through a gradual evolution in practice or may be introduced at one moment. They may be *de facto* or *de jure*. They may be imposed by an external power or a local faction in power or they may be adopted by agreement or vote. Boundaries may be established and defended to counter threats or competition, to preserve advantages, and/or to consolidate and maintain distinctiveness. Their success will depend on degree of isolation, homogeneity, social cohesion and capacity, and the relative strength of internal, supportive versus external, destructive forces.

The case under study involves three interrelated dimensions of boundaries: (1) spatial, (2) social-group, and (3) symbolic. Or four dimensions, if time is also taken into account. In this case, a local group sought state guarantees of exclusive access to resources within a bounded local territory, on the basis of claims to a distinct social boundary (identity) in historical association with that territory. They expected that state recognition of the boundary (in the form of a CADC) would confer symbolic meaning that would mobilize state power to exclude competing claimants to these resources.

Claims to identity (membership within social group boundaries) and territory (area within geographic boundaries) can thus be mutually constitutive. Access or lack of access across territorial boundaries is often determined by social group membership. The self-identification of members and the distinctiveness of social groups may be tied to historical

association with a bounded territory. In a given instance, territorial and social group boundaries may be homologous (as the ancestral domain policy asserts); more likely (as much bloodshed attests), the people occupying the same space may not all belong to the same social group, and group members may not all be encompassed within that space.

Pathways

While the Philippine policy on ancestral domains inspired my initial concentration on boundaries, research soon began to reveal that such a focus was insufficient to explain the outcomes I was observing. Why was this boundary-based instrument evidently failing to live up to its promise of excluding outsiders and providing for a locally controlled, sustainable, forest-based economy and environment? What forms of social relations of access and control, the key explanatory factors I had identified, was I overlooking? What emerged as I sought answers to these questions was the concept of pathways, or boundary crossing social relationships through which people participate in exchanges and gain access to resources. It soon became clear that boundary and pathway relations are not independent; rather, they exist in a dialectical relationship, each shaping the other. Boundaries can be seen as means of blocking particular pathways, or of selectively controlling the nature or rate of flows. It may be necessary to keep certain pathways open in order to gain access to the resources necessary to maintain boundaries against other cross-currents. Engaging in pathway relationships can modify the definition of us versus them, and thus the location of social boundaries. Moreover, membership in a social group or location within territorial boundaries, rather than pathway relationships, may under some circumstances provide the grounds for legitimate or feasible access to resources.

My concept of pathways does not refer to relationships or exchanges within social group boundaries; rather, it specifies associations across social or territorial divisions. Among the most important of these pathway relations are strategic alliances with externally located groups, patron-client linkages, connections with agents of the state, and other forms of influence. External groups may seek out or be sought by local (intra-boundary) groups with complementary interests in order to form alliances; these pathway relationships endow the local group with new sources of influence. Examples of this sort of pathway include the relationships between NGOs and local communities, in which certain local interests gain support through the NGOs' abilities to raise funds, provide technical assistance, popularize causes, attract a network of additional supporters, and influence state officials and policies.

While alliances link groups and are generally voluntary, patronage ties are personal, inevitably asymmetrical, and sometimes coercive. Through pathways of alliance, patronage, and connections with the state, people can gain direct access to (or means of control over) resources. Relationships of influence may also provide indirect routes of access and control. By influence I mean the capacity to modify another's behavior or perceptions either through persuasion, negotiation (exchange), or compulsion (power).

Trade relationships are another important form of pathway relations. One way of conceptualizing a trade pathway is as a commodity chain or a "series of relations (or) interlinked exchanges through which a commodity and its constituents pass from extraction or harvesting through production to end use" (Ribot 1998: p. 307-8). Trade pathways are constituted by relationships of not only commodity exchange, but also access to capital and outstanding debt. The overlap between the various sorts of pathway relationships is significant: local producers (collectors) are often tied to middlemen in the trade through patron-client relations; patronage relationships are often cemented by debt bondage.

In this case study we see how the pathways of trade in non-timber forest products and associated debt relations link indigenous collectors to a chain of middlemen, financiers, ultimately international buyers, and, thereby, the global political economy.

PALAWAN'S CHANGING POLITICAL AND ECONOMIC CONTEXT

Kayasan is located a few kilometers inland from the northwest coast of Palawan island, within the bounds of Puerto Princesa City. Despite its geographic isolation from centers of power and population, markets, migration, and the action of states have long incorporated Palawan's inhabitants into wider political and economic circuits of power and exchange. Its indigenous peoples have collected forest products for regional trade networks extending at least to South China, beginning somewhere between the tenth and twelfth centuries (Hutterer 1977; Kress 1977; Eder 1987). When the United States established its colonial authority at the turn of the century, Palawan was 90 percent forested and inhabited by just over ten thousand people. Driven by wider political, economic and demographic forces, migration of land-less Filipinos to Palawan boomed after World War II, bringing the population of the main island to well over six hundred thousand by the onset of this research in 1995. Logging and settlement had by the same time left under half the forest cover standing in what is still billed as the last frontier of the Philippines.

Despite limited direct presence, the ultimate impact of the Spanish colonial state on the people of Palawan was profound. Spanish rule brought about the ethnic and spatial bifurcation of the Philippine population into a Christianized, nominally westernized majority residing in the lowlands, and a non-Christian, tribal minority originating in (or having retreated to) the uplands; this conception and related legal and administrative mechanisms were sustained by the American and postcolonial regimes (Scott 1982; Hirtz 1998). Spain transformed most lowlanders and all uplanders into squatters when it introduced the Regalian Doctrine, a legal framework in which all land and resources that the Crown has not privately granted or sold remains under its dominion. While the validity of this interpretation has been challenged by some legal authorities (Royo 1988; Gatmaytan 1992), it was adopted by the United States colonial administration and is today enshrined in the Philippine Constitution of 1987. In 1909 the U.S. Supreme Court ruled in Cariño versus the Insular Government that land occupied since time immemorial had never been legally public land. While this decision still stands, it was never implemented by either the American or Philippine governments (Royo 1988; Lynch and Talbott 1995). Under present law, all land with slopes over 18 percent is deemed public forest land to which access is legally granted only in the form of limited-term agreements or concessions. Thus, while the Constitution (Art. XII, sec. 5) recognizes the rights of indigenous cultural communities to their ancestral lands, until recently they were all numbered among the twenty-four million or so squatters on public forest lands (Lynch and Talbot 1995: p. 58).

The first significant steps towards fulfilling this constitutional promise were taken with the issuance of the department administrative order no. 2, series 1993 (hereafter DAO 2) by the Department of Environment and Natural Resources (DENR). This order established the CADC. Although the state is constitutionally prohibited from granting ownership over public land and resources to any party, the DAO 2 stipulates a process through which an indigenous cultural community can delineate, document, and gain recognition of its claim to territory in the form of a certificate. In order to avail itself of the limited tenurial security offered for its ancestral domain, an applicant group must meet the standard and supply the proofs expected of an indigenous cultural community.

These statements reflect a conception that indigenous people are formed into communities, taken to mean homogenous groups with spatially, socially, and temporally fixed boundaries of membership and of location. In other words, the policy instituting the CADC presumes that the recipient communities share these features thought to pertain to persistent and successful common property regimes (Ostrom 1990).

The CADC grants communities the rights "to occupy, cultivate, and utilize the land and all natural resources found therein" (art. VII, sec. 1). Indigenous cultural communities are given the right to negotiate the terms and conditions for the exploitation of natural resources in the area, although it was left unclear if this included authorization for commercial utilization. Their management objective is given: "for the purpose of ensuring the observance of environmental protection." Thus, existing forest product concessions held by other parties within CADC areas will be allowed to expire without renewal (unless explicitly permitted by the community). In return, the CADC holders agree to "establish and activate indigenous practices or culturally founded strategies to protect, conserve and develop the natural resources (…) restore, preserve and maintain a balanced ecology." (Art. VII, sec. 1). In other words, DENR grants beneficiary communities rights to protect and improve environmental resources, rather than to exploit them.

Boundaries of territory and identity: Kayasan (1880-1960)

To what extent under historic conditions did Kayasan match the assumptions embodied in the CADC policy; in particular the association of a bounded territory with a homogeneous, bounded community with the capacity for collective decision making regarding resource access, management, conflict resolution and the like?

I started my field research with a puzzle. As a requirement of the application for a CADC, the people of Kayasan were asked to demonstrate that since time immemorial their ancestors had occupied the land claimed, within boundaries which they were to designate by naming local landmarks and providing sketch maps. Although none of the elders giving sworn statements had been born in Kayasan and none of the current inhabitants were resident before the 1950s, the Batak and Tagbanua residents of Kayasan and neighboring communities were remarkably consistent in naming the boundary markers of this place, and in asserting the ancient history of its use by their forebears. Moreover, neither group made a public distinction between their claims, this despite the fact that Kayasan appears to fall within the outer reaches of the historic range of the Batak (a Negrito group of fewer than four hundred individuals) and probably outside that of the Tagbanua (a more numerous, settled, and agriculturally-based people). What I found was that, under the conditions of low population density prevailing before 1960, the people of Kayasan recognized both cultural markers delineating ethnolinguistic groups and smaller bands and territorial markers in landscape features, in particular the ridges bounding watersheds. However, neither set of markers constituted boundaries in the sense of representing social relations of exclusion which limit movement or resource use. The legitimacy of claims to access to land and forest resources appears to rest on a nested series of identities, ranging from family relationship to the more diffuse idioms of kinship expressed in expanding ethnic identities. Today the Batak found the legitimacy of access to resources within Kayasan on the grounds of a new, pan-tribal form of identity that has expanded to incorporate the Tagbanua, or in principle all indigenous people (*katutubo*), defined in opposition to migrants. It is primarily on the basis of self-ascription (as *katutubo*) that I refer to the indigenous people of Kayasan without specifying tribal affiliation or without implying that each individual is indigenous to (in the dictionary sense of native to or born in) that place. All the Batak and Tagbanua are certainly autochthonous to a wider area in northern or central Palawan. Just as they refer to all non-indigenes as foreigners (*dayuhan*) regardless of birthplace, I refer to the latter as migrants.

The contrast between the meaning of boundaries for the Batak and the formal legal and cadastral notion inherent in the government's CADC helps account for the extent to which the Kayasan claim, if rigorously tested, falls short of governmental CADC standards.

First, where the CADC prompts us to look for fixed boundaries, we find pathways, along which flow people and traded resources. Second, the claim that the boundaries mapped by the Kayasan CADC demarcate an ancestral domain occupied by one, delimited group of people since time immemorial is clearly an "invention of tradition" (Hobsbawm and Ranger 1983). Note that while the state's notion of time immemorial (DAO 2, Art. III, sec. 5) is intrinsically ahistorical; the basis of Batak and Tagbanua associations with landscapes is specific and historical. For example, since periodic movement across landscapes is not an unusual feature of indigenous lifecycles, a period of residence in a given watershed may constitute an equally legitimate basis of claims to resources and inclusion as would birth there. Yet, the sense of historic association with and entitlement to Kayasan terrain and resources is clearly deeply felt. In the minds of the Batak and Tagbanua, as I will argue, it is cultural, or ethnic, identity that provides the basis for legitimate access to land and resources within Kayasan (or another historic territory); just as long as they're Batak, or *katutubo*. While, as I will argue, this identity has been evolving and expanding over time, even at its most restricted interpretation (i.e. as exclusively Batak) it encompassed people coming from a much wider territory than was ultimately certified as ancestral domain. Thus, another way of interpreting the disparity between the locally understood socioterritorial boundaries and those demarcated for the CADC is as a mismatch of scale, both geographical and temporal. Even the CADC definition of ancestral domain might have been said to apply if the territorial map were drawn large enough to include the entire Batak historic range of movement.

Although historical research delineates a village, or putative community level of organization among the Tagbanua, the quality of social cohesion was not focused on this social unit (Fox 1982). Similarly, while Eder (1987: p. 30) refers to "each individual Batak's powerful emotional attachment to the river valley in which he or she grew up," the intimate knowledge of the terrain and resources, and the preference to marry within the area, he also documents the fluidity of the social groups forming and reforming within watersheds and the not infrequent travel or marriage across watershed boundaries. In other words, the sense of cohesion that existed did not correspond to membership in a socially or territorially bounded local community. Furthermore, although much more developed than the forms that prevailed in the Kayasan area, neither the Tagbanua nor the Batak system of leadership was bounded by a socioterritorial community. Rather, the reach of a leaders' authority waxed and waned with time and fell off with distance, depending on the respect engendered by that particular individual. When it came to matters outside the purview of traditional leaders, there was no basis for them to act. While the Batak band leader exercised some authority over internal social conflicts and certain decisions regarding resource use, the fealty of his followers and spatial extent of his authority were in constant flux.

While membership in a social group (family, band or tribe) entitled a Batak to resource access, there was no precedent for excluding access. Requests for food or land could not be denied fellow kin and no one was likely to be turned away: a social insurance policy against frequent lean periods (Cadeliña 1987). Anyone who shared an identity at some level (i.e. any Batak) expected to be granted permission to clear the forest or collect forest products. There was no community level, corresponding to a bounded territory, with a bounded membership, outside of which resource access was excluded. Moreover, there was no basis for applying social sanctions to regulate or restrain resource use, nor any precedent for being required to do so.

Migration and markets (1960-1995)

After the first lowland migrant settler arrived around 1960, migration began to drive forest conversion and tribal displacement in Kayasan and environs. At the same time, growing market demand for forest products attracted increasing numbers of migrants who pushed up the rate of extraction. As a result, within the locality migrant and market pressures are bringing about the partial privatization and commodification of land, thereby transforming local tenurial institutions by formalizing the patterned ways of establishing internal boundaries. While market demand and migrant competition are accelerating the commodification of forest products, local access to trade pathways (beyond serving as extractive labor) is blocked by lack of access to capital and political resources (e.g. licenses). The resultant deepening of debt relations further speeds the outward flow of forest products and profits. These trends are stimulating economic differentiation within the community, largely but not exclusively along ethnic lines. Awareness on the part of Kayasan's indigenes of their worsening economic position, coupled with more general pressures from migrant settlement, competition for forest resources, and social tensions, are catalyzing the formation of a pan-tribal, indigenous identity. This shared identity is reflected in, among other things, an increased rate of intermarriage. In 1995, out of the total population of 235 individuals, thirty-six were Batak. Sixty-four were Tagbanua, and thirty-eight were Batak-Tagbanua. Of the remainder eighty-one were migrants, and their offspring include sixteen Tagbanua migrants.

Forest products: commodification intensifies

Market pathways (that is, flows of forest products and bartered trade goods) have been crossing the geographic boundaries of Kayasan, borne by the indigenous people, long before migrants did. Migrant settlers on Palawan only became involved as traders of forest products in the early twentieth century, a role which had been filled by itinerant Chinese and Muslim traders for many centuries previous. For the most part, the organization of extraction in the forest interior was managed by indigenes who received from these traders supplies and bartered goods, which they dispensed to their fellows from whom they later collected harvested forest products. While 1960 does not represent a particular moment of discontinuity in Kayasan with respect to this trade, two new developments became prominent around that time. First, migrants began to serve as middlemen between trader-buyers and collectors at the local, forest level. Second, growing numbers of migrants entered the area to collect forest products directly.

For much of the last century, the principal commercial forest products extracted from the Kayasan area have been almaciga and rattan. Honey, wild pig, and orchids, in order of decreasing significance, are the other forest products regularly sold for cash. A number of other wild products are occasionally sold, and a much greater diversity of products are collected for subsistence purposes (McDermott 1994). The history of trade in these two products (almaciga and rattan) illustrates some of the ways in which externally-driven political and economic forces have shaped local conditions. Political arrangements underpin the market. The American administration established a system of concessions, or exclusive licenses for the trade and transport of timber and other forest products from public forest land (which comprises most of Palawan's land area and forest resources). While the first almaciga concessions in Palawan date back to at least 1920 (Brown 1990), the first concession for almaciga in the Kayasan area was established after World War II, followed in the 1970s by the first rattan concession.

By the 1980s, the numbers of migrant harvesters and middlemen were mounting, and the concessions also proliferated. By the 1990s there were four almaciga and two rattan concessions overlapping the Kayasan domain. All but one of the concessionaires reside in the provincial capital and operate through middlemen, who provide limited advances and pay harvesters only after they have transported the almaciga to the capital, received their own payment, and returned to the area (and then only if they have cash on hand).

Middlemen in the forest products trade supply harvesters with provisions (*konsumo*) that are required during collecting expeditions in the forest interior, such as rice, dried fish, kerosene and tobacco. While a number of concessionaires, buyers, financiers, and possibly contractors (*agente*) in Palawan are female, the forest product collectors and field-based middlemen are all male. The value of his harvest is deducted from that of the *konsumo* and any other advances a collector has received. Debts are carried over, and, if the balance is positive, the tapper may or may not receive cash, depending on whether the middleman has any on hand. The middleman has no capital of his own, having obtained the supplies from someone else higher up on the trading chain.

Profits follow capital. The *kapitalista*, to use the local term, attempts to oblige those lower on the trading chain to bear most of the risk. Profits move up the chain, risk follows debt downwards. Without capital, there is no control. The whole chain of trade for forest products is grossly under capitalized. Many of the buyers and concessionaires are acting with borrowed capital. The indebted concessionaire cannot cease buying even if prices are poor, nor comply with harvesting restrictions, good management practices, or decent terms of work and pay, even if that was what he or she wished to do. Indigenous residents accuse migrant tappers, who are spurred on by their *kapitalistas*, of destructive harvesting practices that are killing the almaciga trees. Under current conditions, some indigenous tappers (pressed by debt, competition and uncertainty about the behavior of other harvesters) are also engaged in unsustainable harvesting. These indigenes cannot control the rate of their own extraction, not to speak of the rate at which forest resources are flowing out across the geographic boundaries of their home territory.

One of the chief reasons for this difficulty in controlling trade across territorial boundaries is the fact that they are crossed by pathways of capital that had become essential not only to the trade, but to local livelihoods. The link between flows of forest products and flows of credit/debt is tight. The trade in forest products provides the indigenous residents of Kayasan with their major source of both credit and livelihood. Thus, while the trade in forest products is centuries old, the key development that transformed forest products from simply trade items to commodities was the increasing reliance of indigenous collectors on the trade to meet their subsistence needs. Compelled by debt (as well as drawn by market attractions and rising expectations), indigenous Kayasans began to dedicate more and more time to forest product extraction, to the detriment of agricultural productivity and subsistence security.

While the indigenous people of Kayasan had been interacting with non-indigenes at a distance through the trade in forest products for centuries, they felt that their way of life has been drastically transformed by the experience of recent decades during which a mounting influx of migrants has come to settle among them. The Batak, who were themselves moving in and out of the area, originally absorbed the arrival of Tagbanua, who probably began to arrive during the Japanese invasion of the World War II years. Subsequently, two of the migrants currently resident in Kayasan claim to have arrived there in about 1960. Over the next thirty years, fifty-nine indigenous and fifteen migrant adults settled in Kayasan. This figure does not include individuals who arrived during this period but have since left the area or died. In 1995 (when I completed a 100 percent census) the total population of Kayasan was 235, including 113 heads of household (male and female). Over the next five years (1990-1995) they were joined by seven Tagbanua and twenty-four migrants, representing an almost ten-fold increase in the rate of migrant arrivals. As of 1995 the average number of years elapsed since first arrival in Kayasan of Batak adults was twenty-five years, of Tagbanua fifteen years, and of migrants eight years. Years elapsed, rather than years resident, was the measurement chosen, since many of the indigenous families have come and gone from the area during that period. Only seven indigenous adults were actually born within Kayasan, although some of their families had previously spent time in the area and then left again. While 27 percent of the migrant heads of household (male and female) were born in (and therefore in a sense indigenous to) Palawan as a whole, the remainder were born elsewhere in the Philippines, with points of origin scattered among at least eighteen different provinces.

These figures imply that the connection of the current indigenous residents to the geographic bounds of Kayasan is more recent and tenuous than it appears, however. For example, 62 percent of Batak and Tagbanua say that other relatives had preceded them to Kayasan. A majority of Batak (56 percent) say they arrived with their parents, 20 percent say they came to join other relatives, and 13 percent say they came "because they had left land behind." These responses were among the answers to the question: why did you leave your former residence and come to Kayasan? One household interviewed could select more than one of these predefined responses. The reply (because we left land behind) refers to swidden fallow areas, usually still containing fruit trees, originally cleared by the respondent family. It is not uncommon for indigenous families to return to an area of previous residence to tend and harvest fruits (or coffee), and reinforce land claims. A full 44 percent of the Batak and 14 percent Tagbanua came to Kayasan as a result of a government resettlement project. These data were collected as part of a household survey I conducted in 1995; selected questions were re-surveyed in 1996 and 1997. The key issue in the survey design was the choice of social categories (i.e. where to draw the boundaries of (1) the household, (2) the Kayasan community, and (3) the resident ethnic groups?). I defined the household as those living under one roof most of the time, although single males with no permanent homes of their own who sometimes lived with non-relatives were classified as separate households (five in total). I defined the geographic boundaries of the community on the basis of the coverage of the local tribal association and the ancestral domain application. I interviewed 100 percent of resident households, as well as the eleven families (six Tagbanua and five migrant) residing elsewhere/nearby who were growing annual crops in Kayasan (nine), or had tenants farming there (two). The basis for ethnic classification was self-ascription except where intermarriage was involved, since the Batak and Tagbanua have not developed a term to account for mixing of their groups (other than the generic *katutubo*). Although they generally incorporate the (infrequent) marriages between an offspring of an indigene and a migrant into the ethnic group of the former, they do not have a label for Batak-Tagbanua families and children. I

chose to define any individual who had at least one Batak grandparent as Batak; Tagbanua include all those who had no Batak, but at least one Tagbanua grandparent. For questions which applied to a household as a whole, a family with one Batak parent was defined as Batak and a family with one Tagbanua and one migrant parent was defined as Tagbanua

The influx of migrants has motivated indigenous residents to define and defend the external territorial boundaries of Kayasan. The responses of individuals to this perceived threat varied, ranging from anxiety and resignation (many Batak), to competition (some Tagbanua), to a determination to engage in some collective defense (some of both). The latter possibility only began to attract significant support among both Tagbanua and Batak when they learned about the opportunity for recognition by the state and alliances with NGOs through the CADC. But even before this opportunity materialized, many realized that further retreat, once a costly but viable strategy for them, had become untenable. As one Batak remarked in a community meeting: "*Wala kaming malipatan. Hanggang dito lang kami.*" (We have no place to which we are able to move. Until here only are we.).

Even before migrant settlers arrive, indigenous people have historically mediated outsiders' access to the forest by physically occupying the forest interior, locating and bringing out forest products, and clearing the forest for swidden agriculture thereby transforming the landscape. In Kayasan, it was the Batak who first cleared patches of the primary forest for agriculture; a much more labor intensive process than that required to fell secondary (fallow) forest. Then the Tagbanua arrived, capitalizing on this accumulated labor by means of intermarriage with or displacement of the Batak, expanding the area of forest fallow and initiating the establishment of rice paddies (a technology learned by imitating migrants). As government highways and logging roads approached, migrants arrived, responding to the increased physical and market access these roads provided. Migrants then acquired land, mostly previously cleared forest fallow, expropriating the labor of indigenous farmers for little or no return. Regardless of how they obtained land, or its ecological status, migrants often use indigenous labor to transform the land to their productive advantage. They hire indigenous workers to clear the forest, first for a few cycles of shifting cultivation (*kaingin*), subsequently to improve their land by removing stumps and the like to make plowed fields (*bantod*), and finally, if conditions permit, to establish irrigated or flooded wet rice paddy (*basakan*).

This process of transformation of a forested landscape into a site for permanent agriculture is, together with other factors, closing the forest frontier into which the Batak, followed by the Tagbanua, have retreated. This study has produced several lines of evidence confirming that Kayasan has witnessed this pattern of penetration into Batak territory, first by Tagbanua, then migrants, followed by land alienation to migrants, and retreat by the Batak and, to a lesser extent, the Tagbanua. First, my survey data establish the fact that, on average, the Batak residence in Kayasan has been of the longest duration, exceeding that of the Tagbanua, who in turn, have stayed twice as long as the migrants. Second, as the spatial distribution of swiddens shows the expected pattern of migrant plots clustered towards the point of external access (i.e. the nearest road) intermingling with Tagbanua swiddens towards the center of Kayasan, and yielding to exclusively Batak fields in the forested interior. The locations of all swiddens made in 1995, 1996, and 1997 were mapped using a Global Positioning System (GPS) unit. Finally, of all the swiddens made in 1995, while 90 percent of those made by the Batak were reported to have been first cleared from the primary forest by the farmer or relatives, the corresponding figures are 80 percent for the Tagbanua, and only 25 percent for the migrants. The figure for the migrants is probably high, because it was my observation that many migrants cannot distinguish late successional secondary forest from primary forest and that they also lack information about local land use history available to indigenous residents through social networks. Often, indigenous labor further transforms land under migrant ownership into a more productive resource through the conversion of swidden fallows first to plowed fields and then to wet rice paddy. Note that I am referring to the

increased productivity of land under wet rice (as opposed to swidden) cultivation per unit area, not to its productivity per unit of labor, or of the system as a whole. All of the Tagbanua paddies and all but two of the migrant paddies (for which this information was available) were initially cleared from the forest by indigenous Kayasans. Thus, the prior indigenous presence and the continued availability of indigenous labor facilitate colonization of the forest interior by migrant farmers.

Migrants have gained land in Kayasan via numerous strategies: clearance of apparently primary forest, clearance of unclaimed (or uncontested) secondary (fallow) forest, intimidation of previous claimants (both indigenous and migrant), borrowing or being given land by establishing social relations (marriage, *compadre*), leasing (only for wet rice), and purchase.

Within the locality, migrant and market pressures are transforming local tenurial institutions, that is, the patterned ways of establishing and maintaining internal boundaries and transferring the resources that lie within them. The meaning of household level land boundaries in Kayasan is changing as a consequence of the intertwined processes of privatization and commodification.

Prior to 1960, as we have seen, access to land in Kayasan was based on social relationships (kinship and ethnic identity). As migrants arrived and market relations strengthened, claims to land became more private in nature. Independent of cycles of planting, harvesting, and fallow, land claims became more clearly bounded in space and time through more permanent land transformation, brought about by planting tree crops, plowing, or irrigation. Land was also (further) privatized (i.e. claims to its use restricted to one household or rather an extended family or wider social group), by migrant practices such as land registration, and, most decisively, by land sale. The commodification of land, not its privatization, represents an entirely novel introduction by migrants to Kayasan, one that has disrupted long standing tenurial institutions.

If privatization corresponds to the fixing and hardening of household level land boundaries, representing the right to exclude access, then the commodification of land represents the development of pathways, in particular the exchange of land for cash, the bartered commercial equivalent, or the satisfaction of a debt. Such pathways cut across previous social relationships, or social boundaries of inclusion, such as kinship; in so doing they weaken kin or ethnic group based pathways of access to land and harvests.

It is not only in respect to the continuation, albeit in attenuated form, of these extra market claims on land, that the commodification of land in Kayasan is incomplete. Land has been incompletely commodified because it has been only partially privatized. Complete commodification would in theory require that land be treated exclusively as private property, that it be freely bought and sold for prices set on an open market. By contrast, in Kayasan kinship and other social ties may provide extra market access or prevent sale, debt compels exchanges that are not free, and prices are influenced by social relationship, need, lack of information and other non-market factors. The incomplete development of a land market in Kayasan is evidenced by the fact that land prices were wildly variable, and that access to land still was acquired through purchase only in a minority of cases in 1995, while the first land sale in Kayasan occurred only in 1977.

Markets and migration have been transforming social relations in Kayasan, specifically bringing about the partial privatization of land, the commodification of land and forest products and the accumulation of debt. These processes, in turn, are promoting economic differentiation and altering the nature of other forms of social differentiation, in particular the formation of ethnic identity. While economic differentiation continues to favor the position of migrants as a group over that of indigenes as a group, there is some evidence that internal differentiation is occurring among the latter, in which a few Tagbanua are gaining economic advantage over the Batak and other Tagbanua residents of Kayasan. At the same time economic distinctions are growing sharper among the indigenes, however, they are associating more closely together in other ways. First the social boundaries between the Batak and Tagbanua are eroding. The related factors of demographic decline, geographical confinement, intermarriage, and the domination of local leadership and some trade relationships by Tagbanua do not bode well for the long-term persistence of a separate Batak identity in Kayasan. Second, the historically constructed, tribal, homogenizing identity that incorporates all indigenous people in the discourse of the Philippine state and dominant social groups has never recognized any internal boundary differentiating Tagbanua from Batak. Finally, on a more positive note, the common experience of pressures from migration and market penetration, official and social discrimination, economic adversity, reliance on forest dependent forms of livelihood, and similar values and customs (and some other factors) laid the groundwork for the formation of a pan-tribal indigenous identity that was ultimately catalyzed by positive opportunities to gain external recognition and assistance.

The indigenous people of Kayasan are responding to external pressures by retreating, collaborating, assimilating, competing, and/or resisting. Retreat and collaboration (e.g. offering land or labor for sale to migrants) have always been paths open to individual indigenes. Recently, disparities in the abilities of indigenous households to assimilate, or succeed in pursuing migrant style livelihood strategies, may be leading to internal differentiation, which might be expected to weaken *katutubo* (i.e. indigenous) group solidarity. But state initiatives together with proliferating and strengthening alliances with NGOs, extended new identity-based opportunities to resist migrant incursions by enforcing territorial boundaries and to compete with migrants by promising control over trade pathways.

Did the social and economic pressures brought about by migration and market penetration erode or strengthen social boundaries? The answer is mixed. These forces simultaneously erased boundaries distinguishing Batak from Tagbanua and promoted the coalescence of boundaries marking a shared indigenous identity. At the same time, this emergence of this shared identity alone was not sufficient to generate the social cohesion and develop the local capacity to defend territorial boundaries and control trade pathways. To make that attempt feasible, it took in addition the catalyzing power and practical mechanisms made possible through state recognition and by external alliances and investment.

State and non-governmental organizations interventions (1969-1995)

Market and migrant pressures in Kayasan have created the nucleus of a pan-tribal, indigenous identity and the incentive and conditions for its further consolidation. The state, too, has played an important role in indigenous identity formation. Following on a long history of government interventions (e.g. the promotion of migration; favorable treatment of migrants vis-à-vis, among other things, the granting of forest concessions; a series of special bureaucracies for tribal affairs; the location in 1969 of a forced resettlement site near Kayasan which mixed Tagbanua and Batak; the establishment in 1971 and later enlargement of a national park within the Kayasan domain, and the local (Puerto Princesa City government) ban on shifting cultivation, which effectively targeted indigenous people), which relegated Batak and Tagbanua to a common, disadvantaged social position, the new ancestral domain policy and alliances with NGOs provided positive incentives and opportunities for the strategic use of this identity to legitimate ancestral boundaries. Indigenous Kayasans deployed this identity, recognition by the state, and alliances with NGOs to forge and defend territorial boundaries and to attempt to control pathways of access to resources with mixed results. Although undermined by a number of contemporary factors, the community's cohesion and its capacities for collective action developed through the struggle to obtain and implement the certificate. Cohesion and capacity were promoted by the concurrent and complementary evolution of a shared identity.

While 1969 saw the first direct state intervention in Kayasan (when it became the site of a forced resettlement area), the indirect effects of state actions long pre-date this period, structuring markets and driving spontaneous migration and organized settlement. Around twenty years later, NGOs first directly approached the people of Kayasan. Shortly thereafter, the indigenous residents, inspired by migration and market pressures and new political opportunities, sought out government and NGO assistance in demarcating and defending the external territorial boundary of their community in the form of the CADC.

Without the financial and political resources, networks, information, advocacy, legwork, and dedication of NGOs, the CADC would have remained just a dream in Palawan. Not only were NGOs instrumental in designing and pushing through the policy at the national level, their efforts at the provincial level shepherded CADC applications through each stage of the process. In Kayasan, from the time of their initial involvement, three NGOs (a Catholic organization, a legal aid group, and a provincial tribal federation) explained and advocated the adoption of new ancestral domain policies. Shortly after the DENR instituted the CADC in January of 1993, these NGOs applied for (and ultimately received) international funding for conservation oriented projects that included components aimed at securing ancestral domain at several locations, Kayasan among them. I served as a consultant on the planning phase of the largest of these grants, a biodiversity conservation network project funded by USAID and administered by the Washington D.C.-based biodiversity support program, through a consortium of WWF-US, the Nature Conservancy and the World Resources Institute. The 1993 planning grant supplied about US$ 50,000 and the 1994 to 1998 implementation grant was budgeted at over US$ 600,000. Kayasan was one of three project sites in Palawan.

In July of 1993 NGO teams, visited Kayasan and explained project objectives, which included achieving tenurial security. They explained that a CADC would assure rights to ancestral domain and all the resources it contains, preempt others' claims (i.e. cancel outsiders' concessions), and make possible a sustainable livelihood and would thereby empower them to protect their environment and resources. The local reception was enthusiastic, and as suggested, residents prepared the sketch maps that would be required to demonstrate the boundaries of their claim and submitted sworn affidavits.

After many bureaucratic delays and contention (which resulted in the reduction of the area claimed), at last the initial stage of the CADC application for Kayasan was complete and submitted to the regional office of the DENR in December 1994. The next step was to map the domain claim. The NGOs, together with some government offices, promoted and made possible the use of an advanced (and expensive) technology new to Palawan: the GPS.

Due to difficult field conditions, a tight schedule, and doubtless the urge to return home, the government led team limited recordings to thirteen corner readings, in what proved to be an area over 7,500 ha in extent. When the final map was presented to the surveyors and elders of Kayasan, I thought I saw their faces cloud over. This odd shaped, nine sided polygon bore no relation they could discern to the maps they had generated. Unlike the community maps the GPS generated and state authorized map had linear borders bearing no observable relationship to natural features of the landscape, none of which were displayed on the map. No local names were shown. And most confusing of all, where the community map was filled with pictures and labels indicating the presence of homes, fields, rattan, almaciga, and other resources, the official map was only a boundary: the inside was empty. Here local conceptions of boundaries as permeable, multiple and relative to purpose and as demarcated by natural features encircling resource and meaning filled territories ran head on with the state's notion of linear, singular, fixed, impermeable perimeters as cartographic artifacts, or representations of a cadastral imagination. At the same time, the CADC policy held out the hope to indigenous people that by undergoing this technological transformation into a state recognized form, community boundaries would thereby become for the first time visible to the state and represented, even defended, by its agents against other interests.

After more bureaucratic processing, the NGOs finally submitted the final CADC application materials on behalf of Kayasan in June 1995. Progress on the Kayasan CADC application again ground to a halt, this time foundering on national level political struggle. Legal challenges to the constitutionality of the DAO 2 prompted a revision of the text of the CADC certificates. In order to publicize the (hoped for) resumption of progress enabled by the September compromise, the Secretary of the DENR scheduled a visit to Palawan for a public ceremony for the signing of the CADCs for Kayasan and one other community. After yet further deferral, three years after the launching of the public information campaign in Palawan, two years after the publication of the Kayasan claim, and almost one year after the boundary survey, on 28 February 1996, Secretary Ramos came to Puerto Princesa City and signed the CADC for the Tagbanua and Batak communities situated in *sitio* Cayasan, Palawan.

Ancestral domain and after (1995-1997)

The ancestral domain policy assumed the pre-existence of clear and congruent boundaries of territory and community, which it was intended to reinforce through state legitimization. Implementation of the policy should result in the establishment of such boundaries on the landscape and on social association even if prior boundaries were different in character or absent altogether. What were the effects of the institution of state sanctioned boundaries in Kayasan?

Looked at from the local perspective, how many of the indigenous people's hopes were borne out by local experience after the CADC was finally granted to Kayasan? As described to me, these expectations included the following. The boundaries of the CADC will be controlled by indigenous people. They will exclude people from the land and resources inside in a selective manner, based on identity. The CADC boundary will be respected by migrants and state officials. The CADC will guarantee indigenous rights to land and the freedom to pursue livelihood choices freely. The previous concessionaires will be ejected and indigenes will control forest product extraction and trade on the basis of the CADC alone, there will be no need for DENR approval, monitoring, or renewal of concessions.

Defense of boundaries versus migrants

In its initial phases, the certificate for Kayasan's ancestral domain appears to have done little to stem the movement of settlers across its boundaries, and may in fact have increased the flow while modifying its composition. In the year following the CADC boundary survey (May 1995) twelve families settled in Kayasan, representing a 20 percent increase in household number. In the subsequent year, following the CADC award (March 1996) seven families arrived. Both years, the preponderance of newcomers were Tagbanua rather than migrants. The entrance of five migrant land claimants over these two years demonstrates that the CADC boundary did not stop migrant boundary crossing. In 1996, five migrant families moved their primary residence away from Kayasan, although four of those had land claims in Kayasan, which they retained, planning to continue farming at a distance or at a later date. While this rate of migrant in-migration is consistent with recent trends, the arrival of fourteen Tagbanua families in two years represents a significant acceleration of the previous rate. It is difficult to estimate the likely duration of this trend, however, not only because circumstances, and hence incentives, continued to change, but because frequent movement of households has been a typical behavior pattern. For example, two of the fourteen Tagbanua newcomers left within a year, and six had been returning to previous land claims in Kayasan. Most significantly, two of the new migrant families, and all of the Tagbanua, joined relatives already residing in Kayasan. This suggests that claims to land access based on kin relations were winning out over the ancestral domain policy's more restrictive qualifications based on place of origin and local community membership.

There was no noticeable change in the pattern of migrant swidden making from 1995 to 1997: all remained clustered near the highway. The drop in number of migrants' swiddens from 1996 to 1997 from sixteen to six may indicate a lessening of willingness to invest labor in as yet unimproved land following the CADC award. Or, it may represent a growing preference for permanent agriculture. The particular cases (as well as the short time period) make it difficult to draw any conclusion with certainty: of the ten migrant households who cultivated swiddens in 1995 and not in 1997, two had emigrated, five preferred to farm their other, more productive parcels, and one assisted his son rather than making his own swidden.

In contrast, the number of indigenous households making swiddens jumped from thirty-three in 1995 to forty-eight in 1996, before leveling to forty-five in 1997. It is possible that the issuance of the CADC gave prior residents increased confidence in the security of returns to labor invested in land, and, together with the expectation of other benefits (such as NGO assistance), attracted new settlers. Another shift in indigenous swidden patterns occurred in 1997, as indicated in a wider dispersal of indigenes' swiddens, with a larger proportion scattered further from the highway and upriver from the Kayasan center. This could reflect any of a number of factors. First, the jump in total number of swiddens from the CADC might have bolstered confidence to make swiddens in older forest, or, the rumored re-imposition of the swidden ban might have prompted the opposite impulse: to hide swiddens from the view of local officials. Second, the forest supplies better subsistence alternatives than do the settled areas in times of economic hardship such as many experienced that year due to the lack of opportunity in forest products and poor swidden harvests. Additional reasons related to local micro-politics. It is too early to conclude if the CADC will further the longstanding interest of the state in sedentarizing indigenous people, or if, on the contrary, it will permit the continuation of their historic dispersed and mobile settlement pattern.

Pathways: little change

Indigenous Kayasans perceived the continued, largely unchecked exploitation of forest resources by migrants as proof of the failure of the CADC to suffice for boundary defense. The continued cross-boundary flows along trade pathways of forest products and capital substantiate the local assessment that boundary defense was failing in the immediate postCADC period.

Why did the CADC prove insufficient to secure local control of territorial boundaries? There are three major reasons. First, the CADC instrument emerged from high level national policy struggles in a modified and re-interpreted form that does not empower pathway control: most critically, it does not authorize commercial pathways of forest product trade. This outcome itself is partially explained by the second explanatory factor: the CADC intervention does not fundamentally alter the pathways of trade (commodity flows), capital (investment, debt relations, and profit), and underlying relations of power and influence. Finally, successfully deploying ancestral domain certification to control boundaries and pathways of resource access requires a degree of cohesion and forms of internal capacity that the indigenous people of Kayasan did not yet possess.

The lack of impact of CADC issuance on the trade in forest products in particular flowed from each of these factors. Local residents lacked the capacity to stop migrant harvesters and middlemen from crossing the boundaries of the domain and engaging in excessive extraction, since all parties to the trade remain enmeshed in debt to supra-local financiers, buyers, and certain concessionaires with the capital and political influence to maintain forest product licenses. That the CADC failed to redress historic imbalances in political power is borne out by the fact that one of its key provisions, the termination of externally held forest product concessions, was initially blocked by the political elite in Palawan. More seriously, after much debate at the national level, the DENR determined that the CADC management plan would authorize only the exercise of sustainable traditional resource rights. The dominant view within the DENR was that commercial utilization rights must be based on standard licenses obtained through standard procedures (requiring significant capital and influence). This amounted to a major disappointment in the expectations of indigenous Kayasans, prominent among which were the legal authorization of

exclusive access to forest resources and the right to trade them. Instead, they determined to apply on their own for the standard licenses; an effort that initially failed.

Changing social dynamics and boundaries: capacity and identity

The ability to make collective decisions and carry out collective actions (i.e. social capacity) is specific to the nature of the group, the objectives of their actions, and the context in which they operate. In this case, the relevant form of capacity is that which is required to realize the ancestral domain claim (i.e. the ability to defend territorial boundaries and to exploit pathways of trade while controlling access by others). The state, through the CADC policy, defines the community in question, namely the indigenous residents within the Kayasan territorial unit; a combination of identity and place-based factors.

At the same time indigenous people in Kayasan identified unity (cohesion) as one of their key problems and a potential solution, they also pointed to their lack, in contrast to the migrant concessionaires, of influence (pathway relations) and *kakayahan*. The latter term can be translated as capacity, ability, competence, aptitude, skill, resources, wherewithal, or power. The combination in this local term for capacity of ability and power is instructive. Clearly, a group could have all the capacity (ability) in the world yet its efforts could still be crushed by hostile superior powers; it could be placed in a powerless structural position. Indeed, much of this analysis has centered on structural features of the situation of Kayasan, particularly the lack of change in pathways of capital and political influence, elements of power relations. The discussion of capacity is an attempt to look for the role of local agency. How has local capacity, as instrument and product, figured in the struggle to gain and implement the CADC?

It is important to consider the role of local capacity for several additional reasons. First, the NGO partners of Kayasan also identified capacity building as one of the chief requirements of (and chief gaps in) success in implementing the CADC. Second, the state, through its ancestral domain policy (DAO 2), assumes that the CADC holders are communities characterized by not only strong social cohesion and lack of internal differentiation of interest, but by robust capacities for collective action, including an accountable, representative traditional leadership, communal decision making procedures, and effective social sanctions. In practice as well, lower levels of state bureaucracy leave the practical tasks of implementing the CADC (defending boundaries and resource stewardship) to certificate recipients. Often, what is attributed to lack of capacity on the part of communities in fact reflects lack of capacity on the part of state agencies (or NGOs) and/or faulty or inappropriate policies or project design. Finally, it was my observation that the lack of certain capacities impeded indigenous Kayasans in achieving CADC objectives. At the same time, however, the struggles over their CADC developed local capacity in new ways. The chief gains in capacity were the strategies, skills, information, and resources gained through interactions with NGOs, the political alliances and support they channeled, and the impetus given to the development of pan-tribal identity and solidarity.

On the negative side, the foregoing account has provided numerous examples of failures of capacity (among other factors) on the part of people of Kayasan. Lapses in boundary defense have included: aborting the process of marking the CADC boundary, allowing new migrants to settle, failing to apply for a locally controlled rattan concession, and failing to exclude illegal almaciga middlemen and collectors working under expired licenses. Many disappointments have resulted from failures in leadership.

The story is far from over. The formation (and disintegration) of social capacity requires time. The capacities of the indigenous people of Kayasan, together with their allies,

proved sufficient in the triumph of their struggle to gain ancestral domain certification. The following year, however, their efforts to defend domain boundaries and implement certification provisions suffered numerous disappointments. While powerful exogenous factors significantly influenced these outcomes, the lessons learned may themselves contribute to community capacity building, suggesting possible avenues for more effective local response within the room for maneuver that the external context allows.

What role has indigenous identity formation played in the development of local capacity? Although local efforts to defend the territorial boundaries of ancestral domain initially met with uneven success, the experience helped to amalgamate the social boundaries of indigenous identity. Exogenously generated forces of migration and the market were eroding the distinctive features of separate Batak and Tagbanua identities while providing the impetus for those groups to cohere around a pan-tribal, generic *katutubo* identity. To what extent did NGO interventions and later the struggle for and implementation of ancestral domain further this process?

In Palawan, as elsewhere in the Philippines a number of NGOs supply pathways of access to resources, assistance, and influence to constituents specifically on the basis of their indigenous status. The focus on indigenes is currently the *raison d'etre* for a number of NGOs and serves them as an effective strategy for raising foreign interest and funds. Playing the indigenous card has not only raised donor assistance, it has facilitated the extension of networks for exchanging political support and practical information to an international level.

In addition to incentives offered by NGOs, the formation of a shared indigenous identity has been promoted in Kayasan by a complement of other factors: (1) the sense of mutual opposition to migrants, (2) the fit with the state endorsed conception of the tribal-Christian dichotomy, (3) a common, marginalized economic position, (4) historical Batak-Tagbanua cultural affinities, including similar livelihood practices, (5) the loss of distinctive cultural markers, and (6) Tagbanua encroachment on the Batak land (to the extent that Batak and Tagbanua interests are not identical, the Batak are losing out.) Hence, while in some respects Batak and Tagbanua are losing pieces of past identities, through engagement in identity politics they are gaining political, economic, and territorial space within which to fashion a new, shared identity; although with unequal voice in this process.

The ancestral domain claim constitutes the territorialization of identity through the formalizing, mapping, and locating on the ground of resource claims tied to this identity. In Kayasan, however, this claim was simultaneously de-territorialized in the sense that claims to individual access rest on being indigenous, rather than personal historic ties to that particular landscape. For that reason, compounded by kin ties and a broader ethic of access, it is difficult for the Batak and Tagbanua of Kayasan to exclude any non-local indigene from access to the land and resources of their CADC area. The tension arising between the simultaneously identity-based and place-based nature of resource claims adds to the challenges facing local capacities for sustainable resource management.

What remains to be seen is if the people of Kayasan can deploy this identity, their ancestral domain certificate, and their experience, together with pathways of alliance and access in tackling the very real conditions of their marginality and poverty. They know that boundaries are not enough.

CONCLUSION AND POLICY IMPLICATONS

It is not only in Kayasan that indigenous demands take the form of claims to territorial boundaries and rest on an assertion of shared identity and history. Indeed, the quest for state recognition of exclusive rights over particular landscapes is the crux of many indigenous peoples' struggles worldwide. All these campaigns take place in the context of globally linked political and economic processes, involving markets, the movements of peoples, and state actions that shape and limit the possibilities for achieving indigenes' aims of autonomy, protection, or exclusive access. In addition, the policies promulgated by states to respond to and/or contain these demands often establish territorial boundaries, such as those delimiting reservations, regions of self government, or areas under some intermediate status. In many instances boundary-based policies share some of the flaws this study has identified in the Philippine government's institution of the CADC. Namely, such policies misconstrue boundaries as lines rather than as social relationships, imposing or assuming an inaccurate degree of fixity, linearity, singularity and impermeability to territorial boundaries; they also imagine a false homology between boundaries of territory and of identity. To some extent, the loss of accuracy and flexibility entailed in accepting the state's simplifying interpretation of boundaries (as opposed to the way they are realized in practice) may serve indigenous Kayasans' interests and represent an acceptable trade-off in return for legitimization. In contrast, the failure to enable boundary crossing pathway relationships of exchange (trade) and access to political and financial capital initially left Kayasan's indigenes without the resources to defend their boundaries and achieve their aspirations for an improved livelihood.

In many respects, this should not be a surprise. Government policies designed to modify one component of a complex situation should not be expected to transform its entirety. The implementation of a given policy exerts its effects within the context of a long history of state actions and a wider web of shifting political and economic relations and conditions. However, whatever the limitations of the state's policy and its delivery, the opportunity the CADC provided for state legitimization and the support from NGOs it helped attract built on the nucleus of a newly emerging, pan-tribal indigenous identity that had formed in response to pressures from the market, migrations, and previous state interventions. This shared identity, the experience garnered in the quest for the CADC itself, and alliances with NGOs are developing local capacity in ways that may yet enable the defense of territorial boundaries and the locally beneficial exploitation of pathways.

To what extent might these findings for Kayasan pertain elsewhere? In this concluding section I will address this question in two ways. First, I will briefly reconsider the analytical framework and general theoretical argument developed in this paper. Second, and at greater length, I will discuss what can be learned from the case in Kayasan that might apply to other locations in the Philippines as well as to a broader evaluation of the limitations of boundary-based policies (and indeed policy in general) in multiple contexts.

The general thesis advanced states that the degree of local success in enforcing boundaries is related to the balance between external pressures and opportunities, the perceptions on both sides of the boundaries of their legitimacy, the strength of local identity and capacities, and the extent to which pathways of access, exchange, and influence reinforce or undermine these factors. When do pathways build up boundaries and when do they break them down? Lessons learned in Kayasan suggest that pathways degrade boundaries when they directly breach them (i.e. let in what the boundaries were intended to exclude), deplete or fail to supply the resources needed to enforce them, undermine local capacities to defend them, or reveal them as irrelevant or unnecessary to the would-be boundary builders. In contrast, pathway relations reinforce boundaries when they provide resources, develop local capacities and/or directly assist in efforts to establish and defend them (including by persuading others

of their legitimacy). Pathways of alliance can help develop boundaries of identity. Identity itself can serve as a resource, strengthening local cohesion and capacities to defend territorial boundaries and pursue pathways of interest. Identity, in turn, may also be deployed to attract external resources and allies and to gain political voice, opportunity, and leverage in achieving local ends.

Anywhere in the Philippines (or any modern nation), boundaries certified as ancestral domain are likely to reflect a mismatch of spatial and temporal scale, reflecting the current location of the claimants, constricted by historical circumstance from a once more widespread distribution. The assumed match between boundaries of territory and identity is rendered highly problematic, given the fact that both are mutable, shaped by colonial constructs, and subject to re-working by succeeding state interventions, economic pressures and opportunities, migration, intermarriage and a host of other factors. Additionally, the failure to authorize commercial resource extraction and pathways of trade for CADC-holders (or to address their chronic shortage of capital) can be seen as part of a further attempt at an economic (and environmental) fix. This approach doesn't fit in the Philippines (or most other places), where indigenous people, like others, trade, migrate, and mingle.

The people of Kayasan, and doubtless elsewhere, are well aware of these tensions. They experience conflicting motives: on the one hand, they wish to maintain their boundaries, and receive legitimacy from the state to protect their territory, resource base, and individual land claims from state agents (e.g. national park rangers) and migrant incursion and commercial competition. The CADC provides a limited basis for accomplishing these ends. On the other hand, indigenous Kayasans simultaneously wish to strengthen trade pathways and succeed in commerce. Here the CADC provides no help.

In order to capture the gains in boundary security promised, the indigenes invited state intervention by applying for ancestral domain certification. In so doing they accepted a technical map displaying a distorted and difficult to recognize periphery, a diminished territorial claim, the loss of flexibility in their boundaries, and various conditions limiting their rights to manage and exploit resources (e.g. the submission of an Ancestral Domain Management Plan). In this way, the pursuit of the CADC strategy may be said to play into the state's territorializing objectives: to fix its populace and control access to resources. At the same time, however, the process of applying for state certification involved elements of counter mapping: members of the community guided the mapping process, in a manner (notwithstanding tactical compromises) based on local knowledge, with assistance from NGO allies, and in an adversarial relationship to the bureaucracy regulating natural resources (as elsewhere to local government).

Once the lines are mapped and certified by the state, then what? The people of Kayasan looked to the state not only to legitimize, but to enforce these boundaries. Assistance from the resource bureaucracy in excluding migrants was not forthcoming. Even if the intent were there, the state lacks the capacity to undertake this effort across the nearly 8,000 ha of Kayasan's domain, not to speak of the 2.5 million ha that eventually came under ancestral certification nationwide. More significantly, the CADC does not provide local control over resources; rather it recognizes a claim. Crucial ambiguities in the policy instrument left it open to multiple interpretations and to national level political struggles and legal challenges. In practice, this meant that domain certification alone was insufficient to authorize the local management of resources and, most essential for Kayasan, the commercial extraction of forest products. Such authorization, therefore, had to be obtained from local and provincial authorities with whom the people of Kayasan were in a weak negotiating position. Their NGO allies, furthermore, have more influence with provincial and national levels of the resource bureaucracy management than with its provincial and local line officers. Lower levels of government are similarly more responsive to local elites than to NGO advocates.

At the same time that the CADC represents a furthering of state control over indigenous resources, it also invited an expansion of influence on the part of national and international NGOs, as well as foreign donors. The essential part played by NGOs is clearly evidenced by the fact that each of the five CADCs ultimately granted in Palawan went to a site receiving major NGO support. Alliances with these external sources of resources, including capital, information, training, and political influence were for the most part well received, and indeed sought after, in Kayasan; many residents, particularly the leadership, invested much energy in these new pathway relationships.

Interactions with NGOs promoted certain forms of identity in Kayasan. NGOs did not regard the distinction between Batak and Tagbanua as important; rather, they advanced the concept of a pan-tribal (*katutubo*), indigenous identity on the basis of which alliances could be formed, resources garnered, and unique claims to resource access made on the state. Thus, indigenous identity itself becomes a resource. Neither purely primordial nor entirely instrumental, indigenous identity is rooted in shared historical experience, including a rich connection to and knowledge of particular landscapes, agroecosystems, and forms of livelihood. The indigenous people of Kayasan could themselves appreciate this commonality with other indigenous groups, as well as their shared, marginalized structural position (indeed Kayasans hosting an international delegation immediately referred to a Dayak visitor as a fellow *katutubo*).

In such struggles, many indigenous peoples are coming into a position of particular political advantage (notwithstanding the manifest disadvantages they also experience). Indigenous identities are uniquely linked to place and therefore their territorial claims carry a particular weight among receptive audiences. Indigenous peoples are assumed to practice environmental stewardship, which gains them the support of environmentalists. Indeed the network of NGOs whose advocacy is based primarily on a commitment to indigenous rights is significantly smaller than those whose support rests more strongly on environmental grounds. Hence, being indigenous becomes a viable political identity and resource where it can serve as a basis for alliances with extra local organizations, drawing on popular discourses and local to global social movements championing indigenous rights and environmental protection.

