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Swallowed by a cayman : integrating cultural values in Philippine crocodile conservation

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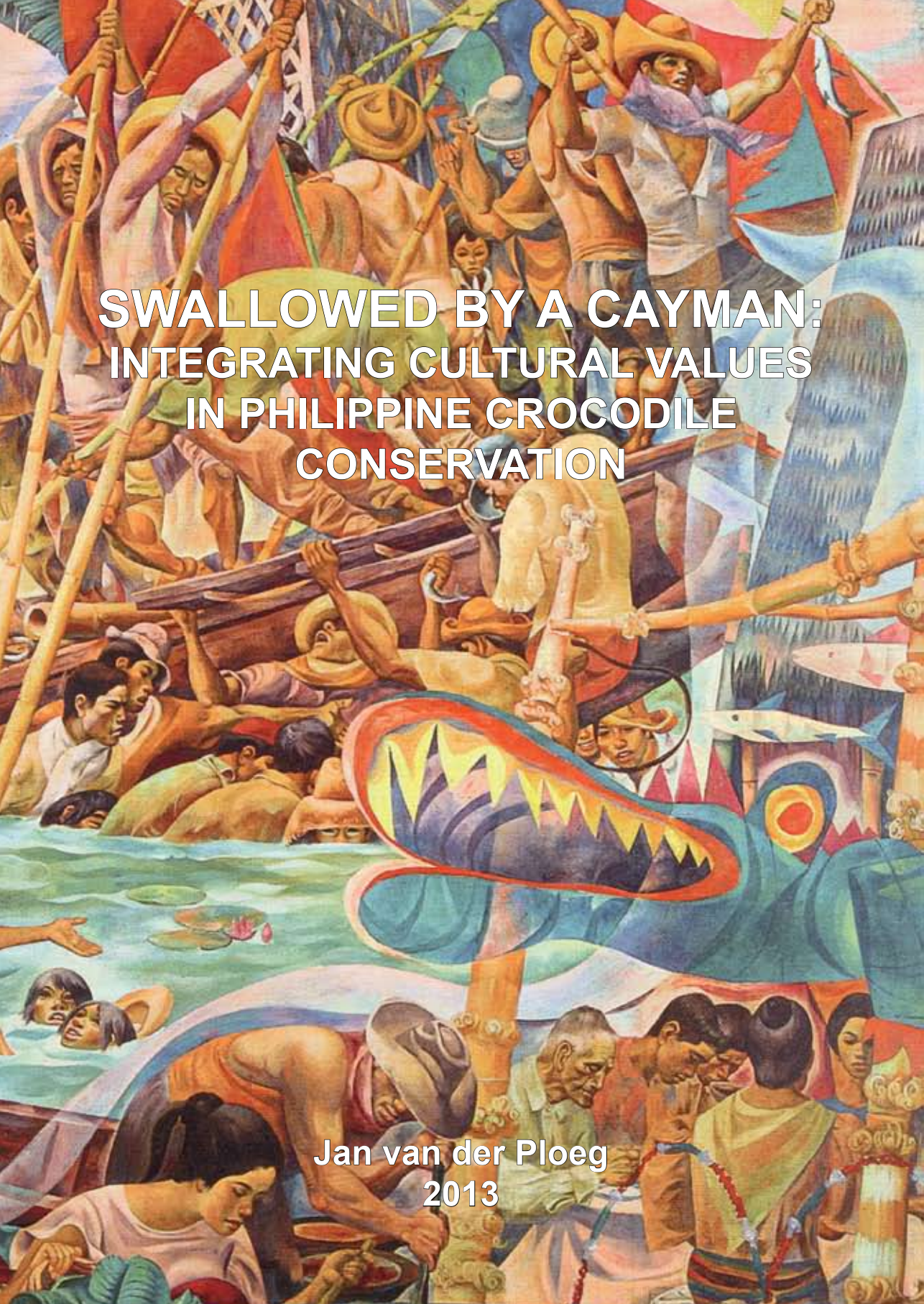

SWALLOWED BY A CAYMAN:
INTEGRATING CULTURAL VALUES IN PHILIPPINE CROCODILE CONSERVATION

Jan van der Ploeg

2013

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SWALLOWED BY A CAYMAN: INTEGRATING CULTURAL VALUES IN PHILIPPINE CROCODILE CONSERVATION

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‘[…] those who have the good fortune to be able to devote their lives to the study of the social world cannot stand aside, neutral and indifferent, from the struggles in which the future of that world is at stake.’ (Bourdieu 2003: 11)

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1. INTRODUCTION

> His son Tales (an abbreviation of Telesforo) had worked at first on shares on the lands of a capitalist, but later, having become the owner of two carabaos and several hundred pesos, determined to work on his own account, aided by his father, his wife, and his three children. So they cut down and cleared away some thick woods which were situated on the borders of the town and which they believed belonged to no one. During the labors of cleaning and cultivating the new land, the whole family fell ill with malaria and the mother died, along with the eldest daughter, Lucia, in the flower of her age. […] But when they began to harvest their first crop a religious corporation, which owned land in the neighboring town, laid claim to the fields, alleging that they fell within their boundaries, and to prove it they at once started to set up their marks. However, the administrator of the religious order left to them, for humanity's sake, the usufruct of the land on condition that they pay a small sum annually—a mere bagatelle, twenty or thirty pesos. Tales, as peaceful a man as could be found, was as much opposed to lawsuits as any one and more submissive to the friars than most people; so, in order not to smash a *palyok* against a *kawali* (as he said, for to him the friars were iron pots and he a clay jar), he had the weakness to yield to their claim, remembering that he did not know Spanish and had no money to pay lawyers. Besides [his father] Selo said to him, 'Patience! You would spend more in one year of litigation than in ten years of paying what the white padres demand. And perhaps they'll pay you back in masses! Pretend that those thirty pesos had been lost in gambling or had fallen into the water and been swallowed by a cayman.' (Rizal 1891: 31-32)

The tragedy of Tales is one of the most famous passages in Philippine literature. It forms an important subplot of José P. Rizal's second novel *El Filibusterismo,* which revealed the abuses of the Spanish colonial system. Rizal forever equated caimans with misuse of power, land dispossession and poverty in Philippine culture.

There are in fact no caimans in the Philippines, but crocodiles.[1] Two species occur in the archipelago: the Indo-Pacific or saltwater crocodile (*Crocodylus porosus*), and the Philippine crocodile (*Crocodylus mindorensis*). The saltwater crocodile is distributed widely throughout Southeast Asia, southern India and northern Australia. Large individuals can grow up to 6 m, and can pose a significant risk to humans (Webb *et al*. 2010).[2] The Philippine crocodile, in contrast, is a much smaller and innocuous species, endemic to the Philippine Islands (Schmidt 1935) (figure 1.1).[3]

Hunting and habitat loss have led to the disappearance of the Philippine crocodile in most parts of the archipelago (Ross 1982; Banks 2005). Remnant Philippine crocodile populations now only survive in the Liguasan Marsh on Mindanao and the northern Sierra Madre mountain range on Luzon (van Weerd 2010). The Philippine crocodile is classified as Critically Endangered on the IUCN Red List of Threatened Species (IUCN 2010), the category for species with the highest risk of extinction.[4] The Philippine crocodile could very well be the first crocodilian to go extinct in the wild due to anthropogenic activities.[5]

Responding to this alarming situation the Philippine government initiated a captive breeding program for the Philippine crocodile and enacted legislation protecting the species and its natural habitat. But the Department of Environment and Natural Resources, the mandated government agency to protect wildlife in the country, lacks the capacity and resources to control the remote rural areas where crocodiles still occur. Philippine crocodiles are still killed and captured, and wetland habitat continues to be overexploited, converted, degraded and polluted, also in protected areas (van Weerd & van der Ploeg 2004).[6] In fact, most people consider the preservation of the Philippine crocodile irrelevant, unfeasible and sometimes even illegitimate (WCSP 1997; Alcala 2008). Efforts to protect or reintroduce the species in the wild have been opposed by rural communities, who fear for the safety of children and livestock, and resist State-mandated restrictions on resource use (Ortega 1998). Policymakers claim that the strict enforcement of environmental legislation risks aggravating rural poverty and question whether the conservation of a large and potentially dangerous predator in the densely populated country is desirable at all. The Secretary of the Department of Environment and Natural Resources, Ramon Paje, for example, recently that remarked that 'there is no place for crocodiles in the Philippines' (AFP 2011).