Yet, the evidence examined so far suggests that indigenous capacity under current conditions in Kayasan is not sufficient to defend boundaries and pursue pathways in a manner that matches local expectations of the benefits the CADC would bring. Nor is there the capacity (or necessarily the intention) for residents to defend boundaries, moderate the scale and rotation of slash and burn farming and regulate the pathways of forest resource trade to a sustainable rate, one that maintains the environmental conditions that underpin traditional ways of life, which outside conservationists value.

But where is the problem? With local capacity? Or with the policy and its underlying assumptions? The Philippines' ancestral domain policy rests on a series of premises about indigenous cultural communities that have been found not to hold in Kayasan: among them clear and congruent social and territorial boundaries (and other features shared among persistent common property regimes). The policy is designed to achieve its objectives of securing indigenous land rights, environmental conditions, and state control primarily through the single act of certifying the boundary on the landscape. I have argued that boundaries alone won't work. Pathways matter. Note that the hypothesis that boundaries will suffice is common to a wide range of governmental policies, such as those concerning conservation, and also forest and land use classification and management, some forms of community-based resource management and even land reform. Policies, therefore, should be designed with due consideration to both boundary and pathway relationships and must provide for their flexible interaction. In other words, where a policy restricts access to certain resources to target groups (by establishing boundaries), it must also provide access to supportive resources (by enabling

pathways) in order to convey a degree of local control, and it must leave in place the flexibility to adapt to changing circumstances (e.g. modifying what or whom a boundary excludes and even its location).

It is particularly relevant to consider the analogous problems that have been found to attend boundary-based approaches to environmental conservation. Politically feasible boundaries often define a territory that is too small to preserve the full complement of biodiversity in a given ecosystem even under relatively static conditions. Even expansive conservation units are almost always insufficiently large, or flexible, to allow adaptation to changing circumstances. If surrounding settlement patterns and political realities make it impossible for conservation boundaries to flex or expand, then pathways may save the day, allowing gene flow within larger populations and corridors for regular migrations and periodic movements to for example, evade drought. Moreover, like it or not, pathways must be attended to not only the breaches made by human settlers and resource extractors, but by invasions of exotic species and the like.

Even if well crafted and flexible boundary and pathway policies were in place, deeper structural conditions might well undermine goals of either conservation or self-determination. In the case of Kayasan, even the exclusive right to extract and trade forest products would not achieve local resource control and benefits if the structure of the market continues to place primary producers in such a weak position, leaving them open to volatile international prices and shifting political winds. Thus, treading a fine line between blaming the victim and denying agency, we recognize that the particular situation, character, and capacities of a community can indeed make a difference, but not in the absence of enabling structural reform. Communities can counter imperfect boundary-based policies by forging pathways of their own; they can endeavor to address deeper structural obstacles by building coalitions, but these may need to go past identity-based affinities.

The policy that created the CADC was flawed not merely because of the limitations of its boundary-based approach. Rather, the deeper (and common) flaw lies in generating expectations that one intervention could address systemic problems. Any policy targeting indigenous people in the Philippines must operate in the context of massive imbalances of power, the peoples' social and political marginalization, their poverty and disadvantaged position in markets unfavorable to rural producers, and mounting environmental pressures. Clearly, no policy could provide a simple fix, even if it was intended to do so. Nonetheless, policies also have unintended consequences. The CADC represented for the people of Kayasan and other indigenous Filipinos an incremental advance in their quest for land rights, and the processes it engendered served as a catalyst for developing local capacity and forging a shared identity, and thereby perhaps the further basis for a coalitional politics to bring about deeper, structural change.

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CHAPTER TWENTY-THREE

THE IKALAHAN IN NORTHERN LUZON

Delbert Rice and Moises O. Pindog

BACKGROUND

We could put a longer title to this paper but the word Ikalahan actually says it all. It is our tribal name and literally means people of the mossy upland forests. By definition, the Ikalahan are a forest people and have been since time immemorial. The Ikalahan are caretakers of the forest. Their indigenous technologies, language and even their social structures are all appropriate to that role.

For centuries the Ikalahan lived in the mossy rain forests of Northern Luzon using sustainable hunting, gathering and swidden agricultural techniques. They protected their environment, their resources and their culture. Shortly after World War II, however, foresters from the newly established Philippine government told them that they were only squatters in government forests. With that in their minds there was no more reason for them to continue protecting those forests. Degradation was rampant from 1950 to 1970.

In 1970 the Ikalahan people near Santa Fe began their battle to have their tenure over their ancestral lands legally recognized. They organized themselves as the Kalahan Educational Foundation (KEF) and in May 1974 they finally succeeded in getting the government to sign memorandum of agreement no. 1 covering nearly 15,000 ha of their ancestral lands. In spite of the past degradation, the high (700 to 1700 m.a.s.l.), steep (averaging 45 degrees) slopes still retained significant forests, many of them old growth, and the people began to act like owners, again, instead of mere squatters.

Prior to 1974 the Ikalahan felt no need to protect the watershed. They had at least 3,000 mm of rainfall every year; more than they needed. To benefit people downstream, however, they agreed to protect the watershed in exchange for land security. There was no precedent for such an agreement but it was a very respectful contract and the people accepted it willingly and fulfilled it diligently. Forest protection and improvement were the goals for everyone and within only a decade the barren slopes were covered with new growth and the brown run-off water during typhoons turned white.

Parenthetically, memorandum of agreement no. 1 became the model for the Integrated Social Forestry (ISF) program, which Presidents Ramos and Arroyo have declared to be the key to national development in the uplands.

You can't eat trees, however. The people also needed to improve their livelihood but they could not expand their agriculture because it would damage the watershed. They could not enlarge their pastures or increase their livestock for the same reason. They needed to find a way to improve their income while still improving the forests.

WILD FRUIT

After much trial and error they finally realized that they could harvest forest fruits and process them into high quality jams and jellies. If people got their cash income from the fruits, they would not want to cut down the trees. They could continue their swidden farming for family food but the farms and pastures could be smaller because much of their cash would come from harvesting wild fruit. The fruits, of course, are a renewable resource because most of the trees bear fruit every year. The people, therefore, opened a small food processing center in Imugan in 1980 with the help of a technically capable volunteer.

It was not easy. It has taken a long time and the people have made many mistakes but they finally improved the products, standardized them and developed a market. Guava (*Psidium guajava*) was the first fruit they used. The amount of waste after making jelly, however, was huge so they developed recipes for guava butter, guava jam and guava vinegar. Now the waste is almost negligible.

Dagwey (*Saurauia bontocensis*) had never been used before. It was too sour to sell in the market but could be processed into a product like raisins that had a ready market. Dagwey jelly, spread and vinegar could be made from by-products, again without negligible waste.

The community became interested in the program and started bringing in new fruits to be tested. Biho-lak (*Embelia philippinensis*) was one of them. Its grape-like jelly was excellent but city people could not pronounce its name so it had to be renamed. It is now called dikay jelly.

Passion fruit (*Passiflora edulis*), santol (*Sandicorum koetjape*) and ginger (*Zingiber oficinale imugani*) soon joined the program. Then two blossoms joined the list of raw materials that produce jelly: roselle blossoms (*Hibiscus sandariffa*) and the blossoms of the gumamela (*Malvaviscus arboreus*).

Forest wildlife also depends on the wild fruits. The people limit themselves, therefore, to 15 percent of the naturally produced fruit. The remaining 85 percent is food for the wildlife, which includes, we must admit, our children and grandchildren. A year ago we harvested 24 tons of guavas which approached the 15 percent level. The foresters began producing seedlings and planting them in the forests to increase the natural production. They have done the same with dagwey which is much more difficult to propagate.

The food processors also desired to make marmalade but the wild citrus were not suitable so they had their foresters plant a few scattered citrus orchards. They intercropped various deterrents with the citrus to keep pests under control and other plants to improve the fertility. No chemicals are allowed.

FOOD PRODUCTION

It is always wisest, especially in these days of the global market and wildly fluctuating prices, for a community to be able to provide for its own basic needs, especially food and housing. Most of the Ikalahan have avoided the temptation to put all of their efforts into cash crops. They maintain a portion of their lands for products that will be directly consumed so that if the market crashes, as it often does, their families will still eat and have a place to live.

OTHER NICHES

Balanced biodiversity is the key to a good sustainable environment, especially in the forests which are rich in biodiversity. Economic diversity should, therefore, be a key to maintaining

that balance. The Ikalahan do not want to depend on a single source of income. They are developing several other ecological niches for *Homo sapiens*.

A few staff members of the foundation and several farmers are raising organic vegetables for the market. The vegetable fields are scattered and predators abound in the surrounding forests so pests are not a serious problem. The market is growing rapidly. The production is labor intensive but profitable. These include raising orchids from the wild genetic stock. It takes four years from seed to a marketable plant and the laboratory work is very difficult but the people are doing their best to get it started.

Mushrooms are finally being produced in commercial quantities. The foundation staff is producing the spawn and the farmers are raising the mushrooms. The cool moist climate is the primary resource being used. Medicinal plants and essential oils may be developed in the near future. These are still being researched.

FURNITURE

As the foundation staff members studied their forest they realized the need to improve it continuously. They also observed, however, that when the forest canopy closed, the production of wildlings slowed down or even stopped. That would be counter-productive. Together they developed what they now call Forest Improvement Technology (FIT), which is a systematic method of culling the forest regularly to improve the quality and speed the growth without any negative impact on the biodiversity or effectiveness of the watershed.

The Ikalahan have been implementing the FIT for more than ten years and it has effectively improved the forests and expedited their growth. It has provided all of the lumber needed for housing but less than 5 percent of the trees were used. More than 95 percent remains in the forest.

The FIT is not really new to the Ikalahan. The ancestors have been doing it for centuries. We have only systematized it to make it clear to the Department of Environment and Natural Resources (DENR) and more usable for this present generation.

Because of the regular culling, the forests are already growing faster: the growth rate is increasing by about 7 percent each year. The time will come very soon when the housing needs of the local population will not be able to consume all of the lumber being produced. Then it will be necessary to establish a local furniture industry to utilize the available lumber. This, too, will provide income for several families.

WILDLIFE PROTECTION

The Ikalahan discovered more than forty species of endangered flora and fauna in their forests. In addition, several species of birds seem to be unique and have never before been identified. The people have, therefore, set aside about 3,000 ha of their forests as sanctuaries for protection of biodiversity. Hunting in the production forests is strictly regulated. Inside the sanctuaries hunting is absolutely forbidden. The protection of the flora and fauna does not provide any direct income to the Ikalahan families but it does improve their agriculture and the quality of life.

FOREST SERVICES

All of these niches allow the Ikalahan to expand and improve their 10,000 ha of production forests while still obtaining an adequate livelihood. The people are working but the forests are also working. They, too, should be remunerated for their work.

The farmers in Isabela province have greatly benefited from the Magat River irrigation system. About half of the water behind the Magat Dam, however, came from the Ikalahan ancestral domain. The protection given to that area stabilizes the flow and reduces the siltation in spite of the damage caused by the 1990 earthquake. It is unfair, however, for the Ikalahan to bear all of the costs of providing the water while other people receive all of the benefits. The Ikalahan should receive proper remuneration for their investment in watershed protection. The foundation will soon be able to quantify the amount of water being supplied to the Magat irrigation system and the proper system should then be arranged to eliminate the unfairness.

CARBON SEQUESTRATION

The United Nations has established the principle that the polluter should pay. The Kyoto Protocol recognizes that rapidly growing forests are the most effective means for sequestering the millions of tons of carbon dioxide that are causing global warming and changing the world's climate.

The Ikalahan began ten years ago to measure the growth rate of their 10,000 ha production forests. The data is very clear that the most effective means of sequestering carbon is to protect the maturing forests. It takes a long time for newly planted plantations to begin to sequester any significant amounts of carbon. The Ikalahan will soon be ready to state how many thousands of tons of carbon dioxide are sequestered each year by their forests. They are preparing themselves to dialogue with some of the larger polluters of the atmosphere and insist that they, the caretakers of the forests, should be remunerated for the services that the forests render.

SOCIAL CHANGE?

In viewing the Ikalahan developmental programs during the past several decades, very few social changes have been needed with the exception of the establishment of a food processing center. A factory had never before existed in the community. Other than that, however, the strongest influence for sustainable development among the Ikalahan has been the cultural continuity in the community.

The tribal elders are still very active in solving community problems. We still wear our old costumes on special occasions. We still sing the old songs and dance the old dances with vigor and joy.

Although most of our people are now Christian, they show their Christian faith in their own Ikalahan way, not merely aping foreign patterns. We have a missionary working with us but instead of him teaching us western methods of living, he is helping to write a manual for us parents to use to teach Ikalahan culture to our children and grandchildren.

We believe that this is as it should be. The Ikalahan ancestors managed their forest environment in a sustainable way for centuries before modern technologies created the havoc of pesticide poisoning, global warming, and a host of other problems.

Thirty years ago our elders saw the danger in too much rapid social change. They established the Kalahan Academy to enable our children to learn modern technologies within the Ikalahan setting so that they would not be emotionally disturbed. We consider our children to be our most important assets. They usually want to be educated, and we want them educated, but we do not want them to lose their respect for their own culture. When they finish their education we want them to apply what they have learned within their own community. This is one of the most pressing reasons for promoting resource processing in the communities. By selling furniture instead of logs or lumber, jelly and vinegar instead of raw fruit, the community is not only maximizing its resources; it is also providing satisfying employment opportunities for its own youth. They will, therefore, be highly motivated to return.

The Ikalahan already have engineers, foresters, mechanics, a physician, a dentist, accountants, several teachers and entrepreneurs who have come home to serve their own communities. They also provide leadership to the community as barangay captains, council members and as Mayor. Some of them will soon be recognized as tribal elders. That is another very important part of providing for sustainable development.

SUMMARY

The Ikalahan learned that they needed to plan holistically and they needed to do it themselves. Although they have benefited from advice from various consultants, they could not allow others to do the planning for them. They had to do it themselves and they had to do it holistically and learn to live with the environment. If they tried to exercise excessive control over the environment, everyone would suffer. They have found that by living with the environment they have a better quality of life.

CONCLUSIONS

In conclusion, to address the theme of this conference, we feel that social change is greatly needed to promote sustainable development. Changes that are not sustainable, should not even be considered as development. They are just changes; changes without genuine development.

The societies which must undergo the most change, however, are not the indigenous peoples. The societies that need to adjust their thinking are the societies of bureaucrats and big businesses. They continually try to manage the environment instead of learning to work with it and allow people to participate constructively as the ancestors of the Ikalahan and other indigenous peoples have been doing for centuries.

We are very grateful for this conference and hope it will have the desired impact and bring about the needed changes so that all the children of this nation can enjoy a future without hunger, intimidation or fear.

CHAPTER TWENTY-FOUR

CONTESTED CROCODILES? PHILIPPINE CROCODILE CONSERVATION AND INDIGENOUS PEOPLES' RIGHTS IN THE NORTHERN SIERRA MADRE

Jan van der Ploeg and Merlijn van Weerd

ABSTRACT

The Philippine crocodile (*Crocodylus mindorensis*) is a critically endangered freshwater crocodile endemic to the Philippines. A small and fragmented population in the Northern Sierra Madre, Northeast Luzon, is currently considered to offer the best prospects for the survival of the species in the wild. Based on a detailed case study, the declaration of a Philippine crocodile sanctuary in Dinang Creek in the municipality of San Mariano, we review some of the premises on the relationship between indigenous peoples' rights, rural poverty alleviation and biodiversity conservation. The Kalinga are the indigenous people in this area. In Dinang Creek, crocodiles have survived as the unintentional consequence of a set of traditional beliefs and practices. However, Kalinga society and culture goes through a process of rapid change. As such these indigenous conservation practices are no longer a viable basis for protecting the Philippine crocodile in the wild. Paradoxically, it appears that Kalinga indigenous' rights are used to mobilize resistance to the plans of the local government unit to establish a crocodile sanctuary. We argue that the micro-politics of crocodile conservation in San Mariano is not simply a struggle between indigenous people and conservationists for control over natural resources but rather the manifestation of broader political conflict in contemporary Philippine society. We conclude that the polarized discourse on conflicts between social justice advocates and environmentalists is in this particular case not particularly helpful in gaining an in-depth understanding of the current local reality.

INTRODUCTION

In October 2003, the Kalinga Minority Organization (KMO) put up a protest banner in the municipality of San Mariano: "*Ipaglaban and karapatang angkinin and lupang pinaghirapan ng mga Kalinga!! Tao ang mahalaga kaysa sa buwaya!*" (Fight for your rights to own the land for which the Kalinga sacrificed so much!! People are more important than crocodiles). This powerful message, written in Ilocano, seems to encapsulate the divergent interests between indigenous people and conservationists in the Northern Sierra Madre. Here, conservationists aim to protect the critically endangered Philippine crocodile in its natural habitat, apparently clashing with local communities who fear that their traditional rights will be violated. On first sight it appears to be a classic case in the growing body of literature on resource conflicts between external conservation agencies and indigenous people. Or isn't it?

On one hand, conservationists have been criticized for violating indigenous peoples' rights by seeking to preserve a western notion of nature through reinforcing the power of the modern state bureaucracy (Peluso 1992; Colchester 2003; Chapin 2004). The rapidly growing field of political ecology has rigorously documented how coercive protection of wildlife has jeopardized the livelihoods of indigenous people (Bryant and Bailey 1997; Ghimire and Pimbert 1997; Bryant 2000). On the other hand, there is growing criticism of presenting indigenous peoples in harmony with nature in a too romantic light. Social and cultural change and population pressure erode the sustainability of natural resource use by indigenous peoples and control over natural resources by indigenous peoples does not automatically provide a guarantee for sustainable use of natural resources (Utting 2000; Kuper 2003; Lu Holt 2005).

This paper describes the political dynamics of Philippine crocodile conservation in Dinang Creek and the responses of local inhabitants. We try to refute the accusation on the protest banner, echoed in political ecology, that conservationists put the preservation of nature above the interest of indigenous peoples. We argue that this view has little relevance for Philippine crocodile conservation or for indigenous peoples' livelihoods and social justice, and renders a critical analysis of the contemporary reality in the Philippine uplands impossible.

Let us, from the beginning, clarify our own position in the spectrum between human rights protagonists and environmentalists. This paper is largely based on our experiences in the Crocodile Rehabilitation, Observance and Conservation (CROC) project, which aims to conserve the Philippine crocodile in the wild in Northeast Luzon. Over the past years we have made regular visits to Dinang Creek to monitor the crocodile population, supervise students and talk with farmers, barangay officials and community leaders how best to protect the crocodiles. As such this paper can be read as a justification of our actions to protect crocodiles. We recognize that reinterpreting political events such as described above while being a player in the game, brings us in a rather vulnerable position. But we feel a need to distance ourselves from the rather simplistic and one-dimensional representations of nature conservation and indigenous peoples' rights in current debates about the conflict or convergence of social justice and biodiversity conservation agendas.

This paper is structured as follows. First, we will give a short background on the Philippine crocodile conservation program in the Northern Sierra Madre. Second, we introduce the reader to the limited ethnographic information that is available on the Kalinga. Third, we present a detailed case study of crocodile conservation activities in Dinang Creek. Two facts clearly stand out. One: crocodiles have survived in Dinang Creek due to an indigenous conservation ethic. Two: the indigenous community fears that crocodile conservation will impose restrictions on resources on which they depend, and consequently resists these efforts. However, the struggle of the local community is not primarily about the control over resources, let alone crocodiles. The indigenous people in Dinang Creek are part,

often unwillingly, of a much larger social conflict in contemporary Philippine society: the violent insurgency of the New Peoples Army (NPA). In the final paragraph we aim to respond to the challenge to conservationists (Chapin 2004) and stress the importance of including a social justice agenda in crocodile conservation activities as a matter of principle and of pragmatism.

THE PHILIPPINE CROCODILE

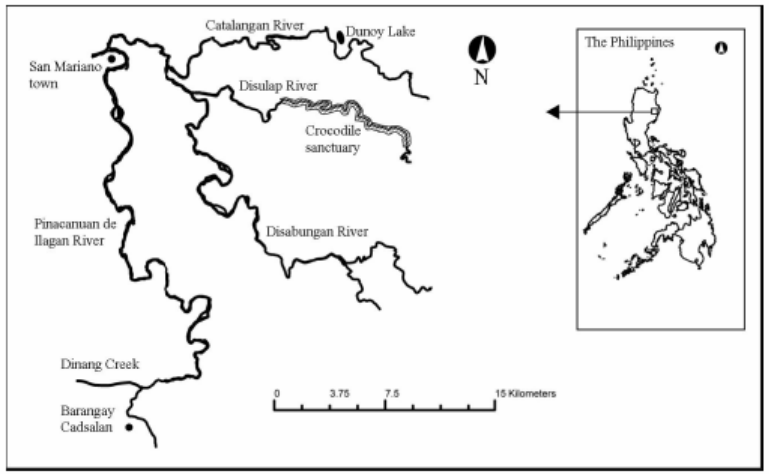
The Philippine crocodile (*Crocodylus mindorensis*) is a small freshwater crocodilian endemic to the Philippines. Intensive hunting, unsustainable fishing, and habitat loss have decimated the population below critical threshold levels throughout the Philippine archipelago (van Weerd and van der Ploeg 2003). The last nation-wide population estimate put the total number of surviving non-hatchling Philippine crocodiles at one hundred, making it the most severely threatened crocodile species in the world (Ross 1998). *Crocodylus mindorensis* is listed in the IUCN red list as critically endangered (IUCN 2005). Responding to this alarming situation, the Department of Environment and Natural Resources (DENR) established a captive breeding program in 1987: the Crocodile Farming Institute (CFI). CFI has successfully bred Philippine crocodiles in captivity, but no crocodiles have so far been re-introduced in the wild. Negative community attitudes towards crocodiles make such a re-introduction almost impossible (Banks 2000). In the Philippines, where the much larger and potentially man-eating estuarine crocodile (*Crocodylus porosus)* also occurs, crocodiles are generally perceived to be dangerous. However, no fatal attacks on people are known from the Philippine crocodile. Since October 2004, the species is officially protected by virtue of Republic Act 9147, the Wildlife Act.

In March 1999, Mr. Samuel Francisco, a fisherman from *sitio* San Isidro in the municipality of San Mariano, accidentally caught a crocodile hatchling in Disulap River. Previously thought to be extinct in the wild on Luzon (WCSP 1997), this by-catch opened the possibility for *in-situ* Philippine crocodile conservation. A Philippine crocodile conservation program was set up by the Dutch funded Northern Sierra Madre Natural Park-Conservation Project (NSMNP-CP), an integrated conservation and development project implemented by Plan International. These conservation activities were sustained by the Crocodile Research, Observance and Conservation (CROC) project of the Cagayan Valley Program on Environment and Development (CVPED) mainly with funding from the British Petroleum (BP) conservation program. Since July 2003, the CROC project is an officially registered Philippine non-governmental organization with the aim to protect the Philippine crocodile in its natural habitat: the Mabuwaya Foundation Inc.

Extensive surveys in San Mariano identified three breeding areas with a total minimum population of thirty-one non-hatchling Philippine crocodiles in 2003 (van Weerd and van der Ploeg 2003): Disulap River, Dunoy Lake and Dinang Creek (see figure 1). Having few ecological similarities, Disulap River is a fast flowing river surrounded by secondary forested lime stone cliffs, Dunoy Lake a small natural depression with stagnant water at the forest fringe, and Dinang Creek a near-stagnant creek in an intensively used agricultural area. These areas share one common trait that might explain the occurrence of remnant populations of Philippine crocodiles: they are inhabited by indigenous people. Especially in Dinang Creek the role of indigenous people in the survival of the Philippine crocodile becomes apparent. Here, the traditional belief systems and resource use practices of the Kalinga prevented the killing of crocodiles, and although these cultural attitudes are now rapidly changing they gave some form of protection to the species. Had the people wished to kill the crocodiles, as happened throughout the Philippines, they could have easily done so.

This is in stark contrast to the wetlands in San Mariano used and controlled by Ibanag or Ilocano farmers where crocodiles were exterminated.

Figure 1: Crocodile localities in San Mariano



A short history of San Mariano reveals much about the processes affecting crocodiles and indigenous people throughout the Philippines. The indigenous peoples of the area, the Agta and Kalinga, depended heavily on the rivers and streams for fish, but had very limited impact on the crocodile population. In this paper we will focus exclusively on the Kalinga. For the sake of the argument we do not include the Agta in the equation; the specific problems surrounding the Agta and their fundamentally different modes of production and organization need specific attention. Agta do not directly live along Dinang Creek and have as such little relevance to the case presented here.

In 1896, the Spanish colonizers established an administrative center on the convergence of the Pinacanauan and Disabungan rivers, and called it San Mariano (Keesing 1962). It marked a turning point in the political control of the area and the fate of the Philippine crocodile. San Mariano experienced a steady influx of Christian Ibanag migrants (Huigen 2004). These groups claimed the best agricultural lands along the extensive riverbanks and flood plains for the cultivation of upland rice, root crops, vegetables and bananas. Crocodiles were regularly killed, but human population was too low to severely threaten the animals: in 1939 there were 7,046 people in San Mariano (Keesing 1962: p. 262). With the construction of Maharlika highway in the 1960s logging corporations expanded their operations to the forests of the Northern Sierra Madre (Van den Top 2003; Persoon and van der Ploeg 2003). A large inflow of impoverished immigrants from Ilocos followed the logging companies and settled in the region, in many cases acquiring the lands of the Kalinga. As of today, 53 percent of the people in San Mariano are of Ilocano origin. These farmers can still recall the days that crocodiles were widely distributed in San Mariano: in the 1960s large crocodiles were still observed in the Pinacanauan and Disabungan rivers. In the 1970s,

commercial hunters from Mindanao systematically searched the river systems of the municipality killing crocodiles for the trade in hides. As a result, the crocodile population collapsed. Rapid economic change continued to threaten the remnant crocodile population: intensive fishing regularly killed crocodiles and freshwater swamps and marshes were converted into rice paddies. Crocodiles were often captured: purposively for the pet trade or accidentally in fishing nets. These factors, combined with a strongly growing human population, in 2000 San Mariano had 40,995 inhabitants, jeopardized the survival changes of the species in San Mariano. The Kalinga who inhabited the river valleys of San Mariano met a similar fate: they were assimilated into mainstream Ilocano society (Scott 1979). San Mariano appears to offer clear evidence that loss of cultural diversity is intricately linked to the loss of biological diversity.

THE KALINGA

The Kalinga are widely considered as the indigenous people of the region currently known as San Mariano. In an article published in 1861, the German naturalist Carl Semper first made notice of the Kalinga: "*Nirgends aber sah ich größere Eintracht und Friede, größere Ordnung und Zufriedenheid ohne das mindeste Zuthun irgend einer obrigkeitlichen Gewalt, die sie nich kennen, als in der einen Hälfte de Rancheria's der Iraya's* (…). *Diese Iraya's oder Calinga's bewhohnen das Flußgebiet des* (…) *Rio de Ilagan*". (Nowhere have I seen more unity and peace, more order and satisfaction without the least need for violence of government, which they do not know, as in the Rancherias of the Irayas. (…) These Irayas or Kalinga inhabit the watershed of the Rio de Ilagan) (op cit.: p. 255-56). Semper described the Kalinga as a distinct cultural community, calling themselves the Iraya or Catalangan: "*Naturvölker (…) die frei von fremden, indischem, muhamedanischem oder chinesischem Einflus geblieben sind*" (a primitive society (…) free of foreign, Indian, Muslim or Chinese influences) (op cit.: p. 253)

There seems to be some confusion over the term Kalinga. The general term Kalinga appears to be mainly used by the Ibanag communities in the lowlands of Isabela to describe the infidel tribes in the mountains: *kalinga* literally means enemy in Ibanag (Scott 1979). Hence, the confusion with the people of Kalinga Province in the Cordillera Mountains with whom the San Mariano Kalinga have no direct historical, economic, cultural or linguistic connections. Also the term *iraya* has an Ibanag origin, meaning upriver (Keesing 1962). Early Spanish sources talk about the Catalanganes (Scott 1979). Blumentritt (1890) referred to the Irayas in *Las Razas del Archipelago Filipino*. Otley Beyer (1917) on his turn distinguished three groups: the Kalibugan, the Katalangan and the Iraya. And in his book 'The ethnohistory of Northern Luzon', Felix Keesing (1962) mentioned that: "On the Sierra Madre side, the Gaddang speakers are sometimes called Kalingas, in the general sense of "enemy" mountaineers, or else have local river names such as the "Katalangan" and the "Kalibugan." But one group east of Ilagan is still called Irraya. Their numbers are small, and they are dry cultivators except as they have adopted lowland wet cropping in contemporary modern times" (op cit.: p. 239). William Henry Scott, based on his visit to San Mariano in 1978, called these groups Kalingas, simply because that's how they were called in San Mariano (Scott 1979). Indeed, today the people refer to themselves as Kalinga. This rather academic labeling exercise finds its origin in different views about the history of the Kalinga. Semper (1861) and Scott (1979) concluded that the Kalinga were a distinct cultural minority with their own identity and language. Felix Keesing (1962), however, claims that the Kalinga are Ibanag and Gaddang runaways: refugees fleeing military raids aimed to pacify the violent uprisings against the Spanish rule. In the rebellions that shook the Cagayan Valley from 1615 to 1755

several pagan groups fled to the mountains to escape Christianization and forced labor. Interestingly, Spanish colonization in the Philippines often reinforced parallel ethnic and religious boundaries or remodeled these when necessary. Consequently, the most relevant distinction between groups in Cagayan Valley became those between the Christian and civilized tribes on the one hand and the pagans and enemies on the other hand (Keesing 1962; Salgado 2002).

Whereas scientists debate the exact origin of the Kalinga, mainstream society classifies them as indigenous to San Mariano. The comprehensive land use plan (CLUP) of the local government unit (LGU) of San Mariano, for example, refers to the Kalinga in very much the same dialectic way as the Spaniards did: "The Kalingas and Negritos in the area today are not significantly different from the group as Semper described 120 years ago but due to the influx of more civilized/cultured groups of people and the continuing education of these aborigines, some socio-economic changes in their lives are observed and noted. At present, there is only a mild trace of this culture in the developing communities especially in the poblacion for the original ethnic groups are nomadic in nature. Thus, they reside in remote and forested areas of the municipality" (MPDC 1995). At present there are 2,541 Kalinga in the municipality of San Mariano. They are concentrated along the Catalangan River and the Pinacanauan de Ilagan, or the Rio de Ilagan as Semper called it. In San Mariano, the Kalinga are among the most marginalized groups in society: average incomes are less than US$ 2 per day. Generally, they depend on slash-and-burn farming in the uplands. However, the traditional swidden agricultural practices as described by Semper no longer exist. The devastation of the forests of San Mariano by logging companies through the state-sponsored Timber License Agreements (TLAs) and the subsequent massive in-migration of Ibanag and Ilocano farmers have made land scarce. Most Kalinga now permanently cultivate an average area of 4 ha. Banana and increasingly yellow corn are important cash crops. Most farmers are self-sufficient and cultivate upland as well as irrigated rice varieties. In addition, beans, kamote, cassava and peanuts are usually grown. Land tenure is, as we will see below, a serious problem: most farmers do not have formal ownership of the lands they cultivate. Small-scale logging is an important additional source of income for many Kalinga families.

William Henry Scott's (1979) main aim was to describe the acculturation process taking place among the Kalinga: "Semper's Kalingas (…) appeared to be on the verge of absorption into the anonymity of the majority population. (…) A century of migration into the Katalangan Valley has outnumbered its Kalinga inhabitants and limited their access to potential swidden land. (…) It was due to the social pressure -and ridicule no doubt- that the districts unhispanized Filipinos gave up their tattoos and earrings, and all the esthetic expressions of their religion. This impetus for change appears to be relatively mild, with an easy mingling of Kalingas and Ibanags, but less benign forces are confronting the same people in the 1970's -namely, modern logging operations and military counterinsurgencies campaigns." Twenty-five years, a logging boom and a revolution later it has become almost impossible to distinguish the Kalinga from their Ibanag and Ilocano neighbors. The traditional clothes, tattoos, earrings and statues that Semper (1861) admired can no longer be found. The changes in immaterial culture are obviously harder to quantify. But religious duties, rituals, healing practices, and oral history have largely disappeared or have fundamentally changed as people were converted to Christianity (Knibbe and Angged in prep.). Without falling in static and romantic prejudice, it can be concluded that Kalinga culture is rapidly changing as these upland communities are being incorporated in Filipino mainstream society. And in this case change indeed implies the loss of identity. There is no explicitly stated wish among the Kalinga to retain a distinct cultural identity with an own language, territory and material culture. On the contrary, in many cases the Kalinga do no longer identify themselves as Kalinga. We experienced many cases in which respondents of Kalinga descent replied being

an Ilocano when asked about their ethnicity. Frequent intermarriage among the different ethnic groups in San Mariano makes it even harder to use an ethnic label. Language is probably the most important characteristic in this ethnic melting pot; many Kalinga children do not speak Kalinga. Today the Kalinga no longer see themselves as enemies but as poor upland farmers at the bottom of the Philippine social hierarchy.

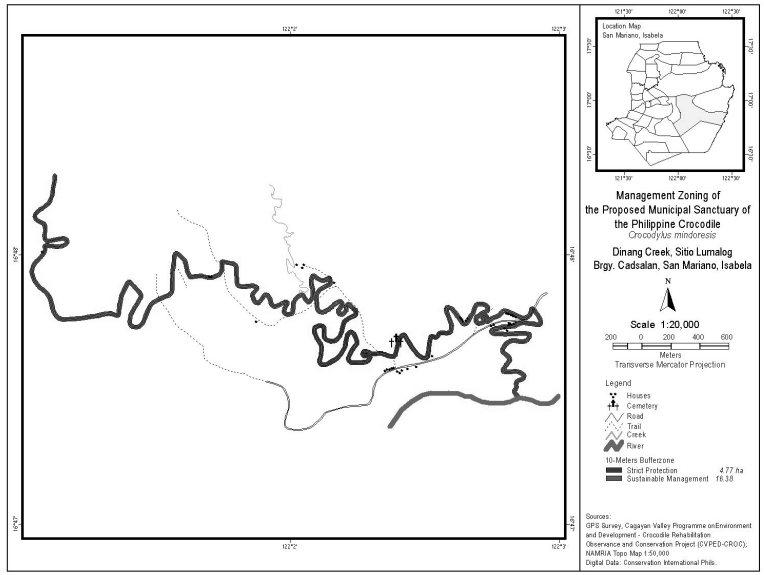
This acculturation process has important implications. Whereas mainstream society generally regards the Kalinga as backward pagans living in remote areas, in other words as indigenous people, they are often denied the specific rights this indigenous status would bring under the Indigenous Peoples' Rights Act (IPRA) on the basis of the societal changes that took place. The general management plan of the Northern Sierra Madre Natural Park (NSMNP) prepared by DENR, for example, states that: "The original inhabitants of the Northern Sierra Madre are the Agtas. Other IPs (indigenous peoples) such as the Paranans and the Kalingas of San Mariano are also known to exist. However, they had been acculturated to the extent that at present these people have mixed with the migrant communities and are no longer recognizable as a group of IPs" (DENR 2001). This is by no means an isolated case: in recent ethnographic literature in the Philippines, the Kalinga are often not included as indigenous people (see for example: Magdaraog 1998; ESSC 1998; Llanda Jocano 2000). More importantly, the National Commission on Indigenous Peoples (NCIP) does not recognize the Kalinga as an indigenous or ethnolinguistic group (NCIP 2005).

So are the Kalinga indigenous? And do they thus deserve special consideration in the natural resource management? These two questions must be answered positively (Kingsbury 1995; Furze 1996 et al.) but with a qualification. Obviously, the rights of the Kalinga should be taken into account when protecting crocodiles. However, it can be argued that the Kalinga do not automatically have more rights than other people in San Mariano. The Ilocano and Ibanag settlers are, after all, also impoverished farmers sharing the same interests and facing the same problems. The objective of this paper is not to debate the indigenous status of the Kalinga but to show the complexity of the concept. This complexity is sadly often ignored in the discourse on indigenous peoples' rights and biodiversity conservation.

TROUBLED WATER: THE CASE OF DINANG CREEK

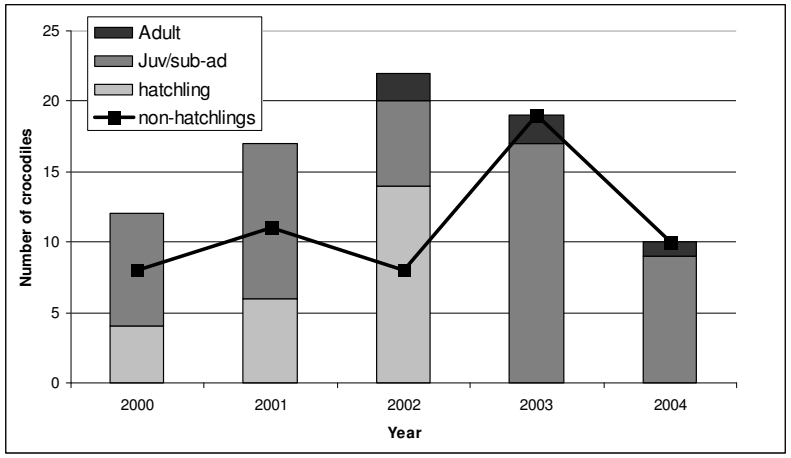
Dinang Creek is a shallow tributary of Pinacanauan de Ilagan. The narrow rivulet is approximately 11 km long (see figure 2). In most places the water is almost stagnant with several deep pools. Both sides of the creek are intensively cultivated, but in most places farmers have left the trees standing on the banks of the creek. Dinang Creek hosts the largest known Philippine crocodile population in Luzon. Figure 3 summarizes the crocodile survey results since 2000. In 2003, nineteen non-hatchling crocodiles were observed in Dinang Creek; a spectacular number regarding the nation-wide estimation of less than one hundred surviving crocodiles (Ross 1998). Breeding seems to have occurred in Dinang Creek in 2000 and 2002. Interestingly, the nesting site is located in a small woodlot adjacent to the creek: a Kalinga burial place. Unfortunately the Armed Forces of the Philippines (AFP) shot an adult crocodile in 2003, presumably to protect the local community, after which no reproduction took place in 2003 and 2004. In June 2005 a new crocodile nest was discovered, unfortunately in the middle of a corn field where it was plowed under by an unsuspecting farmer. We speculate that the decrease in population since 2003 is largely due to super-typhoon Harurot that devastated San Mariano in August 2003. In 2004, we counted ten crocodiles in Dinang Creek.

Figure 2: The proposed Philippine crocodile sanctuary in Dinang Creek



Thirty-five households, of which fifteen are Kalinga, are living around Dinang creek in *sitio* Lumalug. They live mainly from upland agriculture, fishing and small-scale logging. The creek is used in a variety of ways by the local community. It is the main source of drinking water for the community and the water is further used for cleaning, washing clothes, bathing carabaos, etc. Several small streams that feed Dinang Creek are dammed for irrigation purposes. The trees and bamboo groves along the creek are used to provide construction materials for the houses, which still often have a traditional character. The Kalinga construct their house mainly with natural materials such as bamboo for the walls and cogon for the roof. Remarkably they do not like to use more modern and mainstream materials such as galvanized iron (GI) sheets, iron bars, and hollow blocks. This is not only a matter of money. Indeed, architecture is one of the few distinct traits of Kalinga society that remains (Semper 1861; Scott 1978; Knibbe and Angnged in prep.). Remarkably, people do not fish in the creek; accordingly because the fish smells bad and tastes muddy. With the fast flowing clear water of the Pinacanauan just nearby, people also have an attractive alternative. Household incomes are low: annual incomes are around fifty thousand peso per year, below the standard poverty threshold per capita income level for the province. People depend heavily on the main cash crops banana and yellow corn, but high transport costs hamper agricultural development. Located 34 km south of San Mariano town proper, it takes six hours with a truck to reach the barangay. In rainy season, from September to December the roads become impassable. Administratively, *sitio* Lumalug is part of barangay Cadsalan. The watershed of Dinang Creek area was deforested in the late 1960s. However, the lands in the watershed are still classified as forest lands. Consequently, farmers do not have formal land titles. But informal land claims, so called possessions, are generally well respected among the farmers. Most Ibanag and Ilocano settlers in the area arrived in the wake of the logging concessions. But the majority of the people in barangay Cadsalan, 56 percent, is still Kalinga. And that fact has saved the crocodiles in Dinang Creek.

Figure 3: Philippine crocodile population in Dinang Creek (minimum counts during repeated night surveys in May)



Dinang was, almost accidentally, identified as a crocodile habitat in 2000: a child informed the researchers of the NSMNP-CP about the crocodiles in his backyard (Oppenheimer 2001). Since then, the crocodile population has been monitored on a quarterly basis. These short but regular visits, normally the researchers stay in the area for three nights, have resulted in good personal contacts with several households in *sitio* Lumalug and with the barangay officials in Cadsalan. In May 2002, the NSMNP-CP and the LGU of San Mariano organized a crocodile conservation workshop and visited the area to see the crocodiles. The active involvement of the municipal government resulted in four municipal ordinances protecting the Philippine crocodile in San Mariano (van Weerd 2002). Killing crocodiles was strictly prohibited by virtue of municipal ordinance 2000-002 and a crocodile sanctuary was declared in Disulap River. Here, the local community unanimously agreed to minimize human impact in a buffer zone of 10 m on both sides of the river (van Weerd and van der Ploeg 2003). The LGU proposed to give a similar protected status to Dinang Creek (CROC 2003a, Miranda et al. 2004).

After the phase out of NSMNP-CP, the CROC project continued activities in Dinang Creek with the explicit aim to proclaim a sanctuary in Dinang Creek (CROC 2003b). These activities were funded by the Chicago Board of Trade Endangered Species Fund of the Chicago Zoological Society. The proposal for this grant identifies the link between local communities, land and water utilization and the need for local development and secure land tenure as a condition for local support to the proclamation of a crocodile sanctuary. The proposed activities consist of support to an official land survey which is a prerequisite to apply for land titles or stewardships, the provision of water pumps, the creation of a safe bathing area for people, the training and equipment of a local crocodile protection group and the establishment of signboards and a small information centre to provide information to the local community about crocodiles and the sanctuary (CROC 2003b).

An intensive public awareness campaign (centered on the slogan: the Philippine crocodile: something to be proud of) aimed to inform the local people about the crocodiles. Four informative bill boards were placed in strategic localities in the barangay. Three different posters providing background information on the Philippine and the municipal ordinances protecting crocodiles were provided to all households in Lumalug. Six issues of the CROC project newsletter have been distributed to the community. And in 2004 and 2005 the CROC project handed out calendars with background information on the crocodiles and the conservation project. These campaigns have generally reached their goal: everybody in Lumalug now knows that the Philippine crocodile is protected by law (van Weerd et al. 2004).

In May 2003, the Isabela State University (ISU) organized a ten-day summer class for undergraduate environmental science students to collect social and ecological information on Dinang Creek (DESAM 2003). During this visit the students and faculty members stayed in the local elementary school. When typhoon Harurut hit San Mariano in August 2003 and destroyed the school building, the CROC project contributed PhP. 50,000 for the rehabilitation of the roof and the painting of the school walls with, yes, crocodiles. This marked the start of a more proactive integrated conservation and development approach. In November 2003, the DENR conducted a land survey to delineate the crocodile sanctuary and assist farmers in securing tenurial status for their land possessions. Four water pumps were installed in *sitio* Lumalug to provide clean water to the people and minimize crocodile-human conflicts. The LGU also prioritized the barangay in their social services delivery program: farm-to-market roads were improved and a barangay health unit was constructed in Lumalug. Conservation activities came to a halt during the tumultuous and violent election period in the first half of 2004. There were several encounters between AFP and NPA in Cadsalan in the run-up to elections, and on election day the municipal hall of San Mariano was attacked and

burned (Northern Dispatch Weekly 2004). The regular visits of the CROC team to monitor crocodiles resumed after a new Mayor was sworn into office. Several community consultations (in April 2003, July 2003 and October 2004) have been organized to discuss the need for a crocodile sanctuary and negotiate the size, rules and regulations and timeframe of establishment. During a community consultation in October 2004, the farmers in Cadsalan in principle approved the declaration of a crocodile sanctuary but demanded that the tenurial instruments of their lands had to be issued first.

In November 2004, the CROC project organized the second crocodile conservation workshop in the Cabagan campus of ISU. Two barangay officials from Cadsalan and several farmers from Lumalug attended the workshop. Here, participants were trained in environmental law enforcement and designed community-based conservation plans to protect crocodiles and wetlands in their respective locality. It resulted in a draft barangay ordinance prohibiting the killing of crocodiles and specifying a penalty of PhP. 1,000 or fifteen days in jail (Cureg et al. 2005). This ordinance was approved by the barangay council in January 2005. During the workshop a local protection group, the *Bantay Sanktuwaryo*, was officially deputized by the mayor of San Mariano to enforce the municipal and barangay ordinances protecting crocodiles. Three people from *sitio* Lumalug, none of them Kalinga, are members of the *Bantay Sanktuwaryo* of Dinang Creek.

This short summary of conservation efforts in *sitio* Lumalug since 2000 described our efforts to mobilize local support for *in-situ* crocodile conservation. As far as we know, three crocodiles were killed in this period in Dinang Creek: one adult by the AFP in 2003, one juvenile accidentally by children in 2004 and a female adult was shot in April 2005 by an unknown person, locally thought to be an outsider. In all cases, there has been no reaction from the DENR or the LGU. The efforts to declare a 10 m buffer zone along Dinang Creek have so far yielded limited results: a deal was made with the farmers to first formally recognize their land claims. This raises two important questions. First, were all these posters, newsletters, community consultations and workshops really necessary? After all, protected by an indigenous conservation ethic the crocodiles have survived in Cadsalan. And when crocodiles were actually killed there has been no response from the mandated agencies. Second, why is the sanctuary not yet declared and its buffer zone enforced? And if the people ask tenurial instruments in return for their consent and cooperation, why are the stewardship contracts not yet provided? In the following two paragraphs we will look at these issues in greater detail.

How is it possible that crocodiles have survived in such a small, densely populated and intensively used creek? As stated above, people could have easily killed all crocodiles. There have been several incidents where crocodiles caught pigs and dogs, or displayed aggressive behavior towards people. The Philippine crocodile is generally weary of humans but females are known to be more aggressive in the breeding season (Alcala et al. 1987). In most parts of the Philippines this has meant that crocodiles were systematically killed. But not so in *sitio* Lumalug.

In pre-colonial Philippines, crocodiles were generally associated with spirits: "There were river gods, both in general and as resident in particular streams, and important gods and spirits of the sea which received all these waters (…) Crocodiles were held in special veneration because of their obvious danger: they were addressed as Grandfather, and were offered symbolic foodstuffs by the prudent when crossing rivers or even on entering boats." (Scott 1994: p. 78). These traditional practices and beliefs argued William H. Scott have largely disappeared in Philippine society but are, in some cases, still common among indigenous peoples. Indeed, the Agta of the coastal municipalities of the Northern Sierra Madre respectfully refer to large estuarine crocodiles as *Apo* (honorable) or *Lakay* (old man) (CROC 2004). Throughout the Philippines, crocodiles still play a major role in the rituals of indigenous peoples (see for example Gatmaytan 2004). So is it with the Kalinga.

In several of the Kalinga rituals that are still occasionally practiced, rice cakes in the form of crocodiles, so called *inimbad*, are offered to the spirits. Storytelling perhaps still is the most important medium in these remote upland areas. There are several Kalinga myths about transmorphication: people turning into crocodiles and vice versa. Especially Kalinga healers and spirit mediums appear to be in danger of transforming into a crocodile. During the performance of rituals the possessed healer has to be restrained: if she falls in the river she'll become a crocodile. Of course, these are not only stories but reality for most people in *sitio* Lumalug. Interestingly, Kim Knibbe and Andrei Angnged (in prep.) report seeing a Kalinga burying something in the banks of Dinang Creek, accordingly an offer for the crocodiles; a vivid reminder of the words of William H. Scott. Most importantly for our understanding of the survival of crocodiles in Dinang creek is the fact that for the Kalinga killing a crocodile brings along great risks: not a direct physical danger from the animal but the threat that your soul gets bitten (Knibbe and Angnged in prep.). The resulting sickness caused by the vengeful crocodile can only be cured by a ritual performed by healers. Crocodiles are not by necessity bad spirits though; the ancestors also often take the form of a crocodile. The fact that an adult crocodile is often seen at the Kalinga burial site in Lumalug only reinforces this belief. With that in mind, and without going further into Kalinga cosmology, it becomes clearer why people have not killed the crocodiles in Dinang Creek.

Whereas these traditional beliefs have most probably protected the crocodiles in Dinang Creek, they do not form a solid basis for sustained crocodile conservation especially when considering processes of social change that are currently taking place in Kalinga society. (Van den Top and Persoon 2000; Duhaylungsod 2001). The survival of crocodiles is basically the unintended consequence of these beliefs, not a goal in itself. As the passing of traditional ecological knowledge to new generations by narratives is being replaced by general mainstream information from a larger world, people start to see crocodiles in a fundamental different way. The Kalinga burial site offers a good example. The woodlot offered a suitable breeding site for the crocodiles because nobody was supposed to enter the area. However, the local government now requires the Kalinga to bury their dead in the official barangay cemetery citing public health reasons. The traditional practices that safeguarded the crocodiles for long unfortunately do not offer any guarantee for the future. In

that context the conservation efforts in Dinang Creek were definitely needed. Whether the something to be proud of posters will prove to be as effective as the traditional beliefs remains to be seen. But if it will, people will protect crocodiles because of their ecological, economic, natural historic, cultural or even intrinsic value, not out of fear of avenging spirits, or of a punitive government for that matter.

RESISTANCE

But why have these conservation activities achieved so few tangible results over the past three years? The fact stands that there is still no protected area in Dinang Creek. And although the LGU has enacted several municipal ordinances protecting the crocodiles, there has been no enforcement of these local laws. To answer this question we have to examine the everyday politics of crocodile conservation in Dinang Creek in more detail.

The conflict between crocodile conservation and the land rights of the Kalinga appears to be mainly about the proposed 10 m buffer zone. A buffer zone would protect potential nesting sites, minimize crocodile human interactions, and safeguard the sandy riverbanks from erosion. In several places in Dinang Creek, for example in the Kalinga burial site, dense forest and bamboo groves provide refuge for the crocodiles and important resources for the community. In other fields, long fallow periods have created good breeding and basking conditions for crocodiles. But agricultural intensification and expansion threatens these remaining wild lands. This matter was discussed in detail with the local farmers during the community consultations in April and July 2003 (CROC Project 2003a). As mentioned above, the land owners demanded that their land rights would not be jeopardized. In return they would consent with the buffer zone. In this context it should be noted that under Presidential Decree 705, otherwise known as the revised forestry code of the Philippines, it is required to maintain a 20 m buffer zone along water bodies (Oposa 2002; van der Ploeg and van Weerd 2004). The DENR consequently mapped the individual lands and suggested issuing a Certificate of Stewardship Contract (CSC). Interestingly the farmers demanded individual land titles and did not want to consider any form of communal ownership such as a Certificate of Ancestral Domain Claim (CADC) or a Community-Based Forest Management Agreement (CBFMA). Prill-Brett (2001) already noted that upland communities display a strong prevalence for individual land rights. This contradicts, and may explain the failure of, many of the efforts of the Philippine government to empower upland farmers and/or indigenous peoples. A CSC is a non-transferable lease contract that provides upland farmers with tenurial security for twenty-five years with the option of renewal. This, it was thought, would solve one of the main concerns and priorities of the community: securing their traditional land rights. However, no applications have so far been filed at the Community Environment and Natural Resources Office (CENRO) by the community. Slash-and-burn farming near the creek also continued. Repeated follow-ups have not resulted in any breakthrough in this apparent stalemate: people react positively when talking to the CROC team but appear to change their minds in the absence of conservationists.

Peter Utting (2000) nicely summarized the situation: "Upland dwellers (…) have experienced a long history of physical isolation, marginalisation, exploitation, and even overt oppression. In such context there is likely to be considerable mistrust of external institutions (…) the problem of mistrust is often camouflaged by the fact that external agents are generally greeted with civility or passivity, rather than hostility" (op cit.: p. 185). One apparent reason for the foot dragging and lack of cooperation in securing the CSCs could be that farmers fear their incomes would be jeopardized by the 10 m buffer zone. Table 1 summarizes the effects of the implementation of the buffer zone on the livelihoods of the

local people. Take note that it assumes that farmers in Dinang Creek would comply strictly with the regulation or that it would be strictly enforced. Not surprisingly as these rules are the outcome of a long negotiation process with the community, it turns out that the opportunity costs for local farmers are minimal: PhP. 330 per household, or 1.5 percent of household income.

Table 1: Socioeconomic impact of the proposed buffer zone in Dinang Creek

Dimension (N=35)	
Average household size (Range)	5.63 (2 - 11)
Average farm size (Range)	4.83 ha (0.75 - 6)
Average net household income per year (Range)	PhP. 21,959 (0 – 185,000)
Total area of the 10m buffer zone	21.15 ha
Average opportunity costs of the buffer zone per household (Range)	PhP. 330 (0 – 1,475)
Opportunity costs as percentage of household income (Range)	1.5 % (0 - 6.70)
Number of CSC awarded	0

Source: Tumaliuan (in prep.)

More importantly, therefore, seems the persistent fear of the community of land grabbing. Indeed, the Kalinga in barangay Cadsalan have a history of losing land to outsiders with apparent good intentions. The prime agricultural land around Cadsalan were declared alienable and disposable (A&D) in 1928. In the 1960s, the teacher assigned in Cadsalan, an Ilocano, encouraged the Kalinga to apply for land titles. He assisted the farmers, most of them illiterate, in writing their petition, and filed their applications. But when the land titles were released it turned out that he and his two brothers were the only rightful owners. Up to this day, the case has not been resolved despite several costly attempts of the community to bring it to court. The Kalinga farmers still cultivate their lands but are, for Philippine law, basically illegal squatters. Cases like this fuel the insurgency in the uplands. It also explains the mistrust of the Kalinga towards outsiders pushing for crocodile conservation, and their hidden forms of resistance against it.

Hidden? The protest banner of the KMO was a clear political statement, calling for a direct fight. As such it has little to do with the low-profile, non-confrontational, unobtrusive struggles of peasants that typically involve little or no organization (Scott 1985; Kerkvliet 1991). Indeed, we argue here that the protest banner has in fact little to do with crocodile conservation. Of course, the banner was placed by the KMO and specifically mentioned crocodiles. But does the KMO really represent the Kalinga? The KMO is based in barangay Ueg. It is a chapter of the *Asosasyon ti Katatubo nga Mannalon ti Macayucayu* (Association of Minorities and Farmers of Macayucayu) (ACMMA), an umbrella organization of the indigenous peoples of San Mariano that is accredited by the local government unit. The ACMMA officially aims to protect the land rights of the indigenous people and revive their cultural identity. The ACMMA claims a 15,000 ha ancestral domain upstream of barangay Cadsalan, in an area where there are no existing land rights (Espiritu 2005 pers. comm.), which is currently being processed by the provincial NCIP. Also in barangay Cadsalan the ACMMA has a chapter: the Kalinga Tribal Organizations (KTO). These groups, as many other people's organizations in the Philippine uplands, were organized and mobilized by the

NPA. The KMO as such acts as a legitimate political arm of the NPA at the local level, and voices out the concerns of the communist rebels. And the views of the NPA on crocodile conservation are indeed quite negative. In their newsletter *Baringkuas*, which is widely circulated in the Cagayan Valley, the NPA claimed that "*Iti Cadsalan, ada ti naikeddeng a 150-ektarya nga inaladan a santuaryo kas lugar a pagnaedan ken pagpaaduan kadagitoy. Pagbalinen da metten daytoy a pagpasyaran ti turista. Makaala dagiti ganggannaet ken lokal a gubyerno ti dakkel a ganansya manipud iti panagsingir ti entrance fee kadagiti agpasyar. Mangipatakder da met kadagiti* souvenir shop, restaurant, hotel *ken dadduma pay.* (…) *No matuloy ti proyekto, mapatalaw da manipud kadagiti taltalon, piskarya ken mismo a balbalay da.* (…) *Tapno maaywanan dagiti buaya, malablabsing dagiti karbengan ti umili ti Cadsalan ken magungundawayan da. Maiparit ti aglaba ken agbatok iti waig, pati agkayo iti luga nga asideg iti pagnaedan dagiti buaya! Dagitit mannalon ti mapatalaw kadagiti dagdaga da, paa iti interes ti ganggannaet a kapitalista.*" (In Cadsalan, it was decided to fence 150 ha for a sanctuary that will serve as a home and breeding area for crocodiles. They also make this area a tourist destination. The foreigners and the local government will get big profits from the collection of entrance fees of the visitors. They will also build souvenir shops, restaurants, hotels and others. If this project pushes thru, the people will be evicted from their lands, their fishponds and even from their homes. (…) The rights of the people in Cadsalan are violated or set aside and they are taken advantage of in order to protect the crocodile. Washing and fishing is prohibited in the creek and even the gathering of wood near the crocodile area. The farmers will be evicted from their lands in the interests of foreign capitalists.) (*Baringkuas* 2003: p. 11). On several occasions, during meetings with the community, the NPA repeated these allegations. The story spread was that the conservation of the crocodiles supposedly is nothing but a front for large-scale tourism development, the construction of a large hydro-power dam and land grabbing (CROC 2003a). Apparently, these activities are a lot more comprehensible in the dogmatic views of the NPA than efforts to protect crocodiles.

Why does the NPA spread these rumors? One obvious reason is that the NPA aims to protect the rights of the local people, especially of the marginalized Kalinga. The history of the Kalinga offers indeed an example par-excellence for post-Marxist theories on social justice, capitalist repression and peasant rebellion (Sison and Rosca 2004). But a more practical reason is that the NPA wants to minimize outside intrusion in one of their last strongholds in Northeast Luzon. There are frequent violent encounters between AFP and NPA in the upper stream areas of the Pinacanauan de Ilaguen, and Cadsalan is one of the barangays in the frontline. Obviously, outsiders are regarded with great suspicion by the NPA in this tense political climate. The DENR team that conducted the land survey in *sitio* Lumalug was interrogated by thirty armed men to make sure that their activities were pro-poor. The NPA then advised the farmers not to apply for a CSC because the farmers deserve nothing less than titles. In Maoist theory that might indeed be a good principle, but it is not particularly helping the indigenous community on the short term. When the CROC project organized the workshop in Cabagan in November 2004 to design community-based wetland and crocodile conservation action plans, aiming to devolve decision making to the barangay level and incorporate the views and priorities of local people, the NPA prohibited several community members to attend. The few farmers from *sitio* Lumalug that participated in the workshop were interrogated by the NPA upon their return. Clearly, the insurgents fail to understand that the premise of crocodile conservation in North Luzon is the well-being of rural communities. Or they do not want to understand it.

This brings us to the very nature of the NPA in contemporary Philippine society. Increasingly, the NPA is moving from a well-organized left-wing political movement with broad societal support into a criminal organization consisting of a small group of armed men that lives off the people it claims to fight for (Weekley 2001). The communist rebels, for

example, demand a revolutionary tax of all farmers in Cadsalan, something that was unheard of in the 1970s and 1980s. Moreover, the NPA frustrates the wish of the rural community to improve the farm-to-market road as it would make their territory more accessible for the AFP. Basically, any outside intervention in the status-quo threatens the position of the NPA and is resisted by the rebels. In this light the protest banner gets a completely different character: the rights and well-being of the indigenous Kalinga become a perverse legitimization of the continued violent communist rebellion against the Philippine government. Crocodile sanctuaries and the land rights of the Kalinga have actually nothing to do with it.

Political ecology argues that biodiversity conservation does not differ in essence from other forms of regulating resource extraction as it limits access of local people to resources in favor of centralized state control (Bryant 2000). Moreover, the coercive methods to protect natural resources have in many cases undermined the traditional rights of indigenous people with serious negative consequences for their livelihoods (Ghimire and Pimbert 1997). Marcus Colchester (2003 emphasis added) has strongly voiced out these concerns: "Ironically, *western* attempts to promote natural-resource conservation also have foundered on this unresolved conflict between local communities and state administration. National parks established on indigenous lands have *denied* local rights to resources, transforming the inhabitants practically overnight from hunters and cultivators into 'poachers' and 'squatters'."

The case of the Philippine crocodile appears to be a classical example of conservationists aiming to protect a rare species at the expense of the indigenous people, who are resisting these efforts. The NPA clearly ventilated these concerns: "*Dagiti buaya ket makedngan ti gobyerno ti 150 ektarya. Idinto nga agingga ita, kaaduan dagiti mannalon ket agtaltalinaed nga awanan wenno agkurkurang ti bukod a daga a masukay. Ipateg ti panangsalaknib kadagiti buaya, Idinto a dagiti Kalinga, a nanglukat ken nagpadur-as iti daga iti Cadsalan, ket puli a bumasbasit met laengen ket masapul met masalakniban. Iti aktwal, mapapaiddaman da kadagiti serbisyo sosyal a pagrebbengan koma nga ited ti gubyerno kanyada.* (…) *Ti proyekto iti ekoturismo ket idurduron ti Plan International, maysa nga ahensya nga ar-aramaten ti Central Intelligence Agency iti kontrarebolusyon*" (The government is allocating 150 ha to the crocodile while farmers remain landless or have almost no available land to cultivate up to now. The government is giving attention to the protection of the crocodile, but the Kalinga, the first people to open and develop the land in Cadsalan, who are almost extinct already, need to be protected as well. In reality, the government is depriving them of social services they are entitled to. The ecotourism project is implemented by Plan International, an agency that is used by the Central Intelligence Agency for contra-revolutionary activities) (*Baringkuas* 2003: p. 12). It's remarkable how much this communist pamphlet resembles the scholarly work of political ecologists. Both make use of concepts as indigenous people, social justice, and control over and access to scarce resources. Of course, that is not very surprising as both are grounded in Marxists thought. There is also a shared concern for the sources of funding of conservation agencies (Chapin 2004). BP is, as far as we know, not planning to drill for oil in the uplands of San Mariano. It seems also far stretched that Plan International or the Chicago Zoological Society are fronts for the CIA. In the CROC project we have never encountered any demand from donor organizations beyond the terms of references of the project documents.

The political ecology critique on conservation has been useful to undermine the widely held notion that conservation is a non-political activity, and has strengthened more participatory conservation approaches that integrate the protection of natural resources and rural development. But there is a danger that the pendulum swings too far the other way, towards sweeping generalizations about the position of indigenous people, social justice and conservation. In the San Mariano case nothing seems on first sight what it actually is. Refugees become indigenous people. Resistance of indigenous people against crocodile conservation turns out to be a communist rebellion against the government. And crocodile conservation is not a western neo-colonial attempt to safe a potential dangerous animal that is widely considered as a pest, nor does it deny anything to local people. We argue here that political ecology risks getting stuck in the same dogmatic position as the Maoist rebels in Philippine uplands: with serious consequences for the rights of indigenous people and the survival of the Philippine crocodile.

The rediscovery of a small and fragmented population in San Mariano opened new prospects for the conservation of the species in the wild. Conservation activities have focused on protecting *Crocodylus mindorensis* in its natural habitat through mobilizing public support for crocodile conservation, and establishing sanctuaries with the consent and cooperation of local authorities and rural communities. This participatory conservation approach has been characterized by on-going dialogue, compromise and negotiation, not by punitive orders, coercion or enforcement. Nor have their been any attempts to develop tourism, to fence off areas or implement other large protectionist programs. Conservationists and the LGU aim to negotiate management agreements with local communities that are, above all, inclusive, legitimate and feasible. A fundamental paradigm shift has transformed conservation practices, especially in the Philippines where the people-first approach has been institutionalized and integrated in mainstream thinking about the environment. But political ecology fails to recognize this. The current social scientific discourse on the coercive properties of the central state, the historic exclusion patterns that threaten the livelihoods of indigenous peoples or the socially constructed notion of wilderness preservation is not particularly helpful to safe the Philippine crocodile from extinction. In San Mariano, crocodile conservation has the dual objective of protecting the critically endangered Philippine crocodile and improving local livelihoods (Van Weerd 2002; Van Weerd and General 2003; Miranda et al. 2004). Human welfare is always taken into account, especially by the LGU that is insisting on including a social justice agenda in crocodile conservation (Miranda et al. 2004). Interestingly, the crocodiles have little direct economic value, and thus strict protection will not accrue costs for the community, apart from the lands in the 10 m buffer zone. A reversal of this argument implies, however, that few benefits can be derived from crocodile conservation. In this perspective, the development of a comprehensive wetland strategy based on the principles of the ecosystem approach is a promising advance. In San Mariano it is tried to make social equity issues compatible with conservation objectives, as a matter of pragmatism and of principle.

In the long term crocodile conservation is only likely to succeed if it can be made relevant to local people. For this it has to recognize and respect the traditional rights of the Kalinga. In Dinang Creek the CROC project aims to secure the formal land rights of the farmers in *sitio* Lumalug. Paradoxically, these efforts are undermined by those who claim to fight for the rights of the Kalinga. As we have seen above, the discourse on the rights of indigenous people and crocodile conservation is used by the NPA to legitimize a violent rebellion against the Philippine Government. The Kalinga and the crocodiles are caught in the crossfire, to use the phrase of Charles MacDonald (1995), of a wider societal conflict. Political ecology, in its analysis of the historical power relations and political conflicts that structure access to and control over resources, seems to have developed a blind spot for, indeed, power and politics. After all, not all politics are local and not all conflicts in society are over natural resources. The narrow focus of political ecologists tends to overestimate the impact and influence of conservationists. But, conservationists as well as indigenous peoples are almost irrelevant actors in the political forces and structures that shape society.

A basic assumption of political ecology is that there is an intrinsic conflict between the welfare of indigenous people and biodiversity conservation. This critique is also increasingly put forward by conservationists who argue that poverty alleviation is not their core business and that social justice objectives are incompatible with conservation (Chapin 2004; Terborgh et al. 2002). In this paper we have strongly taken position against these views. In Dinang Creek, the Kalinga have protected the Philippine crocodile. The challenge for conservationists is to enable these communities to protect their natural resources in a rapidly changing society. In San Mariano the first steps are made to create the needed win-win scenario. The coming years will be decisive for its success.

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CHAPTER TWENTY-FIVE

INDIGENOUS PEOPLES' RIGHTS AND FOREST CONSERVATION: IMPLEMENTATION REALITIES IN THE BUGKALOT ANCESTRAL DOMAIN

Dante M. Aquino

INTRODUCTION

The paper describes the implementation of the Certificate of Ancestral Domain Claim (CADC), the tenurial instrument issued through the Department of Environment and Natural Resources (DENR) department administrative order (DAO) no. 2 series of 1993 that recognized the rights of indigenous peoples to their ancestral lands, awarded to the Bugkalots, an indigenous people in Northeast Luzon. The Bugkalots formed a people's organization (PO) as the required recipient for the CADC and with whom the government, through the DENR, signed a Community-Based Forest Management Agreement (CBFMA). With the ultimate goal of forest conservation, one salient feature of the policy is for indigenous peoples to apply indigenous knowledge and practices in the use and management of natural resources within their ancestral domain.

With the implementation of the CADC program in the Bugkalot domain as the case study, the paper evaluates the implementation of the CBFMA and analyzes these field realities and the PO's performance in relation with policy provisions in terms of the attainment of its goals. The paper cites on-site situations and raises issues of congruence and disparity between policy and accomplishments, from where recommendations to improve policy implementation were derived. Since the National Commission on Indigenous Peoples (NCIP) took jurisdiction over indigenous peoples and ancestral lands from the DENR as provided by the Indigenous Peoples Rights Act (IPRA) of 1997, the commission processed the conversion of CADC to Certificate of Ancestral Domain Title (CADT). The paper raises issues on which CADC conversions to CADT should be based, given the initial conversion process results and the experiences during the CADC implementation.

BACKGROUND

With the irreversible effects of accelerated forest deforestation during the twentieth century, highlighted by catastrophic natural disasters and calamities, Philippine government policies on forest conservation and controlling deforestation evolved from the earlier regulatory and punitive approaches to the people-centered approaches towards the end of the 1980s. The most innovative among these socially-oriented government policies is DAO no. 2 promulgated by the DENR in 1993 where indigenous peoples were awarded the rights to a specifically-delineated area within their ancestral domain through a CADC. Although the recognition of indigenous peoples' rights was mandated by the Constitution of 1987, no law to this effect was passed by Congress after five years so the DENR policy was an ground-breaking move; partly a result of a long process of lobbying and advocacy by indigenous peoples.

Ten years after the adoption of the Constitution, as preempted by the CADC policy, the Philippine Congress enacted the IPRA of 1997. The law created the NCIP which has jurisdiction over indigenous peoples and their ancestral lands. Mandated to undertake the delineation of ancestral domains and issue CADT, the commission was held back with

constitutionality issues in its initial years. Overcoming these legal battles, the NCIP was burdened with the conversion of the 181 DENR-issued CADCs into CADTs subject to the tedious process in accordance with the IPRA law. The NCIP proceeded in converting CADCs to CADTs following generally the same process and methodology as in the earlier DENR-issued CADCs. With some initial conversions completed and CADTs issued, the NCIP is apparently encountering difficulties which resulted in deficiencies not unlike those committed by the DENR in the issuance of CADCs.

It is in this context that this paper presents the experiences in the CADC implementation, using the CADC awarded to the Bugkalot of Quirino as the case, and highlight issues that needs to be addressed for better policy implementation on ancestral domain rights. With more than hundred CADCs still to be converted to CADTs, these issues raise important considerations that should be addressed in pursuing this objective so that the purported objectives of the policy shall be attained.

This paper, although lacking in scientific discourse and theory, strives to contribute to the practical aspects of ancestral land rights and the role of indigenous peoples in natural resources management. It deals with the implementation of policies on indigenous peoples and the field realities in such implementation. The paper starts with a brief description of DAO 2, the policy that started it all. The Bugkalot ancestral domain is briefly presented to describe the environmental situation in the Bugkalot domain and later the various CADC areas awarded to the Bugkalots. Building on the experiences on these areas, policy provisions against field implementation, with focus on the CBFMA, are discussed. Recommendations on the CADC system are forwarded for considerations in the improvement of the CADT implementation.

Department administrative order no. 2

DAO no. 2 series of 1993, although viewed as lacking the clout and effect of a law passed by Congress, was a drastic measure initiated by the DENR. The order provided for the identification, delineation and recognition of ancestral domain claims by awarding them a CADC. Specified in the certificate of award are their rights and privileges as well as their duties and responsibilities. The critical role they play in the management of their ancestral lands was recognized. They were involved in addressing environmental degradation, particularly deforestation, in their domain.

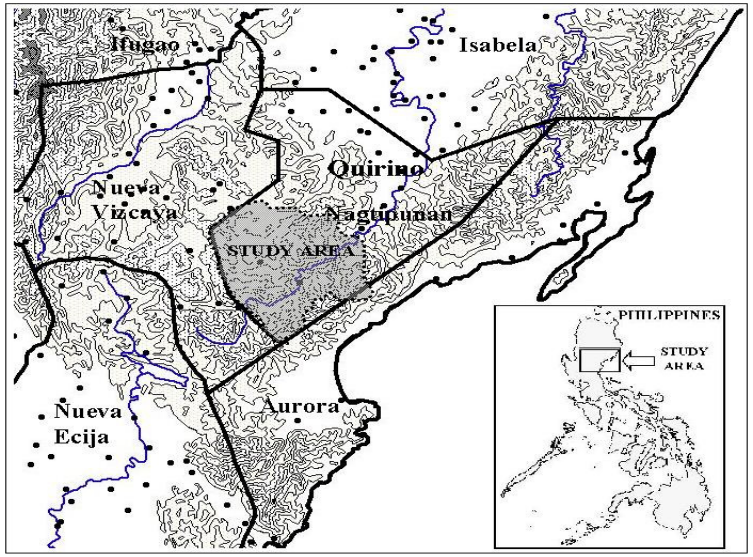
The implementation of the order was spearheaded by a Provincial Special Task Force for Ancestral Domains (PSTFAD) based at the DENR provincial office. The taskforce, with representatives coming from local government units, concerned government agencies, non-government organizations (NGOs), and the concerned indigenous people, followed a very tedious documentation and consultation process including on-site verifications, social surveys, and publication requirements. In its six-year implementation period, many indigenous peoples groups apparently met the criteria and successfully complied with the requirements as evidenced by the issuance of 181 CADCs throughout the country.

THE BUGKALOT ANCESTRAL DOMAIN: THE AREA AND ITS PEOPLE

Although the ancestral domain of the Bugkalot used to cover a wide expanse of land (Salgado 1994; Antolin 1789 translated by Scott 1988), the present domain is restricted within a mountainous area within the provincial boundaries of Quirino, Nueva Vizcaya, and Aurora (see figure 1). It is the headwaters of various rivers draining into the major tributaries of the

Cagayan River in the provinces of Quirino and Nueva Vizcaya and eventually to Isabela and Cagayan. The center of the domain may be accessed from various entry points in Quirino, Nueva Vizcaya, Aurora and Nueva Ecija. One has to travel a circuitous route to travel from one side of the domain to another. The inaccessibility of the area contributed to its relatively pristine state of forest resources where various government pilot projects were implemented. In fact, it is within this same present area that the six CADCs for the Bugkalots were issued by the DENR.

Figure 1: The Bugkalot domain confined within the boundary areas of the provinces of Quirino, Nueva Vizcaya and Aurora (Aquino 2004: p. 126)



Resources in the Bugkalot domain

Resources in the Bugkalot domain are broadly categorized into agriculture, forestry, and water resources. Agricultural areas within the Bugkalot domain are further classified into four interrelated categories: irrigated farms, permanent dry farms, *kaingin* farms, and backyard farms. The agricultural resource practices of the Bugkalots are very dynamic. There is a growing trend to lengthen the fallow period of their swidden farms, extending their swidden area, and later totally foregoing fallowing thereby eventually converting these swidden farms into permanent dry farms. Likewise, imitating the ingenuity of migrants, some Bugkalots tapped nearby creeks or rivers for gravity irrigation and thus became involved with irrigated farming. Also, some have started to bring their swidden technology nearer to home and started making backyard gardens.

The Bugkalot domain had been the site of various people-oriented forestry programs implemented since the 1970s such as various schemes of contract tree farming. By the 1980s, some of them became recipients of Certificates of Stewardship Contracts (CSC) issued

through the Integrated Social Forestry (ISF) program. Being one of the last forest frontiers in Cagayan Valley, the domain has been the ideal site of various government programs on forest conservation, particularly those funded by international institutions. The relatively intact forest areas within the domain were one of the reasons why the domain area was recognized as the ancestral domain claim of the Bugkalots.

The Bugkalot domain is the location of headwaters of large watersheds located in three regions of the country all emanate from the area: in Region 02 (Cagayan Valley), the upper Cagayan River (the Conwap-Casecnan rivers network), the Addalam River (Diduyon, Tubu, Kasibu) and the upper Magat River (Mangga in Dupax); in Region 03 (Central Plains of Luzon), the upper Pampanga River starting from Alfonso Castañeda (Nueva Vizcaya) and Pantabangan (Nueva Ecija); in Region 04 (Southern Tagalog), the Diaat River and Bazal River systems in Maria Aurora, in the province of Aurora. Endowed with clear running waters, these river systems with numerous tributary creeks are a part of the Bugkalot way of life. To many, these provide the most convenient mode of transport to and from inaccessible villages. For daily subsistence many tap springs in the domain for drinking water as evidenced by even existing networks of hoses, plastic tubes or pipes (polyvinyl chloride) some hundreds of meters long, to tap water into households. Much more, there are now irrigation systems within the domain, which involve the Bugkalots in irrigated agriculture. Fish and other water resources augment household food requirements.

The people in the Bugkalot domain

The Bugkalots were known as notorious headhunters having abandoned the practice only in the early 1970s. Then, they were more known as Ilongots, as they are in the comprehensive ethnographic studies of M.Z. Rosaldo (1980) and R.I. Rosaldo (1980), in earlier books (e.g. De Witt Willcox 1912; Anima 1985), in the national dailies, and in a more recent publication (Salgado 1994). It was only after the entry of the missionaries of the New Tribes Mission in the 1960s and the proclamation of Martial Law in the 1970s that outsiders started to venture into the area. Migration into the area increased manifold with the exodus of people from the Cordilleras displaced by the construction of two big hydroelectric dams. All these were greatly facilitated with the construction of roads by concessionaires during the logging boom that ensued. Because of these circumstances, the population in the Bugkalot domain steadily increased. As a consequence, the Bugkalots are now greatly outnumbered by other people within the domain. Various sources show fluctuating Bugkalot population over the years. At present, integrating various considerations and sources, Bugkalot population is around sixty thousand (Aquino 2004: p. 134).

The Bugkalots look no different than any Filipino lowlander (Salgado 1994: p. 45). They cannot be distinguished easily from other ethnic groups. Most of them likewise speak with equal ease national (Tagalog or Pilipino) and the regional languages (Ilocano) to the extent that even among themselves they no longer use Bugkalot. The present Bugkalot houses are not different from the lowland houses. Most houses are already built with reinforced concrete materials as is the common household building materials in the lowlands. Being Bugkalot is a binding force by itself as this gives them sense of attachment and belongingness as a group. Being a Christian convert of the New Tribes Mission is even a closer tie among them.

The Bugkalots however are also members of some organizations other than religious and cultural. Some of them are members of the CADC-recipient PO. Technically, all of them are components of the local government unit of the barangay or the village and many of them occupy elective and appointed positions in these location government units. Half of the

members of the municipal council of Nagtipunan are Bugkalots including the municipal mayor. The Bugkalots also organized a Bugkalot Federation with elected officers from three provinces (Quirino, Nueva Vizcaya, and Aurora), aside form the provincial organizations.

The Bugkalot certificate of ancestral domain claim

From 1994 to 1997, six CADCs with an aggregate area of 205,233 ha were awarded to the Bugkalots (see relative locations in figure 2 and details in table 1). DAO no. 2 was implemented for almost eight years (1993-1998). It was superseded by Republic Act 8371, the IPRA law, but the IRR were issued by NCIP only in June 1998. Found in thirty barangays, in six municipalities, in the three provinces. Each of these CADCs was delineated and awarded to the POs concerned through the facilitation of institutions involved through government programs. The Nagtipunan CADC was facilitated by an NGO funded by the USAID while the five others were helped by the taskforce Casecnan, all with the collaboration of the DENR. The help extended included the preparation of the necessary ancestral domain plans, which are all linked to logging.

Figure 2: The six CADC areas awarded to Bugkalots in six municipalities of three provinces (Aquino 2004: 259)

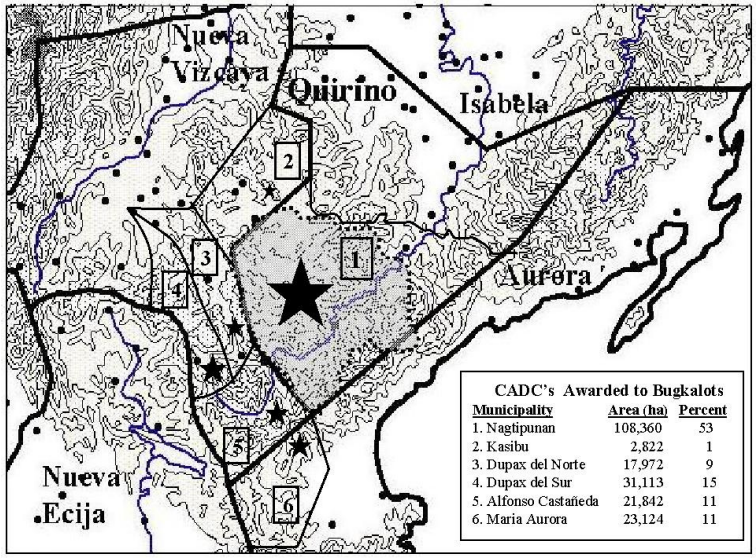


Table 1: The CADCs of the Bugkalots within six towns in the three provinces

Province	Town	Number of barangays covered	Total area (ha)	Month/year Awarded
Quirino	Nagtipunan	12	108,360	June 1994
Nueva Vizcaya				
1	Kasibu	4	2,822	January 1996
2	Dupax del Norte	4	17,972	January 1996
3	Dupax del Sur	6	31,113	January 1996
4	Alfonso Castañeda	2	21,842	January 1996
Aurora	Maria Aurora	2	23,124	January 1997
Total	6 towns	30	205,233	January 1998

The Bugkalot domain being the site of pilot projects of the DENR was among the earliest recipients the CADC; in fact it was the second issued in the country. All forestry related programs were later put under the Community-Based Forest Management Program (CBFMP) hence the CADC POs in the domain signed a CBFMA with the DENR in accordance with the revised policy. The following analyses on CADC implementation were the result of earlier study on this area. The details related to logging were solely based on those three POs that were able to implement their plans. All other aspects are based on all Bugkalot CADCs.

The experiences during the implementation of the CBFMAs in the Bugkalot CADC are cited here only where they relate to some divergence of policy provisions in relation to policy implementation. The intention is to present the experiential circumstances to situate potential remedies and solutions that should be considered for similar undertakings such as the concerns of the NCIP.

Supervision and control of ancestral domains

Supervision of CADC areas and PO operations was under the DENR as provided by DAO 2. The DENR personnel were limited to financial constraints as were the case of government agencies. Field reality was not that no on-site actual supervision and control was undertaken.

As early as the planning stage, the required consultations and involvement of stakeholders were not ideally done. Although an Ancestral Domain Management Plan (ADMP) was prepared, the plan which was supposed to be the overall encompassing guide for the whole domain, this was not followed or implemented; it was prepared just for the sake of compliance. Facilitated by various foreign-funded agencies and NGOs, the plan was reduced and localized (through consultations, site validation and finally translated). However, there is a need to disseminate the contents of the ADMP to the PO members.

The preparation of annual plans was done through the project officer assigned by the DENR to each CBFMA area. The procedures were not followed in coming up with the resource use plan (RUP) where the logging specifications (species, sizes, volume to cut, and the area from where these will be taken, *etc*.) were supposed to be specified. The respective roles of the DENR and the PO were not dichotomized, in fact the DENR assumed the role of the PO by doing the plans. Of course, the incapability of the PO to do this is partly a cause to this.

For purposes of supervision and control of the CADC particularly with the implemented CBFMAs, monitoring and evaluation could have been better with the significant involvement of municipal local government units, as well as other stakeholders such as NGOs or even the academe. If only the PO officers and the Bugkalots themselves were capacitated as envisioned by the ADMP, then monitoring and evaluation could have been more effective with self-monitoring and evaluation by the PO themselves.

Decision making and the people's organization

Empowerment of the PO and its members is one of the salient features of the ADMP. The rationale is that empowered people can make rational decisions for themselves and the management of their domain. In fact, self-determination was one of the enshrined policies of the Constitution for indigenous peoples. Likewise, DAO 2 provides that indigenous organizational and leadership systems shall be recognized.

With the PO organized as the recipient of the CADC/CBFMA, a new leadership system was created, solely for the CADC. The organization did not emanate from the Bugkalots themselves. With the very extensive areas covered by the CADCs, the POs can hardly cope with the purported objective by which it was created. The PO is too loose an organization, so instead of a collective decision making process, the officers are the ones making decisions.

Evidently the structure of POs organized is not fit for the management of ancestral domains. In practice, the PO is just the CADC recipient in paper and did not function as it was supposed to. In fact, the envisioned benefits that should accrue to members of the PO did not materialize. Instead, only the elite members of the PO, mostly the officers, materially benefited from the CADC through the CBFMA.

With the biophysical setting of the domain and the prevailing social conditions (people interrelationships, behavior, and leadership structure), the recipient PO is not appropriate for the management of the domain. There is a need for an organization that is socially cohesive, small enough to be manageable, and not with an extensive membership that encompass all people within a very large area. This means that within the domain, small groups with mutual interest, needs and commitment to a particular domain area may be organized for the purpose.

Environmental policy goals versus personal motives

DAO 2 provisions are for sustainable environmental management through the indigenous peoples. The indigenous peoples have the responsibility to protect flora, fauna, watershed areas, and other forest and mineral reserves within the domain area. This is explicitly stated in the CBFMA agreement the PO signed with the DENR. However, various activities within the domain manifest that this is not religiously followed. In the some patches in the forested parts of the domain, there are patches of newly opened swidden farms. Obviously, many people in the domain, Bugkalots and non-Bugkalots alike, do not comply or are not aware of such restrictions. These provisions are likewise stated in the previously prepared and adopted ADMP as well as in the required annual plans. It is apparent that there is a need for PO officers to spearhead the dissemination and implementation of these policy provisions.

The implementation of the CADC and the CBFMA was focused on natural resources extraction particularly timber. Interest in the Bugkalot ancestral domain was generated and sustained due to the expected benefits derived mainly from commercial logging. This general perception came about when the villages of Landingan and Wasid in the Bugkalot CADC in Nagtipunan, Quirino implemented their CBFMAs. The activities of the POs were centered on logging as manifested by their annual operations plan. The DENR approved their annual operations plans with majority of the prescribed conditions on timber extraction, wood processing and disposal. The sudden bounty in these two parts of the Nagtipunan CADC generated instantaneous interest of the other villages not only within the Nagtipunan CADC but in the rest of the Bugkalot domain. In fact, the other Bugkalot CADCs, four in the province of Nueva Vizcaya and one in Aurora, were offshoots of the initial operations of the CBFMAs in the two villages in Nagtipunan, Quirino. However, these CADCs, although they were able to process their respective ancestral domain plans, were not able to do logging operations as they were taken over by events: the countrywide suspension of CBFMA because of malpractices and the IPRA law.

Logging and the goal of sustainability

As the CADC and the CBFMA programs were DENR-led, it was the main agency responsible for its implementation. Because logging was a major activity in the operation of each of the CBFMA areas, there was a need to adopt a mechanism to regulate cutting of timber. In the absence of such a mechanism for the new forest management approach, the DENR used the selective logging system (SLS), a Philippine version of the American sustained yield forest management system. The SLS was the logging method previously implemented by the government for the old Timber License Agreement (TLA) concessions. The selective logging system has three phases: (1) tree marking, where the trees to be cut and trees to be left (residuals) are marked and documented based on prescriptions (this information is used in monitoring cuts from each cutting area and period), (2) residual inventory, where the marked residual trees are counted and evaluated if damaged, and (3) timber stand improvement, where activities are implemented in response to the findings of the residual inventory (these activities may range from enrichment planting, reforestation, or punishments such as suspension of the concession or even downright closure).

The implementation of the SLS over the preceding decades was not effective for sustained yield forest management in timber concessions. Its use for the CBFMA community-based forest management approach was likewise inappropriate. The way it was implemented was a far cry from the how it was supposed to be done. The check and balances in the monitoring and evaluation of the implementation was not possible because the supposed bases were not appropriately done in the first place. Besides, the SLS was too technical for the PO officers and members to implement, hence they were left with no recourse but to involve and depend on other people who likewise benefited from the arrangements. It was apparent that there was a need for the design of some simple and practical ways in regulating timber extraction.

Other requirements such as prohibited mechanization in wood processing and the one log pond policy, all for regulating logging to sustainable levels, were not good enough to contain the onslaught of timber extraction. The Quirino side of the domain was the site of various forms of illegal forest activities. Timber extraction, particularly narra (*Pterocarpus indicus*) poaching, was ongoing despite no legal sources in the province. The great demand for narra furniture triggered the establishment of many furniture shops that flourished in Nagtipunan and Maddela, despite the declared logging moratorium in the entire province. The CBFMAs of the Bugkalots provided the legal sources of these forest products; the POs became accessories to these activities by way of providing documents in legitimizing the products. After a nationwide suspension of the CBFMA in 1998 and the declaration of a large part of the province of Quirino as a protected landscape in February 2004, the situation for forest product management in the area has drastically changed. The province of Quirino was declared as a protected landscape through Presidential Proclamation 5548 issued 9 February 2004, with coverage area of 206,875 ha. This was reduced to 175,944 ha, covering most parts of Maddela and Nagtipunan, through Presidential Proclamation 779 issued 3 February 2005. Once more, the path to natural resources conservation has been reinforced. But again, as in the past, policy intentions are only as good and as effective as their implementation.

Conversion of claims to titles

When the NCIP started its operation, one of its major mandates was the issuance of certificate of CADTs. The initial bulk of work of the commission in this regard is the conversion of the 181 CADCs issued by the DENR into CADTs. Since these were successfully delineated pursuant to the DENR DAO 2, special provisions are provided by the NCIP in its

implementing rules and regulations of the IPRA for the DENR-issued CADCs (NCIP administrative order no. 1, rule VIII, part I, sec. 5), without going through the process.

An interested indigenous peoples' group, which was issued a CADC by the DENR, can apply for the issuance of a CADT by accomplishing an application form with the NCIP provincial office. With the all records and documents pertinent to the approved CADC, turned over by the DENR, the NCIP provincial officer shall review the same for the correctness of the delineation made, sufficiency of proof, and regularity of the process undertaken. Upon favorable findings of the office, the documents are endorsed to the ancestral domain office of the NCIP central office, through the regional office for the subsequent issuance of the CADT. Only in case of irregularity, the provincial office refers the matter to the regional office for a field investigation and appropriate re-delineation in accordance with the regular process prescribed by the NCIP.

In the Cagayan Valley, the Bugkalot CADCs being among the earliest CADCs were subjected for CADT processing by the NCIP. The six Bugkalot CADCs issued by the DENR were processed together as one for the issuance of CADT. As a result, only one CADT was released by the NCIP in lieu of the CADCs covering only four of the six. The total area of the CADT is more than 150,000 ha covering a part or the whole of the CADCs issued to the Bugkalots in the municipalities of Nagtipunan in Quirino, Kasibu and Dupax del Norte in Nueva Vizcaya, and Maria Aurora in Aurora. For lack of requirement, it did no include the Bugkalot CADCs of the Dupax del Sur and Alfonso Castañeda in Nueva Vizcaya. Obviously, the Bugkalot CADT was neither based on the DENR issued CADCs nor to the Bugkalot ethnic group.

CONCLUSIONS: ANCESTRAL DOMAIN MANAGEMENT FOR THE FUTURE

With the preceding experiences and conclusions, it is imperative that there is a lot that can be done to improve the process. With the reprocessing by the NCIP of the CADCs issued by the DENR and issuing a CADT for each of those that meets the process and satisfies the criteria, the issues raised must be considered.

Critical to the management of an ancestral domain is the recipient PO of the CADT instrument. Since the award is a communal property, the organization should have common commitment and interest so that they can be cohesive enough and committed for the management of the entire domain. Experiences in the Bugkalot CADCs point out that the recipient PO if its members are too many, even when its members are of the same ethnic group, it cannot function as an ideal organization. A PO with members coming from twelve villages located far away from each other as a CADC recipient never had organizational meetings. Even the officers themselves seldom see each other and can hardly meet for the concerns of the organization (Aquino 2004: p. 318-319). For purposes of domain management and resources conservation, the PO officer and members should be committed to a mutually beneficial goal. For the purpose, if everyone has to be involved, his or her personal commitment is necessary, hence the size of the organization is critical.

The physical boundary of the ancestral domain is an equally critical factor for the management of the domain. In the same way as it is harder for a PO to be functional when the membership is too large, it is also harder to manage a domain if its actual area is very large. The Nagtipunan CADC with an area of 108,000 ha located in the jurisdiction of twelve villages that can be accessed through three different entry points coming from opposite directions, two from the other province, is too large to be managed as one whole integrated domain (Aquino 1994: p. 319-320). Even if the CADT is only a social fence mechanism to keep out other people from the domain, the larger the size of the area the less effective it becomes. The domain size for the issuance of CADTs is an important factor especially if a primary consideration is the effective resources management of the domain. This should be given weight by the NCIP in its future undertakings at least for those still to be converted CADT but more especially for the new ones.

It is necessary that social and physical considerations in delineating the boundaries of an ancestral domain for CADT should be synchronized and dovetailed. For purposes of collective land rights, such as the CADT, the suitable social binding force for a group of people may pertain to an area where they have mutual interests or common stakes. This particularly area is an appropriate area for delineation for the issuance CADT which should be awarded to this group of people organized as the recipient PO. There are many ways on how social and physical considerations may be simultaneously considered and synchronized in the delineation and awarding ancestral domain rights (Aquino 2004: p. 323-332). A properly delineated manageable (small-enough) ancestral domain will be better administered by a well-knit group with common interests for the delineated domain.

Given the provisions of the IPRA and its implementing rules and regulations (IRR), the systems and processes in the issuance of CADTs are provided. However, some leeway is available through the IRR. No restrictions are specified on the issuance of only one CADT to an ethnic tribe. One way, then, is to award CADTs covering smaller areas within the large ancestral domain and issue each to a socially intact PO or sub-group of the tribe. With the social and physical considerations simultaneously considered, each CADT can be better managed. The processing of each title will also be simpler and less tedious as this involves lesser time, effort and money on the part of the awarding agency. Another way, on the part of the NCIP, is to amend portions of the IRR of the IPRA to specifically provide for the considerations and issues raised in this paper.

For the sake of indigenous peoples, with due respect of their right to self-determination, and for environmental conservation of their domain areas, utmost consideration should be given to both social and physical factors in the delineation of an area to be awarded as ancestral land. The Philippine initiative, the CADT, is a proactive and giant step towards the recognition of ancestral land rights. Its implementation should be sensitive to on-site field realities and dynamic enough to adapt with the growth of knowledge and discourse on this subject matter.

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CHAPTER TWENTY-SIX

THE NATURAL RESOURCE MANAGEMENT SYSTEM AND SOCIOCULTURAL CHANGE OF THE COASTAL AGTA IN THE NORTHERN SIERRA MADRE NATURAL PARK: CONSERVATION OR DEPLETION?

Delia S. Magaña

INTRODUCTION

Theory

A disillusion in the 1950s with earlier theories stimulated different views, for example the cultural ecology paradigm by Julian Steward. He introduced three steps in investigating the cultural ecology: (1) describing the natural resources and the technology used to extract and process them, (2) outlining the social organization of work for these subsistence and economic activities, and (3) tracing the influence of these two phenomena on other aspects of culture (Barfield 1997: p. 448). He also devised a method for determining the ways in which cultural change is induced by adaptation to the environment and if adaptations of human societies to their environment would need particular modes of behavior. Leslie White's primary premise is that culture increases with the energy use per capita (Barfield 1997: p. 491). Marvin Harris is responsible for the development of cultural materialism focusing on the idea that technological and economic features of a society have the basic role in shaping its particular characteristics (Barfield 1997: p. 137). In bringing ecology and structural functionalism together, Rappaport contributed to a basic framework on culture as a function of the ecosystem. The biological dimension of the ecological approach represented by his study within cultural anthropology has led to the term ecological anthropology (Netting 1996: p. 269). The interest of anthropologists in the environmental debate is exemplified by Milton, who proposes two roles for anthropologist: (1) to study and come to a better understanding of the dialectical relations between humans and their natural environment and (2) to take environmentalism itself as a research object by considering it as a cultural phenomenon (Milton 1996: p. 217). The constructionist approach assumes that worldviews are constructed through people's social experience. Or culture defined as what is in the people's mind is regarded as determining the environment by defining it and imbuing it with meaning (Milton 1996: p. 50-51). Linking indigenous peoples (noble ecological savages or people in harmony with nature) with conservation (defined as the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of the future generations) has become a trend starting in the 1990s in relation to environmentalism and sustainable development.

Objectives

Using the above theories as background, this paper will focus on the Agta coastal communities of the municipalities of Palanan and Divilacan in Isabela Province, which are covered by the Northern Sierra Madre Natural Park (NSMNP), specifically to: (1) explore the coastal Agta environmental knowledge systems, their natural resource use, technology and protection, (2) investigate the effects of lowlanders' resource use on the coastal Agta culture and ecology, and (3) review the key issues in connection with the different development interventions extended by the non-governmental organizations (NGOs) to the Agta coastal communities. The data was gathered during the author's anthropological research and field experience as anthropologist with two NGOs: Plan International and the Nordic Agency for Development and Ecology (NORDECO) from 1997 to 2002.

Population and geographical groupings

Among the various indigenous peoples in the Philippines, only the Agta are both river-valley and coastal dwellers. The coastal Agta, called Dumagat by lowland migrants, meaning people from the sea, are located in Palanan and Divilacan. The Agta in Maconacon and Dinapigue belong to river-valley groups, such as those settled in the mountains of San Mariano, Tumauini and Ilagan.

The total Agta population in the three coastal municipalities of Palanan, Divilacan and Maconacon is 1,405, which is only 6.4 percent of the total lowland population (22,035 people).

The Palanan coastal Agta villages or camps are generally situated along the coast of the Pacific Ocean. Starting from the northern part, where the Pinacanauan River ends, is their settlement Sabang. However, last 1998, the Agta here transferred to Dimatog of barangay Dicotcotan following the advise of the Christian missionaries. Dimatog is considered as part of the Agta ancestral area. In the coastlines of the same barangay are other settlements: Dipagiden and Diago. Didadungan, the next barangay to the southeast, starts from *sitio* Disomangit and ends in *sitio* Divinisa, which is the boundary between the municipalities of Palanan and Dinapigue. Here, four Agta settlements are found: Disomangit, Cacawayanan, Kanaipang and Divinisa. Their fishing and hunting grounds extend from the lower end of Diguyo running through Dikapisan, Digollorin Bay and Divinisa until the Masinao River.

The Divilacan Agta coastal groups are located near Dimapnat River, the boundary between Palanan and Divilacan. Further north along the shoreline, is the Agta village of Diaguan. The Agta here have farm lots, hunting and gathering grounds a few kilometers away in Dilacnadinum, which was in the 1960s proclaimed as a resettlement farm area for all Agta in Palanan and Divilacan by Manda Elizalde who was then the chairman of the Philippine Assistance for National Minorities (PANAMIN). Other Agta groups inhabit barangays Bicobian, Dimasalansan, Dipudo, Dilakit and Dicatian. In Dimasalansan, they are scattered in Dialinawan, Dicatolongden and Makengaden. The Agta also consider the Honeymoon Island as their old settlement and fishing and gathering ground. The wide mangrove forests in Dibigo are also considered as their ancestral area.

Ethnohistorical fragments

Peterson's (1974) excavations in Dimolid in Palanan describe seasonal economic activities that can be attributed to the coastal Agta. The Dimolid site (estimated at 1200 BC or earlier) is

a coastal habitation site, seasonally occupied, which represents a very few scheduled, specialized subsistence activities revolving around the gathering of grain and the manufacture of wood and bamboo tools. The evangelization of the Iraya, Negritos and Aeta by the Catholic mission in Palanan started in the Spanish period in 1588. Around 1780, the coasts of Palanan were inhabited only by the Agta and Irayas (Keesing 1962). Irayas in this historical report may be assumed to refer to the Ibanag (the indigenous population inhabiting the area from Cabagan down to Santiago in Isabela province) population who presently inhabits Palanan. A number of eighteenth century reports clarify that the Agta were engaged in intense symbiotic relationships with lowland farmers and traded forest products for rice, tobacco, metal tools bead and pots (Headland and Reid 1989). Since then until 1966, the church records show that only fourteen children were baptized. The non-Agta population of Palanan increased in the 1960s, and peaked in the 1980s because of the logging industry. The Christian Missionaries for the Unreached (CMU) under the Summer Institute of Linguistics (SIL) arrived in Palanan to introduce Christian doctrines. They resettled the Agta in Dibungco in barangay Marikit, uphill along the Pinacanauan river of Palanan, in 16 ha bought by the SIL that became the Born-Again Christian center both for the Agta groups in Palanan.

NATURAL RESOURCES: KNOWLEDGE, BELIEFS, USES, TECHNOLOGY, PROTECTION AND ECONOMY

Settlement patterns and land use

The coastal Agta sedentary settlement patterns and land use are generally uniform starting from the southeastern part in Sabang of Palanan to the northeastern most part of Dicatian in Divilacan. The Agta settlements are commonly surrounded with dense residential units of the lowlanders, using the same marine and forest resource areas as the Agta. The lowlanders' houses are larger, and generally walled and floored with wood or cement and roofed with galvanized iron. Along the coastline are the Agta lean-to's (*pinanahan*), typically made of rattan, grass stalks, banana leaves twigs of trees and sometimes from salvaged wood. During rainy season, some Agta prepare two lean-to's and connect them together, while others build small thatched houses on poles further away from the coasts. Each village or camp is composed of one or two extended family groupings or bands. A family unit is usually called *mattama* or *mattena*, which is basically a nuclear family.

The Agta coastal villages, marked with old burial grounds, are geographically situated along the shoreline, river tributaries and forests. The agricultural lands of the non-Agta nearby usually consist of upland mixed plantations and rice fields. Forests are classified as: (1) residual, (2) beach, and (3) old growth. Along the shorelines are rock and corral formations. The river tributaries located near the coasts are their sources of water for drinking, cooking, laundering, bathing and other domestic uses. Their small cultivated lands, either located on the slopes or plains are planted with corn, cassava, sweet potato and banana. During the rainy season, the coastal forests are their hunting grounds for wild pigs and deer and their gathering areas for wild fruits, medicinal plants, root-crops, leaves and branches used for constructing their lean-to's, weaving baskets, mats and hats.

The *dayo* site (the place where a band moves temporarily for purposes of economic activities, especially fishing) can be observed in many of the coastal areas during summer. They work as hired laborers of lowlanders during the harvesting of corn. Agta Born-Again Christian centers are distinguished with the presence of a small chapel in their settlements.

Religion

The nature spirits are generally referred to as *hayop*, either malignant or benevolent beings inhabiting forests, streams, creeks, seas, rivers, mountains, big trees and rocks. Another kind of spirit is called *anito* believed to be souls or spirits of the dead, who roam around and haunt humans. These environmental spirits believed to guard natural resources, are supposed to be pacified with a ritual called *paka-pakan*, which literally means inviting somebody to eat offerings basically composed of betel nut quid. There are still many nature spirits that take the physical form of humans or animals, like the *serena* (mermaid in the sea), who is believed to help humans by guarding the marine resources, especially the fishes, and assisting kind-hearted people to catch abundant fish. Unseen spirits are angered by disrespectful actions of humans such as reckless drawing water from the spring or stream or gathering anything from the forests or seas without acknowledging their presence.

Geographical knowledge

The knowledge of the Agta of their coastal environment is quite comprehensive. They have specific names and descriptions for the open sea, shores or coastlines, rock formations, coves, corrals and islands. They also identify specific features of the landscape like the deepest part of the sea or the related sea animals or plants. Attached to these geographical features are their folklore traditions, containing etymologies of place names. For example, Disomangit was believed to have originated from the Agta word *sangit* or cry because the waves sound like a crying woman. The natural resources found in each geographical area are also known in detail, such as the parts of the sea with specific kinds of fishes.

Flora and fauna

The Agta have a very comprehensive knowledge about the resource areas and specific species of fish, shells, shrimps, squid and octopus. Their knowledge on where and when these species can be found is voluminous. They associate the fish with the shapes of the moon, believing that there are more fishes during the waning of the moon than when it is full. They can identify the different names, characteristics, uses and functions of plant species found in their environment. They are aware of the different sea grasses and weeds that the specific sea animals eat, for example the sea-grass species that the dugongs and turtles feed on. The Agta also eat some of the sea-grass species. They also classify the sea animals, recognizing animal sounds, characteristics and functions. For example, they observe the unique characteristics of the *okong* (*Megapodius cumingii*) from other birds, although it is now seldom seen in areas like Kanaipang and Honeymoon Island. The *okong* lays its eggs in a hole under the sand.

Sightings of sea animals are also common experiences of the Agta. Saltwater crocodiles (*Crocodylus porosus*) are found in Dimasalansan, Dicatian and Didadungan, nearby Agta settlements. In 1996, in Dimasalansan, a saltwater crocodile went up the house of an Agta and bit the leg of a sleeping teenager. In 1999, also in Dimasalansan, between Dipudo and Dicatongloden, an Agta twice spotted a saltwater crocodile about eight feet in length and two feet in width. Sights of saltwater crocodiles are very common in these areas but the Agta believe that these crocodiles will not harm them. The dugong, called *duyong* by the Agta, was last sighted in Dimasalansan in 1998 and it was estimated to be eight feet long and more than one foot in width. An Agta saw it eating sea grasses. The Agta believe that only the shrimp-like species locally called *kamantara* can kill the dugong. The Agta do not eat sharks, whales and dugong.

Knowledge on biological diversity

The Agta comprehend the various interconnections of biological diversity. They identify and characterize the entire animal and plant species and related habitats. Relationships of animal species with other phenomena in nature, like the moon, climate and sea-tides, are fully understood by the Agta. Sharks, whales and dolphins are regarded as important for the preservation of other marine species and this belief is reflected in their practice of not eating big fishes. The interrelationships of the plant and animal species within their respective ecosystem, and the interrelationships of these with other natural geographical features, for instance the sea with the forests, are believed by the Agta to be valuable in the maintenance of resources. Thus, logging the trees destroys biodiversity of the sea and forest areas.

Gaygay

The Agta have a traditional sustainable resource management system called *gaygay*, related to death and the depletion of resources. It involves fencing off part of a river considered by the Agta as part of their ancestral domain, for a period of three to five years, so that resources will be able to recover from depletion. This practice is especially present among the river-valley Agta. In 2000, along Divinisa River, which is an important Agta fish water resource area, a *gaygay* was installed in order to give the depleting resources the opportunity to regenerate. An Agta band in Disomangit installed a *gaygay* in reaction to lowland encroachment into their ancestral forest area. Tree branches were hammered with nails to signal their prohibition to the lowlanders entering their important hunting and gathering grounds.

Technologies: traditional and modern

Fishing among the coastal Agta is one of the major subsistence sources. The basic traditional fishing method consists of an iron wire spear (*bettek*) with the length of about 93.5 cm and an arrow point of about 2.5 cm. Attached to the *bettek* is a rubber band called *lastiko*, which has a width of about one centimeter and a length of about seven inches used as a slingshot. The *bettek* is always accompanied with a pair of goggles called *antipara*, which the Agta themselves manufacture. They describe it in relation to the technology of the lowlanders as "*parang walang kwenta pero ito ang bumubuhay sa amin*" (it looks like really nothing at all, but it gives us a living). The Agta employ sustainable ways in extracting resources from their environment, like for instance in catching crabs (*mangagima*), which is exclusively done by women. The crabs are found in natural swampy mangrove areas in Culasi, Dimasalansan and Dicatian. A very simple technology, consisting of a pointed stick and an iron wire with a hook, is used. Important is the quickness of sight in following the crabs' tracks in the mud leading to its habitat. Once its location is found, a hole is dug until about one foot deep, wide enough for one hand to enter. To avoid being bitten by the crab, a bare hand is used in locating the back of a crab, seeing to it that it is big enough for harvest.

Another traditional coastal gathering activity done by the Agta women is catching octopus (*mangugita*), especially during the low tide, when the rocks or corrals are exposed. They also employ a simple tool like a pointed stick and the *bettek*. In looking for octopus, a woman looks closely at the corral rocks or stones, where it is possibly hiding. Any part of its body, showing from underneath, is pierced with the *bettek*. When the water becomes dark, the presence of the octopus is confirmed. It is then firmly struck with the *bettek* until it is dead. Men also catch octopus, but seldom so, in the deeper part of the sea using a technology adopted from lowlanders: an octopus replica (*kasikas*). It is suspended from the boat in order to attract octopus in the sea. When the octopus grabs the *kasikas*, it is then held up from the water and pierced with the *bettek*.

Indigenous-based law

In the formulation of their Ancestral Domain Sustainable Development and Protection Plan (ADSDPP), the general rules set by the coastal Agta on the conservation of natural resources within their ancestral domains include the following: (1) fishing with electric devices, dynamite, cyanide and other poisonous materials is prohibited, (2) fishermen from Quezon and other municipalities outside Palanan are not allowed to fish within the coastal waters covered by ancestral domains of the Agta, (3) the meshes of fishing nets should be big enough to select large fish only (the required mesh size is above number 5), (4) the use of wide and long nets for fishing lobsters is not allowed (only the use of *bentol* is allowed for lobster fishing), (5) killing of the endangered species such as sharks, whales, turtles and their eggs, dugongs, crocodiles and dolphins is not allowed, (6) fish sanctuaries are declared in the areas immediately adjacent to the Agta settlements that are part of their ancestral domains, and (7) anybody who is caught fishing within the declared fish sanctuaries will be penalized.