Figure 1.1: Juvenile Philippine crocodile. Photo by J. van der Ploeg (2013)

Conservationists postulate that people's antagonism towards Philippine crocodiles can only be transformed by generating economic incentives, for example through sustainable use, ecotourism or integrated conservation and development projects (*cf*. Ross 1982; Ortega *et al.* 1993; Ferrer 2008). This utilitarian logic, 'if crocodiles pay, crocodiles stay', has dominated conservation policy and practice in the Philippines over the past twenty-five years. In this thesis I question this reasoning, and I argue that cultural and intrinsic values can also form a motivation for people to tolerate the species in their surroundings.

BACKGROUND

> Another year passed, bringing another good crop, and for this reason the friars raised the rent to fifty pesos, which Tales paid in order not to quarrel and because he expected to sell his sugar at a good price. 'Patience! Pretend that the cayman has grown some,' old Selo consoled him. (Rizal 1891: 32)

José Rizal may have made a mistake in determining the species, but he accurately described the injustice and impotence of a system that in the name of the common good dispossesses poor people from their rights and livelihoods. Victorian ideas about pristine nature free of human interference led, particularly in (post-)colonial societies, to the exclusion, criminalization and marginalization of rural communities (Anderson & Grove 1987; Peluso 1992; Neumann 1998; Brockington & Igoe 2006). The apparent neglect of government agencies and conservation organizations for customary rights, local livelihoods and traditional values has often alienated rural communities from nature conservation (Ghimire & Pimbert 1997; Colchester 2003). The resulting conflicts over the use of natural resources made conservation policies impracticable on the ground (Brechin *et al.* 2003; Borgerhoff Mulder & Coppolillo 2005).

These moral and instrumental concerns have stimulated a search for alternative conservation approaches that explicitly link wildlife conservation to poverty alleviation, political participation and social justice (Western & Wright 1994; Baland & Platteau 1996; Kellert *et al.* 2000; Persoon & van Est 2003). Community-based conservation is based on the assumption that people who directly depend on a natural resource have a stronger interest in its management than the central State (Lynch & Talbot 1995; Brosius *et al.* 2005; Borrini-Feyerabend *et al.* 2007). Conservation, in this view, can only succeed when people benefit from wildlife through sustainable utilization: 'use it or lose it' (Adams 2001; Hutton & Leader-Williams 2003). Successful, and much cited, examples include the Communal Areas Management Program For Indigenous REsources (CAMPFIRE) program in Zimbabwe that generates revenues for rural district councils through trophy hunting (Metcalfe 1994; Olthoff 1995), the vicuña (*Vicugna vicugna*) management program in Peru that allows indigenous communities to harvest

and sell wool of wild vicuñas (Wheeler & Domingo 1997*)*, and marine protected areas in the Philippines that enable local fishers to catch more fish (Russ & Alcala 1999; White *et al.* 2002).

Interestingly, crocodiles are widely regarded as an outstanding example of conservation through sustainable use (*cf*. *The Economist* 2008). The regulation of international trade in crocodile leather reduced uncontrolled exploitation and provided an economic incentive to protect crocodiles and wetland habitat (Webb 2002).[7] The American alligator (*Alligator mississippiensis*) for example was considered endangered in the 1960s, but sustainable harvesting has led to the recovery of alligator populations in Florida and Louisiana (Hines & Abercrombie 1987). In Venezuela the controlled harvest of spectacled caimans (*Caiman crocodilus*) brings in approximately 25 million US$ annually, which forms an important argument for land owners to protect the species and its wetland habitat, and has given the caiman a much more positive image in the eyes of the public (Thorbjarnarson 1999). In northern Australia saltwater crocodile populations are now approaching pre-exploitation levels as a result of crocodile ranching (Webb *et al*. 2010). And in Papua New Guinea saltwater crocodile leather is an important source of cash for rural communities in remote areas, who therefore actively protect the potentially dangerous species on their communal lands (Cox 2009).

It is however becoming increasingly clear that the sustainable use model is not a panacea for all conservation problems (O'Riordan 2002; Adams & Hutton 2007). With fewer than 100 Philippine crocodiles remaining in the wild sustainable use is simply not a realistic management option for the species (Thorbjarnarson 1999). There is an urgent need to design novel solutions to conserve species, such as the Philippine crocodile, that have *no* economic value for rural communities (Woodroffe *et al.* 2005; Dickman *et al.* 2011). Clearly, alleviating poverty should be an important objective, or perhaps even a moral obligation, for conservationists working in the developing world (O'Riordan 2002; Adams *et al.* 2004). But there is growing evidence that a narrow focus on economic incentives can ultimately undermine conservation efforts, especially when the promised benefits do not materialize (Borgerhoff Mulder & Coppolillo 2005). By framing conservation solely as an economic issue, conservationists risk ignoring other valid motivations to conserve wildlife such as tradition, curiosity and emotion. In policy and academic discourses, which are currently dominated by utilitarian rationalism, such an argument might be easily dismissed as a 'western notion that is largely irrelevant for people in developing countries' (Meijaard & Sheil 2008: 167), 'too emotional' (Milton 2002: 4) or perhaps even as a call for 'resurgent protectionism' (Wilshusen *et al.* 2002: 17). Cultural and intrinsic values form, in fact, an important incentive for people to protect wildlife, and efforts to preserve species and ecosystems can be significantly strengthened if these values are taken into account (Adams 1996; Posey 1999; Infield 2001; Maffi & Woodley 2010).