Socioeconomic realm

The Agta economy is a subsistence economy with rice or corn serving as their staple food. Year-round primary economic activities are fishing and catching crabs, lobsters, octopus, squid, and crustaceans, and the planting of root crops, bananas and corn. Hunting wild pig and gathering honey, wild root crops, *minapo* nuts and almaciga resin are secondary sources of income. Some Agta bands maintain domesticated pigs. They either exchange their forest and marine products with rice, corn, coffee and other manufactured goods or sell them for cash. One kilo of fish is usually exchanged with one *ganta* of rice, or paid PhP. 25 to 45 per kg depending on the type of fish. A kilo of fresh octopus is PhP. 25 to 35, and crabs are sold for PhP. 45 per kg. The lowlanders sell all of these, either in the neighboring provinces or in Manila, with big profits.

LOWLAND RESOURCE USE AND EFFECTS

Fishing

Agta and lowlanders who have historical trading exchanges, may refer to each other as *ibay* or *alibay*, meaning trading partner and friend. The Agta provide forest and marine products and exchange these with rice or manufactured goods. Basically, characterizing the *ibay* relationships are generosity and reciprocity, bound with mutual need, since in the exchanging process the equivalent amount is not exactly accounted. They regard one another as brothers and sisters, always helping one who is in need. Usually, Agta family names are derived from their lowland *ibay*. At present, very few of these relationships between the Agta and the lowlanders are maintained which may be attributed to sociocultural and historical changes.

There are different kinds of non-Agta or lowlanders, who depend on coastal resources for fishing: (1) local lowland communities who use the resources for their everyday livelihood, (2) the local lowland businessmen or entrepreneurs who extract the resources in a large scale for commercial purposes, and (3) outsiders from neighboring provinces who regularly do fishing activities in a large scale. It should be noted that there are local lowland communities, also concerned with the rapidly decreasing resources, who try to conserve the resources by avoiding the use of destructive means and most of these people have long histories in living in the area with the Agta communities.

As mentioned, the Agta population is only just over 6 percent of the total lowland population. Consequently, in terms of quantity in resource use, the local lowland communities consume greater amounts of resources, taking into account their much higher population and their modern technologies. In some cases, there are people from this group who employ illegal fishing methods. In Kanaipang, for example, lowlanders caught fourteen sacks of *buraw* fish through dynamite fishing. According to the Agta, they expectedly experience a very few *buraw* fish for that year. They believe that dynamite fishing damages fish populations within a short period of time. There are times when angered Agta threaten lowlanders using dynamite in fishing with their *bolos* or native shotgun or arrows. For instance, in Disomangit, an Agta tried to drive away with a *bolo* a lowlander whom he saw throwing dynamite in the sea opposite their settlement area. In Kanaipang, Agta women drove away men who were attempting to do dynamite fishing.

Local lowland businessmen and outsiders from neighboring provinces such as Aurora and Quezon practice large-scale commercial fishing. In Sabang, a local lowland businessman selling fish recruits other lowlanders to fish with dynamite and cyanide. In the old port in Bicobian, another lowlander is engaged in a large-scale fish and lobster business. He buys the fish and lobster from the Agta at an extremely low price and sells it in Manila for far greater gains. In Disomangit, there are usually lowlanders staying in the Agta settlements for three to

five days to catch lobster with large fishing nets. Also, in Didadungan lowland laborers were observed employing long and wide nets for fishing.

The lowland businessmen also engage in catching shark for the fins and oil, which have a very high market value in Manila. Lowlanders killing sharks for commercial purposes are common phenomena in all coastal municipalities. Another group of fishers are outsiders from neighboring provinces such as Aurora and Quezon, who regularly enter the waters of the NSMNP for fishing purposes on their motorboats. In 1998 and 1999, the Agta reported massive illegal lobster extraction in Didadungan and in San Isidro by these outsiders. They were seen using thick and wide lobster nets, while fishes were left rotten along the shores. Turtles are also caught by lowland business people for commercial and consumption purposes. The hotspot areas for illegal fishing activities are Sabang, Disomangit, Cacawayanan, Kanaipang, Diaguan and Bicobian.

The large-scale, and often illegal, commercial exploitation of marine resources by lowlanders are seriously threatening the Agta resource base. Economic patterns are gradually changing from mutual exchanging of goods to a cash-based system. At present, the Agta sell fish to buy rice and other manufactured goods. Agta-lowlander relationships are changing into formal business arrangements, while competition over resources is also arising. This leads to changing fishing practices among the Agta; because their *bettek* is no longer sufficient for subsistence needs they increasingly use fishing nets.

Land and logging problems

The encroachment of the lowland population into ancestral areas threatens the burial grounds and traditional resource areas of the Agta. This involves logging and the establishment of agricultural lands by the lowlanders. The usual tendency of the Agta is to move to other areas to avoid confrontations or conflicts with the lowlanders. In Divinisa, for example, a lowlander has cleared a wide area including the Agta fields, hunting and gathering grounds, and burial grounds. Many trees, including *almaciga*, were logged. In addition, the alleged operation of mining companies in Divinisa is a critical issue.

There are also questions on land titles awarded by the Department of Environment and Natural Resources (DENR). In Divinisa, for example, land titles were issued to several local lowlanders by the Bureau of Lands in 1995. Two Agta bands received each a 1 ha land title. But Divinisa is also a part of the CADC that was awarded in 1996. Land problems of this type have been prevalent in most Agta ancestral areas. There are Agta ancestral domains allegedly owned by influential government officials, for example Honeymoon Island.

There are illegal logging activities in almost all areas of the NSMNP. The Agta consider this as a very serious problem. It is affecting their everyday life and destroying their traditional hunting and gathering areas. Hunting of wild pigs or gathering of wild root crops has become more difficult.

DEVELOPMENT INTERVENTIONS

Various NGOs have been involved in development projects within the NSMNP: Plan International, NORDECO, Conservation International (CI) and Conservation of the Priority Protected Areas of the Philippines (CPPAP). All of these NGOs cooperated with the DENR and the National Commission on Indigenous Peoples (NCIP). The main objective of these NGOs was to conserve the biological diversity of NSMNP.

Livelihood Support

Fishing

Motorboats, paddleboats, fishing nets and other related fishing accessories were donated to the Agta (livelihood assistance). Nets of 2 to 3 m long and other related accessories were donated to each family. The motorboats were given not only for fishing and marketing the harvest, but also for monitoring the coast. One motorboat and one paddleboat were given to each Agta village. Despite the advice given on the use of the motorboat, problems (on sharing, schedules and gasoline consumption) arose within the various bands. There were mutual accusations of selfishness. There was an isolated case in which a certain lowland businessman was using the Agta motorboat. Some of the families sold their nets to lowlanders. The NGO tried to solve these problems by conducting meetings with the Agta communities where the Agta were urged to resolve the issues among themselves.

The fishing livelihood support has generated (consciously or unconsciously) resource use conflicts with lowlanders (who also received nets and large fish hooks). The rapid depletion of resources (aggravated by the intervention of the NGOs) increasingly threatens the Agta resources and defeats the purpose of conservation. Its effect on the Agta resources has been tremendous, also given the fact that illegal fishing activities have not lessened, as monitoring and enforcement of laws by both government agencies and NGOs did not take place.

Reports on illegal fishing by the Agta to the concerned agencies have been consistently ignored. Instead, the barangay officials who were supposed to lead the preservation of resources confronted the Agta: when an Agta leader reported massive illegal fishing directly to the LGU and DENR, the barangay captain was insulted and ordered the Agta to report cases to him or other barangay officials first. But several reports on illegal fishing from the Agta to the barangay officials had been unattended due to the confidential connivance of the latter with the illegal fishermen. The enforcement of laws in the Agta ancestral areas have been left by the NGOs at the hands of the Agta, who are helpless against political undercurrents. In the Agta tradition a law should always be followed, but they feel that they do not have control over the laws of the lowlanders.

Cultural differences

In Dimasalansan where combined livelihood provisions were extended to both the Agta and lowlanders under the leadership of the barangay captain. Livelihood assistance was provided in the form of shell culture, crab production and fishing. The wishes of the community (motorboats, paddleboats and nets) were provided by the NGO. The project, however, failed because of the cultural differences between Agta and lowlanders.

Crab fattening

Another livelihood project, which underlines the need to respect the indigenous people's rights to use traditional resource areas, was a crab production project. In Culasi of barangay Maligaya, lowland women were involved in a crab production project, wherein native crabs were harvested from the mangrove areas and raised in cages and fed with grated coconut meat. The Agta women complained because according to them, the native crabs were

collected from their own crab gathering grounds and they expressed their fear that such commercial livelihood would possibly deplete the crab resources. Despite these complaints the NGO continued its implementation. After the NGO phased out the project was not continued.

Carabao dispersal

Another form of livelihood support extended to the coastal Agta was the dispersal of carabaos to be used in agricultural activities. The Agta communities in Disomangit and Diaguan (with fields in Dilacnadinum) were provided carabaos (one for each band), farming tools and rice seeds. Training on agriculture and animal husbandry was given, based on the idea the Agta lacked basic farming skills. In their first harvest in Disomangit, there were problems with insect and bat infestations. Thus, a poor harvest was obtained. In Dilacnadinum one of the carabaos died before the planting season since they had no knowledge of taking care of it. Very few families were able to harvest in the end because of bad weather conditions, unsuitability of land for sustainable farming, encroachment of lowland farmers, and disturbance of illegal loggers.

Ancestral domains

A Certificate of Ancestral Domain Claim (CADC) covering 28,375 ha was awarded to the Agta in the municipalities of Palanan and Dinapigue. The CADC covers almost the whole coastal forests from Disomangit to Divinisa, including the Agta hunting and gathering grounds as well as the cultivated areas. It disregards, however, the Agta coastal settlements and resource base. According to the Agta, the lowland population presently occupies almost all the areas that were included in the CADC. Almost all inhabitants inside the CADC area are non-Agta. In the words of the Agta: "What should be made as our CADC area, are the seas, mountains, rivers, settlements, farm lots, and everything where we get our sources of living and the burial grounds of our ancestors. If all of us transfer to that CADC area and drive away the *tolays* (lowlanders), we will surely fight one another."

The shoreline and the sea, where the Agta fish and gather are all excluded from the CADC map. The Agta in Divilacan were not awarded a CADC. Instead land surveys by the DENR were recommended for the awarding of a CADC in barangay Ditarom, which is densely populated by lowlanders.

Due to the inconsistencies in the CADC process, NGOs (believing that only through the recognition of land rights the Agta can engage in the protection of their ancestral areas) provided technical assistance in the re-delineation of the CADC to the DENR and the NCIP. Assistance was also provided in the application for conversion of the CADC into a Certificate of Ancestral Domain Title (CADT) and the formulation of ADSDPP. The Agta, convinced of the value and relevance of a title for their ancestral lands, were able to submit all the requirements to the NCIP. But until present, there has been no approved application yet from the NCIP. The other coastal Agta communities in Palanan and Divilacan were assisted by the NGOs in their CADC application in 2001 through the conduct of a community resource management plan (CRMP). NGOs assisted the Agta in completing the whole CADT application process. But so far, no response has come from the assigned agencies.

The Agta attributed the delayed approval of their CADT application to the extremely slow movement of the NCIP. This was validated when one of NCIP officials told me: "We cannot work on it, because you work so fast. You have to conform to our phase of work since

we also rely on the national government for funding our activities." The reality in the field is that the IPRA is not being implemented due the inability of the national government to provide support, both financial and administrative, to the indigenous peoples. Systemic problems of the government like these should be addressed, perhaps by providing financial support to NCIP (similar to the assistance giving to DENR).

Capacity building

There are four Agta leaders from the coastal municipalities of Palanan and Divilacan who act as PAMB representatives. One of them in particular, Mr. Nonie de la Peña, is very vocal on conservation issues. In one of the general assemblies in 2000 he emphasized the problem of natural resource depletion: "It is good for me, I don't have children of my own, only nephews and nieces, but you, you have many children who will continuously need the resources and they will have nothing if you continue to do the illegal activities destroying our resources. Your children might not be able to taste a single fish from our seas."

The NGOs facilitated the participation of the coastal Agta in the PAMB, provided leadership training and trainings on the IPRA. These need to be continued on a more frequent basis. The formation of Indigenous Peoples Organizations (IPOs), which was facilitated by the NCIP, was done haphazardly just for the sake of fulfilling certain requirements for the CADT application. Thus, the Agta were not truly organized. There is a very urgent need for NGOs to assist in the formation of IPOs through the NCIP in order to empower the Agta communities and to strengthen their cultural identities. This will also benefit nature conservation.

Conflicting laws

Conflicting and overlapping laws on conservation, work against the rights of some communities, especially, the indigenous peoples. This became obvious during the writing of the ADSDPP in Diago, Palanan. Both the Agta and lowland communities were represented in the meeting. With regard to the prohibition of killing turtles by the national laws, an Agta leader expressed: "Since the turtle is part of our culture, why are we still prohibited eating it? We insist that we may continue our culture. We hunt the turtles through our fishing spear and we do this only during December when they are no longer in their reproductive stage. There are still many turtles in Dicotcotan up to the present. On the other hand, the lowlanders catch turtles at all times of the year with their wide and thick fishing nets."

There are also conflicting laws on granting land when there are overlapping land titles. For example some parts of the Agta ancestral domains were at the same time delineated as Community-Based Forestry Management Agreement (CBFMA) and private property (A&D).

Illegal logging

The logging activities by the non-Agta within the areas considered by the Agta as part of their ancestral domains are a pressing conservation issue. During the formulation of the ADSPP in barangay San Isidro, the Agta from Diago asked the Mayor: "can we at least shoot with our *pana* (arrow) the foot of the *tolays* logging the trees?" The Mayor was not able to answer. Nonie de la Peña, an Agta PAMB member, reported to the PAMB meeting that he saw DENR staff conniving with the loggers and receiving money from them. However, another PAMB member told him that somebody said that it was him instead who was conniving with the loggers. It is tragic that an Agta becomes the victim of his own honesty in reporting the realities on illegal logging and the enforcement of conservation policies.

CONCLUSIONS AND RECOMMENDATIONS

Sociocultural change is taking place among Agta communities, in the form of changing technologies and settlement patterns. This change takes place as a result of the Agta adaptation to the increasing depletion of resources. The overexploitation of resources usually takes the form of large-scale commercial resource extraction by lowlanders, often using illegal methods. This sociocultural change among the Agta however, has not lessened their knowledge systems and practices focused on the conservation of biodiversity. Development NGOs working for the protection of the NSMNP face the overwhelming difficulty of bridging the differences between the Agta and lowland communities, both in terms of sociocultural characteristics as well as in the use of natural resources. Let me quote Chapeskie (1995: p. 46) on the problems of relationships between indigenous peoples and lowland migrants in the context of biodiversity conservation: "How should co-management arrangements be established for land and waters, when one set of relationships to land (the aboriginal) have been built around the normative values of equity, cooperation and reciprocity that is expressed in terms of local authority and common property access arrangements while the other set of relationships to land (those regulated by the state) have been built around the normative values of competition, exclusive rights to property/resources and centralized management authority?"

Biodiversity conservation in the NSMNP cannot be attained unless all stakeholders (including a strongly organized indigenous community) would lay down their cards and reveal their wide range of interests (political, economic or otherwise) and discuss together the key issues (like unsustainable livelihood provisions, claims to ancestral domains, conflicting laws and lack of organized communities) in the planning, implementation and management of biodiversity conservation. As Chapin (2004: p. 30) recommends: "What's needed now is a series of independent, non-partisan, thorough and fairly objective evaluations that answers key questions the NGOs can't credibly answer. These evaluations should be taken by non-hierarchical teams representing the various sectors (indigenous peoples, local communities, national NGOs, government agencies and donors, including bilateral and multi-lateral donors (whose influence is enormous) and private corporations, which have been largely silent) and should be prosecuted in the spirit of seeking information and insights, not justifying existing programs. Together, these stakeholders need to pursue the kind of open, public discussion that could lead towards the creation of conservation programs that are responsive to the needs of both biological and human diversity worldwide."

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CHAPTER TWENTY-SEVEN

THE LAW OF THE JUNGLE: LOGGING AS SUSTAINABLE LIVELIHOOD ACTIVITY FOR THE AGTA OF THE NORTHERN SIERRA MADRE NATURAL PARK?

Tessa Minter and Maria L. Ranay

SUMMARY

This paper shows that:

1. Each day six hundred to eight hundred loggers operate in the strict protection zone of the Northern Sierra Madre Natural Park (NSMNP).
2. Lowland entrepreneurs initiate and sustain logging activities, while the logging workforce consists of the rural poor.
3. Logging activities take place within the ancestral domain of the indigenous Agta population. This happens without the consent of the Agta.
4. Logging activities jeopardize the Agta's core livelihood activities: hunting and fishing. Therefore, the Agta disapprove of logging in general.
5. Having no alternative source of cash income, Agta men on the western side of the NSMNP do engage themselves in different components of the logging process.
6. Out of every ten loggers in the NSMNP, less than one is Agta.
7. Agta communities in logging areas suffer from exploitation by non-Agta loggers.
8. Logging activities jeopardize the remaining forest and its rivers.
9. This situation is ecologically and socially unsustainable. Therefore, granting the Agta exclusive rights to timber exploitation in their ancestral domains needs to be considered as a way to protect the remaining forest and to uplift the Agta's economic opportunities.

INTRODUCTION

Contemporary policy and scientific debates on indigenous peoples and natural resource management, both within and outside the Philippines, are dominated by the notion that there is an inherently positive relationship between the two. This paradigm prevails despite criticism on its biased analysis of actual relationships between indigenous peoples and resource use (Duhaylungsod 2001). The Indigenous Peoples' Rights Act (IPRA) itself is founded on the premise that, because of their supposed close relationship with the natural environment, there are no better resource managers than the country's indigenous peoples.

Following this paradigm, non-governmental organizations (NGOs), government and academe label the Agta, the indigenous inhabitants of the Northern Sierra Madre, as ecosystem people. Because they are foragers, their lives are considered simple and in close harmony with nature (Magaña 2000: p. 1; Antolin 2000: p. vii-ix). In fact, a tendency exists to deny that the Agta's contemporary economy does contain certain unsustainable elements. Although this is understandable from an advocacy point of view, in the end it is in nobody's (and certainly not the Agta's) interest to maintain a stereotyped and simplistic image of the Agta as a people in general and as resource users in particular.

This paper will show that the Agta's indigenous identity and their direct dependence on forest ecosystems hold no guarantee for sustainable resource management. It documents

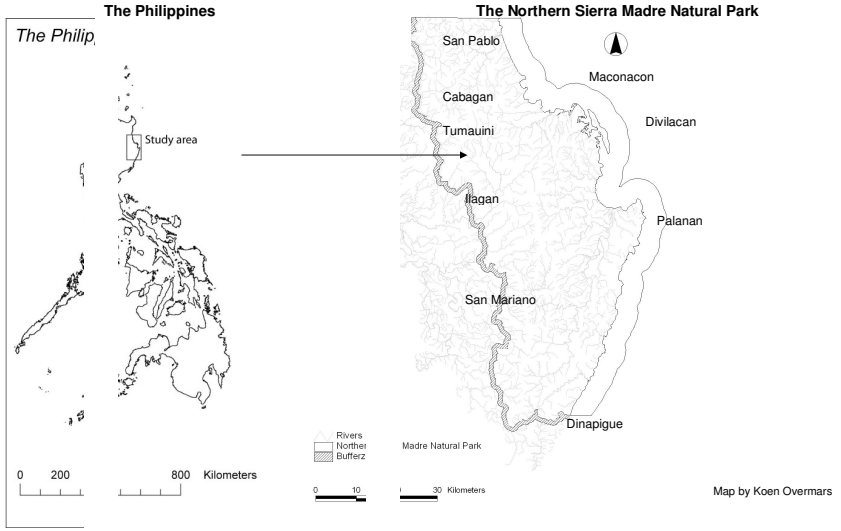
the importance of logging as livelihood activity for various Agta groups that live along the boundaries of what has been declared the NSMNP in 1997. Situated in the province of Isabela, this protected area covers 360,000 ha and includes among others Luzon's last undisturbed lowland rain forest, mangroves and beach forest (Mallari et al. 2001) (see figure 1). Twenty-three thousand people inhabit the park (DENR 2001), of which less than two thousand are Agta (Minter and Ranay 2005; Magaña 2000).

The Agta hover at the bottom of the Philippine social, political and economic hierarchy in the Philippines (Griffin 2000: p. 325-326). Having a Negrito appearance and living a foraging existence, they suffer from structural discrimination and marginalization. Moreover, their foraging economy has come under severe pressure as a consequence of deforestation and immigration into their hunting and fishing grounds from the 1960s onwards (Headland and Headland 1997; Early and Headland 1998; Griffin and Griffin 1985; Rai 1990).

Thus, as is the case in other parts of Northeast Luzon, the Agta living in and along the NSMNP today complement their foraging economy with a number of other activities. In the coastal areas, the majority of the Agta are involved in commercial lobster gathering. In lowland riverine areas, they often combine hunting and fishing with paid farm labor and commercial rattan gathering. In the southern interior of the park, Agta find employment as concession guards for the Luzon Mahogany Timber Corporation. The remainder of this paper will show that more than 50 percent of the Agta households living in the remotest areas along the western boundaries of the protected area earn a meager but indispensable income from logging.

After documenting the logistics of logging and its relative importance for Agta total household revenues, the paper will discuss the complex relationships between Agta and non-Agta loggers. The paper concludes that the current situation is both ecologically and socially unsustainable and that creative solutions need to be found to ensure a better future for the Agta and the forest.

Figure 1: The study area



Exact data on the intensity of logging in the park and its impact on total forest cover are lacking. However, as will be shown below, it is safe to conclude that on an average day, between six hundred and eight hundred loggers are harvesting various hard wood species within what is designed as the NSMNP strict protection zone. The most valued of these are narra (*Pterocarpus indicus*) and almaciga (*Aghatis demara*). The persistence of logging in the entire Sierra Madre can be mainly explained by political patronage, corruption and policy distortions (van den Top 2003; Huigen 1997). Yet, while the logging business is maintained by politically influential outsiders, it drives on a local workforce recruited from among the rural poor.

The logistics of logging

In this paper, the term logging refers to non-corporate logging: the activities described here do not involve corporations, heavy machinery or timber concessions. Instead, the present paper discusses logging conducted by small teams whose only capital is a chainsaw, basic supplies and in some cases a water buffalo. Log transportation mainly takes place via rivers and creeks. This type of logging is locally regarded as a way to earn quick and easy money. But how easy is it really?

Logging is a year round activity, which is at its height between February and June. This period coincides with favorable weather conditions and the low season in the agricultural cycle. Logging is a considerable logistical operation and involves a series of activities, from tree surveying to cutting, resizing, hauling and floating the logs downstream. Logging teams only set out for the forest after an order has been confirmed through a cash advance from the buyer, who is usually a furniture maker, building contractor or lumber dealer from the lowlands. While the loggers are out in the forest producing the appointed volume, the buyer makes arrangements in the lowlands to prevent the confiscation of his shipment (van den Top 1998: p. 120-122).

Logging teams range from four up to eight individuals, each with their own tasks and responsibilities. Teams minimally consist of a surveyor, a chainsaw operator, a helper and several haulers. The surveyor is the person who knows where good timber can be found and he guides the team to the optimal locations. The chainsaw operator brings a helper, who carries the chainsaw or provisions to the cutting area. He may also be responsible for cooking and for calling for help in case the team runs out of gasoline or has engine trouble.

The logs are usually sown into planks in the cutting area itself. Depending on the terrain, the haulers will then transport the logs to the riverside either manually or with a carabao (water buffalo). On arrival at the riverside the planks are prepared for water transport. The number of planks transported at once ranges from two to twelve pieces depending on the number and nature of rapids to be met on the way. The planks are usually kept afloat by resting them on an interior tube of a truck tire. If these are not available, bamboo poles will be nailed to the sides of the planks.

Each of the four municipalities featuring in this paper has its own selling point. These are mostly located just upstream of the most remote barangays, there where the road is not extending any further towards the forest. Log transportation time from the river side to the selling point ranges from three hours to two days. At the selling point, the logs are loaded on a truck and then transported to a second buyer, most often a furniture maker in Ilagan.

Lumber deals are often made on a consignment basis: payment to the logging team is not completed until the buyer has sold the logs to the second buyer. Apart from the advance payment that is made in order to finance for the logging operation itself, the loggers will usually have to wait for the rest of their payment, which is calculated on a per board foot basis. One board foot (bdft) is twelve cubic inch of lumber. One cubic meter equals 324 bdft.

Logging is a physically demanding and risky job. Logging teams spend up to three weeks at once in the forest, living in basic camps along the river. Heavy loads of food provisions and gasoline are brought up to the cutting area. This is done either on foot or by pushing heavily loaded *bangkas* (wooden peddle boats) upstream for as long as three days in a row. The cutting and transportation of logs is outright dangerous and accounts of sometimes fatal accidents are told and retold among the logging population. Given these circumstances, it is hardly surprising that loggers are always male and usually between eighteen and thirty-five years old. Many of them come from the rural areas situated downstream of the cutting areas where they or their parents have land. They usually belong to those groups of farmers who migrated to the uplands from the 1960s onwards (van den Top 2003), although some may temporarily move in for logging activities from far away provinces. They are from predominantly Ilocano, Tagalog and Ifugao ethnicity. While the older loggers have generally gained previous experience in logging companies, the younger generation is learning on the job. Loggers generally claim they need the quick money they earn from logging in order to finance the education of family members.

Agta involvement in logging

Although logging teams may already be complete on arrival in the logging area, surveyors, haulers and occasionally chainsaw operators are often recruited among the resident Agta population in the area of operation. This makes logging an important livelihood activity for many Agta households.

Since 2003, five months of field work were conducted among the Agta population of the western slopes of the NSMNP. The census data collected show that sixty-nine Agta households are residing in the area with a total population of 355. Agta populations per site are changeable in size and composition due to frequent movements of households between Agta settlement sites. The Agta population spreads out in around fourteen settlements in the four municipalities of San Pablo, Tumauini, Ilagan and San Mariano. All of these settlements are situated along rivers and streams at the forest fringe, inaccessible by road. They consist of two to eleven Agta households and usually no non-Agta households reside within the same settlement. The nearest barangays can be found at between two to eight hours hiking distance. While not all Agta settlements are situated within the park boundaries, all of them depend on the resources found inside the park for at least part of their livelihood.

Out of the sixty-nine households, fifty-nine were interviewed on their livelihood activities. Households are defined as the social unit sharing a roof and meals. Households usually consist of the parents and those members of the nuclear family that have not yet established their own independent households. Widowed or orphaned relatives may also be part of it. For more than half of these households, logging turned out to be a major livelihood activity next to hunting and fishing (see figure 2 and table 1). Several observations can be made regarding the twenty families in the four western municipalities that are not involved in logging activities. In the settlements Diwagao and Dialwas, located in the Southeastern part of San Mariano, all households are hired as concession guards and road surveyors for the Luzon Mahogany Timber Corporation. They receive a monthly cash allowance of approximately PhP. 2,000 as well as assorted groceries for each family. Although these families are employed in logging as well, this is a different situation which is therefore not considered as such in this paper. The remaining non-logging households are all situated in the somewhat less isolated Agta settlements of Kamalaklakan, Kamerasitan and Diwagden in the lower parts of San Mariano, where they find employment in farm labor and to some extent in rattan collection.

Figure 2: Agta settlements involved in logging on the western slopes of Northern Sierra Madre Natural Park

Map by Koen Overmars

Table 1: Agta settlements involved in logging on the western slopes of Northern Sierra Madre Natural Park

Agta settlement per municipality	No. of Agta households	Total Agta population	No. of Agta households involved in logging	No. of Agta loggers per site
San Mariano				
- Dipili/Digud/Batag	10	52	10	15
- Kamalaklakan	6	34	0	0
- Kamerasitan	6	40	0	0
- Diwagden	11	60	0	0
- Divisoria	2	14	2	5
- Diwagao	7	38	0	0
- Dialwas	5	18	0	0
Ilagan				
- Disuippi	5	25	5	10
- Malabinao	4	15	4	6
- Kanagman	4	13	4	4
Tumauini				
- Makihawe	3	18	3	10
San Pablo				
- Apogan	6	28	6	10
Total	69	355	35	60

Logging around Agta settlements on the western slopes of the park concentrates along five rivers in four municipalities. As will be specified below, it can be safely concluded that between six hundred and eight hundred non-Agta loggers and a total of sixty Agta loggers are more or less permanently operative in this formally strictly protected zone of the park. In all of these areas, illegal loggers followed in the footsteps of corporate logging. It is important to note here that the Agta settlements described in this paper existed long before the advent of corporate logging: logging has entered Agta living areas rather than the other way around.

In the municipality of San Mariano, logging takes place mainly along Disabungan and Catalangan River. From repeated observations by us and other CVPED researchers it can be concluded that at least two hundred non-Agta loggers are permanently operating in these areas, while the total number of Agta loggers amounts to twenty. Three Agta settlements, Batag, Digud and Dipili are located along Disabungan River. The largest walking distance between the three settlement sites is four hours. Around ten interrelated households frequently move back and forth between these camp sites and all of them are involved in logging. The second logging hotspot in San Mariano concerns the forest along Catalangan River. The two Agta households living in Divisoria are involved in these activities, while they also regularly move to cutting areas on the eastern side of the mountain range, which are part of the municipality of Palanan.

Ilagan is the municipality in which logging is probably most rampant today. Abuan River, one of the Sierra Madre's largest watersheds, leads right to the heart of the furniture industry and thousands of board feet of hardwood can be seen floating downstream daily. Between three hundred and five hundred non-Agta and twenty Agta loggers are active here on an average day (see also van Weerd et al. 2004: p. 145). Three remote Agta settlements, Disuippi, Malabinao and Kanagman, are located in the area. Together these settlements consist of thirteen interrelated households, all of which are involved in logging. In addition, Agta households from the coastal municipality of

Divilacan tend to temporarily move to Abuan River in order to seek employment in logging during the summer months. In May 2003, fifteen Agta households were present in the area. These households do not appear in table 1, since they are spending most of the year in the coastal area

Similar seasonal migration was observed for the Agta settlement of Makihawe, which is situated along the Pinacanauan de Tumauini River in the municipality of Tumauini. In the cutting areas located in this watershed around fifty non-Agta loggers are active throughout the year, while ten Agta loggers from three households earn their living from logging during part of the year. While the Makihawe Agta lived relatively steadily in the area for a long time, they shifted their base to the eastern side of the mountain range in early 2003. Since they have started to develop rice terraces there, the men move back to Makihawe each summer season to engage in logging, while the women and children stay behind to take care of the land.

Lastly, in the municipality of San Pablo logging concentrates in the watershed of the Pinacanauan de San Vicente River. Around fifty non-Agta loggers and ten Agta loggers operate here year round. Apogan, an Agta settlement situated along this river, consists of six Agta households all of which are involved in logging. As is the case in Ilagan and Tumauini, Agta from settlements on the eastern side of the Northern Sierra Madre, may also temporarily move to Apogan for logging related activities during summer season.

What does Agta involvement in logging comprise? Unsurprisingly, logging for the Agta is a predominantly male activity, although several cases are known of women being involved in log transportation and the carrying of supplies. Involvement in logging starts earlier and continues up to higher age than is the case for non-Agta: boys not older than twelve have been observed hauling logs and men in their early sixties may still be transporting the logs down to the selling point.

Because of their intimate knowledge of the forest, logging companies used to hire Agta as tree surveyors (van den Top 2003). Although this still frequently happens in the context of logging, most Agta loggers today are involved in the activity as log haulers and transporters. In a total number of eight cases, which are spread evenly across the Agta population of San Mariano, Ilagan, Tumauini and San Pablo, Agta men are involved in logging as chainsaw operators. All these men learned how to operate the chainsaw during their employment in concession logging. Although these Agta do not own a chainsaw themselves, we know of two sisters in Apogan who, together with their husbands, hire a chainsaw from a log buyer on a monthly basis. The other Agta families in Apogan frequently work for the chainsaw hirers as haulers and transporters while they may also work for logging teams coming from outside.

The importance of logging for Agta livelihood

From the previous discussion we know that for a large portion of the Agta population residing on the western slopes of the NSMNP logging is part of their contemporary economy. The question is: how important is it really?

Time investment in logging

One indicator of the relative importance of logging as livelihood activity is the amount of time invested in the activity. Time allocation data collected in 2004 in the Agta settlements of Dipili and Digud show that logging indeed consumes considerable amounts of male working time: during a total of nine days of observation, an average of 58 percent of male working time was invested in logging.

The time allocation data presented here follow from two different observation periods. Eight households residing in Dipili and Digud were observed for four consecutive days in the third week of January 2004. Four of these households, then staying in Dipili, were again observed for five consecutive days in the first week of August 2004. (Households no. 4 to 8 in table 2 were not included in the second observation period because during that time they had settled in areas that were too far for us to be reached within a day. Of the households no. 5, 6 and 7 we know however, that they were engaged in logging activities in the areas where they moved to. Household no. 4 traveled to Cagayan Province and later to the municipality of Palanan in Isabela Province to visit relatives. During their travels they generated income from commercial rattan collection. Household no. 8 had moved to Diwagden where they worked as paid farm laborers.) While under observation, each household member was asked twice a day (around noon and at dusk) on which activity he or she spent most time during the preceding part of the day. Thus the record only covers day-time activities.

Table 2: Male time investment in logging in Dipili and Digud in January and August 2004

	Time spent in logging related activities as percentage of total working time	
Economically active males per household and their ages	**Observation period 1 18-21 January 2004**	**Observation period 2 4-8 August 2004**
Household 1		
Male 1 (45)	0	30.0
Male 2 (20)	100.0	-
Male 3 (15)	16.6	100.0
Male 4 (13)	40.0	50.0
Household 1a		
Male 1 (20)	-	100.0
Household 2		
Male 1 (35)	50.0	71.0
Household 3		
Male 1 (20)	100.0	100.0
Household 4		
Male 1 (35)	50.0	-
Household 5		
Male 1 (30)	0	-
Household 6		
Male 1 (25)	13.0	-
Household 7		
Male 1 (25)	0	-
Household 8		
Male 1(25)	57.0	-
Male 2 (20)	67.0	-
Average per individual per observation period	41.0	75.0
Overall average	58.0	

Note: Economically active males are those male household members who contribute to household income. Documenting Agta ages is problematic since they generally do not know their own birth dates. The ages appearing in this table are assessments made by the authors. Male no. 2 in household no. 1 corresponds with male no. 1 in household no. 1a. This young man was still living with his parents during observation period 1, but had married and established his own independent household by the start of observation period 2.

From this record it follows that only male household members spent time in logging related activities during the observation periods. For each male individual, the total working time was computed for the entire observation period. That is, time spent in leisure and socializing has been deducted from the total observation time, while male time investment in domestic activities and childcare has been computed as working time. The time spent in logging related activities was computed as a percentage of total working time.

One could argue that it is questionable to draw general conclusions on Agta time investment in logging from a record of two short observation periods. This would be true

if not for the fact that during a total of over two months of field work along Disabungan River in 2003, 2004 and 2005 logging has been observed to be of continuous importance to all Agta households residing in the area. No day would pass without several members of the community being engaged in either chainsaw operation, log hauling, log transportation or the carrying of supplies. Days not spent in logging related activities would usually arise when the loggers felt physically drained from previous logging activities, or when there was an urgent need to engage in hunting and/or fishing in order to provide in protein needs. Therefore, the data presented here are considered to be a reasonable representation of reality.

Income from logging

The ultimate question of course is how much the income generated from logging contributes to total household income. For a variety of reasons it is difficult to gain detailed insight in the relative importance of income gained from logging as part of total Agta household revenues. First, most transactions do not involve cash payments but take the form of barter with various trade partners instead. Second, Agta income heavily relies on credit (usually in the form of rice, coffee, sugar and other consumer goods) and the completion of transactions may take months. Third, due to the illiteracy, bookkeeping is no option and attempts to let informants keep a record of their earnings by means of pictures and symbols have repeatedly failed. Nevertheless, a rough estimate can be made on the basis of the data presented below. The best available data on income earned by Agta from logging are those coming from log-buyers who agreed to keep a record of the logs they buy from the Agta. This was done with the free and prior informed consent of the Agta involved. Two such data sets are available: one for the Agta of Makihawe in Tumauini (Giebels 2005: p. 88), and one for the Agta of Digud and Dipili in San Mariano.

The three Agta households of Makihawe sell their logs to two different buyers, both residing in barangay Antagan. One buyer is favored over the other because of the good price he pays and his hospitability towards the Agta. However, this buyer only buys logs when he has an order from the furniture industry in Ilagan. If this is not the case, the Makihawe Agta sell their logs to the second buyer who buys the logs as so-called salvage wood for a relatively low price. In order to cover up for clandestine logging, many logs are today sold as salvage logs: logs that have supposedly fallen down after typhoons or even trees that were left behind after corporate logging ceased. Various methods are used to give freshly cut logs a salvage look

The two buyers kept a record of the logs they bought from the Agta from 29 April to 1 July 2003. Table 3 shows that, based on this record, the average daily income per Agta logger in Makihawe amounts to PhP. 126.40. Noteworthy is that the standard daily wage for unskilled labor in the Philippines ranges from PhP. 150 to PhP. 200. Please note as well that abovementioned earnings were made during the height of the logging season: it is therefore safe to assume that these figures reflect the highest possible income to be earned. In fact, it is likely that during the rest of the year 2003, no additional income has been earned from logging by these three households considering their shift of residence to the eastern side of the mountain range in the municipality of Maconacon. That these

earnings are nevertheless vital to household income leaves no doubt: during visits to these households in Maconacon in June and November 2004, it turned out that all of them have used their earnings from logging in the dry season of 2004 to pay off debts they had built up with various shop keepers in Maconacon. These debts mainly concern rice supplies and consumer goods such as coffee, sugar, salt and soap. Moreover, for the summer of 2005 the male household members are planning to return to Makihawe to continue their logging activities while women and children will stay behind.

Table 3: Income generated from logging for three Agta households in Makihawe, Tumauini between 29 April and 1 July 2003 (based on Giebels 2005: p. 88)

	Household 1	Household 2	Household 3
Number of loggers in household	5	1	2
Total number of transportations	21	5	6
Total income in PhP.	18,138	3,666	7,481
Computed time investment per logger in days [a]	31.5	37.5	22.5
Average income per logger per working day [b]	115.16	97.8	166.24
Overall average daily income per logger in PhP.	126.40		

[a] Cutting down the tree, log preparation, log hauling and transportation to Antagan takes five to six days. If we add the inventory time (surveying is done either during hunting trips or on separate survey trips) and travel time back from Antagan to Makihawe after transportation is completed (half day) we arrive at a total of seven and a half work days per logger per transportation.

[b] The differences in earnings per household as shown in table 3 can be explained by the different prices paid by the two buyers as well as different prices paid for different tree species and types of logs

In the settlements of Dipili and Digud the situation is less transparent. Many different logging financers, mostly originating from the town centre of San Mariano, operate in this area. Throughout 2003 and 2004, business relationships between Agta and loggers in Dipili and Digud have been observed to be of an often exploitative nature: Agta labor remains unrewarded at worst and underpaid at best. Because of this, the Agta sell their logs to many different buyers at a time and partnerships usually last just as long is needed for the Agta to pay off their debts with one buyer before changing to the next.

A methodological consequence of this changeable situation is that for Dipili and Digud it is much more difficult to gain insight in logging transactions between Agta and their buyers: it is simply not possible to trace all the different buyers and win enough of their trust to let them keep records on income generated from logging by the Agta.

One exception concerns an Ilocano couple from San Mariano who have been logging in the area for over fifteen years. They have been willing to keep a record of their transactions with the Agta households from Digud and Dipili between August and December 2004. As can be seen from the record in table 4 however, only two co-operating Agta households sold logs to the Ilocano couple during that particular period. Moreover, a total of only five transactions were made, while a greater number of unrecorded transactions by the same households are said to have been made with a variety of other buyers. The record therefore only gives us insight in the average amount earned per transportation per person. Based on accounts of both the Agta loggers and their buyers, an average transportation involves ten work days and usually two transportations are completed per month. This implies an average income per logger per working day of PhP. 86 for this record. The fact that the average daily income from

logging is much lower for the Agta in Dipili and Digud than for those in Makihawe reflects the exploitative nature of business relationships between Agta and logging financers as mentioned above.

Table 4: Income generated from logging for two Agta households in Digud and Dipili, San Mariano between September and December 2004

	Household 1	Household 2
Number of loggers in household	1	1
Total number of transportations	5	
Total income in PhP.	8,600	
Average income per transportation	1,720	
Computed time investment per logger in days	50	50
Overall average daily income per logger in PhP.	86	

The average daily income of Agta loggers presented here on the basis of the records from Makihawe, and Digud and Dipili contrasts widely with daily incomes reported in other studies on small scale logging in the Sierra Madre. Van den Top (1998: p. 154) reports that in 1994 the average log hauler earned between PhP. 150 and PhP. 300 a day, while Aquino (2004: p. 270) claims that haulers in the Bugkalot ancestral domain in Quirino earn as much as PhP. 500 a day. This inconsistency can be explained by various factors. First, our own computations of Agta loggers' income probably shows a downward distortion because credit taken by Agta loggers with log buyers may not always be reflected in the records. Second, our sample is very small and it could be that a larger sample would show higher average wages. Third, however, the sample size and methodology used in van den Top's and Aquino's studies are not evident from the sources. Therefore, their estimates probably show an upward distortion. Last, it is very well possible that there is indeed a substantial difference between incomes gained by Agta loggers as compared to non-Agta loggers given the amount of cheating they suffer from.

Despite the meager earnings of Agta loggers however, there is good reason to assume that the income gained from logging is indispensable to Agta households. First, the large amounts of time invested in the activity (see table 2) suggest that working as logger is more worthwhile than working in any other activity. Second, although considerable amounts of both male and female working time are invested in activities such as hunting, fishing and backyard farming, in those Agta settlement areas which are located in cutting areas, logging is generally the only available source of cash income. While there is usually a demand for paid farm labor around many of the less isolated Agta settlements, this is not the case for the settlements situated further upstream. Depending on the location, farm laborers may receive a daily wage of PhP. 60 to 100 or the equivalent of this in rice and free lunch and snacks. Another economic alternative has been the commercial collection of rattan, in which especially women played an active role. However, in most areas featured in this paper, this has ceased to be an option in recent years because rattan has become increasingly difficult to secure while prices have dropped dramatically at the same time. Similarly, the collection of almaciga resin (locally also known as manila copal) used to be a major source of income for the Agta on the

western slopes of the Northern Sierra Madre. Until alternative products became available, the resin used to be in high demand for the production of varnish and as fuel source.

Last, it has been observed time and again that it is mainly with income earned from logging that Agta households buy their rice supplies as well as some other basic necessities. In fact, most income from logging comes in the form of rice and consumer goods such as salt, sugar and coffee. The income from barter trade is unmistakably lower, if only for the reason that the main barter products (wild pig and deer) are averagely not secured more than once a week. Such catch is divided between all members of the Agta settlement, which leaves hardly any meat for trading purposes. It is therefore probably safe to conclude that the income generated by Agta loggers makes up at least between 50 to 60 percent of their households' total income.

Environmental impact

Interestingly, the importance of logging as part of contemporary Agta livelihood, does not automatically imply that Agta favor the activity. On the contrary: Agta informants throughout the study area uniformly express the concern that continued logging in their hunting and fishing areas undermines any other form of livelihood activity than logging itself. Not to mention that even logging may (in the not so distant future) cease to be a viable option if extraction doesn't slow down. Ever since concession logging started in their living areas, the Agta have been the eye witnesses of how continuous timber extraction has affected their ability to make a living from hunting and fishing. They have seen the forest decrease in size and degrade in qualities. They recall how they and their parents have been moving their settlements ever further upstream in order to keep up with the quickly shifting forest fringe and to stay ahead of the growing migrant population. They express their worries on how their hunting and fishing catch has declined over the years and they fear that this trend will continue up to the point that nothing will be left to feed their children with. They lament that the continuous noise of chainsaws chases wild pig and deer ever deeper into the forest. They give accounts of how the forest used to consist of large trees with hardly any undergrowth, while today the forest floor has become overgrown with thorny vegetation which much hampers hunting. They explain that stocks of wild pig and deer keep decreasing because it is exactly those trees that bear the fruits on which these animals feed that are most valuable for the furniture industry. They complain that the loggers use fishing nets, electro-fishing devices, cyanide, blasts and snare traps. They report on how the impact of typhoons becomes ever bigger because there are no large trees left to regulate the water flows that rush through the previously much more stable rivers.

In addition to these emic accounts of the environmental consequences of unsustainable logging, a number of other effects can be mentioned here. Both Agta and non-Agta informants report that several hard wood species (especially narra) are increasingly difficult to secure, which indicates their scarcity and over-exploitation. Moreover, loggers tend to burn down tracts of forest in order to facilitate transportation of logs to the rivers. This not only damages the forest locally, but may also result in uncontrollable forest fires. The sliding of logs down steep hills results in deep gullies which in turn frequently cause land slides. Rivers are murky in the most heavily logged

areas and turn brown and rough after the slightest rain shower. Loggers leave large amounts of waste, including human excrement, around their camps next to the rivers.

Social impact

With all these adverse effects of logging, which are without exception spontaneously acknowledged by even the most active Agta loggers, why do the majority of Agta households in the study area engage in the activity themselves? The answer is as simple as it is harsh: if you can't beat them, join them. That beating them is not an option is not surprising given the number of loggers that is passing by in Agta settlements before entering the cutting areas. As was shown above, on an average day for every Agta logger, ten non-Agta loggers are present in the study area. Under such circumstances it is the law of the jungle that rules (after Rudyard Kipling 1895).

The law of the jungle

In all of the study sites, cutting areas are self-appointed by the various logging teams: the general rule is that those who create the trails leading to and from a cutting area hold user rights over that specific area. The Agta are not consulted in this process nor do they own any cutting areas themselves. Attempts to turn the tide have proven unsuccessful time after time. In some cases, this leads to friction within Agta communities. Under the Northern Sierra Madre Natural Park Conservation Project (NSMNP-CP), leaders have been appointed in most Agta communities in order to monitor resource use in their ancestral domains and to unify the Agta residents in counteracting illegal activities. So far, this approach has had little success. In Dipili, one informant expressed her dissatisfaction about the appointed leader as follows: "He is our leader and is supposed to convince loggers to leave our area, but he is pro-logging! We elected him as leader because he is *bravo*: he is not scared to voice out in meetings. Still, he is not a good leader; many people are bypassing his power."

This particular Agta leader, a man in his late thirties and a skilled chainsaw operator indeed, recognizes his inability to live up to his community's expectations: "I have been told by the DENR to protect this area, and I really want to do this but loggers keep on entering the area and they are going everywhere. I have told them that they are not allowed to log in this area, but they asked me: why can't we log here, was it you who planted the trees? Of course we were not the ones who planted the trees. So we cannot do anything, we need to have black-on-white authority. We told the barangay captain about our problems and he said: just shoot them. But we don't want that, especially since they also have firearms. There is nothing we can do."

What stands out here is that this informant assumes that having a formal authority would solve his problem in keeping loggers out of the area. Unfortunately, other respondents' accounts suggest otherwise. Various Agta members of the Protected Area Management Board (PAMB), who indeed are officially authorized to report loggers to the local authorities, give similar accounts of how they fail to convince loggers to stay out of their ancestral domains. In several instances they experienced aggressive reactions on

the part of the loggers. In other cases they were simply laughed at, after which business continued as usual.

Not only do loggers cause trouble when they are asked to leave the area, they are also reported to be rather forceful in convincing the Agta to work with them. In many of the areas featured in this paper, it was Agta wives in particular who lamented that their husbands were reluctant to co-operate with the loggers at the start, but would eventually agree to do so because they were left no other choice. It is also common practice for incoming loggers to convince the Agta to either let them enter their territories and/or make them work for them by offering them liquor. Such drinking sessions have been observed to take place as early as 7:30 am. Another powerful form of securing Agta support is through debt-bondage. For instance, one group of loggers from San Mariano, operating in Dipili and Digud, met resistance from one particular Agta family in entering the area (this account was given by the loggers themselves and it was confirmed by the Agta family involved). For weeks in a row the loggers let this family borrow rice, gin and consumer goods until the amount of credit taken had become too high for the Agta family to ever be able to pay it back. The loggers then proposed that free access be given to the Agta's hunting grounds for logging purposes as payment for the credit. And so it happened.

Yet, to suggest that the Agta are always completely sidelined in the whirlpool of activity would be incorrect. Relationships between incoming loggers and resident Agta may take very different forms, with outright domination and maltreatment on one side of the continuum and mutual respect and enjoyment on the other side. Let us illustrate this point.

In San Pablo and Ilagan, the resident Agta population has an informal agreement with incoming loggers on their code of conduct. Ideally, these loggers make a courtesy call in the Agta settlement before proceeding upstream. In addition they will bring some benefits for the Agta, usually in the form of consumer goods such as rice, coffee, sugar and cigarettes. An Agta woman from Apogan reflected on this as follows: "We are happy with what they will just whole-heartedly bring us." Other benefits may comprise loggers letting the Agta borrow their chainsaws (sometimes over longer periods of time), assisting them in cleaning land for cultivation by cutting down the big trees, lending them money without interest in case of emergency, or offering the Agta to stay in their houses in the downstream barangays whenever they need to. At times, Agta and non-Agta loggers have been observed eating together and conversing over a fire at night, indicators of mutual trust and respect. However, even in San Pablo and Ilagan, Agta residents feel increasingly incapable of making incoming loggers respect this code of conduct. For instance, since stocks of narra are decreasing in other places, loggers coming to Abuan River no longer originate from Ilagan alone but from other municipalities even outside the province as well. According to our key informant from Disuippi, it is these people who fail to treat the Agta with respect: "They treat us as if we are very low. I often told them that even though we are not educated, we still have our dignity, but they don't care."

In Digud and Dipili, however, this kind of attitude seems to be the rule rather than the exception. Relationships between loggers and Agta are generally distant and tense. The Agta residents have repeatedly shown us the damage that was done to their crops because incoming loggers refused to tie up the carabaos used for log-hauling. In as far the

Agta in this area are in any way assisted by the loggers, this assistance tends to take the form of debt-bondage. Conflicts over payment frequently arise.

Conflict over payment of logs in Digud

Disagreement on payment of logs had built up for several weeks when our help was called by one of the Agta women of Digud one evening. We agreed to mediate in the conflict. The Ilocano chainsaw owner, who was accused of under-payment, was found sitting on one side of the compound holding a machete. A few meters away from him, all Agta individuals living in Digud and Dipili had collected under the lean-to shelter of one of them, the men holding their *deposporo* (self made guns running on gun powder made from match-heads).

According to the two Agta men involved in the conflict, it was triggered as follows. The two had been working for the Ilocano chainsaw owner a few months earlier. They had been doing the surveying, chainsaw operation and then the log transportation all the way to Minanga, near the town of San Mariano. They had been given one *cavan* (or 50 kg) of rice in advance, worth PhP. 800. Since the total amount to be received for their labor was PhP. 1,000 the balance was PhP. 200. After the work was completed, two young Agta men from the same settlement went to see the Ilocano logger in order to claim the additional PhP. 200. They had run out of rice and needed the money to buy new supplies. When they arrived at the chainsaw owner's place, which is a four hour hike from the Agta settlement, he turned out not to be around. The two Agta men asked his son for the remaining amount but he told them that he could not give them the money without permission of his father. Thus, the two Agta men returned to their settlement without any supplies. When the Ilocano logger arrived in the Agta settlement to continue logging, the Agta, by now rather annoyed, reminded him of the PhP. 200. The logger refused since he claimed the laborers had already received all of the payment in kind. After the Agta men had insisted that they get the remaining payment for their labor, the Ilocano logger had threatened the Agta with his machete. The Agta by this time had lost patience because apart from the argument over payment, there was still an additional issue.

Several weeks earlier, the same chainsaw owner and his team had been spending the night in one of the houses of the Agta in Dipili. The Agta men were not around because they went out for hunting only to find out the next morning that the loggers had damaged the house they been staying in. In his anger, one of the Agta proclaimed to us: "If he thinks that we have no right to complain, he's wrong. Although we are only Agta, we know what we are doing and if he does not change his mind, we will be forced to kill him."

The logger's version of the incident was roughly the same, although he denied responsibility for the damaged house. He further insisted that the Agta were not in the position to expect any additional cash since they had already received the *cavan* of rice. In the end, the logger did not pay the additional PhP. 200 but decided to leave the area instead, proclaiming that if the Agta were no longer appreciating his presence in the area, he would not be coming back again.

Sexual relationships and harassment

In some cases, relationships between loggers and Agta take on a sexual character. For instance, an Agta woman from Makihawe has an relationship with one of the log buyers in the area. In Digud, two Agta women are married to an Ilocano and a Tagalog logger respectively. Both couples live in the Agta settlement.
Although there are more such long-term relationships, most sexual relationships between Agta women and non-Agta loggers are of much shorter duration. Many Agta households in logging areas have one or more children from a non-Agta logger. In the many cases, the father of the child has disappeared and the stories behind these children usually remain unclear. Although we have not come across accounts of actual rape of Agta women by non-Agta loggers, both Agta women and men complain of sexual as well as non-sexual harassment by non-Agta loggers. While Agta men are out of camp for overnight hunting activities, Agta women receive visits from non-Agta loggers who are said to offer them gin until they are intoxicated and then talk them into sexual intercourse. The extent of force used on these occasions is not clear, but it is most likely that in many (not all) cases such intercourse takes place against the (conscious) will of Agta women. Sexual relations between Agta women and non-Agta loggers could also be seen in the light of prostitution; however, specific accounts of paid sex were not encountered so far.

Weapons of the weak

Not only do the Agta complain about loggers' attitudes, many loggers and logging financers in turn complain about the Agta's laziness and unreliability. The examples below suggest that these various forms of perceived non-compliance are perhaps the only viable type of resistance the Agta avail of.

In February 2003, a middle class female logging financer from San Mariano came to Dipili to supervise her Agta work force. She explained to us that she had to do this because: "The culture of the Agta is that they are lazy to bring down the trees after I have given them rice." In the financer's perception, after she had given the Agta rice as advance payment they had told her that before anything, they needed to go hunting first. When they returned they had finished all the rice and claimed they needed more rice before they would be able to cut down and transport trees. The financer told us that she paid the Agta in cash after they would deliver their product to the agreed selling point. The Agta, however, informed us that they never received any payment and that all the financer gave them was the rice and some other goods, nowhere near the amount that was supposedly paid. One year later, the Agta of Dipili and Digud had stopped working for this financer, referring to her as *loko* (crazy). They had decided to pay off all credit the financer claimed they had with her and to not take any new credit. Once they had undone themselves of their debts they started selling logs to another buyer.

Another female logging financer worked in the same area in January 2004. She did not own the chainsaw but hired it from someone in a downstream barangay. While her husband worked on their farmland back home, and her children were in school, she

earned part of the household's income by buying logs from the Agta. The Agta were to collect their payment in the form of rice and consumer goods from barangay Del Pilar. The logging financer complained that: "The Agta only work if they are hungry". She repeatedly tried to make general working agreements with them, but if they were not in direct need of supplies they would not be interested in working for her.

Another form of tension arises over accusations of theft of food by the Agta from the loggers. Since loggers may come to the cutting area for several weeks in a row, they bring large stocks of supplies which they store in their camps while they are out cutting trees. Two incidents have been witnessed in which loggers were accusing Agta of stealing their left behind supplies.

DISCUSSION

This paper has so far documented involvement of Agta communities in logging in four municipalities on the western slopes of the NSMNP. The data presented show that over half of the Agta households residing in this specific area are involved in the activity. On the basis of time allocation studies, it is estimated that at least in some areas employment in logging consumes more than half of male working time. Moreover, logging presently forms an indispensable part of these Agta households' contemporary economy: it is estimated that it makes up between 50 to 60 percent of total household income. Ironically, while their core livelihood (hunting and fishing) has come under severe pressure as a consequence of unsustainable logging in the past, the Agta are now forced to complement this meager livelihood by joining in logging themselves.

It is important to note that despite their widespread involvement in logging, the Agta presently play a relatively marginal role in the activity. While an estimated six hundred to eight hundred non-Agta loggers are active in logging in the study area on an average day, the total number of Agta loggers does not exceed sixty individuals. Moreover, the Agta are not and will not be the initiators of timber exploitation because they lack the connections, power and capital to do so.

As it is, the situation is both ecologically and socially unsustainable. While at this moment it is mainly the Agta who are carrying the ecological burden of unsustainable logging, it is likely that the lowlands will soon become affected as well if timber extraction does not slow down. If man-made disasters such as those that took place in December 2004 in Aurora and Quezon are to be avoided, drastic and immediate action is needed. Socially, the situation is untenable because the Agta are left with no other choice but to accept the large influx of loggers into their living areas and to go with the flow. Although there are exceptions, Agta involvement in logging generally goes hand in hand with exploitation, discrimination, conflict and powerlessness.

Defying the law of the jungle

The question we wish to raise here is whether granting the Agta the exclusive right to control the timber extraction and transportation process in their ancestral domains could

offer better future prospects for both the forest and the Agta. There are various arguments for and against this proposition.

Although logging in and around the NSMNP is officially illegal (DENR 2001), it is tolerated. Many people refer to this practice as humanizing the law; because of people's disadvantaged economic position, a blind eye is turned to timber extraction. On the ground, however, this results in an open access situation in which the law of the jungle literally rules. In the end the timber buyers and their connections in government profit, and certainly not for the indigenous Agta population.

From a pragmatic point of view, one could therefore argue that since logging is taking place anyway, legalizing it under specified conditions will at least open the doors for sustainable and equitable extraction. Such specified conditions could include among others that logging takes place only within Agta ancestral domains and under the exclusive control of the Agta. Following the Indigenous Peoples Rights Act, timber extraction procedures would then be laid out in an Ancestral Domain Sustainable Development and Protection Plan (ADSDPP), which is to be drawn up by the indigenous community managing the ancestral domain.

Since the start of the NSMNP-CDP in 1998 over twenty applications for Agta ancestral domain claims and titles throughout the park have been filed with NCIP, of which none has a definite status at this moment. It is beyond the scope of this paper to explain in detail what has gone wrong with these applications (see van Velthoven 2003; Perez and Minter 2004). It is striking that all ADSDPP that were written in the context of these applications, emphasize that logging is strictly prohibited except for construction purposes. This is understandable from a park management point of view, but it is ethically unacceptable in at least two respects.

First, when the park boundaries were delineated in the late 1990s, existing communal timber extraction areas such as the Community-Based Forest Management Agreements (CBFMA) in the municipality of Maconacon have been deliberately left out of the park. This has facilitated continued timber extraction even though the area would probably have been strict protection zone had it been included in the park. Had the Agta been aware of the CADC system at the time, they could and probably would have claimed their ancestral domains prior to the establishment of the park. That they have not been able to do so is a direct consequence of their underprivileged status in Philippine society. Worse, when the park's boundaries and zoning were established, it was incorrectly assumed that no human settlements were present in areas that were in fact inhabited by Agta (Van Weerd pers. comm. 2005). As a result, all Agta ancestral domains situated on the western slopes of the park are now part of the park's strict protection zones in which no resource extraction, except for ceremonial purposes, is allowed. This is a major flaw in the park's management plan. The Agta are commercial hunter-gatherers and depend on wildlife utilization for their daily needs. Being granted the favor of using forest resources for ceremonial purposes is therefore completely useless to them.

Second, allowing the Agta to harvest timber in a sustainable way in their ancestral domains may prove to be one of few viable options for poverty alleviation. This is especially so in those areas where logging has been taking place intensively up to the present and where, as a consequence, a livelihood system based on hunting, fishing and barter trade has become impossible to sustain. As this paper explained, options for generating alternative income from paid farm labor or rattan extraction are limited in

most Agta settlement areas on the western slopes of the park. Acknowledging this problem, the NSMNP-CDP has promoted subsistence farming among Agta communities in these and other areas. Although this approach has been successful for a small number of Agta groups which had previous experience with agricultural activities, in general it has failed in respects and for reasons that go beyond the scope of this paper. What matters here, is that the Agta are foragers and that alternative livelihoods will only succeed if they are compatible with this foraging mode of production. Although, seen in this context, logging offers much better chances than farming, it has never been discussed as an option because it is regarded incompatible with nature conservation per se. Yet, it is highly questionable if the promotion of upland farming, for which standing forest has been completely cleared in several instances, is more ecologically sustainable than selective logging.

Having said this however, there is good reason to plea for maintaining a total log ban in the Northern Sierra Madre and even nationwide. First of all, there is the acute threat continued deforestation in the Philippines presently poses to human communities. The urgency of the problem has been pointed out brutally once more in December 2004 and many rightly wonder how many more times such disasters have to be repeated before the message finally gets across. While a total log ban was proclaimed following the flooding that killed around three thousand people in Aurora and Quezon, at the moment of writing the national government discusses possibilities to lift the logging ban again.

Further, while the Philippines is one of the most biodiversity rich countries in the world, it is also one of the countries in which biodiversity is most threatened. The NSMNP belongs to the last remaining forest frontiers and is among the key priority areas for conservation in the Philippines (Mallari et al. 2001). This serves as a valid argument against any form of legal change which will compromise the Northern Sierra Madre's protected status.

Another argument against allowing regulated logging in Agta ancestral domains comes from previous negative experiences with communal logging in both ancestral domains and CBFMAs (see Tarun-Acay 2003; Leemoon 2002). DENR Secretary Gozun suspended all CBFMAs early 2003 because of their unsustainable management. Aquino (2004) has documented how selective logging in the Bugkalot ancestral domain in Quirino failed both ecologically and socially. The conditions for sustainable extraction as specified in the management plan were ignored, resulting in overexploitation of timber both inside and outside appointed cutting areas. Moreover, the extraction process was dominated by only a small number of people from inside the ancestral domain while people from outside were hired as employees in the process. Last, there was a general lack of involvement of the ancestral domain membership in the design and implementation of conditions for sustainable resource extraction.

Similar and additional problems can be foreseen in case ancestral domains titles will be granted to the Agta living on the western slopes of the NSMNP. Given their present powerlessness in controlling who is entering their resource extraction areas and under what conditions, it remains to be seen how well they will be equipped to regulate access to their ancestral domains even if they have a title to show. In discussing the instrument of ancestral domain titles with the Agta, many informants expressed their doubts on its viability. They fear that non-Agta will simply not accept the fact that the timber extraction process will be dominated by the Agta, while until now it has always

been the other way around. Many Agta informants expect that non-Agta will resort to violence in case such a system will materialize.

Clearly, making such an approach work would require both ideological and technical support of local governments. The catch is that, generally, many politicians are involved in logging and it is certainly not in their interest to put the benefits of timber extraction in the hands of a marginal group of indigenous forest dwellers who are of no importance to their re-election.

A further complication is that, even though the Agta would generally like to see the number of outsiders entering their ancestral domains decrease sharply, there is also a certain amount of ambivalence on this matter. Despite the trouble and the bad terms of trade, in some respects the presence of non-Agta in Agta settlements does make life easier. The non-Agta loggers are buyers of wild meat and woven baskets and they may bring the payment of the Agta's labor up to the settlement in kind, which saves the Agta long trips to the nearest shops.

A last but very real problem is that the filing and processing of ancestral domain claims with the NCIP in Region 02 proves to be a long and winding road. Even if such an instrument could eventually provide solutions, this is not likely to happen on the short term.

CONCLUSIONS

The Agta, the indigenous inhabitants of the Sierra Madre, are among the Philippines' most marginalized and impoverished peoples. Following a contemporary foraging economy, the Agta combine hunting, fishing, gathering and barter trade with various cash generating activities. For the majority of the Agta living on the western slopes of the NSMNP, this cash income is generated through logging. Although Agta loggers' earnings are very meager, they are estimated to make up as much as 50 to 60 percent of total household income and to consume the majority of male working time.

Paradoxically, the Agta themselves disapprove of logging because of the negative impact it has on forest qualities on which they depend for their foraging activities. Yet, with the number of non-Agta loggers in the study area ranging between six hundred to eight hundred individuals against a total Agta population of around four hundred people, it is the law of the jungle that rules. Although the Agta do display some amount of resistance against the dominance of non-Agta loggers entering their ancestral domains, they are of the opinion that going with the flow generally offers the best options for holding on. As a result, approximately one out of ten loggers extracting trees on the western slopes of the NSMNP is Agta. This area happens to overlap largely with both the Agta's ancestral domain and the park's strict protection zone.

These facts have several implications. First, they reveal that the present situation is an ecological and social time bomb. The current timber extraction process is unsustainable in ecological terms and therefore in economic terms as well. If extraction rates don't slow down, revenues from both timber and non timber forest product extraction are likely to decrease in the near future. Socially, the situation is unsustainable because the Agta become ever more marginalized. Although they participate in logging activities, they do not exert any control over the extraction or transportation process, nor

do they get worth for their labor. They further suffer from both physical and mental maltreatment by incoming loggers. Moreover, past and ongoing logging activities in their ancestral domains seriously compromise the Agta's ability to make a living from other activities than logging itself. Worse, in the future, even logging may cease to be an option. Thus, from an indigenous rights perspective, there are strong arguments in favor of granting the Agta the right to control the timber extraction process within their ancestral domains in order to safeguard a long-term income both from logging and the use of non-timber forest products.

What this dire situation further demonstrates, however, is that the Agta's indigenous identity offers no guarantee for sustainable resource extraction. While the IPRA and the Certificate of Ancestral Domain Title (CADT) system are based on the premise that given their close relationship with the environment indigenous people are nature's best stewards, this paper has shown otherwise. Despite their close relationship with the forest and their disapproval of the environmental degradation brought about by unsustainable logging, under the current circumstances the Agta have no choice but to participate in unsustainable logging themselves.

The only guarantee for sustainable resource extraction, whether it concerns timber or non-timber forest products, is a participatory designed sustainable use plan and its strict enforcement. However, as previous experiences have shown, many structural barriers need to be overcome before such a sustainable harvesting system in ancestral domains can be wisely put into place.

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CHAPTER TWENTY-EIGHT

LOCAL GOVERNMENTS AS STEWARDS OF COMMUNAL FORESTS: POTENTIALS AND CONSTRAINTS

Arturo Boquiren

INTRODUCTION

A policy on the establishment of communal forests during the period of American rule in the Philippines contributed to the establishment of communal forests in many of the country's municipalities. Good management of these communal forests can contribute towards the re-greening or restoration of Philippine forests thereby promoting carbon sequestration and climate stability.

The Alno communal forest was one of the four communal forests allocated for firewood and timber needs of the entire municipality in 1922. In 1993, the community resolved to protect the forest. In 1994, a barangay ordinance was passed to protect the forest. It is therefore important to assess the experience of a village local government unit (LGU) or barangay with regard to its capabilities and potentials in managing a communal forest. The assessment will most likely identify policy directions that the country can take both with regard to tapping village local government units or barangay or local governments in the effort to protect, re-green, or restore the forests.

Research problem

How did barangay Alno, La Trinidad, Benguet fare in managing its communal forest? What lessons does the Alno experience suggest on the capability of village level local governments in managing communal forests? Based on the Alno experience, what strategies can be forwarded to promote forest growth and regeneration?

Objectives

1. Identify capabilities and potentials of village level local governments in managing communal forests;
2. Identify possible lessons towards tapping village level local governments for the promotion of forest growth and regeneration;
3. Suggest strategies towards increasing the role of local governments in promoting forest growth and regeneration.

Framework of analysis

The experience of barangay Alno in managing its communal forest will have to be linked up with other community experiences, especially in forest management, as well as with forest laws and policies to derive recommendations on the content of advocacy for village-level LGUs to assume a greater role in forest management. The content of advocacy mentioned can also contribute to the design of appropriate training programs for LGU personnel in forest management. The study recognizes, of course, that many of the forestlands that the local governments co-manage include ancestral land or domain of indigenous peoples. Further, from economics, the perspective recognizes that forests have both tangible and intangible values. For instance, protecting or restoring the forest would be important in managing climate change as the rise in global temperature has been attributed to the emission of greenhouses gases, notably carbon dioxide, which can be absorbed by forest ecosystems (Boquiren 2005).

The most essential point articulated here is that barangay LGUs can have a role in identifying areas for total log ban and have the potential to implement a total log ban policy within certain bounds or limitations. It must be stressed that it is highly likely that the area in which a barangay local government can successfully implement a log ban is relatively small. Further, the forest area must be within the jurisdiction of the barangay LGU. Given the context that there are more than forty thousand barangays nationwide, barangay LGUs have a great potential to contribute to reforestation.

The advocacy for village level (barangay) governments to assume a greater role in forest management should be seen as only one of the five major tracks that must be pursued in an overall effort to re-green or restore Philippine forests: an improved role of the national government, developing mechanisms to reward communities for environmental services they provide, community-based forest management (CBFM), the need to strongly factor in biodiversity conservation and enrichment as well as watershed development in reforestation, and a stronger role for local governments, including the barangays, in forest protection and regeneration.

Sources of data, gathering and analysis

The study used a simple methodology. Largely, the methodology used key informant interviews and agency data to find out the accomplishments and progress of barangay Alno in forest management in relation to the baseline data identified in 1993 by the author with the community and colleagues in the community resource balance sheet project undertaken with the Japan International Cooperation Agency (JICA).

Significance

Data is not immediately available on the size of communal forests in the Philippines. Documents indicate that communal forests were set aside by forest authorities as early as 1900 for the use of communities. In the Cordillera, there are at least 30,000 ha of communal forest. One option available for municipalities is to entrust the management of

the communal forests to the barangay governments. This study takes a preliminary look into the viability of such an option. In turn, some of the options for a barangay government are: (1) to impose a log ban in the communal forest, (2) combine a log ban with contract tree planting, (3) a simple contract tree planting without a log ban, or (4) a contract tree planting that allocates a volume of the produce to the reforestation contractors.

At the same time, while this study takes off from a study of Alno communal forest, the study can have implications on forested ancestral lands or ancestral domains. Forested ancestral lands or ancestral domains can be co-managed by barangay governments on behalf of indigenous peoples or tribes. Another implication would be on training programs that can be designed for barangay governments to increase their capability to manage communal forests. Another possible significance of the study would be on its implications on the possible contribution to reforestation efforts of barangay governments. Still further, the study can have implications for the viability of selective log bans that can be imposed by barangay governments, especially if they have a role in managing Certificate of Ancestral Domain Claims (CADC) and Certificate of Ancestral Land Title (CALT) properties.

Scope and Limitations

The study focuses on the capability of village-level LGUs in managing a communal forest using a case study approach. Lessons from the case study should enable the researcher and interested stakeholders to develop a more comprehensive study.

REVIEW OF LITERATURE

Among of the most important works in the literature on CBFM are those of Aguilar (1982), Aquino (2003), Boquiren (2005), Follosco (1998), Gollin and Kho (2002), Gonsalves and Queblatin (2002), Klein (2003), Koffa and Garrity (2001), la Vina (1995), Magana (2003), Pasicolan, Udo de Haes and Sajise (1997), Persoon, Minter and Visorro (2003), Pulhin (2002), Queblatin et al. (2001), and Vitug (1993). However, the studies are scant on the role of barangay government units in managing the forests. Even the laws of country and their implementing rules do not appear adequate in providing a stronger role for local governments, especially local governments at the barangay level, in managing the forests. The laws on community-based forest management, for example, define that the principal actor in CBFM are the people's organizations (PO). Section 1, article II of DENR department administrative order no. 29 (1996) reads: "the principal participants in the community-based forest management program shall be the local communities as represented by their organizations, herein referred to as people's organizations." Further, it appears that there are no studies on the efficacy of village local government in managing forests. This study attempts to contribute to filling-up that vacuum even as the study is preliminary and exploratory in preparation for a more comprehensive study on the subject.

FOCUS ON THE BARANGAY ALNO COMMUNAL FOREST

The communal forest that is the focus of this study is the one located in barangay Alno with the following description:

The Government of the Philippine Islands
Department of Agriculture and Natural Resources
Bureau of Forestry, Manila
D-5, Lands (C.F.)
La Trinidad, Benguet 16 September 1922

In accordance with the law providing for the establishments of communal forests, the four parcels of public forest described below are hereby set aside for the EXCLUSIVE USE of all the residents of the municipality of La Trinidad, Benguet, Mt. Province:

DESCRIPTIONS OF THE FORESTS
Parcel I
This parcel is situated in barrio Agno, municipality of La Trinidad, sub-province of Benguet, N12°E, about 3,400 meters from the town of La Trinidad, and is described as follows:
Beginning at point 1 or a big rock situated on the north side of Tublay trail, N20°E, about 1,000 meters in a straight line from barrio Agno, La Trinidad, and the following the Tublay trail in a northeasterly direction about 100 meters to the crossing of this trail and a foot trail; thence following this foot trail in a general northerly direction about 170 meters to a point 2 or a Benguet Pine tree situated on the side of the trail; then following the same trail in northeasterly direction about 140 meters to point 3 or a Benguet Pine tree; thence following the same trail in a northerly direction about 50 meters to point 4 or a Benguet Pine tree; thence following a blazed line, N25°W, about 60 meters; thence following a trail in a southwesterly direction about 250 meters to point 5 or a dead Benguet Pine tree situated on the side of the trail; thence following the same trail in a general westerly and northwesterly direction about 390 meters to point 6 or a Benguet tree; thence following a foot trail in a southeasterly and southerly direction about 240 meters to point 7 or a Darco tree situated on the side of the said trail; thence following the same trail in a southerly direction about 240 meters to point 8 or a Benguet Pine tree; thence following the same trail in a southerly direction about 140 meters to point 9 or a Benguet Pine tree; thence following the same trail in a southerly direction about 140 meters to point 10 or a Benguet Pine tree; thence following a cut line, N75°E about 140 meters to point 11 or a Benguet Pine tree situated on the top of a big rock west of Tublay trail; thence following the Tublay trail in a general northeasterly direction about 150 meters to point 12 or a Dapdap tree situated on the north side of Tublay trail; thence following the edge of the forest N65°E, about 200 meters to point 1, or the point of the beginning.
All the trees mentioned above and others along the boundary lines were marked with the official markings hatches, B.F. 133 and 175.
This parcel has an approximate area of 28 hectares.

The residents of the Municipality of La Trinidad may, under the direction of the Bureau of Forestry, cut, collect and remove, without license and free of charge, from these parcels of communal forest, timber of the second and lower groups, firewood, bejuco, resins and other forest products, stone and earth, in quantities sufficient for the personal use of themselves and families. And during such time as the provisions of the law and regulations regarding communal forest are complied with, the residents of the Municipality of La Trinidad may, under license from the Bureau of Forestry, cut and remove timber of the first group.
Timber and other forest products cut or extracted from these parcels of communal forest shall not be sold or used for commercial purposes, nor shall they be transported to any other municipality or town.

William Crosby
Acting Director of Forestry

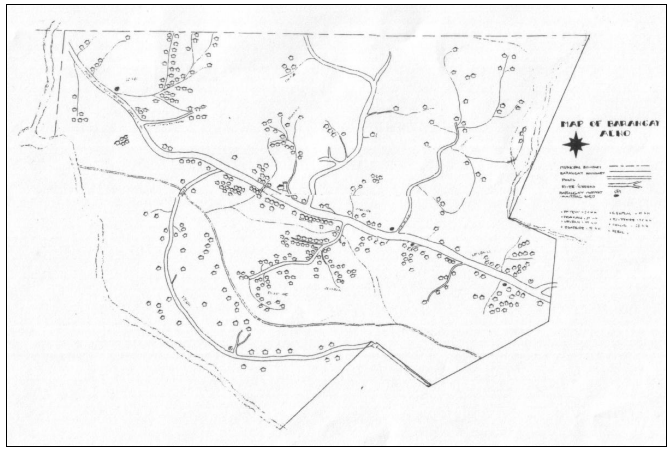
Approved: Rafael Leonpres
Secretary of Agriculture and Natural Resources

Note that ten out of the twelve boundary points of the communal forest refer to trees that existed or were alive as of September 1922; one boundary point refer to a dead tree during that year; while another point refers to a big rock. In 1993, when the community started to have an increased awareness of the importance of the communal forest, there were no details on the communal forest and even the document above was unknown until only sometime 1999.

ALNO SETTLEMENT THEN AND NOW (1993 AND 2005)

As of 2005, Barangay Alno has about 365 households scattered in about 1,012.8 ha of land. In 1993, there were 243 households and, thus, the growth rate of households is about 3.45 percent per annum. Each household has an average size of five members based on a population of 1,214 individuals in 1993. In 2005, the population of Alno is scattered (figure 1)

Figure 1: Barangay Alno settlement map (2005)



In 1993, residents estimated that some 450,430 m² of vegetable gardens had adequate water while 551,331 m² did not have adequate water during summer months. Records of the National Irrigation Administration (NIA) at that time claimed that 12 ha of land were irrigated in the barangay.

In 1993, residents perceived that forested areas had been decreasing in the past years. The forested area in barangay Alno can be classified according to use (as communal forest or as timberland), or according to tenure (as titled, tax-declared, under certificate of stewardship contract (CSC), or public land). The forest in the barangay doubles up as a grazing area, orchard or as agroforestry sites. Some privately owned lands outside the forest ground also have a significant tree cover.

Land classification, use and area

Alno is one of the four barangays in La Trinidad that maintains a communal forest. However, people cite varied figures on the communal forest: ranging up from 28 ha. This is because the boundary of the communal forest of Alno has not been defined. The communal forest as per parcel no. 1 is officially placed at 28 ha for Alno. As of 1993, however, the actual area has not been systematically determined because real boundaries have not been determined, monuments relocated, and measured.

Meanwhile, the timberland consists of 362 ha for both Alno and Alapang. The Alno and Alapang timberlands are not segregated although it is commonly held that there is greater land coverage for Alno. Most of the timberland, however, is under tax declaration and it is believed that a significant portion has been tended as vegetable gardens. Furthermore, about 15 percent to 20 percent area referred to as timberland and communal forest is actually covered by CSC under the DENR Integrated Social Forestry (ISF) program. The twelve awardees of the stewardship/forestry contracts cover a total area of 20.19 ha. These stewardship contracts stipulate the following conditions:

- The grantee is required to observe and/or implement environment protection and conservation measures.
- The grantee is deemed responsible for the protection and conservation of forest growth.
- The grantee is required to cooperate with the Bureau of Forest Development of the DENR in the protection of the forest.
- The grantee is required to preserve monuments and other landmarks within the confines of the land.
- The grantee is prohibited from cutting trees or saplings from a strip of 20 m on each side along the banks of creeks, rivers or streams, bordering or passing across the land.
- The grantee is required to prevent and suppress unauthorized or unregulated fires on the land or other areas immediately adjacent thereto, and assist the bureau of forest development of DENR in extinguishing forest fires within the area.
- The grantor reserves the right to regulate the cutting or harvest of the timber crops to insure forest cover.
- The grantee may mortgage or assign the land to any financial institution as collateral for loans to develop the land.

- In the event of foreclosure, the foreclosing bank or credit institution is required, with the approval of the grantor, to transfer or assign rights and privileges to persons qualified to enter a stewardship agreement with the grantor.
- The grantee is required to plant at least five edible fruit trees per ha to provide food for wildlife.
- In the event of the death or incapacity of the grantee before the expiration of the agreement, the right and privileges emanating from the agreement will pass on to any heir who shall work on and develop the land in accordance with the terms of stewardship.

Sadly, of the timberland, only one parcel was still forested as of 1993. The others are used for grazing and orchards. A considerable area within Alno has been used as orchard by a non-resident whose land ownership in Alno was around 28 ha in 1993.

LOCAL EFFORTS AT REFORESTATION AND AGROFORESTRY.

A reforestation program in the second half of 1992 and first half of 1993 involved the planting of 340 seedlings during the barangay foundation day, and another sixty seedlings brought by the municipal government and subsequently supplied to residents. There is no monitoring data on survival rates in this particular effort. Another effort was the 6 ha bamboo plantation in the communal forest funded by the government. The products from the plantation are supposed to be given back to the government. The Community Environment and Natural Resources Office (CENRO) also implemented a bamboo plantation project involving 10 ha that was not part of the regular DENR program.
Some privately-owned lands (with titles) have significant tree cover. Each of these sites is around 500 to 2,500 m². Owners deliberately planted trees and have allocated the said lots for growing trees as of 1993.

Some of the institutional arrangements and land classification, use, and ownership issues are as follows:

- DENR has no control over areas under tax declaration, although it has control over logging activities. A concern expressed is that the assessment of land under tax declaration is not supported by on-the-ground verification as tax declarations are sources of revenue for the government. As clarified by the Municipal Planning and Development Office (MPDO) coordinator, however, the new Local Government Code requires the conduct of cadastral surveys, which may systematically verify land claims.
- The required base mapping and boundary delineation cannot be sufficiently addressed by the agency or LGU because of constraints in resources as well as lack in a locus of control or jurisdiction over the legal issue.

A tree count conducted in 1993 showed that there were 12,242 trees in the barangay (see table 1) Meanwhile, an inventory of springs in the barangay also conducted in 1993 revealed that there are seventeen natural springs in barangay Alno, of which twelve have water during summer. Further, 123 out 243 households or 51 percent have expressed that

water from the springs is decreasing. In 1993, 182 out of 243 households, or 75 percent, used firewood as their main fuel for cooking.

Table 1: Tree count in barangay Alno (1993)

Tree type	Tree count
Alnus	326
Pine	4,031
Other trees	7,485
Seedlings planted	400
Total	12,242

Note: only 2,350 of the trees are 5 m or higher in height

LOCAL INITIATIVES AND ALNO FOREST AND SPRINGS (1994 TO 2005)

According to key informants in the Alno barangay council, the Alno communal forest has more trees today than it had in 1993 despite a forest fire in 2003 and despite the twenty to thirty trees that were cut down in 1994. The 2003 forest fire affected about half of the communal forest but is believed to have burned only seedlings and not the trees of the communal forest. Those who have counted the trees of the communal forest believe that the trees counted in 1993 were not burned by the forest fire. The origin of the forest fire is unknown but members of the community expressed the possibility that the forest fire may have originated from slash-and-burn agriculture (*kaingin*).

In late 1994, a community member cut down more than twenty trees in the communal forest and sold the logs outside the barangay. However, by then, the barangay council had already come up with a barangay ordinance banning the cutting of trees in the communal forest. The barangay council confronted the community member and warned him that the barangay ordinance may be used against him. In addition, the barangay also threatened to have him arrested. The man conceded and stopped cutting trees.

A key factor that preserved the communal forest is the above mentioned Alno barangay ordinance no. 6 formulated in 1994. The barangay ordinance banned the cutting of trees. The barangay council interprets the ban on the cutting of trees to include a ban even on the gathering of branches from the trees in the communal forest. The ban on cutting of trees is regardless of purpose. It is also understood that the barangay penalties are over and above other penalties under the applicable laws of the country and the municipality. However, getting trellis or sticks for gardens is exempted from the ban but a barangay permit has to be secured. Key informants in the barangay and community assert that there has been no violation of the ordinance other than the incident in 1994.

Prior to the ban, trees in the communal forest were being used as fuel wood and for the construction of items needed for weddings, wakes, baptism, burial, and other festivities and commemoration of the community. Further, any member of the community can get firewood from the communal forest. Alno barangay ordinance no. 6, series of 1994, put an end to all of these.

Initially, the move to institute the ban on cutting of trees in the communal forest met stiff resistance from the constituents of the barangay. As recalled by barangay

officials themselves, more than half of the barangay residents protested the ban when it was still a proposed ordinance. However, the proponents did not lose heart and explained the reasons for the potential benefits people can obtain from the ordinance in every *sitio* of the barangay for at least a month. Then finally, sometime in 1994, when the law was submitted to barangay constituents for decision in the general meeting, the majority positively voted for the passing of the ordinance. In 1997, the barangay chairman who championed the ordinance ran unopposed to serve until 2002. In 2002, he became a municipal councilor. The ordinance forced many households to use LPG rather than firewood for cooking. The costs of the ordinance can be as high as PhP. 665,000 at current prices per year for some 182 households who may have shifted to LPG instead of using firewood for cooking.

In late 2002, the ordinance was amended (however the signing of the ordinance took place in 19 January 2003) to increase the penalties for violations of the law. Now penalties range from PhP. 500 to PhP. 1,000 for every tree cut plus the planting of between ten to twenty seedlings, depending on the nature of offense and in addition to other penalties under Philippine laws. Unfortunately, the barangay has not created a law against the cutting of trees outside the communal forest. This is possibly because most of the timberland is covered with private tax declarations and is considered private land by community members. In contrast, communal forests are treated as common lands by community members.

Meanwhile, the tree cover in the barangay outside of the communal forest remains almost unchanged, as compared to the tree cover in 1993. Although some areas of the barangay enjoyed an increased tree cover, about as many trees were cut down in other areas to give way to housing, houses, and other structures. Thus, on a net basis, people believe that tree cover in the barangay outside of the communal forest remained the same compared to that in 1993.

Between 1993 and 2005, tree planting outside of the communal forest has focused on roadsides in the hope that they can contribute to soil stability. Nevertheless, as landslides have been regularly occurring because of the rains, the landslides have prevented the growth of the trees, especially since mud with the seedlings have to be cleared for motorists immediately after the landslides.

Community members observe that water from springs around the communal forest increased in volume as compared to 1993 although springs immediate to the housing project decreased by a small percentage when a housing project called the Alno sunflower subdivision started in 2003. The housing project is just below the Alno communal forest. It is not clear what the effect of the housing will be on the communal forest. Further, a portion of barangay Alno is being eyed as the future dumping site of the municipality's wastes but details on this are not yet available.

The barangay of Alno has around PhP. 500,000 annual budget of which around 60 percent is allocated for personnel and administration, 10 percent for the *Sangguniang Kabataan* (youth group), 5 percent for the calamity fund, and 20 percent for development. Development funds usually go to waiting sheds, foot trails, footpaths, and bridges.

From 1994 to 2002, around two thousand seedlings were planted in the barangay. Most of the tree seedlings were planted along roadsides with the purpose of providing shade as well as protecting roadsides from landslides. From 2003 to 2005, around two

thousand tree seedlings were planted in the communal forest in which a total of PhP. 7,000 was spent by the barangay. In 2003 to 2005, the large bulk of people mobilized for tree-planting activities were students in the national service training program. The barangay provided food and snacks for participants.

STRENGTHS, WEAKNESSES AND POTENTIALS OF VILLAGE LEVEL OR BARANGAY LGUS IN MANAGING THE FORESTS

The strengths of barangay Alno in managing its communal forest are: (1) it is capable of implementing a ban on logging, and (2) it is capable of enforcing an ordinance on its communal forest.

Based on the Alno experience, we can infer the strengths or potentials of tapping barangay local government units in managing communal forests: (1) it is capable of implementing a ban on logging, at least on a relatively small area, (2) it is capable of implementing reforestation programs, and (3) it is capable of mobilizing sectors for voluntary reforestation.

However, the weaknesses of barangay local government units on forest management are: (1) its capability in implementing a log ban and reforestation programs on a relatively large area is still to be proven, (2) it may not be capable of selecting the appropriate trees for a reforestation program, and (3) it is not yet capable of integrating the concerns of biodiversity protection with forest re-greening or restoration.

CONCLUSIONS, LESSONS AND RECOMMENDATIONS

This study indicates that a village level local government or barangay was able to protect its forest. More importantly, this study indicates that a village level local government unit is capable of implementing a log ban as well as a reforestation program.

Although this study has no basis to say that a village level local government unit can do the same on a larger area, this study nevertheless points to the potential of village level local government units in implementing a reforestation program. This study therefore indicates that the village level local government can be a main participant in community-based forest management programs. Further, this study indicates that in the process of the devolution of many of the functions of the DENR in forest management, the provincial as well as the municipal local governments of the Philippines can devolve some of their forest management functions to the barangay level LGUs. Although more studies may be required to validate or qualify the inferences made by this study, the case study of barangay Alno in managing its communal forest nevertheless justifies the assertions made by this study.

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CHAPTER TWENTY-NINE

ENVIRONMENTAL GOVERNANCE AND EVERYDAY LIFE IN A BENGUET ANCESTRAL DOMAIN

Padmapani L. Perez

INTRODUCTION

It was dark, misty, and cold on the eve of the municipality of Kabayan One hundred fourth foundation day but the hills surrounding the *poblacion* echoed with music and speeches pouring from the brightly lit stage beside the municipal hall. Heavily made up pairs of young, Ibaloy and Kalanguya men and women (the night's contestants in a very special kind of beauty pageant) slowly paraded onstage to pulsating pop music. For the best in avant-garde category, the costumes were truly innovative: assembled from combinations of hand-woven cloth, recycled juice packs, tree bark, and strewn with flowers and leaves. The audience laughed, cheered, and applauded wildly.

This may seem like an unlikely venue for raising environmental awareness, but that is exactly what it was. The first inter-barangay Mr. and Ms. Environment competition was organized by the Municipal Natural Resource Council (MNRC), as a means for encouraging environmentally-oriented activities in all barangays of Kabayan. The MNRC is one of several government organizations with a presence and a mandate involving local communities and the environment in Kabayan. Others are the Department of Environment and Natural Resources (DENR), the Department of Agrarian Reform (DAR), and the National Commission on Indigenous Peoples (NCIP). These four government bodies carry out their own, sometimes overlapping programs, which directly and indirectly seek to influence the ways in which local populations use natural resources. A brief glance at the ways in which each government organization is involved in Kabayan shows an array of laws, policies, structures, interactions and boundaries super-imposed upon a landscape shaped by the indigenous Ibaloy and Kalanguya peoples, and more recently by the Kankana-ey as well.

These four government bodies have their respective approaches to natural resources and indigenous peoples. What they have in common in their respective policies is an underlying assumption that indigenous peoples are inherently environmentalist; where indigenous environmentalism can be taken to denote nature conservation practices, traditional and sustainable use of natural resources, and an intimate knowledge of the natural environment. However, as I will demonstrate in this paper, the individuals who work within these government bodies are confronted with another reality.

This paper gives a detailed account of the venues for local interaction and policy-implementation that these government bodies create, with a view to how natural resource management is addressed at these venues. I then describe changes to natural resource use (and by extension, changes to the environment) vis-à-vis implementation of government programs. I argue that the indigenous peoples of Kabayan, particularly the Kalanguya of barangay Tawangan, are engaged in processes of social and environmental change that are as political as they are practical. These processes result in a simultaneous prioritization and trivialization of natural resources. Furthermore, I argue that the times

and places in the life world of the community at which environmentalism surfaces are limited mainly to venues and interactions for environmental governance. By contrast, the times and places for environmental negotiations are far more frequent and meaningful; where environmental negotiation refers to any negotiation that concerns the use, conservation, and/or ownership of natural resources.

GOVERNING BODIES AND THEIR ACTIVITIES IN KABAYAN

The National Commission on Indigenous Peoples

The municipality of Kabayan is also the ancestral domain of the Ibaloy, Kalanguya, and Kankana-ey cultural communities. The municipality is currently going through a process of converting their Certificate of Ancestral Domain Claim (CADC), to a Certificate of Ancestral Domain Title (CADT). This is being facilitated by the NCIP under the Indigenous Peoples' Rights Act (IPRA). The CADC was issued in 1996, under department administrative order (DAO) no. 2 of the DENR. DAO no.2 was an early land tenure instrument for indigenous peoples to assert claims to territory. However, unlike the IPRA, it gave no legal basis for a title of ownership of community and/or individual indigenous lands. When the IPRA was passed into law in 1997, DAO no. 2 was rescinded and all matters concerning ancestral domains were passed to the newly created NCIP.

The IPRA is a landmark law which recognizes the rights of indigenous peoples to hold title to their territories, or ancestral domains. Alongside this right, the law places upon the shoulders of indigenous cultural communities the responsibility of sustainable development and environmental protection within their ancestral domains. The mandate of the NCIP is to implement this law. The provincial officers of the commission, themselves indigenous to Benguet, do so by conducting information and educational campaigns on the law, by guiding indigenous groups through the legal process of acquiring a title, by assisting in the formulation of a sustainable management plan for the domain, and by seeing to the assertion of indigenous rights such as free and prior informed consent.

From early 2004 up to the time of writing, the heaviest and most complicated work of the commission in Kabayan involved ancestral domain boundary resolutions. These meetings are intended to settle any remaining conflict over land and boundaries between residents of neighboring ancestral domains, ancestral lands, barangays, and municipalities. Ancestral domains are owned communally by an entire indigenous cultural community. Ancestral lands are owned by indigenous individuals and/or clans. The settlement of boundaries is one of the requisite steps of acquiring an ancestral domain title. Under the IPRA, the negotiations of boundaries are meant to take place between local, indigenous residents, knowledgeable elders and tribal leaders (IPRA terminology). Officers of the commission serve as facilitators and mediators.

In Kabayan the negotiations were organized by officials from the provincial office of the commission, based in La Trinidad, the capital of Benguet province. On an appointed date, elders, young men, women, little children, local government officials from the concerned barangays, and NCIP officials would converge at the chosen meeting place, usually in a neutral barangay, or in a barangay on the disputed border.

In the boundary negotiations that I attended as an observer, local people asserted their knowledge of and rights to boundaries by invoking pathways used by ancestors, burial places of ancestors, inherited farmlands, water sources, forests, former sites of swidden fields, and hunting areas. For instance, one young man (to respect the privacy of the individuals that have been quoted in this paper, names have been withheld), a Kalanguya from Kayapa, Nueva Vizcaya, pointed to a spot in the disputed area and had this to say: "This is our watershed. This is where our water comes from. We are the ones who have been managing it. It's a thickly forested area." Then he pointed to an area on the map close to the peak of Mt. Pulag: "This is the grassland. No one's claiming the grassland. It's written in a book, and it's approved by the DENR, that the grasslands, that Tawangan, that Lusod, are all part of Kabayan. They belong to the Ibaloys. But if you were to do an ethnographic survey, you would see here (pointing to watershed area) that these are all Kalanguyas. So what will happen to us Kalanguya? Where is our place?"

By contrast, an elder articulated his knowledge of ancestral domains and a more personal relationship to the land with these words: "Sometimes, all we talk about is politics. Let's talk about ancestral domains in our place. About Huyucto, this is where my grandfather Ubbang is buried. Their fields are here in Gisgisan, Pallunan. They didn't reach Yotoyot. So it's quite sad for others to dictate upon us that it can't be so. If only those of us from here who are affected could decide, wherever we want to go, that's where we should go."

Some also invoked land tax declarations, which brings us to the fact that the boundaries of the ancestral domain of Kabayan are concurrent with the political boundaries of the municipality, which were delineated during the American regime. One local government official from a municipality that shares a border with Kabayan questioned the name of the domain, as it is called the ancestral domain of the Ibaloy, Kankana-ey and Kalanguya cultural communities found in the municipality of Kabayan. The last three words were found to be particularly questionable by the officials in attendance. Individuals, who were involved in the first application for a CADC with the DENR, claim that this delineation was chosen for convenience's sake.

As a result, the negotiations that would come to bear often take place between indigenous politicians and government officials at the municipal and barangay levels. Throughout the province of Benguet and in most of the Cordillera Administrative Region (CAR), indigenous elites have consistently held most government positions. Few politicians of non-indigenous origins have successfully occupied elected or appointed positions. This both hindered and aided the NCIP in meeting its targets. In instances when negotiations between elders reached a deadlock and funds ran out for transportation and food, the commission was able to turn to local government units (LGU) to fund and organize the necessary meetings to reach an agreement. In other cases, negotiations remained at a deadlock precisely because local politicians refused to compromise and sometimes had stakes in tracts of land on the opposite side of the disputed line. They would even involve the elders in planning where the boundary should lie, and what the line of argument should be. In these instances, members of the commission remarked that the discussion was political, not ancestral, and not the least bit indigenous. On the other hand, one could argue that the custom of *tongtongan* has always been political, and that because of this public venue for settling agreements, the practitioners of *tongtongan* are themselves politicians, and/or accustomed to political decisions.

Tongtong is the public settlement of disputes, presided over by elders. This practice is widely spread throughout the Cordillera. Usually the offended side approaches the elders to ask them to mediate. The *tongtong* could take place in the house of the one who requested for the hearing. Anyone who wishes to attend and speak is welcome to do so. Based on their knowledge of genealogies, inheritance, and through their skills in negotiation, the elders would convince the opposing parties to compromise. Agreements were usually sealed with the offering of chickens or a pig, and the drinking of rice beer, or *tapuy*. The person who called for the *tongtong* is obliged to feed all who came to attend. Afable (1989: p. 103) pointed out that the *tongtong* is a source of pride and identity, because it is another example of an Igorot custom chosen over externally-imposed judicial processes. However, nowadays, it is difficult to draw a clear line between external judicial process, and traditional *tongtong*. Elders also hold positions as elected or appointed barangay officials, and manage local conflict in this capacity. *Tongtong* are sealed with a written and signed document, which is filed with other official barangay documents.

In the midst of the debates and claims that go on during ancestral domain boundary resolutions, several questions come up from the people in attendance. What was the commission trying to make them do, anyway? Why were the boundaries splitting apart families? Why shouldn't the ancestral domains follow the areas of settlement, instead of the political boundaries of municipalities? What good would the domain do them anyway?

By way of responding, a provincial officer of the commission once explained: "The purpose of the ancestral domain is protection, for you! This watershed that you are all fighting about, it's for you to protect, to manage. The government is honoring your rights to own this domain. What a waste it would be if we don't take advantage of the law. The purpose of the law is to give, to honor your rights. But you will be the ones to protect and manage the domain. Whatever benefits come from the domain; the benefits are yours! You will make your own policies as to how to manage and use the ancestral domain."

At another negotiation over boundaries, two neighboring barangays could not agree on a compromise as the disputed area was vast, and contained several hectares of farmlands and valuable water sources. A representative of the commission implored to the elders present: "Look, you are all living within a national park. Because of this, your movements and actions are restricted. Do you want this to continue? You should be able to do what you want within your own territory. That's why you should try to come to an agreement. So that your land can be titled and you, not the DENR, will have the right to decide what to do with your land."

As can be seen from the foregoing discussion, the ancestral land issue is in part a forest occupancy and resource management issue, as well as an ethnic minority issue. In these circumstances, not only wealthy elites but also middle-class environmentalists and ordinary landless farmers have significant interests of their own in the future disposition of ancestral domains (Eder and McKenna 2004: p. 64)

The Department of Environment and Natural Resources

For approximately 80 percent of the Mt. Pulag National Park overlaps with the ancestral domain claim of Kabayan. The park was first delineated by table survey, and declared a protected area by presidential decree in 1987. Considered to be a key conservation site in the Philippines, the 11,550 ha national park includes pine forest, lower montane forest, and mossy forest. It encompasses one of the largest remaining forest in the relatively accessible southern part of the Cordillera Central and is habitat to several endemic species of flora and fauna (Mallari et al. 2001: p. 117). However, the park also encompasses entire barangays, which are home to Ibaloy, Kankana-ey, and Kalanguya farmers.

It is now run as a protected area and national park under the National Integrated Protected Areas Program (NIPAP). Park affairs are presided over by the Protected Areas Management Board (PAMB), which is composed of officials of the DENR, and representatives from all the barangays situated within and along the borders of the park. All of these barangays are composed of Ibaloy, Kankana-ey, Kalanguya, and Karao indigenous cultural communities.

The National Protected Areas System (NIPAS) recognizes the rights of indigenous communities in protected areas, with the clause that they should be using the natural resources in a traditional and ecologically-sound manner, and for subsistence purposes only. However, the existence of a subsistence-level form of livelihood in the area is historically questionable. Spanish chroniclers found that indigenous peoples in these parts of the Cordilleras have been involved in lively, boundary-crossing trade relations at least as early as the fifteenth century (Scott 1974a). Government attempts to control and curb these activities have been failing since Spanish times as well (Scott 1974b). Officers of the DENR, themselves indigenous to the Cordillera, are aware that this is the case (at present there are five forest rangers for the entire park area, some of them reside in urban centers far removed from the park). On more than one occasion, they have stated that biodiversity conservation is hard to sell in indigenous communities. Nonetheless, the assumption embedded in the law, in combination with the zoning of the park, has caused much friction between DENR and local people as I shall discuss below.

The PAMB, along with the Protected Areas and Wildlife Service (PAWS) of the DENR, are mandated to protect and conserve the biodiversity of the area, regulate entries to the park, monitor activities and development projects in all the barangays, and prevent the further depletion of natural resources found therein. The board meets at least four times a year, in the office of the Protected Area Superintendent (PASu) in Ambangeg, Bokod. There is no regular presence of an ecological expert or environmental scientist at these meetings. The regional technical director of the PAWS usually chairs the meeting, and a secretary is assigned to take down the minutes. During the meeting, board members address each other thus: “Mr. Chairman, may I raise a question on this matter?” Barangay representatives present sectoral reports on the state of the forests in their area.

For example, in the summer of 2004, two barangay representatives, both Kalanguya, reported that it was the time of year for people to start cleaning their swidden fields, which meant that a lot of fires were being lit. One informed the board that he “advised people to be careful in burning so that only the dried weeds from their kaingin would be burned and not the whole mountain.” The same representative was asked if there were any forest fires in his barangay. He replied that there were none. The other board member said that the elected barangay officials were also helping to inform people

that they should not cut down trees. He emphasized that none of the people in his area were expanding their fields into the virgin forest. Another barangay representative mentioned bulldozing activities taking place in his barangay. He explained that the field that was being bulldozed was previously terraced, and only needed leveling. He further explained that no trees were cut in the process.

Further sectoral reports in the minutes said that there were no forest fires or illegal activities in the other barangays. At times, DENR staff interjected their own reports and observations on clearings and burned areas which the barangay representatives excluded, whether intentionally or not. Apparently, the local presence of a PAMB member does not guarantee the end of these activities. At one meeting that I attended, a frustrated member asked what power he had to apprehend offenders. He said that much as he wanted to protect the environment, he felt he had no authority. He was told that efforts were being made for the Department of Justice to deputize PAMB members. In addition, during the cigarette and coffee breaks of the PAMB meetings, the restrained and structured discussions turn into unreserved conversations about how people from other areas (usually neighboring barangays or municipalities) are the ones doing the burning and bulldozing in the PAMB members’ own barangays. It was strikingly almost always the fault of an outsider.

A member of the board remarked in an interview that indigenous people are not likely to report on the illegal activities of other indigenous people, even when it may be their duty to the state to do so. This statement is supported by my observation of everyday life in the field. There exists a tacit understanding between *kailian*, that every one puts all their efforts into making a living. Generally speaking, *kailian* is used by the Kalanguya of Tawangan to refer to co-members of a community or a defined territorial area. In the ritual sphere of life, *kailian* refers to those who are invited to a feast and included in the distribution of meat at such a feast. In interviews and casual conversations any, seemingly questionable environmental activity vis-à-vis the park rules is described or referred to as a last recourse in meeting one’s family’s needs. As one former forest ranger painfully found out, his attempts to curb his fellow-Kalanguyas’ illegal logging activities constituted betrayal of his *kailian*, causing him to be ostracized and sometimes threatened: “I was hated for that kind of work.” As a resident of Tawangan, he continues to try to make people aware of the dangers of deforestation at barangay meetings, which most residents attend with regularity, but he is usually laughed at or ignored: “The people know what they are doing, but I’m thinking, in about ten years when the trees are gone they’ll see. It’s our fault.”

These and the above articulations of PAMB members hint at how activities that take place within the park are negotiated as the need arises, and between individuals who are immediately present and embedded in community life. Below, I describe three more instances which show where else and how else environmental negotiations take place, to include a network of government officials beyond the immediate vicinity.

In December 2004 an emergency PAMB meeting was called to discuss a road being built in the park, leading from barangay Tawangan to Lusod. Officers of the PAWS lamented that the road was routed through primary forest, and came close to the grasslands surrounding the peak of Mt. Pulag. It was causing a lot of erosion and destroying flora. Furthermore, it was pointed out that the road-building was proceeding without an environmental compliance certificate (ECC), which should have been applied

for at the DENR when the road was still in the planning process. Apparently the road-building started with the blessings and support of elected and appointed local government officials ranging from the municipal through to provincial and congressional levels. They cited the wishes of local people and funding availability as the urgent reasons behind the road-building. The PAMB stopped the building of the road on this technicality, although only 1 km out of the 7.4 km length of the dirt road remained to be built. The proponents of the project, in particular the Department of Public Works and Highways, were asked to pay a fine, and to apply for the ECC so that the road-building could continue. In the light of these events, the PAMB arranged for a seminar on environmental impact assessment, so that they would be better equipped to deal with similar situations in the future.

The second event that I take note of here is of an entirely different nature. Recently, individuals from Kabayan were reprimanded for having fired a gun in a game of target practice on the peak of Mt. Pulag. Backpacking groups of students from Baguio had witnessed this and were surprised that Ibaloy locals should do this on their own sacred mountain. Reports reached the PASu office, and the municipal government of Kabayan. In an attempt to plead their case, the offending persons visited staff of the PAWS in the office in Ambangeg. However they were told that park rules must be followed. According to Ibaloy custom, the individuals were fined one pig, which was slaughtered and consumed by local government officials.

Finally, the young man who spoke about watersheds in the ancestral domain boundary resolution described in the previous section is a member of the Indigenous Mount Pulag Tour Guides Association, made up mostly of Kalanguyas living in Babadac, barangay Bashoy, the popular entry point to the national park. His articulations at the negotiations reflect his membership in the association. His explicit reference to a watershed and its management hints at the regular exposure of the association to the environmental discourses of the DENR, which helps to organize training activities for the guides. These young men (there are no female members), have been able to earn cash and have created for themselves a sense of entitlement through their work, which involves guiding mountain climbers into the national park and assuring that they follow park rules on campsites, water sources, and prohibitions on plant removal. The park requires visitors to have one guide for every six heads in a group. In a 2005 forest fire, it was members of the association who put the fire out. They are also students and farmers in their own localities.

The Department of Agrarian Reform

Most of the barangays surrounding the Mt. Pulag National Park are presently involved in the production of cash crops, particularly temperate vegetables for lowland markets. The DAR has been implementing the national Comprehensive Agrarian Reform Program (CARP) in some of these places, including the Kabayan barangays of Tawangan and Lusod. Tawangan was selected as an agrarian reform community in 1996 because the department had issued Certificates of Land Ownership Awards (CLOA) to residents there.

Technically, Tawangan constitutes an exception to the CARP. It is not classified as alienable and disposable land. It's also inside a protected area. However, by arguing that the land was agrarian land prior to the declaration of the park, and following the

recognition of indigenous rights as provided for in the Philippine Constitution, the CARP, and NIPAP, the regional office of the DAR was able to justify the identification of Tawangan as an agrarian reform community. A memorandum of agreement concerning the creation of agrarian reform communities and the extension of agrarian reform services within the protected area was created between the regional offices of the DAR and the DENR, following on negotiations between their respective regional heads. This memorandum of agreement has since been rescinded. However, the fact remains that CLOAs exist within the Mt. Pulag National Park, thanks to this agreement. Again, this agreement and negotiation can be taken to be an environmental negotiation, because of its bearing on natural resource utilization in the area, as will be explained in the next section.

In line with the concept of an ancestral domain, the department delineated only so-called mother CLOAs. This means that contiguous lots that belonged to several people were delineated as one block. Then all the landowners within that block were listed as holders of the mother CLOA. People in Tawangan expect that the mother CLOAs will be subdivided in the near future, so that they can hold individual titles. However, in keeping with the aforementioned agreement with the DENR that the land parcels should not be titled individually, and in keeping with the concept of ancestral domains, officers of the DAR foresee difficulties in this.

Another technicality in the awarding of collective agrarian reform titles in Tawangan, is that during the surveying and delineating of the land, people included areas that were not yet agricultural lands at the time. The local people tried to justify this, explaining that they feared they would no longer be allowed by the DENR to enter non-agricultural areas if they were not included in the collective title. Even non-agricultural lands were vital to farmers because they contained water sources. Officials of the DAR were hard put to refuse, or to insist that the CLOA include farmed land only. When they expressed apprehension that the local people would open up agricultural areas in the forests included in the CLOA, the locals quickly said that they wouldn't. However, there are now vegetable gardens located above the Pinnayag River, which should have been the upper boundary of the CLOAs in the first place. This is yet another example of an environmental negotiation, the resolution of which may not be environmentally-sound.