RESEARCH QUESTIONS AND METHODOLOGY

> The father and grandfather then thought of providing some education for the two children, especially the daughter Juliana, or Juli, as they called her, for she gave promise of being accomplished and beautiful. A boy who was a friend of the family, Basilio, was studying in Manila, and he was of as lowly origin as they. But this dream seemed destined not to be realized. […] 'Patience! Pretend that the cayman's relatives have joined him,' advised Tandang Selo, smiling placidly. (Rizal 1891: 33)

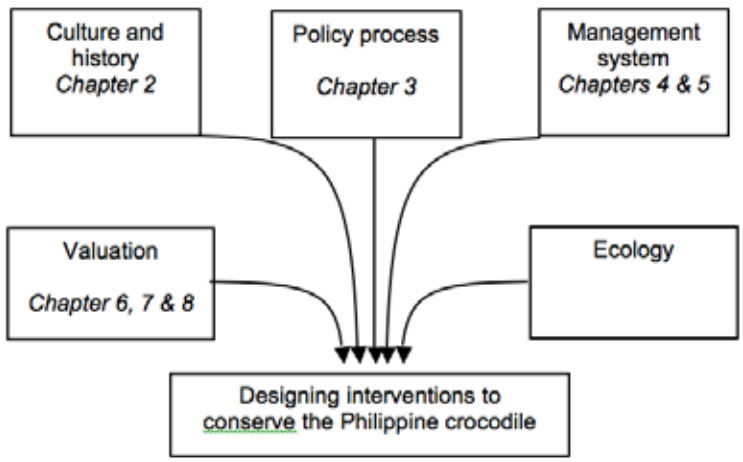
Since 2001 I have been involved in efforts to conserve the Philippine crocodile in the wild in the northern Sierra Madre mountain range on Luzon. After the discovery of a remnant Philippine crocodile population in the Disulap River in the municipality of San Mariano in 1999, the Northern Sierra Madre Natural Park Conservation Project (NSMNP-CP) designed an in-situ conservation strategy for the species (van Weerd 2000; van Weerd & General 2003). After the termination of the Northern Sierra Madre Natural Park Conservation Project, Philippine crocodile conservation efforts were continued in the framework of the Cagayan Valley Program on Environment and Development (CVPED), the academic partnership of Isabela State University (ISU) and Leiden University, for which I was working at that moment (van der Ploeg *et al*. 2008; Persoon *et al.* 2009). In 2003 I co-founded the Mabuwaya Foundation, a Philippine non-profit organization with the aim to preserve the Philippine crocodile in its natural freshwater habitat in the northern Sierra Madre. Mabuwaya is a contraction of the Filipino words *mabuhay* (long live) and *buwaya* (crocodile) (van Weerd & van der Ploeg 2012).[8]

But how to conserve a critically endangered species in a context of rural poverty, social change, weak governance, rapid land use transitions, and a history of State-sponsored resource plunder? The main objective of this dissertation is to design a novel approach to preserve the Philippine crocodile in the wild. Conservation problems are generally defined from a narrow ecological and economic perspective, thereby ignoring the historical, social, psychological, cultural and political dimensions of the problem (Clark *et al*. 1996; Nie 2001). Such a biased approach often prevents the identification of effective solutions. Here clearly lies an important task for social scientists (Mascia *et al*. 2003). Over the past twelve years I have used anthropological theoretical insights (Ingold, 1994; Fergusson 1994; Scott 1998; Milton 2002; Berkes 2004) and research methods (Chambers 1983; Vayda 2008; Walters & Vayda 2009) to analyze 'the Philippine crocodile problem', and identify alternative ways to conserve the species in the wild.

To structure this thesis I use a method developed by Tim Clark *et al*. (1996) to systematically analyze conservation problems and identify innovative solutions. The model identifies five dimensions that explain why certain species, in their case large carnivores in North America, have declined and why current conservation approaches are inadequate: ecological factors, historical and cultural reasons, socioeconomic or

valuational considerations, management problems and policy processes (figure 1.2). Each of the subsequent chapters focuses on one of these dimensions, with the exception of ecology.[9] The model leads us to a set of research questions, wholly different than that are typically asked in conservation biology and environmental economics: *Why are crocodiles reviled in Philippine culture* (chapter 2)? *Why is conservation policy failing to preserve the Philippine crocodile in the wild* (chapter 3)? *How to enforce environmental legislation protecting the species in the remote rural areas* (chapter 4)? *How to mobilize local support for in-situ conservation, and how to determine whether these efforts actually improve the status of the Philippine crocodile in the wild* (chapter 5 & 6)? *How to justify Philippine crocodile conservation in the absence of direct economic benefits, especially when working with poor rural communities* (chapter 7)? *And how to deal with the risk of living with a potential dangerous predator* (chapter 8)? These questions draw attention to issues that are often ignored in conservation efforts, and identify alternative solutions to protect the Philippine crocodile in the wild.

Figure 1.2: Schematic representation of key dimensions necessary for analyzing and crafting solutions for complex conservation problems (Clark *et al.* 1996: 943). The corresponding chapters in this thesis are indicated in italics.



Inevitably this 'participatory action research' implies a certain bias and raises concerns about the objectivity of the analysis (Bacon *et al.* 2005: 1). Some scholars go as far to argue that efforts to address environmental and developmental problems are 'antithetical' to anthropology (Li 2007: 3). Personally, I do not think that societal engagement necessarily hampers an objective and honest scientific analysis; and I'm concerned about the fact that such a critical approach has become dominant in

Dutch academia. I would argue, following Kai Lee (1993) and Kay Milton (1996), that research and engagement can be mutually enriching: my dual role as researcher and conservationist has provided information and insights that a supposedly neutral observer could not easily have obtained (see also: Hale 2008; Kellett 2009). Moreover, I think that scientists working in tropical landscapes simply cannot afford being detached observers, but must make long-term commitments to alleviate poverty and conserve biodiversity (Sayer & Campbell 2004; Tyler 2006; Noss 2007). In the words of Nancy Scheper-Hughes (1995: 409): 'moral relativism is no longer appropriate to the world in which we live, and anthropology, if it is to be worth anything, must be ethically grounded.'

Obviously, combining academic inquiry with conservation action can pose ethical dilemmas (Scheyvens 2003; Persoon & Minter 2011). In interactions with farmers, fishers, loggers, village leaders and government officials I have been transparent about my objectives. People participated voluntarily in interviews, surveys, dialogues and community consultations. No payments were made for information. The disclosure of sensitive information, for example about illegal logging or the use of destructive fishing methods, has never led to repercussions for individual respondents. Overall, I think that the information gathered in the course of my research has contributed to the design of a community-based conservation program that reflects and respects the values, rights, culture, livelihoods and knowledge of local people. One of the problems with discussions on the ethics of combining conservation with science is that they are often obscured by the question whether it is right to protect a potentially dangerous predator in a human-dominated landscape. It's beyond the scope of this introduction to answer that legitimate question; I only hope that the reader will answer it positively after reading this thesis.

This thesis combines qualitative and quantitative anthropological research methods (Bernard 2006). It is based primarily on informal interviews with more than 200 farmers and fishers in the northern Sierra Madre. Interviews were always conducted with the assistance of an interpreter, and recorded in notebooks. In addition I interviewed local government officials, forest rangers, politicians, conservationists and scientists on their views of the 'Philippine crocodile problem.' Focus group discussions were another important source of information. Over the past years the Mabuwaya Foundation organized 53 community consultations in *barangays* (villages) in the municipality of San Mariano to discuss possible steps to protect crocodiles in the wild. These meetings were usually recorded on video, and transcribed afterwards by staff members of the Mabuwaya Foundation. A structured questionnaire was administered among 550 in 14 barangays in the northern Sierra Madre, generating important insights in changing perceptions of and attitudes towards Philippine crocodiles. I also made extensive use of the field reports of Mabuwaya Foundation staff who systematically recorded observations on Philippine crocodile occurrence and threats. In addition, I supervised

46 Dutch and Filipino students who collected data on a variety of topics ranging from Philippine crocodile ecology and behavior to people's awareness of environmental legislation, and from local ecological knowledge to land use changes (see appendix 1 for a comprehensive list of student reports). Specific research methods and techniques are discussed in greater detail in the subsequent chapters.