Since 1996, a community development facilitator of the DAR has been present in Tawangan, traveling there on a monthly basis to work with the local community. The role of a development facilitator is to coordinate programs and projects that would address the seven key result areas identified as targets by the DAR: (1) land tenure improvement, (2) infrastructure support services, (3) farm productivity and income, (4) organizational building and strengthening, (5) basic social services, (6) gender and development, and (7) ecosystems development. The development facilitator of Tawangan has been successful in helping the community to build up a cooperative which runs a store, and which has given the community and local farmers' access to loans for farm development.

On one interaction between the development facilitator and local residents, the community was asked to draw up conditions for environmental protection that they would follow in the event of a road's arrival in Tawangan. The road has arrived in Tawangan but no one is monitoring whether the conditions set before are still being honored, or even remembered. In the year 2000, the DAR conducted barangay consultations in Tawangan and facilitated the creation of a barangay development plan. The plan contains development projects that were identified by community members and

which DAR officials helped to conceptualize. The plan included support infrastructure projects such as roads, buildings for day care center and barangay hall, as well as projects for environment protection and resource management. According to the development facilitator of Tawangan, training seminars have been held in Tawangan on reforestation and agroforestry. A tree nursery was set-up with assistance coming from the Mapua Institute of Technology, which has offered development help to the community through a charity foundation. Apart from these, however, there isn't much indication of environmental activities organized through the DAR. In an interview, a DAR official admitted that this area of work had to be strengthened, and expressed the hope that serious reforestation efforts would begin soon in Tawangan.

In a DAR-organized farmer's forum held in Baguio City in 2004, a representative from one of the province's agrarian reform communities announced to the gathered farmers that "the agricultural industry of Benguet is in the intensive care unit." During this forum, much of the discussion revolved around ways to help improve the plight of vegetable farmers in Benguet, including improved infrastructure like farm-to-market roads and greenhouses. Some farmers also demanded the country's withdrawal from the General Agreement on Tariffs and Trade (GATT) of the World Trade Organization (WTO), or an amendment of the country's membership. One indication of environmental concern came when one farmer expressed an interest in learning organic farming. Apart from this, the discussion revolved around development and the DAR mandate to assist farmer-beneficiaries and agrarian reform communities in farm productivity and income, and to give free land titles. As one DAR official, himself an indigenous person of Benguet province, said: "We've been working our land ever since but our ownership has to be recognized. In these days, it is given much importance." Although the increasing dependence of local livelihoods on vegetable gardening in Benguet has put ever-increasing pressure on the environment, there was no mention of issues on sustainable resource management at this forum.

The Municipal Natural Resource Council

Finally, the MNCR is attached to the LGU, and is composed of appointed members from the different municipal offices. The council's mandate is to review all municipal development projects and determine their environmental impact. In a conversation with a member of the council, it was pointed out to me that environmental protection was not a pressing concern for people when making a living was such a struggle. I attended a session of the MNRC in which they conceptualized the Mr. and Ms. Environment pageant described at the beginning of this paper. The council members were in agreement with each other that this should not be a beauty contest. Instead, the barangays would compete on the basis of environmentally-oriented criteria and the contestants would stand as representatives of their respective barangays. The criteria that was set included zero forest fires, recycling and waste management, cleanliness and greenness, creation of environmental barangay resolutions, and the involvement of Mr. and Ms. Environment candidates in environmental activities in their areas. The contest was announced in May 2004, so that the judging period stretched over six months. Through soliciting funding from the municipal government, the DENR, and other supporters, the MNRC was able to

award the first place winners with PhP. 100,000 worth of funding for environmental projects.

The pageant that was held drew a large crowd from all over the municipality. The audience was repeatedly told what the criteria for judging the barangays were. The meanings of each criterion were explained at least four times throughout the entire program. As was intended by the council, the pageant became a venue for environmental education as well as entertainment. Did the Mr. and Ms. Environment bring about any positively environmental reverberations? In the barangay of Tawangan, one enterprising family's collection of scrap metal, soda cans, and discarded plastic and glass bottles turned into an environmental activity in a rather indirect way. The re-sellable garbage was collected by children after school hours, and the family paid them by the kilo. This truckload of garbage was to be sold to a junkshop in La Trinidad for almost double the price at which the family bought it in Tawangan. However, as family members discussed the sale of the metal, plastic, and glass, some one announced that they should ask for the sales invoice to be written out in the name of barangay Tawangan. They knew from the mechanics of the Mr. and Ms. Environment competition that the presentation of the receipt would give added points for Tawangan in the following year's pageant, particularly in the recycling and waste management criterion. Of course, the collection of re-sellable garbage was first and foremost a money-making activity. However, some glimmer of hope may be taken from the fact that information from the pageant reached and was being retained by various community members. The MNRC, with the help of the municipal government, hopes to hold the Mr. and Ms. Environment pageant every year, and to raise environmental awareness in this way.

With regard to the mandate of the MNRC to monitor all municipal projects, there is potentially a conflict of interests since MNRC members have other roles to fulfill in the municipality. For example, the chairperson of the MNRC is the municipal Vice-Mayor. Another member is the personal assistant to the Mayor. Understandably, these other roles would take precedence over the role of MNRC-member. The very same individuals who support the MNRC in one capacity, may support environmentally destructive development projects in another, political and practical context.

Summary

In the venues described above, it appears that agents of the state and local residents (in this case indigenous peoples on both sides of the fence) constantly negotiate with each other. In the face-to-face interactions that ensue, it seems that people in positions of power do not always insist on following the law. Instead, attempts are made to meet the perceived needs or desires of the people. Since it is the implementer who is confronted with the variety of interests, understandings, constraints and abilities of the target population, it is mostly he or she who abandons the preconceived set of categories in favor of a more practical analysis. Here is the critical moment of decision making, of the actual accomplishment of projects, which is most strikingly different from any written plans. Thus any logically derived set of categories fades away in the face of the exigencies of everyday social life (Long 2001: p. 174). Re-interpretation of the law takes place most especially when government representatives are called upon to make decisions on site, or during the course of an environmental negotiation. Conversely, re-

interpretations can also obstruct the implementation of things that may be in the best interests of local people.

What has been the effect of the presence and actions of these governing bodies and their respective programs in one locality? What influence have they had on the indigenous peoples' natural resource use?

KALANGUYA NATURAL RESOURCE-USE

Settlement, subsistence and trade in barangay Tawangan

Barangay Tawangan is a site of convergence for all of the governing bodies described above. Although none have a daily presence in Tawangan, representatives of each arrived in the barangay, carrying their programs with them, at least once in 2004. Barangay officials and elders of Tawangan traveled to other locations to attend meetings organized by these government bodies. In this paper, Tawangan is a location which embodies Escobar's notion of place as the experience of, and from, a particular location with some sense of boundaries, grounds, and links to everyday practices (Escobar 2001: p. 152, as quoted in Blaser 2004: p. 29)

The population of Tawangan is primarily Kalanguya. They trace their genealogy twelve generations back to an apical ancestor who came from Ahin, Tinoc. According to Patricia Afable (1989: p. 157), Tinoc, or Tinek, is the name not only of a settlement but also of a larger region that includes the Ahin and Kadaklan headwaters, the Mount Pulag heights, and the Matunu headwaters region known as Danggu. The elders of Tawangan (age fifty to eighty) relate that their ancestors came in search of land where they could grow ubi (*Ipomea batatas*, more commonly referred to as camote throughout the Philippines) and raise their pigs. The lives of the ancestors were said to have revolved around their pigs, until recently. One family or household would have at least five pigs, and both human and pigs subsisted mainly on ubi.

The Kalanguyas were slash-and-burn farmers, clearing and burning fields for ubi. One field could be used for up to five years, after which it would be left for at least twenty years before it would be cleared for planting once more. One household could have several *uma* with ubi growing in it at one time, typically quite far apart. According to the elders' accounts, this was because the Kalanguya were constantly on the move, in search of a place where their pigs thrived. The health and growth of the pigs was a gauge of whether a place was suitable for living or not. If a pig was not doing well, they would leave a swidden and find a better area where another swidden could be started. If a sow gave birth in one place, then they would stay for a longer period.

To this day, the Kalanguyas in Tawangan determine the length of time that swidden field has been left fallow by the size of the trees and other vegetation that have grown. However, they are no longer mobile as their ancestors once were, and choose to remain sedentary. One reason given for this was security. People eventually began to build their houses closer together because thieves from other indigenous groups would come and steal their expensive pots and take slaves from among the Kalanguya in Tawangan. They were less easily victimized when they lived in larger groups. Another reason cited for the establishment of permanent settlements included the arrival of government.

The main purpose for raising the pigs was for ritual meat, and also for trade. The Kalanguyas were visited by people from Kabayan, Buguias, Ifugao, and even coming from as far away as Bontoc. These people brought hand-woven cloth and blankets, cooking pots, axes, and rice, which they traded for pigs or *bakkol*. *Bakkol* is *camote* that has been dried and pounded into flour. According to some Ibaloy respondents, *bakkol* was a famine food. They would walk from Kabayan to Tawangan, Lusod, and sometimes Tinoc to trade for *bakkol* when their rice crops would fail. For the Kalanguya on the other hand, camote in its different forms was a staple food. The Kalanguyas also traveled far to trade their pigs and chickens for different produce. They used to walk three days to Baguio, or longer to the coastal areas of Pangasinan to trade for salt.

When the first settlers of Tawangan arrived, the area where the center of the barangay now stands was a fertile valley, and they called it Daklanto, meaning flat area. At the time, the Kalanguyas maintained their swidden fields in the valley, and lived with their pigs in the hills surrounding it. Work mostly constituted maintaining the *inum'an*, carrying the root crop and camote leaves up to their houses from the valley, and gathering firewood with which to cook the ubi. The Kalanguyas also gathered non-timber forest products from the mossy oak forest, such as bark cloth, medicines, wild fruits, and other edibles. June to August was hunting season for wild boar, deer, monkeys, birds, and cloud rats. The Kalanguyas did not hunt from February to April, because these were the months when most animals would be pregnant or giving birth. At the time, hunters were careful not to follow their prey into the mountains that they deemed to be part of Bokod and Ifugao. Although people recognized the existence of boundaries between territories, and were careful not to hunt in the mountains of others, within the Kalanguya group in Tawangan, there was no concept of communal ownership of forests or rivers. One elder remarked that this was only practiced in Ifugao, but not among the Kalanguya. These findings are corroborated by the research of Afable among the Kalanguya (she refers to them as Kallahan) in Kayapa, Nueva Vizcaya, and among the Ibaloys of Kabayan as found by Wiber (1993) in her research in the central barangay or *poblacion*. Thus it can be said that although there existed a concept of territoriality and straying out of place or belonging to a settlement, in the past there was no concept of communal ownership of particular areas.

Elders claim that in the time of their ancestors, people were not so concerned with ownership. If a family or individual were the first to clear an area for the swidden, that area would be recognized as their property, which they could pass on to their children or relatives as inheritance. Children usually received their inheritance when they married. Both male and female children received equal parcels of land from their parents. It was up to married couples to decide where they would live. The decision usually depended on the size of the parcel of land that was given. It should at least be large enough to produce a crop that would sustain the newly-married couple. In the past there was always the possibility for newlyweds to clear new swidden fields for themselves. This system of inheritance, called *tawid* by the Kalanguya, is followed to this day, although it exists alongside many new ways of transferring ownership of, or use-rights to land. For example, some parents said that although the lots that they could pass on to their children were decreasing in size, their children could at least make money now and buy more land elsewhere. These new ways, according to Tawangan respondents, came with the arrival of the road.

From ubi to carrots and lettuce

In 1996, it became possible for four-wheel drive vehicles, especially privately-owned jeeps and trucks, to reach Tawangan. The road was built from funds coming from the municipal government of Kabayan, the former congressman, the provincial government, and calamity funds. Prior to this, Tawangan could only be reached on foot. The coming of the road also coincided with the issuance of mother CLOAs by the DAR. There was a sudden upsurge of conflict over land. Younger informants (age twenty to thirty years) recall that once the road arrived, their fathers did almost nothing but attend *tongtong*.

Tawangan households quickly converted some, but not all, of their swidden fields into vegetable gardens, signaling the end of fallow periods on converted lands. The few rice terraces in the community are also occasionally planted to vegetables, although the households that own them keep the option of converting them back to rice paddies. Land conversion has also touched the forest, with new ubi fields and vegetable gardens being cleared in 2005. Trips into the forest for hunting or to gather food, medicine, and firewood are less and less frequent as gardening takes up ten to twelve hours of an adult's day.

The shift from ubi-based swidden agriculture to commercial vegetable gardening was initially financed by Kalanguya and Ibaloy elite based outside of Tawangan. They stood as capitalists for the beginning of production, providing money, farm inputs, equipment, and transportation, while Tawangan residents worked on their own lots. Profits from the harvest were divided among the farmers and the financiers. Locals call this system, supply, where the financier is the supplier of farm inputs and transportation. This continues to this day, with the exception that now, a few Tawangan residents are able to finance themselves and other local farmers as well. Another system of cash flow and land-use in Tawangan that was introduced with the road is the locally-termed *salda*. This is a system of pawning a piece of land for an agreed-upon amount of cash. The provider of the cash can till the land and use it until such time that the owner of the lot is able to return the full amount of cash.

The capital to plant a crop of carrots in a 1 ha garden may reach up to PhP. 8,000. If the price of carrots is good at the time of harvest, farmers and their suppliers can get a gross income of PhP. 20,000 to 30,000 from one crop. On the other hand, they could go bankrupt and will then choose to gamble another round of expenses on another crop of vegetables in the hopes of regaining their losses.

The advent of commercial farming in Tawangan stems from a combination of internal desires and needs to earn more cash, and external, socioeconomic pressures, as well as support, to increase production. For example, through the development facilitator of the DAR, foreign funding was at one point granted to the farmer's cooperative (also set up by the DAR), which was made available as farming capital for the agrarian reform beneficiaries, those that had lots in the mother CLOAs. The development facilitator has also helped to organize seminars on pest-control for Tawangan farmers. External support also included the arrival of a bulldozer in Tawangan, through the intercession of financiers and politicians ranging from municipal to provincial levels of local government.

The presence of bulldozers, not only in Tawangan, but also in other barangays within the Mt. Pulag National Park, has come to symbolize both the promise of progress and the threat of destruction. The bulldozers are used to clear and level land for vegetable gardens. They are also used to open roads that serve as arteries leading from vegetable gardens to main roads. This makes it easier to load vegetables (5,000 to 10,000 kg at a time, depending on the size of the garden) unto transportation headed for lowland markets. In times when roads have been destroyed by typhoon-caused landslides, the bulldozers have also proven useful to local people in clearing the blocked areas as soon as possible. In the absence of bulldozers or skilled operators, people have had to rely on their own manual labor to open roads and rebuild collapsed portions. For the farmers, the roads represent a decrease in labor inputs, expenses, and damage risks for transporting harvests to markets. The roads also provide access to hospitals and medicine and basic services. To local indigenous people, the bulldozers are clearly useful tools. For the DENR, the roads (and bulldozers) pose a serious threat to biodiversity and conservation. This is yet another cause for friction between the DENR and local people. One often repeated story is an occasion when DENR representatives threatened to burn a bulldozer. Community residents replied that the DENR would have to burn the people first.

In another incident involving a bulldozer, the romanticized view of indigenous peoples in harmony with nature's spirits is confronted. A small road was being opened by a bulldozer, to provide access to vehicles to gardens located directly below the central *sitio* of Tawangan. People said that they saw one of the men working on the road, walking home at dusk being followed by a dog that was shifting from black to white. That same night, the operator of the bulldozer dreamed of little people asking him why he was destroying their home. The following day, a boulder was mysteriously dislodged from above the road, fell, and hit the bulldozer. The bulldozer broke down and wouldn't start up again. One of the elders, and one of the last remaining *mabaki* (traditional Kalanguya priest), was called upon. Taking note of the dog and the dreams, the *mabaki* advised the people involved in the roadwork to bring two chickens, *tapuy* or rice beer, clothes and some money to the site. He then prayed and sacrificed the chickens in the traditional way saying, roughly translated: "Please move to a new home. This is government work for vehicles to pass, so please move. Here is money as payment, here is *tapuy*, and here are clothes for you." The next day, the bulldozer was repaired and the work continued, now with the legitimacy accorded to it by the ritual. Who could stop the bulldozer, now that even the spirits acquiesced to step aside for it? In this particular instance, the DENR did not and could not intervene, primarily because they have no presence in the barangay.

The story of the transition of livelihood in Tawangan from dependency on ubi and barter trade to commercial vegetables is also a story of the implementation of government development programs. Furthermore, the transition indicates the influence of government policy on natural resource utilization. Thus far, the opportunity to generate cash through vital resources such as land and water has signaled swifter conversion of forests, and new systems of transferring ownership and use-rights to natural resources.

At this point, I would like to shed more light on the interface (Long 2001) at which Tawangan Kalanguya interact with the state's policies and agents, with a view to how these venues hold potential for environmentalism but instead become occasions for negotiation.

VENUES AND INVOLVEMENTS FOR ENVIRONMENTALISM

Given the venues for interaction described in preceding sections, we can see that each government agency focuses most on its primary mandate. Thus the DENR is the one agency that maintains a strong focus on natural resource use within the Mt. Pulag National Park, and is consistently able to create venues specifically for environmental conversation. However, the environmental conversations remain as such, and are usually confined to the PAMB meetings. For example, in the case of the Tawangan-Lusod road, the PAMB was to make a resolution prohibiting the building of new structures and the opening of new gardens along the road. When this news was announced in Tawangan, it was met with laughter. Backpackers reported to the DENR that they saw new pig-houses by the road, and no trespassing signs nailed unto trees along the roadside. The general attitude of locals towards the DENR is negative. The park rules and boundaries are spoken off as an insult to the prior rights and occupation of the Tawangan Kalanguya, and of the Kabayan Ibaloy. The people have a strong sense of entitlement that is matched with a strong discourse that goes along the lines of: "We have been protecting these forests even before the DENR came with the park boundaries. How can they tell us that we can no longer do what we want with our land?"

The lack of security and freedom from prosecution for actions taken in their own lands is one reason that the Tawangan Kalanguya have participated in more than one means of asserting their ownership and prior occupation of the land. One is through the mother CLOAs issued by the DAR, which, according to urban-based Kalanguya leaders, is better than nothing. Another is through the anticipated CADT of the municipality of Kabayan, which will be issued by the NCIP once all the requirements and procedures have been met.

The NCIP is under pressure to meet targets, and as of yet, has no long-standing relationship with the local communities. Officers of the commission appear in Kabayan and some of the municipality's barangays for workshops and crucial negotiations, but are otherwise removed from everyday life. The indigenous people of Tawangan and Kabayan hold on to the hope that, once the ancestral domain is titled, they will be given individual titles to ancestral lands. Although they are still far from this goal, the political leaders continue to alternately cooperate with, and seek support from, the commission in all endeavors having to do with the ancestral domain. If at all, natural resource management is usually brought up in NCIP organized venues as a right, not a responsibility. In relation to this, there is also the perception of Mt. Pulag as a source of income, wealth, water, land, and prestige. Thus at least four different ancestral domain claims encompass the peak. In the negotiations between opposing groups, the above ideas take precedence over the much-lauded (by outsiders) cultural belief that Mt. Pulag is spiritual homeland and sacred ground to the indigenous peoples that live in its foothills.

One of the discourses of resistance to the ancestral boundaries revolves around the argument that the Kalanguya are a unified ethnic group split apart across five provinces in the Cordillera. The effect of this has been that the Kalanguya are a minority in each province, with no political voice or empowerment. Kalanguya elite, educated, urban-based, and with powerful political networks though not necessarily wealthy, have been instrumental in cultivating the idea of a unified Kalanguya identity, and a duly recognized

Kalanguya territory. This is invoked repeatedly in the negotiation of boundaries, as was described above.

Of the four government organizations discussed above, the DAR has the most long-standing relationship with local communities in Kabayan. The long-term presence of a development facilitator in Tawangan gives the DAR a ringside view of what is taking place therein. The DAR has been most effective in advancing its own mandate and delivering basic services, however weak its contributions to sound natural resource management may be as of this time.

Since the MNRC is composed of members who have other, more important responsibilities to fulfill within the local government, the MNRC mandate is not fully realized. However, the potential is there. In particular, the initiative to promote environmental awareness is strong among members of the council. The Mr. and Ms. Environment inter-barangay competition was a creative brainchild, which could become an effective vehicle for environmental education, as long as it does not degenerate into a mere pageant.

CONCLUSION

In an ancestral domain such as Kabayan, indigenousness is a meaningful element in the dynamics of environmental change and policy-implementation. Being Kalanguya, and from the foothills of Mt. Pulag, is a category not just of identity, but also of environmentalist behavior as well as a means of articulating rights to natural resources. However, individuals consciously select the times and places for invoking indigenousness, sovereignty, prior occupation, or ecologically-sound natural resource utilization. These are deployed or activated as strategic means for asserting entitlement in environmental negotiations, which are often political. The decisions made in environmental negotiations emerge from the interstices of face-to-face interactions between individuals, less likely to emerge from structures of government programs. Livelihood needs are often used as a trivializing argument against environmental conservation.

Environmentalism takes up a limited time and space in people's everyday lives in Tawangan. It is not an all-pervading indigenous philosophy, cosmology, or indigenous knowledge system. The venues for it are decidedly modern, formalized and removed from daily existence because they are scheduled, announced, and prepared for. A time and place are set aside for them, usually in a school classroom, barangay hall, or some other government building. Normal farming activities stop and people come dressed for the occasion. The presence of certain government representatives indicates to the local people the nature of the discussion. Even in the venues intended for environmentalist discussion, such us in the PAMB meetings, concerns regarding development infrastructure and distribution of funds often take up more time than discussions about forest conversion.

I suggest that the next logical step for governing bodies working on the environment is not new policies or regulations. The answer is more rigorous implementation and this can be concretely done by increasing the frequency and intensity of venues and involvements for environmental awareness and management.

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CHAPTER THIRTY

DEFINITIONS AND DISCOURSES ON INDIGENOUS PEOPLES IN SOME NEIGHBORING SOUTHEAST ASIAN COUNTRIES: INDONESIA, MALAYSIA AND TAIWAN

Gerard A. Persoon

INTRODUCTION

The concept of indigenous peoples as used as in the international discourse and by multilateral agencies is highly controversial in various Southeast Asian countries. There are big differences between countries in terms of rights and status of indigenous peoples. Indonesia, Vietnam and Malaysia for instance basically deny that there is a domestic issue regarding indigenous peoples in the way it is understood by the international community. The government of Malaysia considers all Malay people, who count for more than 50 percent of the population, as indigenous in opposition to ethnic Chinese and Indians. Indonesia too denies that some ethnic groups are indigenous while others are not. Indonesia only differentiates between Indonesian citizens and outsiders in addition to Indonesians of a different ethnic origin. Tribal communities are only considered as isolated groups in urgent need of development and not as indigenous peoples, somewhat comparable to the situation of the scheduled tribes in India. The Philippines however shows a radically different picture within the Asian context. In 1997 the former president Ramos signed the Indigenous Peoples' Rights Act (IPRA), granting rights to the indigenous peoples of the country who constitute more than 10 percent of the country's population of over seventy million people. Because of the very active role of Filipino non-governmental organizations (NGOs) within the Asian indigenous peoples' movement, neighboring countries are regularly irritated by the position of this country.

In most Southeast Asian countries, just like in India, the idea of being indigenous and the position of those who nowadays are being labeled as indigenous people, is radically different from the situation in Latin and North American countries and Australia and New Zealand. In these countries the local population was really colonized by people with very different cultures, languages and religions. Interestingly such a similar process also took place in Taiwan, where until the efforts of the Dutch to bring Chinese from the mainland in the seventeenth century, the aborigines were the sole inhabitants of the island. Apart from the small Negrito populations in countries like the Philippines, Thailand and Malaysia, the idea of indigenous peoples within these countries can not easily be based on historical, cultural, linguistic or religious arguments. In many Asian countries the modern discourse of indigenous peoples is used for ethnic groups that differ in varying degrees from a culturally dominant mainstream in a country. In general it is related to people who were usually categorized as tribal people, ethnic or cultural minorities, and hill tribes. In some cases it is also used as a new label to differentiate peasants from people living in more remote and inaccessible mountainous areas (Li 2000a).

The popularity of the concept can largely be ascribed to the successes of the international movement of indigenous peoples with the aid of support groups and a

number of influential countries. The granting of rights at the international level and the fact that all major donor agencies have now issued indigenous peoples policy guidelines that should guide their activities, provide representatives of these groups with a powerful idiom to articulate the special position of these groups. It is only necessary to have the concept of indigenousness being accepted within the national and local context. Though at the international level this may not be very difficult, at the other levels it is a complicated and often ambivalent issue. At the international level there is, in the absence of a formally accepted definition of indigenous peoples, a high degree of tolerance of people who claim to represent a particular indigenous group. This is partly explained by the accepted principles of self-determination and self-identification and the absence of clear-cut principles of representation at this level (who speaks on behalf of whom?).

At the national and at the local level however the situation is much more complicated. Claims to be indigenous vis-à-vis non-indigenous people are often rejected by governments, even though the Philippines is remarkably un-Asian in this respect. Other ethnic groups object to the allocation of special and exclusive rights for indigenous peoples or to their preferential behavior. And the historical evidence, on which the legitimization of these special rights is based, is often relatively weak. At the local level the situation may even be more complicated as is clear from intensive field studies (Li 2000a; Li 2000b; Karlsson 2001). Ethnic and cultural labels, now used as identity markers for indigenous peoples, are often the internalized results of colonial practices such as ethnic name giving and drawing of boundaries for administrative purposes. In most cases there is little evidence for referring back to the pre-colonial situation as is often suggested by employing concepts such as: 'times immemorial' and 'the way and territory of the ancestors.' In the past, high degrees of mobility, intermarriage resulting among others in an ethnically mixed population, and all kinds of cultural influences, complicate matters. Even relatively remote tribal peoples are not always traditional or pure in that sense. People, ideas, and artifacts have always been on the move. They have had a social life and history. Cultural boundaries were rarely static for long periods of time and for that reason it is very hard to make the very clear distinctions nowadays.

In this paper I will present and compare the colonial and contemporary history, contents and consequences of the formal definitions and discourses on indigenous peoples in Indonesia, Malaysia and Taiwan. Jointly they provide a varied image of the indigenous peoples' discourse which sometimes resembles and sometimes contrasts the situation in the Philippines. Attention will also be paid to some international issues such as the role of declarations like the Convention on Biological Diversity (CBD) and the policy statements of the United Nations (UN), World Bank, Asian Development Bank (ADB), European Union (EU) and the World Wildlife Fund for Nature (WWF) in the national discourses. A few cases from the field will be used to illustrate to what kind of consequences these discourses actually lead.

INDONESIA

The government of Indonesia has always denied that the international discourse on the position and rights of indigenous people bears any relevance to the country. The only distinction made officially is between native Indonesians and ethnic strangers such as the Chinese, Arabs and the Indo-Europeans. Census data make no reference to ethnic

affiliation within the category of Indonesian citizens. It has been a unified state ever since independence. It has never participated in the discourse on indigenous people and until very recently did not allow for any representation of particular ethnic groups in these forums. Except for the position of the Papua of Irian Jaya and the people of East Timor discussions on the indigenous peoples of Asia seemed to be of little relevance to what was happening in this country (see e.g. Nicholas & Singh 1996; Barnes et al. 1996). To some extent it seemed as if the international world accepted the official position of Indonesia in this respect for a long time even though some of the major donor agencies like the World Bank and the ADB apply their indigenous peoples' policy guidelines also in Indonesia.

Colonial history

In the colonial ethnography which was intimately linked with the administration of the colonial state of that time, the dominant classification of the Indonesian population was phrased in evolutionary terms. In addition to the central high cultures, mention was made of half-cultures and of the pagan, or primitive tribes, to indicate various hunting and gathering tribes, and shifting agriculturists in Sumatra and Borneo. Important also were the development perspectives of these peoples. Very often these were considered as limited because "hunger, the best incentive for progress, was missing in many cases". (Colijn 1907, my translation).

Never throughout the colonial history was there any explicitly formulated colonial policy towards these tribes. In general however there was an idea to abolish primitive customs like headhunting, slavery, tribal warfare and burial of widows. In Irian Jaya measures were taken against what was being called sexual excesses. At a later stage measures were taken to combat slash-and-burn agriculture (in Dutch called *roofbouw*, literally meaning predatory cultivation) in order to protect valuable forests and watersheds and to prevent forests from being converted into the unproductive grasslands. With regard to religion the colonial government promoted a policy of non-interference in Muslim areas but it strongly promoted conversion to Christianity in pagan areas. Beyond these issues there was little overall policy formulation with regard to the tribal communities. It was left to the local authorities to take adequate measures. That is why there were substantial differences in governmental interference in various regions of the archipelago (Colijn 1907).

There were a few interesting exceptions however to this general rule. Scattered throughout the colonial state a number of small tribes became the focus of attention of the colonial government. In West Java the Baduy occupied a special position and enjoyed full protection by the colonial government against encroaching farmers. This ascetic ethnic group of only a few thousand people adheres to a life style which is defined by the way their ancestors lived. The colonial government respected that position just as the sultans of West Java had done before and the government of independent Indonesia continues to do. It is believed that the wellbeing of the Baduy is crucial to the world.

A kind of protection was also offered to a number of hunting and gathering tribes in Sumatra and Borneo. They needed to be protected against slavery and abuse in order to avoid serious harm and misery because after all "they were also subjects of the Dutch Queen" (Winter 1901, my translation). Faced with threats of physical extinction, the

colonial government also tried to interfere on the island of Enggano by bringing in fresh blood from Jakarta (then Batavia) and by taking other protective measures which would not yield lasting positive results (Keuning 1955).

This idea of protection became crucial again in the formulation of the right policy when late in the colonial history, Irian Jaya (formerly known as Dutch New Guinea) was opened up and new tribes were discovered. A commission of government officials and the Dutch Organization for Nature Conservation made a strong plea for a very protective approach regarding the native tribes of that area. This policy however was never officially adopted (Nederlandsche Commissie 1938).

Tribes and the Indonesian bureaucracy

The Dutch did not leave any bureaucratic structure or any clearly formulated policy in dealing with tribal communities when Indonesia declared independence in 1945 (and obtained it officially in 1949). There was even no terminology for this category of people(s) beyond concepts like primitive tribes, and pagan tribes. At present there are various parts of the Indonesian bureaucracy that have a direct linkage with the tribal peoples in the country though each from its own perspective. The most important here are the departments of Social Affairs, Forestry and Religion.

When the Indonesian bureaucracy had passed through its initial turbulent phase it became clear that the Department of Social Affairs would be the one to be put in charge of the tribal people of the country. Tribal people were thought to be primitive and backward and policies were formulated to bring them back to the mainstream of Indonesian life just like a number of other problematic groups of people in the country. The term used for these tribes was *suku-suku terasing* or isolated ethnic groups and the aim of the policy was described as a re-socialization or civilization process (*memasyarakatkan kembali or memperdayakan*). At that time there was not yet any large scale program to actually implement that policy. This situation started to change since the mid 1970s. From that moment onwards a more clearly formulated policy was designed, substantial budgets were allocated and projects were implemented.

Over the years the names have been changed regularly in a quite significant manner. They changed from the plural *suku-suku terasing* to the ambivalent *masyarakat suku terasing* to finally *masyarakat terasing* (isolated community) to indicate the dominant aspect of isolation (rather than cultural diversity). The prevailing definition of these people is: "members of communities who live in forests, in mountainous areas or in riverine or coastal zones and in social circumstances (economy and level of civilization) of simple nature. Because of their isolation they have no contact with the outside world, and as a result there is hardly any social change or progress" (Departemen Sosial 1991a: p. 3). Through an all-encompassing and uniform civilization and development program, implemented in resettlement villages (of about one hundred houses each), these communities are brought (back) into the mainstream in Indonesian social life. The duration of these projects is five years. This includes new forms of housing, modes of subsistence, education, religion, health care, and administration.

Numbers regarding the size of these isolated communities have varied over the years. At some point in time nearly two million people were classified as tribal. At present however a little over one million are considered as being socially and culturally

isolated. They live scattered over the entire archipelago and include an enormous variety of peoples (hunters and gatherers, sea nomads, shifting agriculturists, isolated island populations and hills tribes). At present more than three hundred fifty of these projects have been implemented all over the country. However, 1.02 million people (the total population of Indonesia is more than 220 million) who belong to the tribal population are still untouched (Departemen Sosial 1999c).

From a somewhat different perspective the Department of Forestry is also dealing with this group of people. In as far as they practice shifting agriculture or inhabit protected areas, this department aims to settle them down and turn them into permanent farmers outside national parks or nature reserves (Departemen Kehutanan 1991). The target groups of the departments of Social Affairs and of Forestry do not fully overlap. On the one hand there are tribal groups who do not practice shifting agriculture (sea nomads, nomadic hunters and gatherers) and on the other hand there are numerous people of non-tribal ethnic groups who are engaged in shifting agriculture. But another part is considered as tribal shifting cultivators and is for that matter a potential target of both departments.

Finally, mention should be made of the role of the Department of Religion in relation to the *masyarakat terasing*. One of their assumed characteristics is that these tribal communities do not (yet) have a religion (Departemen Agama 1991). Religion in Indonesia is officially limited to the five world religions: Islam, Catholicism, Protestantism, Hinduism and Buddhism (in Indonesia Catholicism and Protestantism are officially considered as separate religions and not as two variants of Christianity). And everybody should adhere one of these religions. All other forms of religion and beliefs are not recognized as such but condemned as paganism, superstition and primitive beliefs. For a long time it was suggested that people who do not adhere one of these religions were communists. That is why missionary activities among the pagans by organizations from the official religions were strongly promoted. In addition it should be noted that there is also a strong religious influence through the regular government programs in the field of education, health care, and administration. The color of such influence depends strongly on the dominant ethnic group in the wider context of the tribal communities. Financial help from abroad is very important in many areas for Christian and Islamic missionary work.

In addition to the departments mentioned above, there are other departments that employ activities among the tribal communities but they are far less important and often implemented through the Department of Social Affairs. Moreover they are based on the same kind of perceptions regarding the tribal communities. The only exception to this rule is the Department for the Environment. Over the years this department has time and again criticized some of the governmental programs (especially the forced nature of the processes of change) and it argued that tribal communities make a valuable contribution to the cultural diversity of the country. Moreover they are also supposed to have important lessons to teach in the field of environmental sustainability (Persoon 1994; Salim 1999).

Indonesia and international organizations

Indonesia has always denied that the international discussion regarding indigenous peoples bears any relevance to the country. It did not participate actively in these forums and it also denied representatives of particular ethnic groups to represent Indonesia during those meetings. In some cases spokesmen of East Timor, the Moluccas or West Irian (Irian Jaya) who had found asylum in other countries went to these meetings in order to inform the international community about the situation in their home area. But this never had many consequences for the people in the country itself. And the international community rarely took any action until recently.

To give just one example I would like to refer to the efforts of the ADB to achieve agreement on a policy paper regarding indigenous peoples. This process suffered for a very long time from the refusal of countries like Indonesia to take part in the discussions by sending an official delegation while at the same time representatives of particular ethnic groups were also not allowed to participate in the consultations. It took the bank many years to achieve sufficient consensus among its members while at the same time the bank did not want to alienate the indigenous peoples' organizations from its own institutions (ADB 1998). And more recently it has engaged in extensive discussions within Indonesia in an effort to bridge the gap between the official position of the country and the organizations of the indigenous peoples (ADB 2002a; ADB 2002b).

Over the years however and through very complicated procedures some of the organizations have adopted guidelines, principles and policy statements regarding the rights and position of indigenous people. Often these rules are declared to be not applicable to Indonesia but in practice they are relevant at least to some extent. The World Bank changed to some extent its policy regarding financing of transmigration projects after exposure of the consequences for tribal (or indigenous) peoples (see e.g. *the Ecologist* 1986). In the same manner the Indonesian biodiversity conservation project of the ADB could not be implemented unless indigenous peoples would be involved through local organizations (ADB/MOF 1996; Persoon 1998). Also WWF has committed itself to involve indigenous peoples more actively since it has published its statement of principles in 1996 (WWF 1996). This is not to say that through the international organizations indigenous people are recognized as such within Indonesia but to some extent these organizations have imported some of the international ideology with regard to indigenous peoples through their financial power and structures of operations. I believe this is also crucial for what has happened in the recent past in Indonesia and what is likely to happen in the near future.

Aliansi Masyarakat Adat Nusantara

Since the fall of president Suharto in May 1998 a wave of democratization processes has gone through the country. Numerous new political parties were founded and NGOs are booming in many areas (Pompe 1999). One of the most amazing events in relation to indigenous peoples has been the mass demonstration in Jakarta by people who labeled themselves as *masyarakat adat* (*adat* communities). *Adat* is a complicated concept. It encompasses concepts like culture, customs, systems of local justice and the like. In some contexts it is also understood as the traditional life style of a particular community. *Adat* land is usually understood as the (communal) village territory. This massive manifestation took place in March 1999. As venue for the event they had chosen the prestigious Hotel Indonesia in the center of Jakarta. Hundreds of people, many of them in their traditional outfit, were present. They were representing more than two hundred ethnic groups. This demonstration was supported by various organizations from the west, though their support was never made very explicit. To many officials the magnitude of the manifestation was a big surprise. The organization had invited high officials for a discussion about the demands of the *masyarakat adat*. Not surprisingly, most of them did not show up. They left the uneasy job to lower officials many of whom were not prepared to face such a crowd and they also did not have the authority to speak out on the issues raised during the meeting. At the end of the gathering a number of demands were formulated: (1) elimination of terms which denigrate indigenous people and their rights, (2) recognition of the diversity of indigenous people and recognition of rights, knowledge and skills, (3) representation of indigenous people at state institutions, (4) restoration of rights of indigenous peoples over land, and natural resources, (5) change of the concept of state control as contained in the Basic Agrarian Law, and the Forestry and Mining Act, (6) discussions need to be held with indigenous peoples about the use of land and resources by the government and the private sector, (7) social welfare programs must guarantee not to violate indigenous rights, (8) there must be no military involvement in civil society as currently exists under the Armed Forces Dual Function doctrine, (9) the state authorities must find a fair means to settle the issue of self-determination of indigenous peoples (e.g. it is the State's responsibility to restore the rights of indigenous peoples which have been violated for so long), and (10) the state must acknowledge and sign international agreements which protect the rights of indigenous peoples (e.g. the International Labor Organization (ILO) convention 169 and actively participate in the formulation of the UN draft declaration on the rights of indigenous peoples). These demands were of course formulated in the Indonesian language. The central term in this context in Indonesian is *masyarakat adat*, which is defined as: "Our communities whose lives are based on customary rights to certain lands which have been handed down through the generations exert sovereignty over these lands and natural resources; our societies and cultures are governed by customary laws and customary institutions which sustain the continuity of our communities" (AMAN 1999). In the Indonesian text the English words indigenous peoples are used once: in relation to the UN declaration on indigenous peoples. In the integral translation of the 1999 Indonesian text into English *masyarakat adat* is consequently translated as indigenous peoples (Down to Earth, special issue 1999).

During the meeting the *Aliansi Masyarakat Adat Nusantara* (Alliance of Indonesian Adat Communities, AMAN) was officially founded. A mission statement was formulated and an organizational structure designed. A representative of the Baduy was selected as the executive secretary of the organization (a wise choice given the fact that the Baduy use to have a privileged position among high governmental officials in comparison with many other groups in Indonesia). In some of its most recent bilingual publications and brochures AMAN also presents itself as the Indigenous Peoples' Alliance of the Archipelago. At present it is an alliance of seventeen organizations and represents ninety-seven indigenous communities from various provinces in Indonesia (AMAN 2002).

An official reaction to the declaration and demands was never given. However it is noteworthy to draw attention to two formal changes since that meeting. In the first place a presidential and a ministerial decree were issued in September and October 1999 to announce an official change in the name of the former *masyarakat terasing*. From that moment onward this category of people will be called *komunitas adat terpencil* to announce a new vision and a more participatory approach in the development of these communities (Departemen Sosial 1999a). The inclusion of the word *adat* is certainly to be understood as a kind of recognition that these people are more than just isolated: they have customs, a culture, and a particular way of life. A big conference was organised by the Department of Social Affairs in Jakarta in December 1999 to inform other departments, the media and interested organizations about the change (Departemen Sosial 1999b). In June 2002 a new ministerial decision was published to guide the development of this part of the population. To a large extent it echoes the spirit of the previous declarations with some minor modifications in its present wording. This decision also reinstalled the Department of Social Affairs as the responsible governmental institution after a couple of years of bureaucratic confusion (Departemen Sosial 2002).

The second formal change refers to the inclusion of *etnis minoritas* (ethnic minorities) as one of the so-called functional groups in the *Majelis Permusyawaratan Rakyat Republik Indonesia* (People's Consultative Congress, MPR). Though they occupy only five out of a total of 695 seats, it is significant that this group is now included under the label of ethnic minorities. Moreover the seats are occupied by representatives of ethnic groups which were usually classified as *masyarakat terasing*; that is a Baduy, a Kubu, a Papua, a Dayak and a Sangir (MPR 1999).

In September 2003 the second AMAN conference took place in Lombok. Even more peoples were present compared to the first meeting but with so many other turbulent developments going on in the country it turned out to be difficult to reach the same level of attention. This second meeting was among others mentioned to raise the level of awareness of presidential candidates and political parties with respect to indigenous peoples. Though initially there was some hope that at least a number of candidates and parties would pay attention to their concerns, at the end of 2004 the gains were very limited. Obtaining support for indigenous peoples through the national politic arena is bound to remain very limited.

Future prospects

The recent political history of Indonesia is still to be written but one of the remarkable features of present-day developments is certainly the new forms of democratization. New organizations and new democratic procedures are being formulated. It is very likely that the international discourse on indigenous peoples will provide an opportunity for many of the ethnic groups to articulate their rights and seek support within a rapidly changing Indonesia. They will also be inspired by recent developments in other countries, like the Philippines. Though at present the movement is still politically weak it is likely to gain strength in the near future. However ambitions of various ethnic groups and indigenous peoples differ widely, ranging from independence to the right to land and to self determination. It is still highly unclear how the Indonesian bureaucracy will react to these new movements. The most recent policy statement by the present government reveals no

significant changes with regard to this part of the population. Of a different nature is of course the danger of ethnic violence or even ethnic cleansing under the banner the concept of indigenousness. Outbursts of this kind have taken place in recent years in Central Kalimantan, the Moluccas and West Papua. In these cases the indigenous people (Dayak, Moluccans, or Papua) were directing their aggression to migrants (Madurese, Javanese or others). Though in all of these cases the historical situation is complex and there are many other influencing factors but there can be no doubt that the reinforced emphasis on being indigenous versus non-indigenous is at least part of the explanation.

MALAYSIA

The discourse with regard to the indigenous people of Malaysia takes place along two different lines. On the hand there is the international discourse which refers to a very small part of the nation's population, the Orang Asli, as the indigenous people. They number about one hundred thousand people divided over a number of different groups. In numerous books and articles these peoples are considered as the indigenous peoples of the country to whom the international declarations should be applicable. Much of this literature is very critical about the ways the Malaysian government has dealt with this people in the past and the way it continues to do so in the present (Denton et al. 1998).

On the other hand there is the official position of the Malaysian government which considers about 58 percent of the country's population as indigenous. During an official conference in the international year of the indigenous peoples (1993), held in Kuala Lumpur, the Deputy Prime Minister of Malaysia, Dato' Seri Anwar Ibrahim, defined the indigenous people of Malaysia as the entire *bumiputera* (prince of the earth) community. This category of indigenous people included three groups: (1) the Malays, (2) the aborigines, and (3) the natives. He also added: "The natives and aborigines should not be left in isolation. The best course for them is to accelerate their integration into the global society. However, it must necessarily mean a readiness to change on their part." (Anwar 1993). The categories are all also legally defined. According to the Aboriginal Peoples Act of 1954 (and revised in 1974) the Orang Asli include: (1) any person whose male parent is or was a member of an aboriginal ethnic group, who speaks an aboriginal language and habitually follows an aboriginal way of life, customs and beliefs, (2) any person of any race adopted when an infant by an aborigine and who is brought up an aborigine, or (3) the child of any union between an aboriginal female and a male of another race provided the child remains a member of an aboriginal community. The Orang Asli are usually divided in three different categories: (1) the Negritos, (2) the Senoi and the (3) proto-Malays. Culturally and linguistically however it is hard to maintain this distinction at the local level because of a high degree of mixture. A Malay is constitutionally defined as a person who professes the religion of Islam, habitually speaks the Malay language, conforms to Malay customs and was before Merdeka Day (Independence) born in the Federation or in Singapore or born of parents one of whom was born in the Federation. The Malaysian Federal Constitution further defines the native as: (1) in relation to Sarawak, a person who is a citizen and either belongs to one of the races (e.g. Bukitans, Dusuns, Kenyah, Punans, Malays, Penans) specified as indigenous to the State or is a mixed blood deriving exclusively from those races, or (2) in relation to Sabah, a person who is a citizen, is the child or grandchild or a person of a race

indigenous to Sabah, and was born either in Sabah or to a father domiciled in Sabah at the time of the birth. The constitutional definitions are of great importance with regard to socioeconomic privileges and benefits because the federal Constitution has accorded reservations of quotas in respect of services, scholarships, and licenses for these groups (Lim 1998).

Though the natives and the aborigines are defined as similar to the Malays this does not mean that they do not receive special attention. On the contrary: over the years the Orang Asli have received a lot of governmental attention in order to bring them to the mainstream of Malay life through various kinds of facilities. Comparatively speaking there is a rather abundant literature on the various Orang Asli groups, focusing on ethnographic description and quite a number of publications also deal with issues of modernity, state interference and its effects on the life and culture of the people.

Colonial history

The history of the special position of the Orang Asli goes back to the early days of colonization. Even before that the forest dwelling tribes were engaged in the production of various kinds of non-timber forest products. In the literature special mention is made of products like rattan, camphor, bee wax, birds' nests, rhino horn and forest fruits. Also the local markets were provided with these kinds of products through Malay or Chinese middlemen. In addition to the hunting and gathering activities many of the Orang Asli are also involved in shifting agriculture. Because of the political strategy of indirect rule by the British where the sultans were left in charge of Malay customs and religion, the Orang Asli were further isolated. Much of the uncultivated land was appropriated and the Orang Asli were increasingly pushed into more marginal areas. The attitude of the colonial government is usually described as being rather mixed. On the one hand they were treated as an interesting kind of noble savages. There was a lot of research effort put into studying their life style, religion and culture. This work was facilitated by the government. Also for the sake of museum collections a lot of research was done among them. On the other hand the colonial government did not really protect the Orang Asli against encroaching farmers and it did not take action against repression from neighboring Malay communities in spite of the formulated intentions.

The term Orang Asli is now widely used in Malaysia for all the aboriginal people, both by the government as well as by the people themselves. A long time ago, in the early days of British administration they used to be called Sakai (not to be confused with the Sumatran group of hunters and gatherers also called Sakai, who live in the province of Riau). This term however had several negative connotations. In the first place it means slave or dependants. In the second place the term was also used for one particular ethnic group which is now called Senoi. In the beginning of this century they were also collectively called the pagan races. The accepted term of Orang Asli without doubt refers to the fact that these groups were indeed the original inhabitants of Malaysia before the arrival of the Malay, the Chinese and the Indians (Carey 1976: p. 5). Very often the term aboriginals or aboriginal population is used. The term indigenous however is carefully avoided in all official documents though anthropologists and local spokesmen prefer this word with reference to the international discourse and declarations (Denton et al. 1998).

From the beginning of the century onwards the state officials appointed a Superintendent of the Sakais. Most of them like Skeat, Evans and Noone had started their careers as good fieldworkers and deserved their appointments on the basis of their intimate knowledge of the people concerned. Noone drafted the first formal government policy on Orang Asli, the Aboriginal Tribes Enactment which was to become a basis for later government policies (Holman 1984; Denton et al. 1998). It was recommended that the government would establish aboriginal reservations and appoint a high official for aboriginal affairs.

The Japanese occupation of Malaysia mainly implied a retreat into the forest for the Orang Asli and a kind of co-operation with the communist dominated guerrilla force. The period from 1948 until 1960 is known as the Emergency Period: the communist insurgency which also had a large impact on the Orang Asli. Large scale resettlement of Chinese squatters was undertaken in order to cut the guerrillas of their supplies. Also the Orang Asli were resettled. In retrospect this scheme is labeled as a total disaster. Lack of shelter, poor nutrition and total social and psychological upheaval killed many of the resettled Orang Asli (Carey 1976: p. 308). Others fled from the resettlement projects back to the forest and in many cases they retreated to jungle forts with high concentrations of guerrillas. Gradually it became clear that the sympathy of the Orang Asli could not be won by coercion. The Department of Aboriginal Affairs was put in charge of the task of establishing better relations with them. In order to do this task the department was substantially expanded in 1954. In 1957 the Federation became an independent state. Gradually the government achieved more control over the situation and declared the Emergency over in 1960.

Orang Asli and the Malaysian bureaucracy

In 1961 the Ministry of the Interior published a statement of policy regarding the administration of the aborigine peoples of the Federation of Malaya. The ultimate goal of the policy is the integration of the Orang Asli with the Malay people of the country. But it is explicitly stated that it should be national integration and not artificial assimilation. This policy statement however did not have the force of law. The Department of Aboriginal Affairs (JHEOA) was the single agency in charge of government supervision and services. It has a very strong position in relation to almost anything that is happening in the Orang Asli areas and with regard to the Orang Asli themselves. A few years later the terms Aborigines and Sakai were officially abolished in favor of the term Orang Asli which is also maintained in official non-Malay texts.

Legally the Orang Asli still occupy an ambivalent position. They are excluded from certain rights which the Malays and the natives of Sarawak and Sabah have while on the other hand the possibility of receiving designated areas as aboriginal areas as was enabled by the Aboriginal Peoples Act has not been used to the extent of its possibilities. Only seventeen of the 667 Orang Asli villages were labeled as Orang Asli areas or reserves (Nicholas 1991; Denton et al. 1998: p. 74). In other cases regulations regarding the *bumiputeras* are said to be not applicable to the Orang Asli but only to the natives of Sarawak and Sabah. In the literature there are numerous cases of Orang Asli being displaced by Malays looking for arable land or by the State in search of extension of plantations or infrastructure.

The discourse on indigenous peoples in Malaysia is without any doubt heavily influenced by the events following the world wide press attention of the Penan people obstructing logging operations in Sarawak. The Swiss Bruno Manser reported from the interior of Sarawak to friends abroad about the struggle of the Penan with the logging companies and the authorities. Numerous other organizations started to pay attention to this issue and even in national parliaments in many western countries questions were asked about the Malaysian timber trade and its consequences for the local population. Among others it would lead to petitions in the European Parliament and the US Congress asking for suspension of timber imports from Sarawak until proper environmental and human rights measures were taken. In Malaysia this campaign had several effects. In the first place Bruno Manser was put on top of the list of wanted persons but he succeeded is hiding in the jungle and finally fled the country. Local people were arrested. At the international level Malaysia started a campaign in an effort to convince authorities of other countries of the sustainable manner of forest management and the government's way of dealing with the native population was an internal and domestic affair anyway. Moreover much of the criticism from outside was said to be based on false romanticism (Manser 1996; Dove 1998).

In retrospect it is clear that the Penan resistance to logging was the start of much wider campaigns for recognition of indigenous peoples' rights and for inclusion of these rights in the criteria for sustainable forest management and certification of timber for the international market (see Udo de Haes, this volume). This impact may have been bigger outside Malaysia than in the country itself as Malaysia is still persistent in its attitude towards many of these issued raised at the international forums.

Future prospects

There is something very paradoxical about the official use of concepts like Orang Asli, *bumiputera*, and natives in the context of Malaysia. The concept of *bumiputera* has gained political significance since it is used as the ideological basis for special privileges of Malays in contrast with Chinese and Indians. But because of the presence of an official group called the Orang Asli, or the original people, it seems as if they are even more *bumiputera*, than the Malays. That is one of the reasons why there is a wide spread conviction among many politicians and the general public that it would be better if the Orang Asli would just become Malays, adopt Islam and integrate into Malaysian society without any special status. The adoption of Islam is considered crucial in this respect because conversion to that religion in Malaysia is almost identical with giving up an Orang Asli life style and identity. This idea has led various authorities to aim for that direction (Karim 1996; Denton et al. 1998).

Within Malaysia there are a number of organizations and individuals who are trying to put the plight of the nation's indigenous peoples, including both the Orang Asli and the natives of Sabah and Sarawak on the political agenda and to argue for more recognition of rights and less repressive attitudes. They do so by means of publications, raising public awareness domestically and representation at international meetings. Among them there are also a few fully educated academics with an Orang Asli background. So far however the government of Malaysia has shown little willingness to

change its formal position and is persistent in its general policies. So the near future is unlikely to show substantial differences in this respect.

TAIWAN

Though Taiwan is usually not considered as part of Southeast Asia, there is ample reason to include a short note on the aborigines of Taiwan in this overview. In the first place because of short geographical distance between the Philippines and Taiwan. In the second place there can be no doubt that historically the aborigines of Taiwan and the Malayo-Polynesian indigenous peoples in the Philippines have a common origin. With regard to the present: the aborigines in Taiwan, who only form a small minority in the country, look for inspiration regarding the development of indigenous rights and expressions of indigenous ethnicity to other countries in the region.

History

Until the beginning of the seventeenth century, the island of Formosa was entirely occupied by what travelers called uncivilized barbarians. In fact, the Dutch started to bring Chinese from the main land to Formosa as work force and to promote agriculture. This turned out to be a profitable enterprise. The United East India Company exported sugar and rattan to China and deerskin and sugar to Japan. In 1652 a revolt started to protest against the exploitation by the Dutch. Later the Dutch were defeated and expelled by Ming loyalist Cheng Ch'eng-kung in 1662. At the end of the seventeenth century it is estimated that there were about one hundred thousand Chinese in Taiwan. The Manchu Imperial Court started to send government officials to the island in 1684. Numerous bloody fights are reported between the Chinese and the aborigines who gradually were forced to take refuge in the rugged mountainous part of the country in the east. Those aborigines who remained on the western side lived in a sea of Chinese culture. The lowlands in the western part were taken over by the Chinese who rapidly increased in numbers. The western lowlands were brought under intensive cultivation. According to some historians, the living conditions of the aborigines started to improve under the Japanese administration which started in 1895. The Japanese also conducted a census among them and started to classify them in various groups. In 1910 the Bureau of Aboriginal Affairs made a classification of the various aboriginal groups: Atayal, Bunun, Tsou, Tsarisen, Paiwan, Puyuma, Ami, Yani and Saisiat. Over the years this list has been adopted with little changes: in some cases groups have been merged and in other cases new names have been given. At present the government has a list of nine populations. NGOs of the aborigines themselves differentiate between eleven groups.