RESEARCH AREA

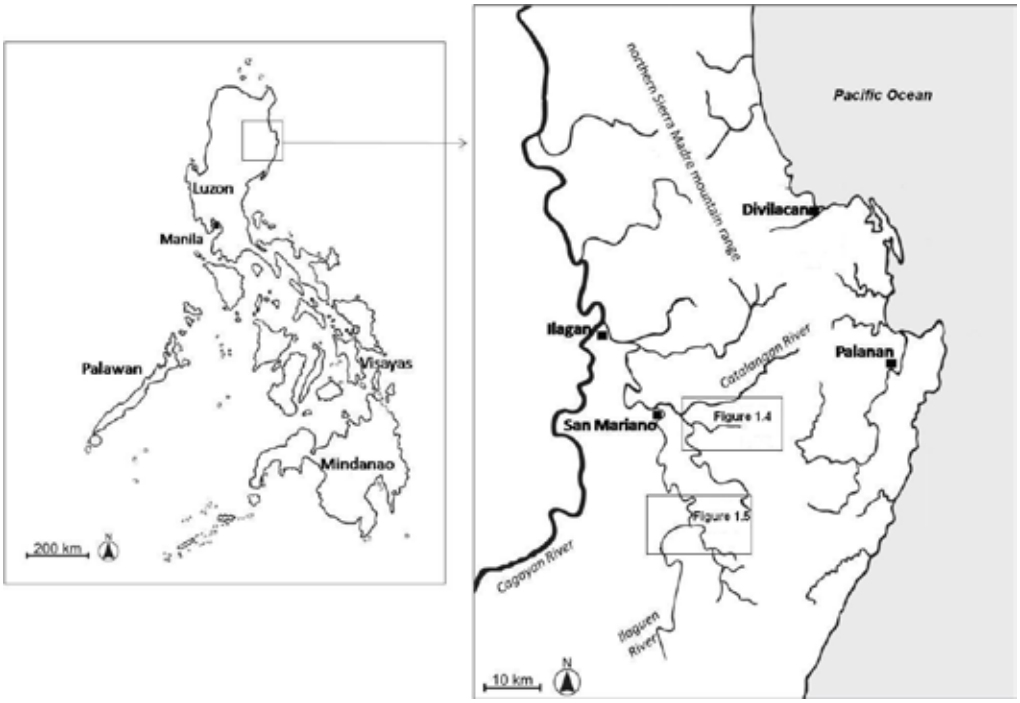
> Tales became serious and scratched his head. The clay jar was giving up all its rice to the iron pot. When the rent had risen to two hundred pesos, Tales was not content with scratching his head and sighing; he murmured and protested. […] Who was this intruder that he should have any right to his land? Had he brought from his own country a single handful of soil? […] Old Selo, on looking at his son's face, did not dare to mention the cayman, but tried to calm him by talking of clay jars, reminding him that the winner in a lawsuit was left without a shirt to his back. 'We shall all be turned to clay, father, and without shirts we were born,' was the reply. (Rizal 1891: 33)

The research and conservation activities, on which this thesis is based, have mainly focused on the municipality of San Mariano in Isabela Province, specifically on three sites where Philippine crocodiles breed in the wild: Disulap River, Dunoy Lake and Dinang Creek (see figure 1.3). Most households in this remote rural area cultivate 3 to 4 ha (Overmars & Verburg 2005; Huigen & Jens 2006). Farmers practice slash-and-burn techniques (*kaingin*) to clear forest vegetation. Steep slopes are planted with banana, cassava and upland rice. Irrigated rice fields are constructed in the valleys. In recent years hybrid yellow corn has replaced banana as the dominant cash crop. As a result farmers have become increasingly dependent on traders who supply credit for seeds, fertilizer and pesticides in return for exclusive procurement rights.[10] Logging remains an important source of cash for many poor households along the forest frontier (van der Ploeg *et al.* 2011e) Fishing is another important, yet often overlooked, livelihood activity.[11] San Mariano ranks among the poorest municipalities of the Philippines: 60 percent of the people live on less than US$ 1 per day (NSCB 2007).

San Mariano has long been inhabited. Agta hunter-gatherers lived in the forest, and traded forest products with farming communities in the Cagayan Valley and Palanan (Minter 2010). During the 18th century Ibanag and Gaddang communities who resisted colonial repression and conversion settled in the Catalangan and Ilaguen river valleys. Collectively these refugees are referred to as 'Kalinga', literally meaning 'enemy' in Ibanag (Keesing 1962). The town of San Mariano was founded in 1896 by the Spanish colonial administration. Ibanag farmers settled in and around the town. In the 1950s Ilocano settlers from Central Luzon reclaimed lands in the forest of San Mariano. Rapid population growth, land scarcity and the construction of logging roads led to a massive influx of farmers from 1965 onwards (van den Top 1998). A new wave of migrants,

mainly from Ifugao province, settled on the forest frontier in the late 1990s (van der Ploeg *et al*. 2007). At present approximately 45,000 people live in the municipality.

Figure 1.3: the northern Sierra Madre



Site 1: Disulap River

The Disulap River is a fast flowing river characterized by shallow rapids interspersed with deep pools. Underwater caves and crevices provide excellent hiding places for Philippine crocodiles, and have enabled a few individuals to escape persecution.

The river forms the boundary between barangays San Jose and Disulap (figure 1.4). Approximately 3,500 people live in the area (NSBC 2007). There are several *sitios* (hamlets) located along the river, of which San Isidro is the largest. The Disulap Valley was deforested in the 1970s by commercial logging companies. San Isidro functioned as log pond and later as nursery for the reforestation efforts of several logging corporations. When logging was banned in 1992 many laborers settled in the area (Persoon & van der Ploeg 2003).[12] Nowadays most people in the valley are Ilocano. Several Agta communities live in temporary settlements along the forest frontier. Ifugao

migrants continue to settle in the area, particularly around *sitio* Diwagden. Over the past years land use has rapidly intensified: in 2000 the hilly landscape around San Isidro was characterized by banana plantations, grasslands and swiddens, but nowadays hybrid yellow corn is the dominant crop. Remnant forest is cleared for agricultural development.

The Northern Sierra Madre Natural Park Conservation Project spearheaded efforts to protect the Philippine crocodile in Disulap River. In 2001, after an intensive lobby, the *Sangguniang Bayan* (municipal council) of San Mariano proclaimed an 11 km stretch of the river, from the boundary of the Northern Sierra Madre Natural Park to *sitio* Singap, as the municipal Philippine crocodile sanctuary (van Weerd & General 2003). Municipal ordinance 2001-17 requires farmers to maintain a 10 m buffer zone along the Disulap River to protect crocodile nests and minimize erosion. Originally it was envisioned to create a 20 m buffer zone, but this was revised downwards after community consultations in San Isidro. Large billboards with information on the sanctuary were placed along roads and footpaths near the sanctuary. In 2004 the municipal mayor deputized six men from the area as *Bantay Sanktuwaryo* (sanctuary guards). These local wardens are responsible to monitor the sanctuary. They receive a small monthly incentive from the municipal government (PhP. 500) and a medical insurance. In 2006 the Mabuwaya Foundation demarcated the buffer zone with signposts.

Figure 1.4: Disulap River and Dunoy Lake

Site 2: Dunoy Lake

Dunoy Lake is a small shallow pond (0.5 ha) fed by two artesian springs. The lake is located on a fluvial terrace along the Catalangan River. The warm, stagnant lake provides optimal habitat for Philippine crocodile hatchlings. After two or three years the juveniles disperse along the Catalangan River. There are several adult crocodiles in the Catalangan River who use Dunoy Lake as a refuge during the rainy season (van Weerd *et al.* 2006).

The landscape around Dunoy Lake is characterized by degraded forest, grasslands and bamboo groves interspersed with corn and rice fields. The lake itself is located on the forest frontier: to the east are the forests of the Sierra Madre, to the west land use intensifies (figure 1.4). *Sitio* Villa Miranda, formerly known as Andarayan, is the main population center, and serves as a loading point for timber harvested in the forest. Administratively the area is part of barangay Dibuluan, which has around 1,250 inhabitants (NSBC 2007). Dibuluan and Villa Miranda have been inhabited for more than two hundred years. These settlements were stopovers on the trail to Palanan traversing the Sierra Madre mountain range. The Catalangan watershed is the ancestral land of the Kalinga, but nowadays most people are of Ilocano origin (Scott 1979; van der Ploeg & van Weerd 2005).

The Catalangan River forms the boundary of the Northern Sierra Madre Natural Park, the largest protected area of the Philippines. Dunoy Lake is located in the strict protection zone of the park. In theory all human activities are prohibited in this area with the exception of 'scientific studies and ceremonial use by indigenous cultural communities' (DENR 2001a: 6). In practice however farmers continue to expand their fields and intensively use the forest and rivers: most people in the area are not aware of the boundaries, zones or rules and regulations of the protected area. After several community consultations the Mabuwaya Foundation placed billboards around the lake. Captive-bred juvenile Philippine crocodiles are regularly released in the area to re-enforce the crocodile population (van de Ven *et al*. 2009).

Site 3: Dinang Creek

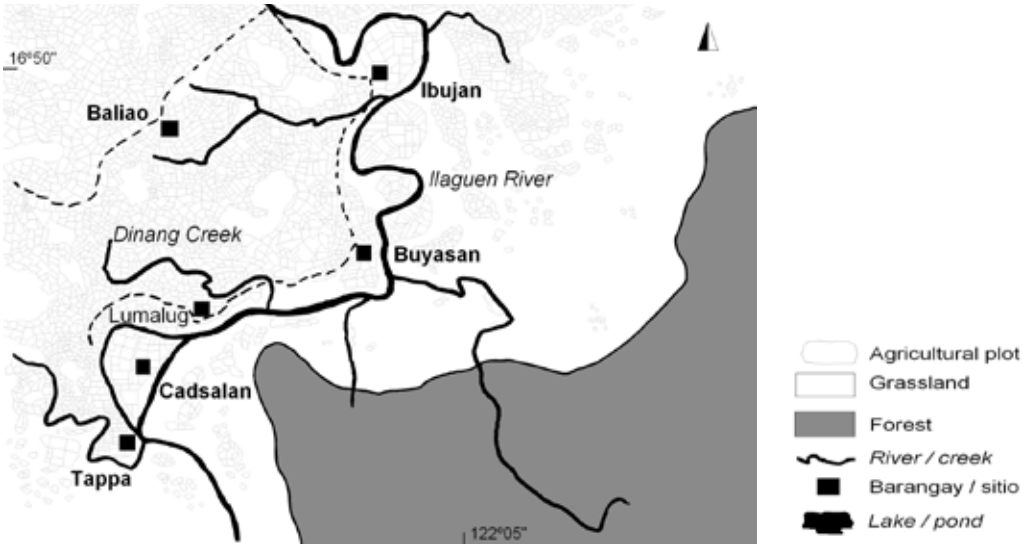
Dinang Creek is a small tributary of the Ilaguen River. The 11 kilometer-long creek meanders through sloping grasslands. Only a narrow strip on the banks of the creek remains forested. The water in the shallow creek is almost stagnant, and murky. Pools have formed in the bends of the creek. The creek drops with a steep waterfall into the Ilaguen River. In 2009 and 2012 three Philippine crocodile nests were recorded along the creek, making Dinang an important nesting site for the species.

A small *sitio*, Lumalug, is located adjacent to the creek. Dinang Creek is part of

barangay Cadsalan, which has around 1,200 inhabitants (NSBC 2007). Cadsalan itself lies on the confluence of Ilaguen River and Dicamay River (figure 1.5). The Kalinga still form a majority in barangays Cadsalan, Ibujan, Buyasan and Tappa, which are all located along the Ilaguen River. Land use along Ilaguen River is characterized by small agricultural plots: irrigated rice fields in the valleys, banana plantations on the steep slopes, and upland rice and yellow corn on the hill tops. The area was deforested in the early 1970s.

In 2003 the Mabuwaya Foundation and the LGU organized several meetings with the land claimants and barangay officials of Cadsalan with the intention to declare Dinang Creek as a crocodile sanctuary. At first, people in Lumalug were highly suspicious of the motives of the foundation: it was feared that crocodiles were a front for land grabbing (van der Ploeg & van Weerd 2005). But after several community consultations and meetings with the land claimants, the barangay council adopted a resolution declaring Dinang Creek a crocodile sanctuary with a five meter buffer zone in 2005. In practice the barangay ordinance is largely ignored: people fish, bath and shade livestock in the creek. People continue to cultivate their land up to the edge of the creek. Crocodile attacks on people and livestock pose a serious challenge to the conservation efforts in this densely populated area.

Figure 1.5: Dinang Creek



OUTLINE

> There was then seen a struggle such as was never before carried on under the skies of the Philippines: that of a poor Indian, ignorant and friendless, confiding in the justness and righteousness of his cause, fighting against a powerful corporation before which Justice bowed her head, while the judges let fall the scales and surrendered the sword. He fought as tenaciously as the ant which bites when it knows that it is going to be crushed, as does the fly which looks into space only through a pane of glass. Yet the clay jar defying the iron pot and smashing itself into a thousand pieces bad in it something impressive—it had the sublimeness of desperation! (Rizal 1891: 34)

The chapters of this thesis have been published in several scientific journals and newsletters. The format of these articles has been altered for the purpose of this thesis, but the content has remained largely unchanged. Inevitably the choice to write a PhD. dissertation based on articles implies some replication and overlap, for which I apologize to the reader. These articles were written in cooperation with several co-authors. Details about the specific roles of these co-authors in the research design, data collection, analysis and writing of the articles is provided in the first footnote of every chapter. To avoid unnecessary repetition I have combined the references into a single literature list at the end of the thesis.

Chapter 2 counters the popular notion that Philippine culture forms an obstacle for crocodile conservation. In the pre-colonial Philippines crocodiles were venerated as the embodiment of the ancestors. It enabled people to share the landscape with a potentially dangerous predator. These traditional beliefs and practices prove remarkably resilient, and may actually offer clues for conserving crocodiles in the twenty-first century. The chapter is based on an extensive literature review and ethnographic fieldwork in the northern Sierra Madre. It was published in *Environment & History* in 2011 (volume 17, number 2, pages 229-264).

Chapter 3 investigates the utilitarian logic that continues to underpin conservation policy in the Philippines, despite its evident failure to protect crocodiles and wetland habitat, and to improve the livelihoods of poor people living in crocodile habitat. Based on a qualitative case-study of the Palawan Wildlife Rehabilitation and Rescue Center (PWRCC) it is argued that that the conception of incentives purely in terms of economic benefits is too narrow and potentially counterproductive. The chapter was originally published in the *Journal of Environment and Development* in 2011 (volume 20, number 3, pages 308-328).

Chapter 4 consists of a detailed description of the community-based crocodile conservation program in San Mariano. The democratization and decentralization processes that are taking place in the Philippines since the fall of the Marcos dictatorship are often regarded as an obstacle for biodiversity conservation (*cf*. Lutz & Caldecott 1996). But in the northern Sierra Madre, the devolution of power and authority from the national government to local government units, rural communities and civil society

organizations has facilitated the design of municipal and barangay ordinances that protect crocodiles in the wild. These local agreements carry greater legitimacy and are therefore better enforced than national legislation such as the Wildlife Act. The chapter was published in the journal *Philippine Studies* in 2004 (volume 52, number 3, pages 346-383).