In the 1920 a system of aboriginal reservations was established by the Japanese which limited the entrance of the Chinese. At the same time a process of resettlement was started to bring the highland aborigines down and a sense of oppression roused the mountaineers. The isolated mountain villages were resettled in the more accessible foothills along the eastern coast. About thirty thousand aborigines were resettled during those years. Bloody incidents however were also part of this history. Gradually the Japanese adopted a gradual pacification policy. Roads and bridges were constructed in the mountain region, the public school system was extended and primary health care

helped to overcome some of the prevailing health hazards such as malaria. The Chinese were prohibited to enter the aboriginal areas. This policy was maintained until Japanese rule over Taiwan ended with their defeat in World War II.

Under the new Chinese government, the aborigines became citizens of China with the same legal rights as the Han Chinese. The Chinese government continued to maintain the reserve system in the mountain area, forbidding the Chinese to enter without a permit (apart from policemen, school teachers and shopkeepers). The dominant policy is one of artificial assimilation, without rights to self-determination and collective rights as ethnic groups (ATA et al. 1996: p. 363). The construction of roads has greatly improved the accessibility of the region. But in addition also dams and power lines have been constructed. With the increase in welfare and the need for recreation the newly built highways have also brought hundred thousands of tourists to the East coast as the area also includes a number of National Parks with spectacular views and gorges. As a result the acculturation of the aborigines into the dominant Chinese culture has rapidly increased. In Taiwan this process is usually labeled as the consequences of "plainisation or Hanism" (Cauquelin 2004).

Demographically the aborigines have gradually increased in numbers but their relative position in relation to the Chinese majority has declined over the years. They constitute less than 2 percent of the entire population (see table 1). At the present moment the majority of indigenous people are agricultural workers on land which they do not own themselves, or they have found employment as laborers in the industrialized towns across the country.

Table 1: The indigenous peoples of Taiwan (ATA 1996 et al.)

Group	No. of people
Taroko	30, 000
Amis	129,220
Paiwan	60,434
Tayal	48,957
Bunun	38,267
Puyuma	8,132
Tsou	5,797
Saisiat	4,194
Thao	248
Rukai	8,007
Yami	4,335
Total	337,342

Indigenous peoples' movement

At present the total aboriginal population is estimated at around three hundred seventy thousand. In spite of numerous development projects and various kinds of protective measures the aborigines still suffer from higher death rates, compared to the Chinese population, as a result of lack of modern health facilities, a lack of basic hygiene and alcoholism. The abandonment of traditional culture is considered as another major problem. Modern schooling and the promotion of Mandarin Chinese over the aboriginal languages, alienated the younger generation from its cultural roots. Though this was part

and parcel of the process of Hanism and plainisation of the aboriginal culture, the threat of a complete cultural loss made a group of young intellectuals create the Alliance of Taiwan Aborigines (ATA) in 1984. This was in itself a remarkable event as until 1987 the Kuomintang regime in Taiwan had imposed martial law that did not allow for any kind of opposition (it was considered a war crime). Although martial law was lifted in 1987, lots of restrictions in the mountain areas inhabited by the aborigines are being maintained. In 1984 it was also publicly announced that the indigenous people wanted to be called aborigines instead of the official designation of compatriots from the mountains. They also wanted to recover their ethnic names and identity instead of their Chinese names.

In 1989 the aborigines' movement started to add a new claim: give back the land which had been put under government administration. But most of the land that was occupied by the aborigines was turned into four national parks. Little progress has been made in this respect as most of the land falls under the jurisdiction of the Forestry Commission or the Ministry of Defense. Other issues in the discourse are their place in the history of the country in which they only feature as head-hunters, the storage of nuclear waste on one of the small islands off the coast (Lan-yu), and child prostitution. In 1991 the ATA linked up with the international indigenous peoples' movement by participating in the discussions on the universal declaration of rights of indigenous peoples in Geneva. By now they have also linkages with some of the international indigenous peoples' networks in Asia and the Pacific such as the Asian Indigenous Peoples' Pact (AIPP) and the Pacific-Asia Council of Indigenous Peoples (PACIP).

In recent years they have had some degree of success. In 1994 the official designation of compatriots from the mountains has been replaced by aborigine or native. They have also regained the right to carry their native names instead of Chinese names. In 1997 the Council of Aboriginal Affairs was created and aborigines have obtained seats in all kinds of administrative assemblies and councils. Special development plans have been designed for the aboriginal economy. Training in ethnic languages has been introduced in many schools.

Hanism (changing into a Chinese) was a process of total absorption. Anybody who was not a Chinese was by definition "a raw barbarian who had to be cooked" (Cauquelin 2004). At present there seems to be growing a new kind of recognition for the aborigines in Taiwan, who in contrast with the position in many other Southeast Asian countries have been able to participate more actively in the fruits of the development processes. The aboriginal culture has also become an interesting element in the relation with mainland China, as it really differentiates Taiwan from the mainland. In the words of Eades: "the aboriginal culture has been appropriated as a national icon in the island's future and its relations with the regime on the mainland" (2003: p. 247). In recent years the colorful, folkloristic aspects of Taiwanese aboriginal culture have also become an important element in the promotion of what is truly Taiwanese in the world of commerce. The tourist aboriginal villages are just one expression of this tendency. At the academic level there is a strong interest in the aborigines of the country. There are quite a number of anthropologists, many of whom are of aboriginal descent, doing historical research among them. This intellectual interest is certainly part of the general movement.

In relation to environmental management the aborigines play an insignificant role. As stated above most of the land that they traditionally occupied has been taken over by

the Chinese and has been converted into intensively used agricultural land. Those who have fled to the mountains have to a large extent sold their agricultural land to Chinese once the area had become more accessible or their land was turned into nationals parks. There remains little land that can actually be managed. Claims on traditional lands are unlikely to be successful in the years to come. As a result of the economic prosperity of the country, and the complex diplomatic status of Taiwan in the international world, there is very little external influence on the situation of the indigenous peoples through the international organizations and discourses.

CONCLUSION

The differences between the definitions and discourses with respect to the position of indigenous peoples in Indonesia, Malaysia and Taiwan in comparison with the Philippines are enormous. At the national level there is very little that the countries have in common. There are big differences in the relative size of the indigenous communities. It is also clear that the concept itself is heavily loaded with political meaning. It certainly does not primarily refer to historical events or anthropological insights. While in the Philippines the successful resistance of the indigenous people towards the colonial powers and the injustice done to the indigenous peoples in the recent past are important considerations in the present granting of rights to them, Malaysia and Indonesia take a totally different look at the historical events and operate with very different time horizons. In these countries tribal people are lacking behind in the development process and should be incorporated as soon as possible. There is also a rather different attitude with regard to the religion of the tribal people. In Malaysia, Islam is a dominant element in the incorporation process. In Indonesia, the situation varies widely depending in the provincial context: in some provinces Islam is dominant, while in others Protestantism or Catholicism are realistic options if people are forced to choose. In a few cases even Hinduism turns out to be an alternative. In the Philippines, religion seems largely absent as a crucial element in the development of indigenous peoples. There is less formal pressure to give up local religions in favor of other alternatives even though many missionary organizations are active among the indigenous peoples. In Taiwan, Hanism seems to be the dominant assimilation force changing the life style of the country's indigenous peoples

With these kinds of differences in mind it is not difficult to imagine that the issue of indigenous peoples is not regularly put on the agenda during political meetings. Within the context of the Association of Southeast Asian Nations (ASEAN) for instance, it is hardly ever discussed. This issue is considered to be a domestic affair in which other countries' interference in not being appreciated. This is of course based on the awareness of the controversial nature of the issue not only with regard to the countries dealt with in this paper but also because of the situation in the other ASEAN member states. At the level of bilateral relations there has been occasional irritation, for instance when the Indonesia government requested the Philippines to withhold permission to the University of the Philippines to hold a meeting to discuss human rights issues related to East Timor. Indonesia and Malaysia continue to be absent from formal discussions about the declarations on indigenous peoples. It is not likely that this will change in the near future. Malaysia is unlikely to change its position on the status of the Malay people as the

indigenous people of the country. The Philippines have gone far with respect to the granting of rights but is now facing problems of implementation and finding the balance between the various legal domains, like individual rights versus collective rights and the hierarchy between conflicting rights issued in different points in time. Because of its economic position, its political structure, its more outspoken position in the international world, and its smaller dependence on funding from international bodies, Malaysia is less likely to be affected by the international discourses than Indonesia and the Philippines.

The position of Indonesia is uncertain at the moment. Though it sticks officially to the idea that all Indonesians are indigenous, there are indications that things are changing slowly. Increased regional autonomy, and new waves of democratization under which ethnic identity might become a powerful factor. In this process the claim to be recognized as being indigenous might become more and more powerful because of the international discourses. The declarations and policy statements by multilateral organizations like the World Bank, ADB, the EU and many individual donor countries and the possibilities offered for instance by the CBD (article 8j in particular) are increasingly being used to support claims to land rights, to self determination or at least to be accepted as a full partner in the discussion. It is also interesting to see that in the recent literature on community-based natural resource management by indigenous peoples, examples from the Philippines take a prominent position. This may also be of influence for Indonesia now it is gradually moving towards a new paradigm in natural resource management, for instance in its new Forestry Law, by allowing for more involvement of local communities for which *adat* communities (tribal people) could also classify. In some cases legal adjustments may follow actual practices in the field. In Indonesia it would certainly need an adjustment also in the bureaucratic institutions dealing with these peoples. The situation in Taiwan is most likely to remain as it has been in the recent past. With the overwhelming Chinese majority in the country the high level of population density and the designation of the forested areas as national parks, the aspirations for reclaiming land rights in the future are unlikely to be fulfilled.

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CHAPTER THIRTY-ONE

TOWARDS UNDERSTANDING THE ROLE OF INDIGENOUS PEOPLES IN THE PHILIPPINES: A SYNTHESIS

Tessa Minter, Padmapani L. Perez and Gerard Persoon

INTRODUCTION

The participants in our panel were social scientists from Mindanao, Palawan, the Cordilleras, and the Sierra Madre. We came together to address a series of questions: How are indigenous peoples affected by the implementation of environmental laws and policies? More specifically, how have indigenous peoples' lives changed since the enactment of the National Integrated Protected Areas System (NIPAS) Act and the Indigenous Peoples' Rights Act (IPRA)? How is sustainable environmental development being pursued among indigenous peoples? What are the changes that are taking place in the environment, and among people, where development programs and conservation projects are being implemented? We wanted to look back at what has been done since various areas have been protected, and since indigenous rights have been recognized. We also attempted to look forward to what may be next.

In looking back we all agreed that the Philippines is ahead in Southeast Asia in terms of the strengthening of indigenous identities and the recognition of indigenous rights. Furthermore, the protected areas in the Philippines are not oppressive towards local people, as they are in other parts of the world.

The conclusions (relevant not only in the Sierra Madre, but also in Mindanao, Palawan, the Cordillera, and other Southeast Asian countries) that came up during the panel's discussions revolved around two topics: (1) conclusions in relation to the links between indigenous peoples, nature conservation and development, and (2) conclusions in relation to the design and implementation of projects and policies involving indigenous peoples.

CONCLUSIONS IN RELATION TO THE LINKS BETWEEN INDIGENOUS PEOPLES' RIGHTS, CONSERVATION AND DEVELOPMENT

IPRA and NIPAS and other government and non-government programs assume that indigenous peoples are natural environmentalists. Sustainable resource use does exist among indigenous communities, but it exists alongside unsustainable resource use practices. Therefore, the benefits of indigenous resource use and belief systems for environmental protection have to be determined, not simply assumed.

Some examples show that the value of nature in itself is effective for encouraging people to conserve the environment. Motivating people to protect the environment through a sense of pride or even love may work, even if it is not based on material gain.

We have generally failed to make it obvious to local communities that environmental protection sustains livelihoods in the long term. Although, community

members are generally aware of this, the need for livelihood is given as an apology for allowing environmental degradation. This widespread practice of humanizing the law benefits a select few, with disastrous results for the rural majority.

There are cases which seem to be successful in combining indigenous peoples' welfare with environmental sustainability. The elements that make these cases work are: (1) strong partnerships with communities on the ground and local government units, (2) long-term relationships between development agents and local people, (3) creative ideas, (4) education, and (5) effective tapping of existing social structures.

CONCLUSIONS IN RELATION TO THE DESIGN AND IMPLEMENTATION OF PROJECTS AND POLICIES INVOLVING INDIGENOUS PEOPLES

Despite all the rhetoric about our indigenous brothers and sisters that is written on paper and echoes through speeches held at public venues, indigenous groups still are discriminated and disrespected. Racist and paternalistic attitudes are present in schools, government offices at local and regional levels, and in NGOs working in the field of environment and development.

There is a need for more face-to-face encounters between indigenous peoples and project implementers in indigenous peoples' own settlements. The remote locations and assumed mobility of indigenous peoples are not necessarily an obstacle to such face-to-face encounters. Aversion to do fieldwork usually is the main obstacle.

There is an urgent need to strengthen indigenous peoples' capacities and practical skills in order for them to participate in trade relations on equal footing.

Rather than viewing and treating indigenous peoples as being weak, helpless victims of society which depend on outside assistance for their development, indigenous peoples (in fact, all local people) will benefit from an approach which emphasizes and feeds their strengths and capabilities. What are indigenous peoples' own aspirations for their future? What is already in store within indigenous communities? We can build on those elements, rather than impose alien forms of social organization, settlement patterns and livelihood strategies.

Government and non-government programs tend to have relatively short cycles of operation. Local communities and partner-agencies need to be prepared for projects' phase out in order to ensure continuity and sustainability. It may prove useful to have contingency plans prepared in case of early project pull-out.

In mobilizing indigenous peoples for advocacy and involving them in wider political venues, such as a Protected Area Management Board (PAMB), genuine, democratic and gender-sensitive representation should be ensured. Furthermore, we need to facilitate the spread of capacities gained by indigenous peoples' representatives to all sectors of their society.

A stronger implementation of the IPRA can be gained through improved information and education campaigns, capacity-building within the National Commission on Indigenous Peoples (NCIP), and better coordination between and within government agencies and NGOs.

The IPRA, the Certificate of Ancestral Domain Title (CADT) system and other development programs cannot be expected to be a quick fix for the power imbalances

underlying the great poverty indigenous peoples live in. Appropriate action is needed to address these problems.

IN CLOSING…

As social scientists we have not always succeeded in making our research results accessible to the public. In this light, the members of our panel wish to express our willingness to contribute to the enrichment of policy-formulation and implementation. What we have to offer is detailed knowledge of the daily realities of indigenous peoples, environmental conservation, and development. However, researchers should not stop there. Our research agendas need to be fed with concerns coming from policy-makers and implementers, in order for our studies to be of direct relevance to conservation and development.

PANEL THREE

THE FUTURE OF PHILIPPINE FORESTRY EDUCATION: ISSUES AND CHALLENGES

Edmundo C. Gumpal, Jouel B. Taggueg and Eileen C. Bernardo

CHAPTER THIRTY-TWO

ENHANCING AND SUSTAINING THE QUALITY OF HIGHER EDUCATION: THE CASE OF THE BACHELOR OF SCIENCE IN FORESTRY PROGRAM AT THE COLLEGE OF FORESTRY AND ENVIRONMENTAL MANAGEMENT OF ISABELA STATE UNIVERSITY

Edmundo C. Gumpal

ABSTRACT

There is great debate among modern educators as to whether the recognized global environmental crisis is a result of modern education or the lack of it. In the Philippines, modern educators have known for quite some time that the quality of Philippine education has been deteriorating. Inspired by this idea, this paper was conceived as a modest attempt to present the empirical situation of contemporary Philippine forestry education.

Using the Isabela State University (ISU) College of Forestry and Environmental Management (CFEM) as a typical case, the recurrent theme of discussion in the paper revolves around the issue of quality and sustainability of the Bachelor of Science in Forestry (BSF) program. CFEM is a higher education institution granted as one of the four centers of excellence (COE) in forestry education in the Philippines by the Commission of Higher Education (CHED), the highest authority on tertiary level education in the country. Initially, the paper provides a glimpse of the obtaining situation and describes and analyzes the highly relevant issues and concerns facing the institution in the light of the increasing challenges in the forestry and environmental sectors.

As the university is at the front door of the Northern Sierra Madre Natural Park (NSMNP), the largest contiguous block of primary forests in the Philippines, the paper also proposes to foster elaborate cooperation in the areas of forestry and environmental education for the sustainable management of forests and other natural resources and for sustaining biodiversity conservation through academic and institutional development programs, research and extension.

Addressing and consequently solving the environmental crisis in the country through enhanced and sustained forestry and environmental education is, however, a relatively long-term process and the sharing of experiences and expertise among regional, national and international collaborators is simply the first bold step towards that direction.

INTRODUCTION

Rationale

The objectives of forestry education are (1) the promotion of knowledge in forestry and the environment, (2) the search for new knowledge through research, and (3) the promotion of scientific knowledge in the sustainable management, conservation and utilization of forest and environmental resources. In meeting these ends, forestry

academic institutions provide training to students to become professional foresters and technicians.

Traditional forestry education has been tied down to timber exploitation with little emphasis on environmental management considerations. Today, with the paradigm shift in forestry from timber exploitation to sustainable forest management and the shift in environmental science from issues on deforestation, air pollution, erosion and water pollution, pesticide use, and hazardous wastes to habitat loss, carbon sequestration and biodiversity conservation, forestry education has to shift gears. This not only brings about new policies and programs but also new knowledge, skills, attitudes and values that are needed to successfully translate these new policies and programs into reality. It is in view of this situation that forestry education has to be enhanced and sustained.

Background

Forestry education in the Philippines started in 1910 with the establishment of the Department of Forestry in the College of Agriculture at the University of the Philippines at Los Baños (UPLB) in Laguna. The department was purposely created to address the need for adequately well-trained manpower in forestry to serve the need of the then Bureau of Forestry. The department had grown to expand its services in forestry manpower training and became a full-blown college in 1954. Today, the college has expanded its curricular offerings both in the undergraduate and graduate levels and is named the College of Forestry and Natural Resources (CFNR).

The proliferation of forestry schools and colleges in the Philippines started in the mid 1950s. Today, there are more than fifty forestry academic institutions offering various degree programs in forestry and natural resources management. CFEM is among these forestry academic institutions.

The College of Forestry and Environmental Management

As one among the premier forestry educational institutions in the Philippines, CFEM officially started as early as 1968 when the School of Forestry of the then Cagayan Valley Institute of Technology (CVIT) offered the BSF and the Forest Ranger Certificate (FRC) academic programs basically to cater to the needs for foresters and forest rangers in Region 02. Upholding the tradition of quality forestry education, the school has grown into a college in 1978 when the ISU system was created by virtue of Presidential Decree 1434. In implementing the decree, six former higher education campuses in Isabela were merged into the ISU system. Two of these campuses, namely, CVIT at Cabagan and the Isabela State College of Agriculture (ISCA) at Echague were both offering the BSF and the FRC academic programs by then. As a form of rationalization of forestry education in the university system, the School of Forestry at the former CVIT and the Department of Forestry at former ISCA were merged into the College of Forestry. By implementing the rationalization process to optimize the use of manpower, equipment and financial resources in the university system, the Cabagan campus of the university was identified as the seat of forestry education and the forestry course offerings at ISU Echague campus were gradually phased-out resulting in the integration of the latter's manpower and other resources of the two campuses. The university policy of rationalization had strengthened

the College of Forestry in terms of faculty and facilities; and in 1985, it began to offer a graduate program in forestry to cater to the needs of the region for advanced degree programs in forestry.

With the advent of environmentalism in the early 1980s, the College of Forestry and Leiden University in the Netherlands established the Cagayan Valley Program on Environment and Development (CVPED) in 1989. The program, whose primary function is to conduct joint research related to environmental problems in Region 02, provided impetus to the college to branch out into other fields such as environmental science. In response to the demands of the time, the college had revised its BSF and the Master of Forestry curricula was prepared and implemented. In view of this development, the former Environmental and Land-Use Planning Department of the college was renamed into the Department of Environmental Science and Management (DESAM) to spearhead the research and education on environmental issues. This finally led to the renaming of the College of Forestry into CFEM. A new academic program was created in 1994: the Master of Science in Environmental Studies (MSES). After the college's participation in a series of conferences, seminars, workshops and meetings sponsored by the Environmental Education Network of the Philippines (EENP) where ISU is an active member, the Bachelor in Environmental Science (BSES) curricular program was developed and CFEM was one of the three tertiary level institutions in the Philippines that pioneered in the offering of BSES in the school year 1996-1997. CFEM established itself as the center for environmental concerns in the region and is now acknowledged as one of the leading centers for environmental education in the Philippines. In 1996, through the facilitation of CVPED and the support of Plan International, the Environmental Information Center (EIC) was created as the regional center for environmental information.

The financial assistance provided by CHED to CFEM under the COE grant that started in 2002 has significantly contributed to the overall development of the college to sustain its status as COE in forestry education.

In the early 1990s, the Technical Panel in Agricultural Education (TPAE), a committee under the CHED made a recommendation in the master plan for forestry development on the number and structure of forestry schools in the country. The panel recommended that there should at least be one national college of forestry and one forestry college in each of the regions, except in the National Capital Region. As envisaged, the national forestry college will concentrate on curricular modeling at the baccalaureate level and offer post-graduate degrees. Tasked to undertake basic and applied research, the national forestry college shall assist the government in forestry planning and policy formulation and shall develop linkages both in the national and international levels. The regional colleges, on the other hand, shall concentrate in the offering of the baccalaureate degree as well as at the technician level and in exceptional cases also offer the master degree program. The regional colleges are also tasked to undertake researches to address regional needs and shall assist the government as well as the private sector in matters related to forestry. The regional colleges shall link with the national forestry college.

In pursuit of the above plan and after satisfactorily complying with the minimum standards set by CHED, CFEM was then identified as a regional forestry college and subsequently granted as COE in forestry education in the Philippines in early 2002.

Typical of any higher public educational institution, however, CFEM has been beset with serious problems. These include dwindling student population, very low passing rates in the forester licensure examination and unemployment and/or underemployment of graduates.

Objectives of the paper

This paper has been conceived as an attempt to present empirical situations in contemporary Philippine education. Its recurring theme has generally been anchored on two contemplating issues: (1) the quality and (2) the sustainability of forestry education. Initially, the paper provides a glimpse of the obtaining situations in many forestry colleges by describing and analyzing relevant issues, concerns and problems besetting the institutions in the light of the many challenges facing the forestry and environment sectors.

The paper also proposes to foster more elaborate cooperation in the areas of forestry and environmental education and to share experiences and expertise among national and international institutions to improve obtaining situations.

ISSUES AND CHALLENGES IN FORESTRY EDUCATION

It is a general perception among forestry academicians, researchers and other professionals that the issues, problems and concerns in forestry education in the Philippines are common to all other forestry educational institutions in the country, with the exception of the CFNR and a few forestry colleges/schools in southern Philippines. These issues, problems and concerns are related but not limited to the following: (1) dwindling student population, (2) relatively poor quality of students, (3) undeveloped faculty and staff, (4) low commitment to teaching by the faculty, (5) low passing rate in the forester licensure examination, (6) unemployment of graduates, and (7) relative higher cost of education.

Dwindling student population

Over the years, there has been a considerable decrease in enrollments and graduations in many forestry schools and colleges in the Philippines. In the FAO study on forestry education in Sub-Saharan Africa and Southeast Asia (2005) it was reported that in the Philippines, the two year certificate graduations showed decreasing trends. It decreased sharply between 1993 and 2002: from an average of 188 per year during 1993 to 1997 to 113 during 1998 to 2002 periods. For the professional level, the output of graduates over this ten year period was fairly stable, in average of 262 per year. In terms of enrollment, both the certificate and degree levels had decreased for the same period. The same trends were observed for the postgraduate levels.

The general decrease in enrollment and graduation has been affected by many factors. This includes: (1) limited job opportunities for graduates, which is attributed to the very tight financial difficulties on the part of the government (employment in forestry has been strongly dominated by the public sector), (2) the general apathy of students to the forestry profession, (3) the proliferation of many non-technical courses in many

schools and colleges (especially, information technology and other computer-related courses, hotel and restaurant management, nursing, teacher education, criminology and many others). The generally low number and passing rates in the forester licensure examinations and the unstable employment opportunities for forestry graduates over the years have also become one of the reasons why students prefer to take other courses.

Number and quality of forestry schools

In 1989, the total number of forestry schools in the country was only thirty-seven. The present number has been estimated to have ballooned to sixty. Unfortunately, many of these forestry schools and colleges have not been able to develop a strong faculty. They also fail to develop and implement standards curricula to keep in stride with the developments in forestry science and technology. They use ineffective and inefficient instructional processes and methodologies. There are inadequate learning opportunities for students, inadequate laboratory equipment and facilities, and inadequate or poorly equipped libraries all lead to poor performance in the forester licensure examinations.

Poor quality of students

There has been a general consensus among many forestry professionals that most students taking up forestry do so as a last resort. After graduation in high school, the more qualified students would prefer to take up the white collar professions (engineering, medicine and related fields, hotel and restaurant management, information technology and many other related courses). It has been a common observation among the forestry schools that many of these students taking forestry have poor study habits, they are passive and they have poor written communication skills as manifested by their reports and research work outputs.

Undeveloped faculty and staff

The issues that are commonly raised during meetings and workshops of forestry academic institutions include the academic preparation of the faculty members teaching forestry subjects. While higher education by the faculty has been pursued, some faculty programs have not verticalized their programs. By verticalization it is meant that the higher degree programs pursued by the faculty are anchored on their BSF degree programs. Faculty members teaching forestry degree programs should have appropriate degrees and highly qualified to teach in terms of their academic preparations and professional competence. In addition, the faculty and staff should be encouraged to attend national and international scientific and professional meetings, seminars and conferences.

Commitment to teaching

There is felt need for a much deeper commitment to teaching by some faculty members. Commitment does not only mean coming to school on time but how the faculty has been able to prepare for his daily activities of teaching to include the formulation and development of his course syllabi including their revisions by incorporating new trends

and developments in the profession, teaching delivery and appropriate testing for students.

With the advent of the national and international mobilization of resources for development projects especially in the uplands, the involvement and active participation of the more demanded and demanding faculty members in the guise of resource generation and capability recognition of institutions in various (supposedly short-term but often times prolonged) consultancy services have also become a culprit in the declining quality of forestry education. It is very unfortunate that CFEM has not been spared of this reality.

Low passing rate in the forester licensure examinations

Over the years, a closer look at the results of the forester licensure examinations indicates a dismal showing. This only confirms the observations of the TPAE of the CHED that most of the forestry schools and colleges in the Philippines are generally weak and ineffective.

Despite the prestigious awards of recognition of CFEM as one of the four COE in forestry education in the Philippines, and its accreditation as level two by the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACUPP), the institution has also been beset with the dismal performance of ISU graduates in the forester licensure examination given by the board of foresters over the years. Unfortunately, the average passing rate of ISU examinees in the recent years is generally below the national average passing rate. This reality has seemingly painted an unfavorable picture of CFEM in the forestry education sector.

Unemployment or underemployment of graduates

There has been a considerable increase in the unemployment rates of forestry professionals or graduates over the years. In many cases, forestry graduates are employed in jobs that are outside their competence as forestry professionals or graduates. The promise of employment over the years has ceased to materialize. Many claim that employment in the various sectors of the profession is generally anchored on the simple play of politics. In addition, if forestry professionals are being absorbed in these sectors, their work tenure status has become very shaky because of the very tight fiscal realities.

Relatively higher costs of quality forestry education

The costs of forestry education are relatively higher when compared to other academic programs. The very dynamic nature of forestry and the scope of forestry-related activities have been increasing as foresters face an array of new professional challenges. The paradigm shift from traditional forestry to sustainable forest management, biodiversity conservation, environmental impact assessment, community-based forest management, social forestry, agroforestry and poverty alleviation in the uplands, has made forestry education even more expensive.

Quality forestry education demands quality instruction that requires quality faculty and staff, quality laboratory equipment and physical facilities, quality library and

quality support services as well. With the increasing mobilization of resources for development projects in the uplands by national and international bodies, quality foresters has also become very demanding and many of these foresters are in the forestry education sector. This situation has had great impacts on the delivery of quality teaching services in the academic sector.

ENHANCING AND SUSTAINING THE QUALITY OF FORESTRY EDUCATION

Like any other organization, forestry educational institutions have four major elements: (1) program aspirations and identification of needs, (2) program inputs and activities, (3) program results, and (4) program monitoring and evaluation.

Academic program aspirations and identification of needs

Comparable with any development oriented institutions, the development of academic programs of higher education institutions emanate from the higher education institutions' aspirations, vision and mission, guiding principles and policies, current state of affairs and goals and objectives.

Aspirations, vision and mission, guiding principles and policies and goals and objectives specify what the academic institutions want of their academic programs. For many academic institutions like CFEM, such aspirations may include a sustainable level of student population, higher number of passing and rates in the forester licensure examinations and gainful employment of graduates.

The current state of affairs reflects the current situation of the academic institutions in terms of the various factors that affect it and how the institution can satisfy the needs of the program. However, the institutions' aspirations and needs are vertically integrated and they range from the institution's dreams and ambitions. Improving the quality of their graduates, the faculty, the curricula and instructional modalities, student services, research, extension and community involvement, library and other facilities, laboratories, etc. are examples institutional dreams and ambitions.

Based on the goals and objectives (guided by some institutional principles and policies, current state of the academic institutions, current and expected academic requirements and availability of financial resources) specific academic programs and activities are quantified and determined.

Academic program inputs

Academic program inputs consist of the manpower and the other resources that are needed for the purpose of attaining the academic program objectives while academic program activities are actions undertaken in order to execute and implement the academic plans.

The overriding view on the directions for enhancing and sustaining the quality of forestry education is basically anchored on quality assurance; more specifically referred to as accreditation in the Philippines. Accreditation is generally perceived as a system of evaluation to improve the quality of education and it focuses on the assessment of programs by external accrediting bodies.

Over the years since the late 1980s, the AACCUP, an independent, autonomous body, duly organized in accordance with law and registered under the Securities and Exchange Commission (SEC), has developed an accreditation process to formally recognize an educational program as possessing certain standards of quality or excellence based on an analysis of the merits of its educational operation in relation to its objectives.

Academic program results

The results of the academic program can be classified into three major categories: (1) program outputs, (2) program effects, and (3) program impacts. Program outputs are the physical outcomes produced by the program and measurements of services provided (e.g. the total number of students graduated). Program effects are the direct and immediate consequences of the program such as number of passers in the forester licensure examinations. Program impacts are the changes in the environment as may be brought about by the program such as the attainment of the broad goals of social equity, sustainable forest productivity, ecological stability and integrity of the communities where the graduates are being employed.

Program monitoring and evaluation

Program monitoring and evaluation deals with the examination of the various program components or elements to determine, as objectively as possible, the relevance, efficiency and effectiveness of the BSF academic program in the context of the program objectives.

External environment

As in the case of other development programs, forestry academic programs do not operate in a vacuum. They are not limited to the academic environment, or to the political and administrative factors, instead they combine these and seek to influence them.

The external environment enhances and sustains the quality of forestry education. Among the very notable processes in forestry education is the continued evolvement of forestry colleges and schools over time, which is generally a reflection of the political and institutional climates of different times. It is believed that the proliferation of many undeveloped forestry educational institutions in the country today is the result of political ambitions. The opening of an academic program is used as a vehicle for winning the votes of many people during elections.

Another issue on the environment of forestry academic institutions (also a reflection of the political climate) is the case of banning logging operations throughout the country brought about by the successive typhoons (Unding, Winnie and Yoyong) that caused destruction and deaths in Aurora and Quezon Provinces in December 2004. The greatest impacts of the logging ban are the foreign exchange outflow to purchase timber and processed wood imports to meet the growing domestic requirements, the direct costs of monitoring and enforcement by forest authorities, and the costs of generating alternative livelihood activities in view of employment displacement in the forestry sector. In effect, all these costs have something to do with the sustainability of the forestry education sector.

In the Philippines, the need to rationalize the opening of new academic programs in forestry has become an urgent concern of the government.

LAYING DOWN THE GROUNDWORKS FOR QUALITY FORESTRY EDUCATION

The AACCUP has developed an instrument to monitor and evaluate the effectiveness of academic programs, which included the items to be evaluated and the techniques of computing the summary of ratings. The instrument has the following major areas of evaluation: (1) vision, mission, goals and objectives, (2) faculty, (3) curriculum and instruction, (4) student services, (5) research, (6) extension and community involvement, (7) library, (8) physical plant facilities, (9) laboratories and shops, and (10) administration.

With slight improvements and/or modifications this instrument shall be used as the fundamental guide for developing and operationalizing some strategies to enhance and sustain the quality of higher education.

Vision, mission, goals and objectives

The vision, mission, goals and objectives of a college provide the fundamental basis upon which an academic program operates. It is the most fundamental area in all the ten areas in the AACCUP instrument for evaluating the performance of academic programs. Vision, mission, goals and objectives express the philosophy upon which the academic institution operates.

As a matter of policy, the institution should recognize the important roles of its graduates in nation-building and towards that end, it should promote the sustained development of its graduates whose competencies are internationally recognized and considered world-class brought about by regulatory measures, programs and activities that foster professional growth and development.

The traditional mode of funding for state colleges in the Philippines has been based on a negotiated funding scheme that was dictated by economic inflation factors. With the increasing number of the state institutions through the years and the inequities and inefficiencies in the allocation of limited state resources, the need to rationalize funding has become an urgent concern of the government.

Determined to implement some changes in the current scheme of funding of these state institutions, the CHED has recently proposed a mechanism that considers a link between funding and quality in higher education. Patterned after the United Kingdom funding council, the commission has currently devised the normative financing scheme as a means to rationalize funding of the universities and colleges.

One of the performance indicators of quality considered in the normative financing scheme is the performance of the graduates of higher education institutions in the various licensure examinations. Moreover, the performance of graduates in licensure examinations has always been given importance in any evaluation of a university or a college.

The focus on licensure examinations as performance indicators of higher education institutions is beyond question as this is an indication of the quality of education that the institutions are mandated to provide. It is, therefore, imperative that

graduates of academic programs with licensure examinations are required to take and pass the examinations.

Passing the licensure examination (much more: landing at the top-ten performing schools and/or the top-ten examinees in the licensure examinations) is, however, a relatively difficult and persevering task. The development of a lofty vision, mission, goals and objectives of an academic program such as the forestry program is simply the first bold step towards this direction.

Translating this vision into reality necessitates the provision of learning and other relevantly related opportunities for forestry students to enhance their preparedness to pass the licensure examinations to enable them become licensed and self-realized professionals.

Preparing for the forester licensure examination does not come overnight. It takes a very long term process: (1) the realignment of the curricular program with the syllabi of the licensure examinations, (2) the implementation of strict admission and retention policies, (3) the provision of highly qualified faculty and staff in terms of academic qualifications, experience and professional competence, (4) the provision of learning opportunities, implementation of appropriate classroom management activities, (5) the provision of the needed instructional materials to make instruction effective to enable students to achieve intended learning outcomes, (6) the development and implementation of programs and activities to enhance the personality development of the students to maximize their potentials, (7) the firm establishment of research and extension programs and activities for the generation and application of new knowledge and technologies generated, (8) the provision of adequate library facilities to assist the students and faculty alike in gaining of new knowledge and how to apply them, (9) the provision of adequate physical plant, facilities and laboratories to successfully implement the academic programs, and (10) the administrative support to initiate instructional processes.

Curricular program

The curriculum provides the basic framework and guidelines of what ideas, concepts, experiences, knowledge, skills, values and attitudes should be imparted to the students to prepare them for their professional work. The roles of professional foresters from traditional forestry (exploitation) to biodiversity conservation (where foresters function as development specialists, ecotourism specialists, environmental impact specialists, plantation experts, agroforestry specialist, natural resource experts, researchers and rural development specialists, among others) are rapidly changing. Entrepreneurship, leadership, a good understanding of the code of ethics for foresters, and curricular programs should be evolved and enriched to incorporate new and emerging trends in the forestry and related professions.

An evaluation of the existing curricular programs in forestry and environment education at CFEM point to the need to overhaul the curricular contents of the academic programs to address these changing demands of the times in terms of the competencies desired for the professions. Since the college has adequate faculty in its various fields of specialization, there is a need to redirect some of the faculty expertise through trainings.

In addition, faculty members have not been able to fully benefit from taking courses that provide pointers on how to teach effectively. For the benefit of the faculty

especially for the new teachers, short courses to orient them in the intricacies of teaching should be offered every summer before the start of classes for the succeeding school year.

It is for these reasons that curriculum development should be given the highest order of priority by the forestry academic institutions. The successful implementation of this development effort must be anchored on sound principles of collective responsibility and accountability. This means that the fundamental mechanism of implementation must coherently and cooperatively be facilitated by all sectors of the profession (government, non-government organizations, other forestry and environment academic institutions, civic and religious organizations, the upland farmers, business and industry). This is necessary since the usual piecemeal approach in dealing with the various institutions in the country often resulted in fragmented and inappropriate technical solutions to sustain curricular development efforts.

Faculty and students

The quality of forestry and environment graduates depends to a considerable degree on the quality of the faculty and staff. With the very fast pace in the development of forestry and environmental science and technology, the faculty and staff must have to keep abreast with these changes. The faculty has to pursue an unending search for new knowledge and recent developments in their respective fields of interest. They must not cease to learn in order to maintain their cutting edge in the global workplace.

Several human resources development programs must have to be pursued following the concept of verticalization of academic programs in the master, doctorate and postdoctorate degree levels, including short-term training programs. By verticalization, the higher degree programs to be pursued by the faculty should be anchored on their basic degree programs. This means that faculty members should not be allowed to pursue higher education outside their fields of specialization. In this way, faculty members are assured of more in-depth training and exposure in their own fields of specialization. In addition, the faculty and staff should be encouraged to attend national and international scientific and professional meetings, seminars and conferences.

Faculty exchange programs between academic institutions are among the new approaches towards successful development of academic institutions. Faculty members from other COE in forestry education in the Philippines should be invited to lecture on their major fields of expertise at CFEM. Likewise faculty members from the college should be allowed to lecture in their fields of expertise in other COE institutions when requested. In this way, concepts and ideas are fertilized to improve the delivery of academic, research and extension services among partner institutions. With the support of CHED, the college will be able to pursue its programs on faculty exchange starting school year 2005-2006.

Over the years, trends at CFEM have indicated that there has been a high rate of faculty turn-over in the college. To encourage faculty/staff members to stay put, the college should be able to develop and implement mechanisms to sustain the giving of incentives to outstanding and high performing faculty such as the continuous granting of the best teacher award, best researcher award, publication incentive awards, and subsidized paper presentation and conference attendance to national and international bodies.

With the financial support from CHED through the COE grant, the college has programmed several faculty award systems as form of incentives for good performance in its various academic, research and extension thrusts but the giving of these awards is limited for a period of only three years.

The relatively high costs of forestry and environment education in terms of competent faculty/staff and modern facilities and equipment necessitate the recruitment of equally capable and deserving students. While it has been recognized that high quality students are generally pursuing technical professions outside the region, the college should be able to attract high quality students through a vigorous student recruitment program by providing them with scholarships and other forms of assistance in pursuit of forestry as career programs. This is necessary to sustain the operation of the college since there has been serious problem of dwindling student population in the forestry academic program.

The faculty should also be able to devote time to train student leaders to assume leadership roles to help address the issues and concerns in the forestry and the environment sectors by organizing themselves into responsive groups or movements.

Above all, to elicit active involvement and participation of the faculty and students alike in the various activity areas, CFEM faculty and staff and students alike should be able to demonstrate high levels of professionalism and conduct anchored on the principles of equity, integrity, honesty, capability and loyalty in all aspects of their works and activities.

Physical facilities development

Physical facilities for instructional purposes such as classrooms and other training facilities, including laboratory equipment and other training media is generally lacking in most forestry and environment educational institutions. Most of the schools do not have the necessary fund allocations to acquire the needed facilities and equipment, including library holdings. As a result, the quality of instruction suffers to the detriment of the graduates. The development of facilities needs to be rationalized to enable the forestry institutions to provide high standards of education and training. One of the immediate measures to solve the problem of the general lack of facilities and equipment is to optimize facilities and equipment use and by sharing the use of available facilities with other colleges. Common equipment shall be made available to all colleges needing them.

CFEM has greatly benefited from its status as COE. Several millions of pesos have been allocated from the CHED grant for the development of its faculty, library holdings, laboratory equipment, computers and various facilities to improve delivery of services in instruction, research and extension.

Establishing networks and linkages

No academic institution can survive alone by itself in the global workplace. In carrying out their various academic, research and extension programs, forestry and environment academic institutions should be able to strongly coordinate and link with other government agencies and non-governmental organizations (NGOs).

In any government system, the fundamental function of the government is to serve the best interests of its people. The various forestry development activities should emanate and reflect the aspirations, guiding principles and policies, current state of affairs and long-term goals and objectives of the forestry sector. And in order for these objectives to be realized, sufficient inputs and other resources should have to be provided by the government and should be managed through an appropriate, sustainable, effective and efficient process. Forestry development activities are generally conceived as collaborative undertakings of various government agencies. Forestry academic institutions should cooperate in the development of the forestry sector.

Over the years, there have been changes in policies governing administration of forest resources. This has influenced the attitude and behavior of people towards forestry, particularly those in the forestry education sectors. Take a recent event: the successive typhoons (Unding, Winnie and Yoyong) that had caused many deaths and destruction in Aurora and Quezon Provinces. The government banned commercial logging in many natural forests in the country except for a few regions in Mindanao. Unwittingly, the decision to ban logging by the national government has great implications on the sustainability of the forestry profession by reducing the demand for foresters and consequently in forestry education, particularly the subsequent decline in enrollment in forestry academic programs.

As intermediary government organizations, the forestry business and the private sectors should mobilize resources through acquisition and distribution of material wealth and resources, search for innovative ideas and opportunities, organize business activities and initiate the business aspects of production, utilization and marketing of forestry goods and services. These innovative ideas should be translated into the rubrics of forestry education.

The 1990 Philippine master plan for forestry development has adopted a basic policy on NGOs participation in the development, conservation, management and protection of natural resources. These non-profit, voluntary organizations can serve as excellent partners of forestry educational institutions, especially in the areas of research and extension.

The primordial role of the society of Filipino foresters should be in providing moral and ethical standards of conduct and behavior among their members. Apart from this, the society should serve as vehicle for small-scale technology transfer and should coordinate with the forestry academic institutions specifically in devising curricular programs that would provide the guidelines on what ideas, concepts and experiences which are to be imparted to forestry students to prepare them for their professional work.

The media's role in forestry education should be the activation and strengthening of the public information system. Hence, the media should be backed up by a strong extension and communication support; not from the technical point of view but from a more holistic viewpoint. This is necessary to create public awareness and understanding of the various aspects of forestry as a profession and as practice.

The recently organized Philippine Forestry Education Network (PFEN) can provide a difference in educating the Filipino foresters. Organized in February 2005, PFEN has eighteen forestry educational institutions as members. Its missions are: (1) the promotion and maintenance of close working relationships among the member institutions and other national and international agencies engaged in forestry, (2) the

formulation of plans, policies and programs that will advance the welfare of the member institutions, (3) the implementation of collaborative undertakings such as research, extension and development projects, joint seminars and other related activities that will promote forestry education in the country, and (4) the exploration of ways by which member institutions can help one another and contribute more effectively to the socioeconomic improvement of the Filipino people (see Razal and Dolom this volume).

The international community can also build a network among institutions in the promotion of socioeconomic, sociocultural and biological research and information in forestry and translate this information into results relevant to sustainable management, development, utilization. In pursuit of this, natural and social scientists, in collaboration with forestry academic institutions, forestry research organizations, NGOs and forestry departments around the world should develop a network to exchange information.

Institutionalization of resource generation

With the gradual decrease of government subsidy to higher education institutions, there is a need to increase the income of the university to fund its various development programs. CFEM has to devise mechanisms to support itself through its involvement in production activities, including consultancy services.

RECOMMENDATIONS

Heavily drawn on the merits and the various areas of the AACCUP instrument, the following recommendations and strategies are worthy of consideration.

On dwindling student population

To address the issue of dwindling student population, the conduct of a massive enrollment campaign within the service area of the university is very indispensable. The campaign process may use a combination of the following strategies:

1. Production of campaign materials such as brochures, posters and multi-media presentations;
2. Visits by the faculty to high schools in the region;
3. Awareness programs for high school students through the conduct of poster contests and writing of poems and songs, etc.;
4. Offering of a three-day orientation on the importance of forests and forestry as a career, targeting high school students;
5. Offering scholarships to incoming students; and
6. Establishment of demonstration areas like mini-forests as eco-destinations for high school students.

On increasing the number and passing rate in the forester licensure examination

To increase the number and the passing rate in the forester licensure examination, the following recommendations and strategies are worthwhile considering:

1. As part of the yearly college orientation program, freshmen are given the objective of passing the forester licensure examination;
2. Provision of the checklist of topics in the approved syllabi for the forester licensure examination subjects to all students. Topics not discussed during regular classes but appearing in the checklist shall be brought to the attention of the faculty teaching the subject and to the chairmen/dean for inclusion as special topics in the succeeding academic term;
3. Requiring old students to make an inventory of what had been discussed during the conduct of regular classes and compare the same with the checklist;
4. Giving comprehensive examinations to each student at the end of the academic year. Students who failed the comprehensive examinations are required to take summer remedial classes;
5. The construction and administration of test items in the various regular examinations given to the students during their academic years shall be patterned after the licensure examination questions so that students get oriented with the type of tests given in the forester licensure examination;
6. Students are required to maintain a database of actual board examination questions/problems which they can refer to later on during the review;
7. Where appropriate, two refresher courses at the senior level of the academic year of the student shall be offered. The non-unit (special topic) courses may be added to the last two semester subjects of the students to deal with the forester licensure examinations in preparation for the review and the forester licensure examinations;
8. Giving of awards to students passing the forester licensure examinations;
9. Provide free review classes and other incentive systems for graduating students; and
10. Establishment of a review center as a distinct unit whose function is to produce graduates who shall become licensed professionals.

On employment of forestry graduates

1. Increasing the presence of foresters vis-à-vis non-forestry graduates both in private and public forestry employment agencies and NGOs by making them competent in forest protection and reforestation;
2. Bridging the gap between the number of foresters and the need of the forestry service by reverting the Forest Management Bureau (FMB) as a line rather than a staff bureau of the Department of Environment and Natural Resources (DENR); and
3. Strengthen the unification of forestry educational institutions through PFEN to promote the forestry education sector as an important stakeholder of the forestry profession.

On vision, mission, goals and objectives

1. Assessment of the old vision, mission, goals and objectives of CFEM and the BSF program and develop new ones;
2. Dissemination of the new vision, mission, goals and objectives to the various stakeholders of the profession such as students, faculty, administration, community, alumni and people from the industry; and
3. Documentation of the understanding and acceptability of the new vision, mission, goals and objectives;

On curriculum and instruction

1. Re-assessment of the curricular program contents to determine if the academic program meets the CHED, PRC and TPAE minimum standards;
2. Re-assessment the BSF curricular program if it reflects the national, regional and institutional goals and objectives;
3. Development of a new curricular program for the BSF program in view of the changing roles of foresters through the identification of the competencies for the profession underscoring the knowledge, skills, attitudes and values that the forester should possess;
4. Logical sequencing of subjects in the BSF curriculum underscoring pre-requisite subjects; and
5. Undertake or join activities to ensure quality in the planning, design and monitoring and review of the curricular program;

On instructional processes

1. Development of course syllabi for relatively new subjects and updating of the old syllabi through the incorporation of new trends and developments in the profession;
2. Provisions for allowing flexibility to accommodate revisions and adjustments to the syllabi while the course progresses;
3. Inclusion in the syllabi of the lists of suggested reading materials and references of recent editions;
4. Provision of copies of the syllabi to students;
5. Enrichment of classroom instruction through attendance to symposia, seminars, workshops and professional lectures, conduct of field trips and learning visits, peer teaching and cooperative learning, computer assisted instruction and computer assisted learning;
6. Provision of course requirements that would contribute to quality and independent study for students such as the use of group or individual projects or reports, term papers, learning contracts, research study, etc.;
7. Development and application of teaching strategies that would stimulate the development of the student's individual needs and intelligence;
8. Development of instructional materials through the utilization of varied, multi-sensory materials and computer programs;

9. Implementation of policies governing student attendance in the classroom; and
10. Enforcement and maintenance of classroom discipline in consonance with democratic processes.

On faculty and staff

1. Improvement of teaching methods through training; this should be made compulsory to all ISU-CFEM faculty members;
2. Realignment of some of the CHED-COE budget from faculty exchange to conduct activities to improve student enrollment and provide scholarships to students;
3. Invitation of lecturers from other COE colleges and other academic, research and professional institutions for both regular and review classes;
4. Need for a much deeper commitment to teaching of some members of the faculty and rewarding them with appropriate distinctions such as best teacher award, best researcher award, etc.;
5. Need to develop the faculty according to the competencies of the profession (verticalized higher degree programs);
6. Development and implementation of faculty exchange/visiting professors program; and
7. In compliance to the PRC Modernization Act of 2000, CFEM faculty members should be encouraged to take the forester licensure examinations.

On physical plant facilities and laboratories

1. Renovation/repair of the CFEM building (e.g., broken windows, leaking offices and laboratory rooms, replacement of vinyl flooring tiles with euro tiles, replacement of gutter ceilings, non-functional comfort rooms, ceiling fans, door knobs, provision for fire escapes, etc.)
2. Putting up of a centralized emergency alarm system and firefighting equipment;
3. Establishment of inter-office communication system;
4. Improvement of service facilities like the lounge area, reception and waiting areas;
5. Establishment of centralized storage room for tools, equipment and supplies and materials;
6. Establishment of a maintenance and repair unit to provide the desired services; and
7. Production of guidelines and posting on appropriate places on the proper use of equipment, tools and safety devices.

On administrative support

1. Conduct of awareness program about the BSF program and CFEM as COE in forestry education to build student morale and loyalty;
2. Offering of loans exclusively for CFEM students pursuing the BSF program;

3. Implementation of a mentoring system for CFEM students like the adopt-a-student program;
4. Strict admission and retention policies (e.g. grade requirement prior to admission to the BSF program, minimum acceptable grade as a condition for continuing the program);
5. Strict implementation of no failing grade in any board-related course/subject including the passing of qualifying examination;
6. Implementation of the rules on attendance of the faculty and students in the classroom through the signing of attendance sheets to be submitted to the department chairmen and the dean;
7. Provision of substitutes or special arrangements whenever faculty members are absent;
8. Serious implementation of periodic faculty performance evaluation in accordance with existing institutional policies;
9. Conduct of regular dialogues involving the administrative officials, faculty and students;
10. Recognition for outstanding achievements of both students and faculty;
11. Need for a comprehensive review of the BSF program in the light of the changing roles, trends and priorities underscoring the importance of judicious academic planning and implementation; and
12. Commitment to the highest academic standards.

On students

1. Development and implementation of a well-organized student personnel services program underscoring student welfare, growth and development such as housing, medical/dental, guidance, scholarships, student publications, etc.;
2. Provision of guidance programs to students that should include orientation for new freshmen and transferees, classroom and student body organizations and advisory committee, where appropriate; and
3. Implementation of incentives to good performing students in terms of tuition discounts, scholarships, etc.

On research and extension

1. Formulation of research and extension programs relevant to provincial (Isabela) and regional needs (Region 02) involving all stakeholders (faculty and staff, administrative officials, students, alumni, community, industry, non-government organizations, etc.);
2. Strengthen the link between instruction and research and development activities to make it more relevant to the needs of the people of Isabela;
3. Collaboration with various research and extension institutions locally and abroad; and
4. Research and extension activities should not only be conducted for publication purposes by the researchers/institutions but also for reaching and benefiting the

marginalized the communities. Research should make a difference in the lives of the people in the communities.

On resource generation

1. Need to increase the income of the university to help fund its various programs without much dependence on national appropriations; and
2. CFEM has to devise mechanisms to support itself through its involvement in worthwhile production activities, including cost benefit sharing of production projects and consultancy services.

On linkages

1. Link with other national and international bodies to possibly renew the contents, the styles and approaches towards forestry and nature conservation by combining the experiences in various countries with highly different types of resources, knowledge and skills and management styles through mutual learning; and
2. Development of new curricular offerings and corresponding support services (in terms of faculty development and training, equipment, laboratories, etc.) to address the above linkages.

On organizational culture and leadership

1. To elicit active involvement and participation of the faculty and students alike in the various activity areas, CFEM faculty and students alike should be able to demonstrate high levels of professionalism and conduct anchored on the principles of equity, integrity, honesty, capability and loyalty in all aspects of their works and activities.

CONCLUSION

If the BSF program at CFEM is to be substantially improved in 2005 and beyond, the program faculty and staff and administrative officials should develop a scheme that should consider the interrelationships among all the factors or variables that affect or are affected by the program. This requires a deeper understanding of the academic, political, administrative and managerial, economic and ideological factors that are crucial in the implementation of the academic program.

The usual piecemeal approach has been proven to be ineffective in dealing with most of the problems, issues and concerns affecting forestry academic institutions. The holistic approach, on the other hand, enables academic planners to formulate comprehensive rational decisions that would make the program more effective. However, while the latter approach has the greatest drawback against time, money and effort, its greatest advantage is its objectivity since implementing it requires a sound justification with these limitations.

The sharply declining enrollment and appreciation for the forestry profession amidst the environmental disasters and calamities that are linked to deforestation

(pointing the accusing fingers to the foresters) makes our remaining forests vulnerable to these disasters in the long term. How can we increase forestry enrollment if we accuse foresters for these environmental disasters and calamities?