Conservationists are increasingly urged to engage in 'open dialogues' and 'concerted negotiations' with rural communities (Brechin *et al.* 2003: 21). But what such participatory processes look like in practice often remains unclear. Chapter 5 describes four community consultations in which villagers, local government officials and staff of the Mabuwaya Foundation discuss ways to conserve crocodiles. It shows how community participation facilitates information sharing, links environmental conservation to broader debates on rural development and social justice, and often leads to conservation action at the grassroots level. The chapter was published in 2009 in the *Crocodile Specialist Group Newsletter* (volume 28, number 3, pages 8-10).

Chapter 6 evaluates the public awareness campaign for the conservation of the Philippine crocodile in the northern Sierra Madre through a quantitative counterfactual comparison. It shows that disseminating information to rural communities is an essential first step for community-based conservation. The article 'Assessing the effectiveness of environmental education: mobilizing public support for Philippine crocodile conservation' was published in 2011 in the journal *Conservation Letters* (volume 4, number 4, pages 313-323).

Most people in the municipality of San Mariano now know that the Philippine crocodile is legally protected, and as a result the species is no longer purposively killed. But people often do not understand *why* crocodiles are protected. Chapter 7 argues that utilitarian reasons to justify in-situ Philippine crocodile conservation are often based on inaccuracies and flawed assumptions, and that cultural and intrinsic values offer a more realistic and honest argument to convince rural communities to protect crocodiles. The chapter was published in 2011 in the *Journal of Integrative Environmental Sciences* (volume 8, number 4, pages 287-298).

Chapter 8 documents two recent attacks of Philippine crocodiles on people in San Mariano. Such incidents quickly erode local support for in-situ conservation efforts. Simple precautionary measures can minimize human-crocodile conflict. But raising awareness, providing safe access to water or relocating problem-crocodiles can never completely assure human safety. Paradoxically, rural communities living in Philippine crocodile habitat seem more willing to accept this harsh reality than most outsiders can imagine. Traditional cultural values enable people to cope with the risk of living with a large predator. The chapter was published in 2012 in the *Crocodile Specialist Group Newsletter* (volume 31, number 2, pages 20-23).

This thesis challenges the common view that people will only conserve crocodiles when they profit financially from it. Its central argument is that conservationists should

stop pretending that Philippine crocodiles can generate tangible economic benefits for rural communities. Such an utilitarian approach inevitably leads to disappointments and conflicts, and risks overshadowing other arguments that can inspire conservation. Instead, it is vital to find ways to (re-)build cultural links between people and nature, and assure that conservation efforts reflect locally important issues and values (Adams 1997; Posey 1999; Infield 2001; Pilgrim & Pretty 2010). I think José Rizal would have agreed.

ENDNOTES

1. The order *Crocodylia* consists of three families: the *Gavialoidea* (the gharials), the *Crocodylia* (the crocodiles) and the *Alligatoridae* (the alligators and caimans). There are six caiman species, which are all restricted to the New World (Martin 2008).
2. Historical reports of 10 m long saltwater crocodiles are known to be in error (Whitaker & Whitaker 2008). The naturalist Guggisberg (1972: 39) reported an 8.80 m saltwater crocodile from northern Luzon, but thought it unlikely that 'monsters of such dimensions could still survive today.' In 2011 a 6.1 m saltwater crocodile was captured in the municipality of Bunawan on Mindanao. This crocodile, named 'Lolong', captured headlines around the world as the 'largest crocodile in captivity' (Britton 2012).
3. The maximum reported length of a museum specimen is 3 m (Hall 1989). The largest Philippine crocodile captured in the wild on Luzon measured 2.7 m (van Weerd 2010). Significantly, there are no reported fatal Philippine crocodile attacks on humans (van Weerd & van der Ploeg 2012). Juvenile Philippine crocodiles feed on shrimps, dragonflies, fish, frogs and snails, and adult crocodiles prey opportunistically on wild and domestic pigs, dogs, rats, snakes and water birds.
4. This is based on criteria A1c (an 80 percent observed decline in extent of occurrence in 3 generations) and C2a (less than 250 adults in the wild, and a highly fragmented and declining population) (IUCN 2010). The saltwater crocodile, is actually also severely threatened in the Philippines; but as populations have recovered in the wild in Papua New Guinea and northern Australia the species is not globally threatened (Webb *et al.* 2010; IUCN 2010).
5. Evidently, this is a reflection of the exceptional high rates of biodiversity loss in South and Southeast Asia (Hoffmann *et al.* 2010). The rich terrestrial, freshwater and marine ecosystems of tropical Asia are severely threatened by degradation, overexploitation, invasive species and pollution, driven by a rapidly growing human population and economic development (Ashton 2007; Woodruff 2010). Widespread rural poverty and weak governance further exacerbate what has been called 'the Asian biodiversity crisis' (Sodhi *et al.* 2004; McNeely *et al.* 2009). Particularly freshwater wetlands are experiencing a severe decline in biodiversity (Dudgeon 1992; Gopal 2005; Dudgeon *et al.* 2006). Nowhere is the situation as bad as in Philippines (Myers *et al*. 2000; Sodhi *et al*. 2010; Duckworth *et al*. 2012). The densely populated Philippine archipelago has lost most of its forest cover as a result of commercial logging and agricultural expansion (Kummer 1992; World Bank 2003). Freshwater wetlands are under even greater pressure from anthropogenic activities, but are poorly represented in the country's protected area system (DENR & UNEP 1997). As a result the Philippines has more threatened endemic species per km^2 than any other country in the world (Ong *et al.* 2002; Brooks *et al.* 2002).
6. The Philippine crocodile still occurs in the Northern Sierra Madre Natural Park on Luzon and the Liguasan Marsh Game Refuge on Mindanao (Mallari *et al.* 2001; Pomares *et al.* 2008). The species seems to be exterminated in the Naujan Lake National Park on Mindoro. Records from the Agusan

Marsh Wildlife Sanctuary are known to be in error (Pontillas 2000).

7. In 1975 *Crocodylus mindorensis* was listed on the CITES Appendix I, banning all international trade in the species (UNEP-WCMC 2003). But the Philippine crocodile continued to be pursued for food, out of fear and to meet the domestic demand for 'traditional' medicines, exotic pets and exclusive souvenirs (WSCP 1997).
8. The Philippine crocodile conservation project of the Mabuwaya Foundation is financially supported by the following donors: Conservation Leadership Program (CLP), Critical Ecosystem Partnership Fund (CEPF), Haribon Foundation, WWF-Philippines, van Tienhoven Foundation, Netherlands Committee for IUCN, Provincial Government of Isabela, WWF-Netherlands, Prince Bernhard Fund for Nature, Hong Kong Ocean Park Conservation Foundation, People's Trust for Endangered Species (PTES), Crocodylus Porosus Philippines Inc (CPPI), IUCN/SSC Crocodile Specialist Group, US Fish and Wildlife Service (USFWS), Rufford Foundation, Disney Worldwide Conservation Fund, USAID, Foundation for the Philippine Environment (FPE), Philippine Tropical Forest Conservation Foundation (PTFCF), UNDP and Lacoste through the Save your Logo program. Additional support was provided by Melbourne Zoo, Gladys Porter Zoo, Chicago Zoological Society, Taronga Zoo, Cleveland Metroparks Zoo and Cleveland Zoological Society, Lowry Park Zoo, Naples Zoo, Oregon Foundation, Pittsburgh Zoo & Aquarium, Henry Doorly Zoo, St Augustine Alligator Farm, The Phoenix Zoo Conservation and Science Grant Program, Woodland Park Zoological Society, Danish Crocodile Zoo, Boise Zoo, Sea World Busch Garden, Chester Zoo, Bergen Aquarium, Zurich Zoo, Köln Zoo and London Zoo.
9. Little is known about the ecology and behavior of the Philippine crocodile. Most ecological information on the species was based on observations in captivity in the 1990s (Alcala 1997; Ortega 1998). Recent studies by the Mabuwaya Foundation have generated important new insights on population dynamics; behavior, reproduction, home ranges, movements, growth rates of Philippine crocodiles in the wild. See for example: van Weerd & van der Ploeg 2004; Tarun *et al.* 2004; van Weerd *et al.* 2006; van Weerd & van der Ploeg 2008; van de Ven *et al.* 2009; van Weerd 2010; van Weerd & van der Ploeg 2012).
10. A few prominent families dominate local politics through patronage networks and the threat of violence, and control the local economy (*cf.* Kerkvliet 1990; Borras 2001). Most farmers do not formally own the land they cultivate: 86 percent of the municipality remains classified as forest land (Local government of San Mariano 2010).
11. Most people fish for subsistence. A few commercial fishers sell fish and shrimps on the market in San Mariano town. Rivers and creeks are generally regarded as open-access resources. In most areas there are no rules limiting access or prohibiting specific fishing methods: fishers can catch anything, anywhere, and as much as they like. Giant tilapia (Nile tilapia *Oreochromis niloticus*), *siling* (Java barb *Barbonymus gonionotus*), *hito* (Bangkok catfish *Clarias batrachus*) and *imelda* (Russian carp *Carassius carassius*) are the most commonly caught species. These four fish species have been introduced to the Philippines in the 1950s, an indication of the unprecedented changes in freshwater ecosystems that have occurred over the past sixty years. People use a great variety of fishing methods: spears (*pana*), nets (*tabukol* or *sigay*), traps (*bubu)*, fykes (*bukatot*), draining (*makkammil*), and hooks (*banit*). Electricity fishing (*kuryente*) is often tolerated by village officials. In some villages dynamite fishing is banned, except for specific occasions when much fish is needed such as funerals, feasts or Holy Week.
12. In the 1970s San Mariano was one of the centers of the corporate logging industry in the Sierra Madre (van den Top 1998). In 1992 the Aquino administration imposed a logging moratorium in San Mariano, and in 2001 the remaining forests of the municipality were included in Northern Sierra Madre Natural Park, the largest protected area of the Philippines. Logging is by definition illegal in the park, but people continue to harvest and sell timber (van der Ploeg *et al*. 2011e). Timber harvesting remains one of the most profitable income-generating activities for rural households along the forest frontier.

2. A CULTURAL HISTORY OF CROCODILES IN THE PHILIPPINES: TOWARDS A NEW PEACE PACT?[1]

INTRODUCTION

In March 2004, I conducted together with several colleagues of the Mabuwaya Foundation a crocodile survey along the coast of the Northern Sierra Madre Natural Park in Isabela Province in Northeast Luzon. We counted crocodiles and interviewed people on human-crocodile conflicts. Hunters explained the importance of treating crocodiles with respect and farmers told anecdotes about enchanted crocodiles. We heard stories about spirits changing into vengeful crocodiles. Some people told us that they were afraid of crocodiles. Others mentioned that they had recently found a crocodile nest and had eaten the eggs. But none of the respondents expressed a fundamental objection to living with crocodiles. On our way back, waiting for the airplane, we had a conversation with a senior government official who reassured us that there were no more dangerous crocodiles in the protected area: Moro hunters and the military had killed and eaten them all to protect the people. Jokingly he added that if we were looking for crocodiles we could better go to the halls of Congress in Quezon City. We had heard this joke many times before, but never in such contrast with the perceptions of hunters, farmers and fishermen as that day in Palanan.

Commercial hunting for the international trade in crocodile skins decimated crocodile populations in the Philippines (Wernstedt & Spencer 1967). *Crocodylus porosus* is a premium species for the crocodile leather industry, and the species has been hunted intensively in the Philippines since the 1940s. As the Indo-Pacific crocodile became rare, hunters shifted their attention to the Philippine crocodile. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) banned the international trade in *Crocodylus mindorensis* skins on 1 July 1975. Ten years later, on 1 August 1985, the Philippines' Indo-Pacific crocodile population was also placed on CITES Appendix 1.

Since 2004, both crocodile species are officially protected under Philippine law (by virtue of the Wildlife Act: Republic Act 9147). However, in the socio-political context of the Philippines environmental legislation is seldom enforced: crocodiles continue to be killed for food or fun, and out of fear (van der Ploeg & van Weerd 2004). The conversion and degradation of wetland habitat pose significant threats to crocodiles in the Philippines and might prevent a recovery of the species (Ross & Alcala 1983; Thorbjarnarson 1999). The widespread use of dynamite, electricity and pesticides to maximize fish catches also poses a heavy toll on the remaining crocodile populations. As a result the Indo-Pacific crocodile and the Philippine crocodile have become rare in the wild: both species face a high risk of extinction in the near future in the Philippines.

Crocodiles have an image problem in the Philippines. In mainstream Filipino culture crocodiles are seen as vermin and considered to be a severe threat to children and livestock (Ortega 1998; Banks 2005). Crocodiles are stereotyped as ferocious monsters or bloodthirsty man-eaters, and associated with greed and deceit: corrupt government officials, selfish athletes, landlords and moneylenders are often called *buwaya*, Filipino for crocodile. In the media politicians are often portrayed as crocodiles (figure 2.1).

Figure 2.1: In Philippine media crocodiles are associated with corruption and nepotism. Left: A congressman portrayed as a hungry crocodile (Philippine Star, 14 December 2006). Right: President Gloria Macapagal-Arroyo can't get rid of her corrupt image (Philippine Star, 13 December 2007)

It is argued that these negative attitudes of the Filipino public form a major obstacle to *in-situ* crocodile conservation (Ross 1982; Banks 2005). The Wildlife Conservation Society of the Philippines. for example, concluded that:

> 'Filipinos have a strong dislike for the reptiles, especially crocodiles, due to the reputation of the estuarine crocodile as a man-eater, causing fear for all crocodiles. This has pushed the [Philippine crocodile] to the verge of extinction.' (WCSP 1997: 78).

Since the 1980s government policy has been based on the idea that in order to secure the survival of crocodiles in the Philippines, animals have to be removed from the wild and bred in captivity (Ross 1982; Ortega *et al*. 1993). In this chapter I contest this view. Attitudes towards crocodiles are indefinitely more complex and diverse than policy makers, conservationists and the media suggest.

In earlier times crocodiles were feared *and* revered: specific rules regulated

the relationship with crocodiles and enabled people to share the landscape with potentially dangerous carnivores. The Spanish friars recorded these primordial sentiments towards crocodiles in detail. These beliefs did not disappear: in the uplands of the Philippines indigenous communities still associate crocodiles with ancestors, fertility and mystic power. This veneration is expressed in material art, architecture, music and oral literature, and has played a role in the survival of the crocodiles in the Philippines. On Luzon the Kalinga sing ballads about the relationship between chiefs and crocodiles (Menez 2004). On Palawan the Tagbanwa believe their ancestors made a blood pact with the crocodiles to prevent attacks. And on Mindanao the T'boli weave cloth with delicate crocodile motifs (Paterno *et al*. 2001) and the Magindanaon believe they descent from crocodiles (Mangansakan 2008). Not surprisingly these are also the areas where crocodiles still survive in the wild.