There is a need to rationalize employment in both private and public forestry agencies. Employing non-foresters to do forestry-related works in the public forestry service is an insult to the forestry profession. How many students would still want to pursue a career in forestry if they end up jobless after graduation and/or after passing the forester licensure examinations?

Enhancing and sustaining the quality of forestry education at CFEM to its status as COE in forestry education in the Philippines was a long-term process. Rationalizing higher education in public higher education such as the BSF program is simply the first bold step towards that direction. We look forward to CFEM redeeming itself as one of the four COE in forestry education in the Philippines!

The granting of CFEM as COE should not impinge among students and high school graduates that forestry as a career in the college is a tough and a difficult program of study. Students and faculty members alike should hold on the principle that there is no substitute for quality and excellence and there is no excuse for ignorance and mediocrity.

Quo vadis forester? We need to rescue the sinking and vanishing academic program at CFEM and what we need are development interventions as well as directions and reforms to sustain its status as one of the premier forestry educational institutions in the country.

Producing highly competent foresters means integrating the scientific knowledge and skills with the right attitudes and values and the demands of various stakeholders (the forestry business and the private sectors, the society of Filipino foresters, the DENR, NGOs, etc.). This will spark a new beginning for the profession.

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CHAPTER THIRTY-THREE

DON MARIANO MARCOS MEMORIAL STATE UNIVERSITY: PERSPECTIVES AND CHALLENGES IN FORESTRY EDUCATION

Lilito D. Gavina

BRIEF HISTORY

In February 1986, the Don Mariano Marcos Memorial State University (DMMMSU) received an agroforestry complex, a grant-in-aid (*gratis et amore*) from the Japanese government through the Japan International Cooperation Agency (JICA). The complex is the main pillar of agroforestry education in the university. In April 1988, the technical panel for agricultural education through the DMMMSU-University of the Philippines Los Baños (UPLB) institutional assistance program upgraded and improved the agroforestry courses and faculty competencies in carrying out agroforestry instruction, research and extension. With the aim of rationalizing the curricular offerings of the university, the Bachelor of Science in Agroforestry (BSAF) program was further enhanced in 1997 with the transfer of the Bachelor of Science in Forestry (BSF) program from Rosario campus to Bacnotan campus. The department offers the BSAF and BSF curricular programs.

In April 2002 the Agroforestry and Forestry Department was converted into an Institute of Agroforestry and Watershed Management (IAWM). In April 2003, the program for strengthening the IAWM was launched under Asia-Link project in partnership with the University of Wales in the United Kingdom and the University of Cork in Ireland to enhance the capability of the institute, particularly its curricular program.

MISSION OF THE UNIVERSITY

To provide advanced instruction in the arts, agriculture, forestry, fisheries, engineering, and natural sciences as well as in technological and professional fields, to promote research, and engage in extension work (Presidential Decree 1778).

GOAL

To produce quality graduates in agroforestry, forestry and watershed management; generate information and develop relevant technologies; and promote their dissemination and adoption in response to the challenges of sustainable development.

OBJECTIVES

1. To provide quality education in agroforestry, forestry, and watershed management.
2. To conduct appropriate research in agroforestry, forestry and watershed management.
3. To package, disseminate and showcase matured technologies in agroforestry, forestry and watershed management.

PROGRAMS AND PROJECTS

Instruction

At present, the IAWM offers the BSAF and the BSF. Regular enrichment to both curricular programs is made to respond to the needs of the region in particular and the nation in general. In the near future, the IAWM will offer a Bachelor of Science in Watershed Management.

Research

The institute conducts research on nursery propagation techniques, intercropping, alley cropping, agroforestry systems, soil and water conservation and rehabilitation of denuded uplands and agroforestry product utilization. The IAWM works closely with the Center for Research in Agroforestry Development (CRAD) based at DMMMSU-NLUC, Bacnotan, La Union.

The institute maintains functional linkages with the following: the Department of Environment and Natural Resources (DENR) Region 01, the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), the Institute of Agroforestry (IAF) at UPLB, the Philippine Agroforestry Education, Research Network (PAFERN), the Southeast Asia Network for Agroforestry Education (SEANAFE), the World Agroforestry Center (ICRAF), the University of Wales, and the University of Cork.

Extension or community development service

The institute is involved in the extension program of the university on public education and information supportive to the goals of forest conservation, and effective use of agroforestry as a production technology. The IAWM is also involved in the La Union greening program, and the professor-in-a-barangay project (on-call-basis).

RESOURCES

The institute has thirteen core faculty members with diverse field of specializations and support staff. Faculty members from the Department of Agricultural Engineering, the Department of Agriculture (plant and animal science), the Department of Agribusiness Management, and the Department of Agriculture Teacher Education are tapped to handle subjects along their field of specializations that are required in the BSF and BSAF programs.

The institute is housed at the agroforestry complex. The complex is equipped with basic facilities in support to agroforestry and forestry instruction, research and extension. The major facilities of the complex include the following: (1) audio-visual room, (2) crop processing laboratory, (3) soil laboratory, (4) crop protection laboratory, (5) dendrology/ecology laboratory, (6) computer/statistical analysis laboratory, (7) drawing room/mini library, and (8) medical/dental clinic.

Other facilities/projects of the institute include the following: (1) handicraft workshop, (2) agroforestry research and demonstration farm, (3) agroforestry/forestry nursery, greenhouses, compost house, nursery shed, and mist-irrigation system, (4) vermi-compost project, (5) Bio-N project (mixing plant) co-managed with the Department of Agriculture.

The school fees of every student at DMMMSU are partially subsidized by the Philippine government. Financial assistance in the form of scholarships and grants are also available to deserving students.

ISSUES

The main issue confronting the offering of our BSF program is the low enrolment of incoming freshmen. This is attributed to the proliferation of more attractive courses like nursing and information technology.

To overcome this problem, the IAWM has further strengthened its information drive to various barangay high schools in Region 01. Another strategy to attract enrollees is the provision for scholarship grants to deserving students.

Another issue facing the BSF program is the accreditation process conducted by the Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACCUP). The Commission on Higher Education (CHED) has its own evaluation process based on minimum standards. AACCUP and CHED should come up with a common evaluation/accreditation process to maximize resources.

CHALLENGES

The interest of conserving watersheds in the country has been increasing over the last decades. Premised on the need to produce manpower with skills and knowledge to address the problems on watershed deterioration, DMMMSU has a pivotal role through IAWM to train and educate new generations of specialist equipped to meet the modern challenges. The Master of Science in Watershed Management is a timely degree offering.

The watershed management curriculum was developed using a participatory approach: various stakeholders were consulted and were involved in the development process. The stakeholders included alumni and prospective employees as well as farmers living in the watershed areas in Region 01 and the Cordillera Administrative Region.

The curriculum was developed jointly by faculty members of the IAWM at DMMMSU, and partners from the University of Wales and the University of Cork. This was made possible through the Asia-Link project entitled: strengthening the Institute of Agroforestry and Watershed Management at DMMMSU, Philippines. It was received financial support from the European Union.

The aim of the project is to strengthen the teaching, training and extension activities of IAWM. The main activities included the development of the Master of Science in Watershed Management and the enrichment of the BSAF with a major in watershed management. Teaching materials and production of training materials for rural extension in agroforestry and watershed management is also a component of the program. The methodologies used and materials developed will be tested and adopted by our European partners in their respective universities.

CHAPTER THIRTY-FOUR

THE PHILIPPINE FORESTRY EDUCATION NETWORK: TO MAKE A DIFFERENCE IN EDUCATING FILIPINO FORESTERS

Ramon A. Razal and Priscila C. Dolom

INTRODUCTION

Philippine forestry education seeks to promote knowledge in forestry, search for new knowledge through research, and promote the application of scientific forestry knowledge in the sustainable management, conservation and utilization of forest resources. Until the 1950s, only one forestry school in the Philippines existed: the then College of Forestry at the University of the Philippines in Los Baños (UPLB) established in 1910 in Laguna. As such, it is one of the oldest degree granting units of UPLB and is considered to be at the forefront of forestry instruction, research and extension. Through the years, the number of forestry schools in the Philippines increased, with a distribution in different locations throughout the country. As of 2003, eighty-five schools, colleges and/or universities offering baccalaureate courses in forestry have been reported.

The increasing interest among academic institutions to offer forestry education programs has led to the rapid proliferation of forestry schools in the country. However, there has been no strong links within and among schools and various organizations engaged in advancing forestry as a science and practice. Efforts to establish a formal coalition of forestry schools for better linkages and coordination of efforts towards strengthening forestry education, research and extension in the Philippines have come and gone, having been beset with the problem of sustainability and continuing interest by member institutions.

HISTORICAL BACKGROUND

On 24 January 1989, the Philippine Association of Forestry Colleges Incorporated (PAFCI) was formally organized and registered with the Securities and Exchange Commission (SEC) under registration no. 159274 as a non-stock corporation. PAFCI was formed by six member-institutions composed of (1) Mindanao State University (MSU) in Marawi City; (2) Isabela State University (ISU) in Cabagan, Isabela; (3) Central Mindanao University (CMU) in Maramag, Bukidnon; (4) Gregorio Araneta University Foundation (GAUF) in Malabon, Metro Manila; (5) Don Mariano Marcos Memorial State University (DMMMSU) in Bacnotan, La Union; and (6) UPLB. The principal office of the association was in UPLB. There was an effort to sustain its existence but for some reasons, the association became inactive since 1996.

Hence, the College of Forestry and Natural Resources (CFNR) of UPLB took the initiative in reviving the association. The first Philippine forestry deans' meeting at the CFNR was organized on 5 February 2004, for the following purposes:

1. To unify forestry education institutions in the Philippines.

2. To join efforts so that the forestry education sector can be recognized as an important stakeholder as far as forestry is concerned, and promote a strong representation in the national government regarding policy formulation affecting the forestry sector.
3. Institutionalize and share resources among forestry schools.
4. Rationalize forestry education in the country to address the problem of mushrooming forestry schools that, in turn, poses a big problem in the employment of forestry graduates.

The meeting was attended by seventeen participating forestry schools throughout the country represented by their deans, department chairs, directors and/or faculty members. During the meeting, the seventeen participating schools manifested their willingness to change the association's name. This is to facilitate its registration with the SEC since PAFCI had been inactive for nine years. The group agreed to form a new association: the Philippine Forestry Education Network (PFEN). The rationale behind the choice of the network's name was to focus on educational aspects of forestry and to collaborate with other organizations/groups in other areas like research and extension to facilitate the sharing of resources, and the conduct of research and extension programs/activities. A second reason was to address the problem of who will represent each school in the network because forestry educational institutions differ in their organizational set-up. There is great variation among universities with regard to the particular unit that offers forestry in their respective schools. Thus, it was agreed that the person to represent the school in the network should specifically come from the forestry department, the expertise of whom should be in forestry and allied fields.

In the subsequent follow-up meeting in July 2004, upon the appeal of the dean of the College of Forestry and Environmental Management (CFEM) of Isabela State University (ISU) who claimed to have not formally received the invitation to attend the February 2004 initial meeting, the group agreed to accept ISU as an incorporating member. This was in consideration of the fact that ISU was also one of the six original member schools of PAFCI.

THE PHILIPPINE FORESTRY EDUCATION NETWORK

PFEN is a conglomeration of forestry educational institutions in the Philippines. The network was registered on 13 October 2004, at the SEC as a non-stock and non-profit association under the laws of the Republic of the Philippines with registration no. CN 200415860. The term for which the association is to exist is fifty years from the date of the issuance of the certificate of incorporation. The principal office of the network is at CFNR.

VISION

PFEN's vision is to have an effective, dynamic, sustainable and participatory national network of forestry colleges, schools, or institutions committed to the advancement of forestry education in the Philippines.

MISSION

To strengthen and enhance the participation of Philippine forestry schools in the development of forestry education through:

1. Promotion and maintenance of close working relationships among the members and other national and international agencies engaged in forestry.
2. Mutual consultation and formulation of plans, policies and programs that will advance the welfare of the member institutions.
3. Implementation of collaborative undertakings such as research, extension and development projects, joint seminars and other related activities that will promote forestry education in the country.
4. Exploration of ways by which member institutions can help one another and contribute more effectively to the socioeconomic improvement of the Filipino people.

THE MEMBERS

The eighteen members of PFEN are in Luzon: (1) University of the Philippines Los Baños (UPLB), (2) Southern Luzon Polytechnic College (SLPC), (3) Occidental Mindoro National college (OMNC), (4) Nueva Vizcaya State University (NVSU), (5) Pampanga Agricultural College (PAC), (6) Don Mariano Marcos Memorial State University (DMMMSU), (7) Mariano Marcos State University (MMSU), (8) State Polytechnic College of Aborlan (SPC), (9) Benguet State University (BSU), (10) Ifugao State College of Agriculture and Forestry (ISCAF), (11) Mountain Province State Polytechnic College (MPSPC), (12) Kalinga-Apayao State College (KASC), (13) Apayao State College (ASC), and (14) Isabela State University (ISU). In the Visayas: (15) Leyte State University (LSU). And in Mindanao (16) Western Mindanao State University (WMSU), (17) Central Mindanao University (CMU), and (18) Mindanao State University (MSU)

TRUSTEES AND OFFICERS OF THE NETWORK

As prescribed by the SEC, there shall be seven trustees of the network. It was suggested that one of the trustees would be the contact person of PFEN to ensure continuity with regard to the management of the network. The following schools with their respective representatives were voted to be among the trustees of the network while officers were elected from among the members of the board of trustees following the SEC prescribed set of officers (table 1).

Table 1: trustees and officers of the Philippine Forestry Education Network

President	Dr. Ramon A. Razal (UPLB)
Vice President	Dr. Eduardo C. Gumpal (ISU)
Secretary	Prof. Marissa R. Parao (BSU)
Treasurer	Dr. Priscila C. Dolom (UPLB) PFEN contact person
Public relations officer	Dr. Yolina T. Castaneto (NVSU)
Auditor	Prof. Wilfredo C. Faller (SLPC)
Project manager	Prof. Danilo C. Mero (MSU)

All officers of the network shall hold office for two years until their successors are duly elected. The election of officers will be held during the general/regular meeting of the network in February of each year, except when otherwise agreed upon by the members.

PLANS AND PROGRAMS OF THE NETWORK

The following are the plans/programs were identified by the members of the network during its first meeting on 5 February 2004. The plans/programs are classified into short term and long term plans.

The short term plan: (1) preparation of a Philippine map showing the location of different forestry schools in the country; (2) drafting and ratification of the Constitution and by-laws of the Network; and (3) profile of faculty members of each school, including areas or field of specialization and involvement in research and extension activities.

The long term plan: (1) student exchange program (e.g. practicum or conduct of thesis); (2) upgrading of forestry education; (3) holding of yearly meeting to discuss issues affecting forestry; (4) continuous dissemination/publication of forestry information updates; (5) publication of a newsletter; (6) representation to the Philippine Regulation Commission (PRC) and other concerned bodies in the forestry sector; (7) standardization of forestry curriculum in consultation with PRC and the Commission on Higher Education (CHED); (8) website creation; and (9) database of member schools and their faculty members with corresponding expertise.

Aside from the identified plans/programs for PFEN, the members agreed that the network should also identify some income generating projects. Each school was encouraged to propose a program or project which will involve all other members/schools of the network. The following program/projects were identified as income-generating projects for PFEN: (1) seedling production; (2) bid for development projects; (3) capacity building (e.g. teachers' enhancement program/trainings, development of teaching guides/laboratory manuals, review class for foresters' board examination); (4) developing capacity for research in forestry; (5) forest terminologies in different dialects; (6) species-geographic areas identification; and (7) assessment of forestry education (e.g. performance of graduates in the forestry licensure examination, facilitate the transition from regulatory to service-oriented professionals).

WHAT THE PHILIPPINE FORESTRY EDUCATION NETWORK HAS DONE

The network is just more than one year old. During its short period of existence, PFEN made significant accomplishments, among which are the following:

1. Issued a petition requesting that BSF graduates less than twenty-one years old be allowed to take the licensure exam. As a result PRC is now allowing new BSF graduates to take the exam although the license would not be issued to those who pass unless they reach the age of twenty-one.
2. Formulated the network's articles of incorporation and by-laws;
3. Prepared an inter-institutional memorandum of agreement;
4. Passed a resolution for the reorganization of the PAFCI;
5. Laid-down the network's short and long-term plans and programs;
6. Made a profile of faculty members;
7. Made a map locating forestry schools in the country. The map is completed and is on display at CFNR;
8. Made a PFEN brochure;
9. Established close collaboration with the continuing professional education council for foresters through its chair, Dr. Monina Uriarte, who is also the chair of the board for foresters of the PRC;
10. Drafted a program proposal on enhancing the relevance of Philippine forestry schools through ethnoforestry knowledge centers, participatory training and community-based conservation programs;

Distribution of the maiden issue of the network newsletter: the PFEN trunkline.

MAJOR ISSUES AND CONCERNS

The following are the major issues and concerns faced by the network that needs immediate action.

Insufficient funding

At present, PFEN basically relies on the members' registration/membership fee and annual dues which are PhP. 1,000 and PhP. 500, respectively. This amount could hardly finance the activities of the network. For instance, PFEN can not hire full time staff to look after the day-to-day activities of the network. While the CFNR at UPLB has organized an ad-hoc committee that coordinates the concerns of PFEN, members of this committee have other priority activities in their respective offices. There is a need to look for sustainable source of financing for the network.

Need to expand network membership

Currently only 22 percent of the reported forestry schools are members of the network. At the same time, very few from the Visayas and Mindanao areas have joined the

network. To strengthen PFEN, it is necessary to encourage other forestry schools especially in the Visayas and Mindanao areas to join PFEN. This will lead to better representation of forestry schools and effectively facilitate implementation of the networks programs and activities.

How to sustain the participation of the members?

During the last meeting only eleven out of the eighteen members were able to attend. It seems that some institutions do not have enough funds to finance travel expenses of their representatives. If this trend will continue, PFEN might just become inactive, as happened with PAFCI.

SUMMARY

PFEN is a conglomeration of eighteen forestry education institutions in the Philippines. The network was formed on 5 February 2004 and registered on 13 October 2004 at the SEC as non-stock and non-profit association. Its organization is important to promote better linkages and coordination among forestry schools in terms of instruction, research and extension. It is also necessary for rationalizing forestry education in the country and to promote strong representation in the national government regarding policies affecting the forestry sector. In its one year of existence PFEN has achieved some accomplishments geared towards institutionalizing the network and laying the foundation for effective coordination and linkages among forestry schools. However, the network is faced with major issues and concerns which threaten its very existence. In view of this, PFEN has embarked on some activities that could generate funds for the network.

PANEL FOUR

MODELING LAND USE TRANSITIONS IN THE CAGAYAN VALLEY

Marino R. Romero and Jan van der Ploeg

CHAPTER THIRTY-FIVE

LAND USE PERSPECTIVES: LESSONS FROM THE LOCAL LEVEL

Marco G.A. Huigen

The things I will talk about are not new. Stronger, most of it is common knowledge and you will probably know more about it than I do, but still I think I need to do this, because (1) it might reinforce some thoughts on processes which I consider to be crucial for the regional development, and (2) the scientific approach might add an extra, helpful dimension to the issues involved.

The scientific approach I have is multidisciplinary. In the last four years I have looked at the San Mariano land use system from various perspectives: ecological and environmental, demographical, economical and institutional. Sometimes I did this from the farm households' perspective; other times on a higher scale, from a system dynamic perspective. In this talk I will try to combine all these viewpoints.

Four years ago, the starting point for me, being a scientist, was to see whether the land use system in the San Mariano area should be described more along lines of a pessimistic Malthusian theorem or if there would be Boserupian transition opportunities.

Basically, Malthus' idea is that a system gets trapped into a destructive mode, where population growth will lead to a complete consumption of the natural resources and results in increasing poverty. Boserup is a bit more optimistic; she states that, in case the stress of a system increases (i.e. population increases), human creativity will enforce new processes (technologies) and induce transition to fight environmental degradation and poverty.

Now, four years further along the road of study, it is time for summing up my findings. Yet, that is not easy. Not easy, because the message I bring is not so positive and nobody likes bad news. But the good news is: it is not hopeless.

The population of San Mariano (and in general in the rural areas of Region 02) is growing rapidly, in the remote rural areas much faster than in the urban areas. The growth rate in San Mariano town seems to have stabilized on an annual 2 percent, but there are rural areas where population growth reaches peaks of 8 percent growth per annum, especially areas close to the forest frontier. Although computer simulation points out that although 8 percent peaks won't appear often, a rapid growth of 2.6 to 3.4 percent for the rural areas of San Mariano will continue for at least the next fifteen to twenty years.

The early 1970s were a period with a huge population boom. The reason seems clear: the large-scale logging attracted quite a lot of healthy young workers from all over the Philippines. A population boom always comes with its after-effect: a smaller boom when the children of the booming generation get married and reproduce. Again, also this second boom is nicely visible in the census statistics of 1997. The early 1990s, twenty years after the first boom, shows another peak growth in the population. The San Mariano population has never been as young as it is now. Almost sixty percent of its population is under the age of fifteen.

The population census of 1997 shows that birth control measures are yielding effects, but as of now only in the barangays nearest to San Mariano proper. My fieldwork

indicates that these measures are welcome, also in the more remote areas. The younger households nowadays do not want to have an unlimited number of children. They indicate that having three or four children is economically feasible. The decision-making on having children has become more influenced by an economic rationale.

The main question for the near future is where all these people will have to live, and what will be their livelihood. San Mariano, with a rural population of 85 percent, has practically no other economic opportunities than being a farmer, but, land is scarce. Of course, a percentage of the youngsters will move out to the big cities to find work, but a much larger percentage intends to stay in San Mariano and become a farmer, especially those who do not have a college degree and those without a connection in the big cities. We see a gradual expansion of cultivated areas at the cost of the forest of the Sierra Madre, and, this sprawl is likely to continue because all the land between the outer barangays and the *centro* is occupied.

For the previous generation the land of their parents could still be sub-divided, such that enough land was available to make a living. However, the current land sizes are too small to endure another subdivision among the inheritors. The average land size of a contemporary farm is only 2 to 3 ha, which is also the bare minimum size for a small household to survive in the current land use system.

So, for the next generation there is no more land division possible, job opportunities in the big cities are scarce and the border of the Northern Sierra Madre Natural Park prohibits the entrance of new farms. Where does the next generation go? How can they make a living? One way of getting a living for quite a number of these landless youngsters is to go into the forest and cut the remaining stock of hardwood trees. It is hard to prove quantitatively, but compared to 1995, an increase in the number of youngsters logging in the forest has occurred. Perhaps the amount of wood coming from the forest did not increase, but the number of people engaged in logging certainly did.

The forest does not get healthier this way and indirectly the whole environment gets worse. As we all know, the forest is of the utmost importance for the quality of the agricultural land. The forest keeps the water and the soil in the mountains and therefore helps preventing an increase of erosion, and disastrous events such as floods.

To secure the future agricultural land quality (the most important economic resource of the province) and to minimize the dangers of natural disasters, logging has to stop. Environmental awareness is there and increases, at least among the people who do not have a direct interest. But for the landless youngsters logging is the only chance they see to set up a living for themselves. What else can they do? Tilling 0.5 ha will not provide the means they need to survive and start a family of their own.

The youngsters nearer to the *centro* do not have such a high impulse to go to the forest as those living near and knowing the forest; they seek their fortune in servicing businesses, but these opportunities are quickly getting satisfied too. A tricycle drivers' income slowly decreases while economic inflation continues. The number of tricycles cannot increase anymore, because the demand does not increase and hence the total money to be earned does not increase.

A while ago I stated that the current land size of a farm household is approximately 2 ha. I stated too that in the current land use system this size is just enough to survive. I want to emphasize that it is just enough to survive, but that every year the farming households becomes poorer. If we look back at the hybrid corn prices of the

early 1990s (a maximum of PhP. 8 to 9 per kg) and compare them with the contemporary price farmers get from the traders (PhP. 6 to 7 per kg) and add to that the inflation of the peso (70 percent in ten years) everybody sees that they get less than 80 percent of the relative worth of 1995. This is not a healthy development; even stronger, this is totally unsustainable from an economic perspective. Unsustainable, unhealthy, economic processes cause stress in the human system. It causes the human system to become less resilient; or more vulnerable if you like. Simply put, it makes people unhappier about their life. This was clearly shown after the typhoon year 2003. Farmers gathered several times to demonstrate their unhappiness to the traders, who are, according to the farmers, the cause of the social stress. The military is fighting another battle against the NPA than ten years ago. The rebellious character, the ideology, the type of rebel, has changed because the type of unhappiness has changed. Of course this is not the only reason, there are more, but it certainly contributes.

Please, do not get me wrong, I do not think the traders are the direct cause of the economic stress. Even the opposite, if it weren't for the traders' financial buffer, the typhoon disasters of 2003 would have been much worse. The traders provided the financial buffer for the agricultural system to continue and maintain. Only a small number of farmers got disconnected from the credit system.

Yet, I do think there is a systematic failure. General economic theory says that if a business, such as a farm, wants to stay economically healthy, it has to gain a profit and invest a certain amount back into the farm. Nowadays, the average farming households cannot save or invest any of their profit into their farm. They use it all for consumptive reasons and to pay back the loans they have.

At a higher abstraction level, money gained from a sequence of activities should partially flow back into that sequence, and every sub-activity should use a part of the investment to become more effective and/or efficient. The contemporary land use system makes profit (otherwise it cannot sustain) but the profit does not flow back for investment to all of the activities. Yes, all the profits go to the traders and the large businesses that provide the seeds, chemicals and fertilizer. The farmers do not profit accordingly and cannot make the necessary investments.

Once more, do not get me wrong, I do not think the traders and global businesses are wrong by making a profit, every company should. But as I said, a land use system can only be sustainable if the profit flows partly back to all its sub-activities, hence also partly to the farmers to invest. Nowadays, the profits flow for a large part out of the land use system. This cannot endure and has to change in order to sustain the economic system.

The question of how to do that is not simple. It demands a change in attitude of all the players in the land use system. Strategies should be developed where traders help the farmers invest in their farm.

The current produce and processing of the current produce have to adapt within these necessary strategies. Most of the current hybrid corn processing takes place outside the region. Again, at a higher scale money flows out of the system and cannot return for the necessary investments. The spatial lines of the processing are too long. I think that, if the current land use wants to continue, these lines of processing should get shorter, so that a larger part of the profit stays within the local system. In the near future a corn processing plant is necessary to sustain the current system.

Besides making the whole line of production more effective and efficient at the regional scale, another possible strategy is to change the type of produce. Yellow corn is not the most profitable crop for the agricultural system; and not for the farmers in particular. And most probable it will not become so in the near future. This signal is already identified by the San Miguel cooperation which has started a large campaign to introduce cassava, and replace hybrid corn, at a large scale. From an economic viewpoint it is a healthy development. According to the numbers cassava yields better scores than corn, however, from an ecological point of view this has to be seen. Scientific literature is, at the least, skeptic on the profits of cassava, especially in the longer run. It has a completely different impact on the ecosystem and on the soil in specific. Cassava practically grows everywhere and is a very strong, persistent crop, it can endure a lot of climatic variation, rain and drought, but you also have to pay a price for that strength. Cassava drains the soil from its nutrients and decreases the quality of the soil structure at a higher pace than, for example, hybrid corn does. These negative effects on the soil might in the long run become a large economic cost for the agricultural system, which should be taken into account from the start.

The agricultural system of San Mariano (and even of the entire province) should opt for the two strategies, agroforestry and wet rice cultivation, as identified by respectively Plan-Philippines and the municipal government. And this shows that my message is not without hope. A lot of smart people with the right intentions see what better courses for the future there are. Fruit trees and production forests have a high market value, much higher than yellow corn. They have a much better function in the ecosystem by keeping the soil healthy and alive than a monocropping such as yellow corn or cassava, and, seemingly getting more important, they endure the effects of natural disasters much better.

But again, I like to stress that farmers cannot make the change to a more viable future themselves. All the players in the land use system need to help them to invest, especially with the agroforestry in the first few years when the production has not gained momentum yet. I think here a well-coordinated, honest micro-financing system has a fair potential. Such a micro-financing system could also be beneficial for the development of wet rice fields.

And, as noted before, the lines of production and processing have to become shorter. It will do the region a lot of good to invest in a fruit processing plant for the long run, because the more activities stay within the region, the more profit will stay within the land use system to re-invest, which is, as I have reasoned, the only way for a sustainable economic system. An indirect benefit might be the attraction of other industries and services providing new jobs and economic growth.

CHAPTER THIRTY-SIX

THE ROLE OF THE REGIONAL GEOGRAPHICAL INFORMATION SYSTEM NETWORK IN THE LAND USE PLANNING OF THE CAGAYAN VALLEY

Milagros A. Rimando

INTRODUCTION

The Regional Development Council (RDC) sets the direction of all socioeconomic activities in the Cagayan Valley region. This year, the council adopted a Regional Physical Framework Plan (RPFP) for 2000 to 2030, a document of broad regional policies that need to be translated into more detailed municipal policies in the comprehensive land use plan (CLUP). All municipalities need a CLUP that should guide the local government unit (LGU) in the management of its resources, and a zoning ordinance to implement this plan.

REGIONAL LAND USE PLANNING

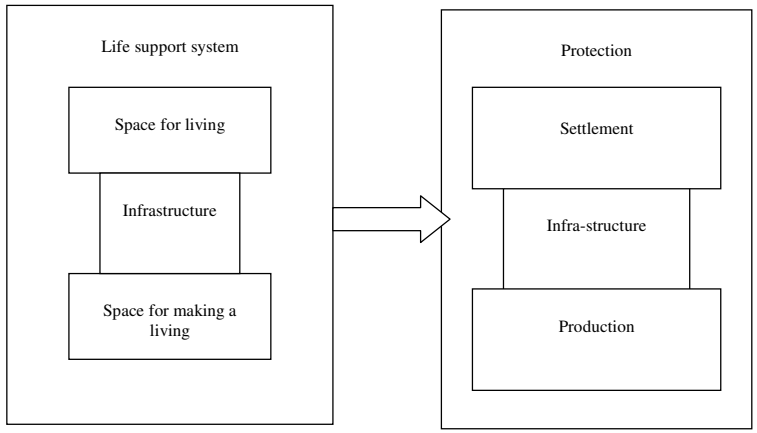
The RPFP 2000-2030 is the primary guide in the allocation, use and management of the region's land and other physical resources. It consists of policies to guide investments and socioeconomic projects to ensure the protection of the quality of the environment. The RPFP was crafted to advance the national framework for physical planning. At the same time, it supports the region's development aspirations and addresses the different resource related concerns that constrain the region's development. It serves to guide decisions on how the physical resources can be put to best and acceptable use.

The RDC prepared the RPFP through its Regional Land Use Committee (RLUC), which draws members from the Housing and Land Use Regulatory Board (HLURB), the Housing and Urban Development Coordinating Council (HUDCC), the Department of Interior and Local Government (DILG), the Department of Environment and Natural Resources (DENR), the Department of Agriculture (DA), the Bureau of Fisheries and Aquatic Resources (BFAR), the Department of Agrarian Reform (DAR), the Department of Tourism (DOT), the Department of Trade and Industries (DTI), the Department of Public Works Highways (DPWH) and other key regional agencies. For two years, the team gathered and validated all available planning data and maps from the national as well as regional agencies. The land use, population and settlement data, and economic and infrastructure information were processed using tools such as scalogram analysis, eco-profiling and map overlay. Several workshops were then used as venues for the validation and discussion of the results: the identification of the major issues and the identification of objectives and policies.

Throughout the planning period, the RLUC was consulting with the other RDC committees. An initially completed document was discussed with the stakeholders in the five provinces of the region. The RDC adopted the RPFP 2000-2030 on 17 February 2005.

The RPFP is laid out in terms of four land uses as categorized in the national framework for physical planning: (1) settlement, (2) production, (3) protection, and (4) infrastructure. Figure 1 presents the four areas in any territorial unit (Serote 2003) and the corresponding land use categories in the RPFP.

Figure 1: Land use categories



The space for living is where man sets up home and undertakes activities for his reproduction and welfare. There is the space for making a living that is intended for carrying out his livelihood activities such as fishing, farming and trading. The infrastructure is that connecting space that supports these two spaces. The fourth, which is an open space, the life support system provides the resources that man needs such as food, air and water but also absorbs the wastes generated in the human activities. These are the four spaces that correspond to settlement, production, infrastructure, and protection areas, respectively. These major land uses are closely interrelated but are not mutually exclusive.

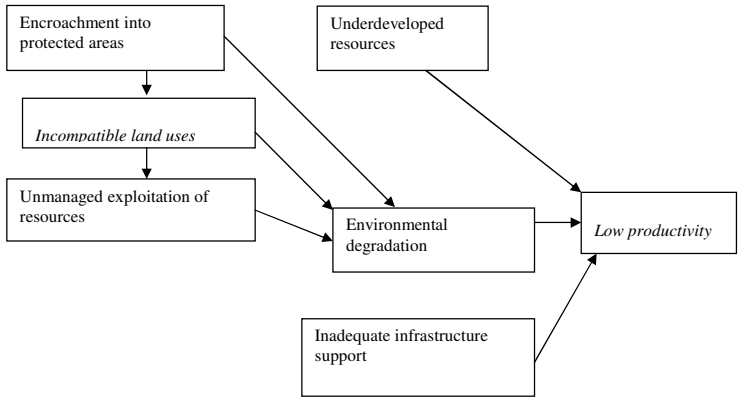
The objectives and policies in the RPFP focus on the settlements development, production land use, protection land use and infrastructure development. This way, the plan integrates the features and needs of the population, the potentials and limitations of land resources and infrastructure support into one physical framework that guides socioeconomic activities at the regional and sub-regional levels.

MAJOR CHALLENGES AND VISION

The Cagayan Valley possesses considerable potentials, such as a wide expanse of rich agricultural areas, productive forestlands, vast grasslands, abundant inland water and marine resources, and mineral and indigenous energy resources. Unfortunately, these resources remain underutilized owing to low investment levels.

The development of the Cagayan Valley continues to be constrained by several problems (figure 2) mainly hinged on sustainability issues. The unmanaged exploitation of resources and consequent environmental degradation has resulted from the sporadic and unregulated settlements in protected areas, the population pressure in urban centers, and the encroachment in agricultural areas as well as other protected lands. The non-delineation of forest and Alienable and Disposable (A&D) lands contributes to incompatible land uses in the region over time. Grassland and brush lands are being cultivated, mining applications overlap with other land uses, and hazard prone areas that are not properly identified pose a threat to the populace.

Figure 2: The development challenges.



All these together and the inadequacy of infrastructure facilities contribute to the low productivity in the region's agriculture. It is in this context that the RPFP envisions the region's physical development as follows: "A region of world class, empowered and productive citizenry and competitive agri-industrial economy, modern infrastructure, responsive basic services and well-managed eco-system in peaceful and orderly communities at one with God, among themselves and with the rest of the world. It will be

a physically developed area with a rational network of agri-related industries and spatially accessible services while providing for equal economic opportunities. This is supported by a strategically located infrastructure, a stable watershed and bio-diversity rich areas."

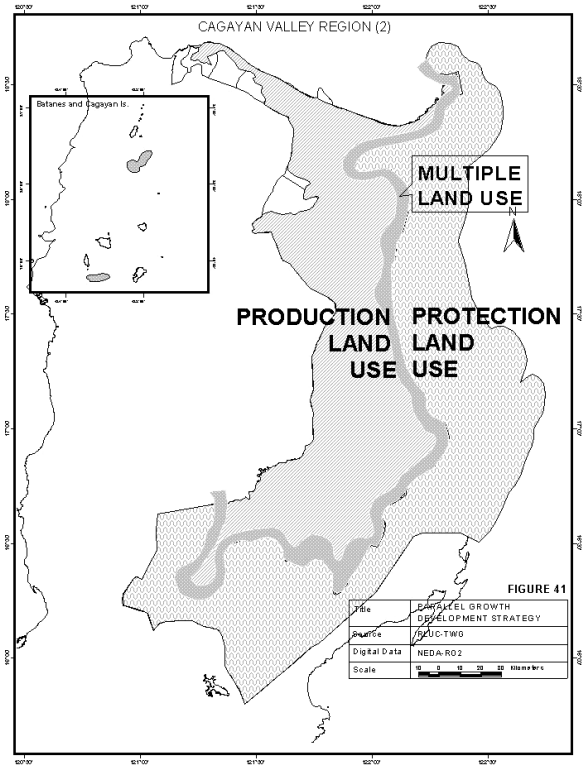
THE SPATIAL STRATEGY: PARALLEL GROWTH CONCEPT

Consistent with the development vision, the region adopted a parallel growth strategy, harmonizing the region's desire to facilitate and attain agri-industrial development and its need to enhance the region's environmental integrity. The concept provides that equal attention will be accorded to the protection and sustainability of land utilization while the region aims to pursue agri-industrial development in terms of the regional distribution and growth direction.

Conservation and protection activities are given priority in the eastern side of the region, the Sierra Madre corridor (see figure 3). This is a solid block of highly protected areas stretching from Cagayan through Isabela, Nueva Vizcaya and Quirino and down to the provinces of Aurora and Quezon of Region 03. The corridor interconnects protected areas and serves as the source of critical resources like water and wood. Biodiversity in the corridor is believed to be one of the richest in the world so great effort will be put in environmental rehabilitation and protection measures.

The production activities are mostly in the valley side of the region where rich agricultural plains and forest production areas are located. There are designated economic zones, institutional/financial zones, agriculture zones, fishery zones, agroforestry zones, potential mining zones, and tourism zones.

Figure 3: The parallel growth strategy



Multiple land use is promoted in the Cagayan riverine zone. The river will continue to assume a special significance in the region, ecologically, economically, socially and culturally. Aside from the protection of the river and its riverbanks there is a need for the conservation of the endangered ludong fish and other rare species in the Cagayan River.

LAND USE POLICIES RELEVANT TO THE SIERRA MADRE CORRIDOR

Protection land use is predominant in the Sierra Madre corridor. Here, the preservation and rehabilitation of the watershed and other critical areas is crucial. The primary policies therefore that guide activities in the corridor include the following:

1. Ground delineation of protected lands and other significant areas. The completion of the ground delineation between the forest area and the A&D lands will be the rallying point for the resolution of most environmental planning issues. In pursuit of this policy, the LGUs will be encouraged to be involved in the validation and resolution of delineation conflicts to ensure the effectiveness of the demarcation.
2. Proclamation of all watersheds and key biodiversity areas. All critical watersheds (regardless of their present state) and potential key biodiversity rich areas shall be further delineated and supported with the corresponding national and local executive or legislative action for their protection. This should include assessment of the status of all existing watersheds to determine the level of interventions needed for all watersheds in the region.
3. Preparation and implementation of sustainable and integrated management plans in all watershed areas and critical protected areas. The management and development of watersheds should be designed and implemented through a holistic and sustainable approach, focusing on the resources and the people directly involved in its management. The integrated watershed management plans will serve as guides for the LGUs and other stakeholders in implementing critical interventions for the region's watershed areas.
4. Protection and conservation of biodiversity rich areas. Biodiversity rich areas should be the priority subjects of protection and conservation initiatives while those requiring rehabilitation should be accorded the necessary interventions to restore them to their original state.
5. Regulation and restriction of activities in upland areas. The framework of regulation shall apply in production forest areas while restriction shall apply on delineated protected forest areas. Thus, activities in the upland areas shall be closely regulated to include the restriction of further migration to forest protection areas. Parallel to this, LGUs should develop monitoring mechanisms based on the management plans of the ancestral domain claims (CADCs).
6. Identification of brush land and grassland areas and optimization of their utilization. This requires the identification of brush land areas and the determination of land suitability for the optimum utilization of these areas. The LGUs will be involved in the implementation of this policy and shall consider these areas in the preparation of their CLUP.
7. Formulation of ancestral domain sustainable development protection plans (ADSDPP) for all identified ancestral domain claims (CADCs). All ancestral domain claims should be supported with management plans that are consistent with existing relevant laws and policies. In the formulation of the management plans, critical stakeholders should be involved and direct implementers and beneficiaries of the plan should be apprised of their respective roles and responsibilities.

8. Development of timber corridors and non-timber production areas. For the next thirty years, timber harvesting will be disallowed in protected forests. Provinces will be required to identify and delineate timber production zones for future resource requirement within the secondary growth forest to include existing Community-Based Forest Management Agreements (CBFMA), socialized Integrated Forest Management Agreements (SIFMA), and Integrated Forest Management Agreements (IFMA) areas. Likewise, the private sector will be encouraged to invest in industrial tree plantations and private tree farms.
9. Adoption of an integrated and coordinated water resource management. For more rational water resource management in the region, there is an urgent need to address water resource management through an integrated and coordinated water resource management. The RPFP has delineated the Cagayan River as a multiple use zone. A framework for its development into the Cagayan riverine system (with components on watershed protection, irrigation, flood control, fishery production and transportation) will be formulated in pursuit of this policy.
10. Adoption and promotion of responsible mining. The Philippine Mining Act of 1995 and the Small Scale Mining Act shall serve as the governing policies in the utilization of mineral resources of the region, aside from other pertinent regulations such as the natural minerals policy. The overall framework for mining activities shall be the rational utilization of the region's mineral resources and the mitigation of adverse effects brought about by mining operations.
11. Strict enforcement of approved local land use plans and zoning ordinances. As mandated by the Local Government Code of 1991, the LGUs shall continue to prepare and update their CLUP, and enact these through zoning ordinances as bases for their development directions. Coordination between the LGUs and concerned national government agencies will be strengthened to assure the implementation of environmental laws and policies, specifically those contained in the local ordinances.

THE REGIONAL GEOGRAPHIC INFORMATION NETWORK

The RDC has set up a geographical information system (GIS) center for up-to-date and accurate digitized geographic data on the Cagayan Valley. The GIS facility was valuable in the integration of data and maps for the formulation of the RPFP. With technical assistance from the Conservational International (CI), the inter-agency planning team developed the expertise, which facilitated the land use mapping and overlay analysis employed in the RPFP formulation. The technology also proved helpful in the presentation of data and maps during the consultations and workshops.

Eventually, the Regional Geographic Information Network (RGIN) was conceived as a strategy for institutionalizing the sharing of spatial and non-spatial data and information among government agencies, local governments and the private sector. The RGIN was established through a memorandum of agreement signed in September 2003 by twenty agencies, five provincial governments and CI. An operations manual now guides the operations of the RGIN.

The RGIN is set to pursue and sustain the networking initiative through the following major activities lined up for 2005 and beyond:

1. Continuing the GIS capability building program that has been designed for the region.
2. Completing the establishment of the provincial GIS centers and agency GIS units.
3. Adopting of a standardized regional base map and map preparation guidelines to ensure consistency and compatibility of thematic maps in the region.
4. Developing a regional database information system that systematizes the sharing of information between network members and other GIS data users.

CONCLUSION

The RDC experience shows that the GIS network is an effective way to facilitate the sharing and integrating of data from various sources. The technology is an advantage in land use planning particularly in pinpointing critical areas or potential areas that need to be addressed through policies or projects.

The RGIN will therefore strengthen its linkages with other GIS practitioners in order to further develop and enhance the region's database. The RDC should strengthen its GIS capabilities and its land use tools in aid of its planning function.

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LIST OF ABBREVIATIONS

A&D	Alienable and Disposable
AACCUP	Accrediting Agency of Chartered Colleges and Universities in the Philippines
ABARE	Australian Bureau of Agricultural and Resource Economics
ACIAR	Australian Center for International Agricultural Research
ACMMA	*Asosasyon ti Katatubo nga Mannalon ti Macayucayu*
ADB	Asian Development Bank
ADBR	Ancestral Domain Boundary Resolutions
ADMP	Ancestral Domain Management Plan
ADSDPP	Ancestral Domain Sustainable Development and Protection Plan
AECI	Spanish Agency for International Cooperation
AFP	Armed Forces of the Philippines
AFRIM	Alternative Forum for Research and Development
AIPP	Asian Indigenous Peoples' Pact
AMAN	*Aliansi Masyarakat Adat Nusantara* (Alliance of Indonesian Adat Communities)
ANR	Assisted Natural Regeneration
ANU	Australian National University
ASEAN	Association of Southeast Asian Nations
ATA	Alliance of Taiwan Aborigines
ATFS	American Tree Farm System
ATSAL	Agroforestry Tree Seed Association of Lantapan
BCA	Benefit-Cost Analysis
BFAR	Bureau of Fisheries and Aquatic Resources
BP	British Petroleum
BRP	Philippines-Netherlands Biodiversity Research Program
BSAF	Bachelor of Science in Agroforestry
BSES	Bachelor in Environmental Science
BSF	Bachelor of Science in Forestry
BSU	Benguet State University
CADC	Certificate of Ancestral Domain Claim
CADT	Certificate of Ancestral Domain Title
CAFGU	Civilian Armed Forces Government Unit
CALT	Certificate of Ancestral Land Title
CAP	Common Agricultural Policy
CAR	Cordillera Administrative Region
CARP	Comprehensive Agrarian Reform Program
CAVAPPED	Cagayan Valley Partners for People's Development
CBD	Convention on Biological Diversity
CBFMA	Community-Based Forest Management Agreement
CBFMP	Community-Based Forest Management Program
CDM	Clean Development Mechanism
CENRO	Community Environment and Natural Resources Office
CFEM	College of Forestry and Environmental Management

CFI	Crocodile Farming Institute
CFNR	College of Forestry and Natural Resources
CFPP	Compensatory Forest Plantation Project
CHED	Commission on Higher Education
CI	Conservation International
CIA	Central Intelligence Agency
CIFOR	Center for International Forestry Research
CLOA	Certification of Land Ownership Award
CLUP	Comprehensive Land Use Plan
CML	Institute of Environmental Sciences
CMU	Christian Mission for the Unreached
CPA	Certified Public Accountant
CPLA	Cordillera People's Liberation Army
CPPAP	Conservation of Priority Protected Areas of the Philippines
CO_2	Carbon Dioxide
COE	Center of Excellence
CRMP	Community Resource Management Plan
CROC	Crocodile Rehabilitation, Observance and Conservation
CSA	Canadian Standard Association
CSC	Certificate of Stewardship Contract
CVARRD	Cagayan Valley Agricultural Resources Research and Development
CVIT	Cagayan Valley Institute of Technology
CVPED	Cagayan Valley Program on Environment and Development
DAO	Department Administrative Order
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DESAM	Department of Environmental Science And Management
DfNSIP	Debt for Nature Swap Initiative Program
DGIS	*Directoraat Generaal Internationale Samenwerking* (Netherlands Ministry of Foreign Affairs)
DILG	Department of Interior and Local Government
DMMMSU	Don Mariano Marcos Memorial State University
DOST	Department of Science and Technology
DOT	Department of Tourism
DPWH	Department of Public Works Highways
DTI	Department of Trade and Industries
ECC	Environmental Compliance Certificate
EDSA	Efipanio De los Santos Avenue
EENP	Environmental Education Network of the Philippines
EIC	Environmental Information Center
EIS	Environmental Impact Statement
EMS	Ecological Main Structure
ERDB	Ecosystem Research and Development Bureau

ESSC	Environmental Science for Social Change
EU	European Union
EWW	Enterprise Works Worldwide
FAO	Food and Agriculture Organization
FDPM	Forest Department Peninsular Malaysia
FFS	Farmers Field School
FIT	Forest Improvement Technology
FMB	Forest Management Bureau
FPUE	department of Forest Products Utilization Engineering
FRC	Forest Ranger Certificate
FRIM	Forest Research Institute Malaysia
FRM	department of Forest Resources Management
FSC	Forest Stewardship Council
FVCTLDC	Father Vincent Cullen Tulugan Learning and Development Center
GAMAPAKA	*Gagmayng Mag-uuma sa Parokya sa Kalabugao*
GAP	Good Agricultural Practice
GATT	General Agreement on Tariffs and Trade
GHG	Greenhouse Gases
GI	Galvanized Iron
GIS	Geographical Information System
GOLD	Governance on Local Democracy project
GoP	Government of the Philippines
GP	Germination Period
GPS	Global Positioning System
GTZ	*Deutsche Gesellschaft für Technische Zusammenarbeit*
HLURB	Housing and Land Use Regulatory Board
HUDCC	Housing and Urban Development Coordinating Council
IAF	Institute of Agroforestry
IAWM	Institute of Agroforestry and Watershed Management
ICRAF	World Agroforestry Center
IDR	Indonesian Rupiah
IFMA	Integrated Forest Management Agreement
IIRR	International Institute of Rural Reconstruction
IIT	Iligan Institute of Technology
ILO	International Labor Organization
IP	Indigenous Peoples
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IPO	Indigenous Peoples' Organization
IPRA	Indigenous Peoples' Rights Act
IRA	Internal Revenue Allotment
IRNR	Institute of Renewable Natural Resources
IRR	Implementing Rules and Regulations
ISCA	Isabela State College of Agriculture
ISF	Integrated Social Forestry
ISO	International Organization for Standardization

ISU	Isabela State University
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
JBIC	Japanese Bank for International Cooperation
JICA	Japanese International Cooperation Agency
JOFCA	Japanese Overseas Forestry Consultants Association
JSF	Josefa Segovia Foundation
KEF	Kalahan Educational Foundation
KITLV	*Koninklijk Instituut voor Taal-, Land- en Volkenkunde*
KMO	Kalinga Minority Organization
KTO	Kalinga Tribal Organization
LGU	Local Government Unit
LPG	Liquefied Petroleum Gas
LSU	Leyte State University
LUTM	Land Use Transition Modeling
MASREDECA	Mataga-ay Sustainable Resources Development and Conservation Association
MMRNP	Mt. Malindang Range Natural Park
MNRC	Municipal Natural Resources Council
MOF	Ministry of Forestry
MPDC	Municipal Planning and Development Council
MPDO	Municipal Planning and Development Office
MPR	*Majelis Permusyawaratan Rakyat Republik Indonesia* (People's Consultative Congress)
MSC	Marine Stewardship Council
MSU	Mindanao State University
MTCC	Malaysian Timber Certification Council
NALCO	Nasipit Lumber Company
NARC	National Abaca Research Center
NATRIPAL	United Tribes of Palawan
NCF	Net Carbon Flow
NCIP	National Commission on Indigenous Peoples
NEDA	National Economic Development Authority
NGO	Non-Governmental Organization
NIA	National Irrigation Authority
NIPAP	National Integrated Protected Areas Program
NIPAS	National Integrated Protected Area System
NORDECO	Nordic Agency for Development and Ecology
NPA	New People's Army
NPV	Net Present Value
NSMNP	Northern Sierra Madre Natural Park
NSMNP-CP	Northern Sierra Madre Natural Park - Conservation Project
NSO	National Statistics Office
NSRC	Neo-Synthesis Research Center
NTFP-EP	Non Timber Forest Products - Exchange Program
NVSIT	Nueva Vizcaya State Institute of Technology

NVSU	Nueva Vizcaya State University
PACBRMA	Protected Area Community-Based Resource Management Association
PACIP	Pacific-Asia Council of Indigenous Peoples
PAF 3	Poverty Alleviation Fund 3
PAFCI	Philippine Association of Forestry Colleges Incorporated
PAFERN	Philippine Agroforestry Education, Research Network
PAFID	Philippine Assistance for Intercultural Dialogue
PAMB	Protected Area Management Board
PANAMIN	Philippine Assistance for National Minorities
PASu	Protected Area Superintendent
PAWB	Protected Areas Wildlife Bureau
PAWS	Protected Areas and Wildlife Service
PCA	Philippine Coconut Authority
PCCARD	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
PD	Presidential Decree
PEFC	Program for Endorsement of Forest Certification schemes
PENRO	Provincial Environment and Natural Resource Office
PFEN	Philippine Forestry Education Network
PhP.	Philippine Peso
PICOP	Paper Industries Corporation of the Philippines
PNOC	Philippine National Oil Company
PO	People's Organization
PRA	Participatory Rural Appraisal
PRC	Philippine Regulation Commission
PGP	Pre-Germination Period
PRC	Philippine Regulation Commission
PSTFAD	Provincial Special Task Force for Ancestral Domains
PTFI	Provident Tree Farm Inc.
RAWOO	Netherlands National Development Research Council
RDC	Regional Development Council
RGIN	Regional Geographic Information Network
RISDA	Rubber Industry Smallholders Development Authority
RLUC	Regional Land Use Committee
RM	Malaysian Ringgit
RNIP	Regional Network on Indigenous Peoples
RPFP	Regional Physical Framework Plan
RUP	Resource Use Plan/Permit
SALT	Sloping Agricultural Land Techniques
SCU	State Colleges and Universities
SCUAF	Soil Changes Under Agroforestry
SEAMEO	Southeast Asian Ministers of Education Organization
SEANAFE	Southeast Asian Network for Agroforestry Education
SEARCA	Regional Center for Graduate Study and Research in Agriculture
SEC	Securities and Exchange Commission

SESAM	School of Environmental Science and Management
SFI	Sustainable Forestry Initiative
SIFMA	Socialized Integrated Forest Management Agreement
SIL	Summer Institute of Linguistics
SLIFM	Small and Low Intensity Forest Management
SLPC	Southern Luzon Polytechnic College
SLS	Selective Logging System
SPLTP	Special Private Land Timber Permit
SUCCESS	Sustainable Cocoa Extension Service for Smallholders
TFL	Tree Farm Leasehold
TLA	Timber License Agreement
TOT	Training Of Trainers
TPAE	Technical Panel in Agricultural Education
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNRISD	United Nations Research Institute for Social Development
UP	University of the Philippines
UPLB	University of the Philippines Los Baños
URDC	Upland Resources Development Center
USAID	United States Agency for International Development
WCED	World Commission on Environment and Development
WCSP	Wildlife Conservation Society of the Philippines
WHO	World Health Organization
WRI	World Resources Institute
WTO	World Trade Organization
WWF	World Wildlife Fund for Nature

The Cagayan Valley Program on Environment and Development (CVPED) is the research and education partnership of the College of Forestry and Environmental Management (CFEM) of Isabela State University in the Philippines and the Institute of Environmental Sciences (CML) of Leiden University in the Netherlands. Established in 1989, the interdisciplinary program aims to contribute to a better understanding of social and environmental changes in the Cagayan River basin. This book is the output of the fifth international conference on environment and development that was organized at the Cabagan campus of Isabela State University from 11 to 16 April 2005. It aims to give an overview of the research conducted in the framework of the joint program over the past three years.

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