In this chapter I aim to look through W.H. Scott's proverbial 'cracks in the parchment curtain' in order to get a better understanding of the relations between crocodiles and people in pre-colonial Philippines, and the changes that occurred in this relationship over time (Scott 1982). I present a literature overview of historical sources on perceptions of crocodiles in the Philippines, complemented with information from the ethnographic literature. For contemporary attitudes towards crocodiles I mainly rely on field work in the northern Sierra Madre between 2001 and 2008. I adopt a historical and comparative perspective, explicitly showing the cultural continuity of perceptions of crocodiles in both space and time. The Kalinga in the northern Sierra Madre, for example, make rice cakes in the form of a crocodile during healing ceremonies. Gatmaytan (2004) and Maceda (1984) report similar healing rituals among the Manobo and the Magindanaon, respectively. This seems remarkably familiar to the rice cake offerings in the form of a crocodile (*binuwaya*) in pre-colonial Visayas reported by W.H. Scott (1994). This transcends academic curiosity: the Kalinga ancestral lands in the northern Sierra Madre form the last stronghold for the Philippine crocodile in the wild. Here, the species survived as an unintended result of traditional values, beliefs and practices.

My aim in this chapter is to document the views, feelings and imaginations of the inhabitants of the Philippine Islands toward crocodiles through time and to counter the simplistic assumption that culture hinders crocodile conservation.[2] Filipino culture in all its diversity and flux is not a barrier for coexistence with crocodiles. On the contrary, an assessment of indigenous cosmology and contemporary marginalized perceptions of crocodiles might offer clues for conserving crocodiles in the Philippines in the wild in the twenty-first century.

THE PRE-COLONIAL HERITAGE

A reconstruction of primordial sentiments towards crocodiles in the Philippines inevitably has to cope with the bias of the Spanish *conquistadores* and friars. Obviously, the notes on the biology of the Philippine Islands and the cosmology of the *indios*, as the native Filipinos were called, were primarily made for effective exploitation and conversion. But despite the racism and religious dogmas, the Spanish archives provide detailed information of everyday life in the archipelago, and surprisingly often mentioned crocodiles.[3]

One of the first and best known written accounts of crocodiles in the Philippines was made by Antonio de Morga (1609: 93-94) a high-ranking colonial officer in Manila:

> 'There are […] a great number of crocodiles [in the rivers and creeks], which are very bloodthirsty and cruel. They quite commonly pull from their *bancas* the natives who go in those boats, and cause many injuries among the horned cattle and the horses of the stock-farms, when they go to drink. And although the people fish for them often and kill them, they are never diminished in number. For that reason, the natives set closely-rated divisions and enclosures in the rivers and creeks of their settlements, where they bathe, secure from those monsters, which they fear so greatly that they venerate and adore them, as if they were beings superior to themselves. All their oaths and execrations, and those which are of any weight with them (even among the Christians) are, thus expressed: "So may the crocodile kill him!" They call the crocodile *buhaya* in their language. It has happened when someone has sworn falsely, or when he has broken his word, that then, some accident has occurred to him with the crocodile, which God, whom he offends, has so permitted for the sake of the authority and purity of the truth, and the promise of it.'

As the Spanish settled in the coastal lowlands or along major river systems, in de Morga's case Laguna de Bay and the estuary of Pasig River, the historical accounts most likely refer to the Indo-Pacific crocodile. Throughout the Philippine archipelago, and indeed most of the Malay world, the Indo-Pacific crocodile was called *buwaya*.[4] In most parts of the Philippines, people distinguished between the two crocodile species (table 2.1). This is reflected in 17th century Spanish vocabularies where a distinction was often made between *cocodrilo* and *caimán*; a nuance that was later lost in English dictionaries (see for example: Long 1843: 88).[5] But local taxonomy was indefinitely more complex than this: it included ancestor-crocodiles, spirit-crocodiles and witch-crocodiles.

Taxonomy and cosmology

De Morga's quote exemplifies the paradoxical relationship between crocodiles and men in pre-colonial Philippines. On the one hand, crocodiles posed a significant danger to people and livestock. Man-eating crocodiles are a recurrent theme in the Spanish archives. The historiographer of Aragon, Bartolomé Leonardo de Argensola (1708: 235), for example, wrote:

> 'In the rivers and lakes are many monstrous caimans, or crocodiles; these kill the Indians very easily, and especially the children, who happen unadvisedly to come where they are, as well as the cattle when they go to drink. It often happens that they lay hold of their snouts, or noses, and draw them under water, where they are drowned, without being able to defend themselves.'

On the other hand, crocodiles were venerated. The best illustration of this fact comes from the book *Labor Evangelica* written in 1663 by Francisco Colin:

> '[The Tagalogs] held the crocodile in the greatest veneration; and, when they made any statement about it, when they saw it in the water cried out, in all subjection, "*Nono*", signifying Grandfather. They asked it pleasantly and tenderly not to harm them; and for that purpose offered it a portion what they carried in their boats, by throwing it into the water.'

People prayed and made offerings to edifices of crocodiles (Blumentritt 1882: 12; Jagor 1875: 207; Cole 1913: 114). The *buwaya* was a benign symbol of physical strength, sexuality, fierceness and power. In legends and myths, heroes and chiefs were depicted as crocodiles or thought to have personal bonds with crocodiles. [6] Warrior chiefs traced their ancestry to crocodiles and wore necklaces made of crocodile teeth, *boaia*, as symbols of their power. Crocodile teeth were also widely used as omens and as amulets to protect the bearer from evil spirits and sickness (de Loarca 1582: 130; Bowring 1859:157; Scott 1994: 82). Crocodile motifs were woven into funeral cloths and carved into coffins to protect the deceased from evil spirits (Maxwell 1990: 98; Benedict 1916: 42). Throughout insular Southeast Asia crocodiles were associated with water and rain, and thus with agricultural fertility and rice culture (Schulte Northolt 1971; Middelkoop 1971: 437; Hose & McDougall: 198). In pre-colonial Philippines crocodiles were symbols of danger as well as protection, a benevolent and malevolent power at once (Maxwell 1990: 133). The functional interpretation of Antonio de Morga that crocodiles were worshipped because of the danger they posed –'monsters, which they fear so greatly that they venerate and adore them'- does however injustice to the complexity of pre-colonial Philippine cosmology.

The *indios* in fact worshipped a variety of ancestor spirits, nature gods and mythical creatures, which could take the form of a crocodile. First, it was thought that

the ancestors could reincarnate in crocodile form:

> 'They believe that after a certain cycle of years, the souls of their forefathers were turned into crocodiles.' (Pablo de Jesus cited in Nocheseda 2002: 104).

These benevolent ancestor spirits, called *anito*, were venerated as personal guardians and secured good harvests. But they could also cause death and destruction if not given due respect (Scott 1994). Second, crocodiles could be the embodiment of nature-gods, generally called *diwata*. Negrito peoples in the Philippines, for example, believed that a large crocodile, called *Lahua,* inhabited the earth and caused earthquakes (Schebesta 1957: 276; Garvan 1963: 204). In several origin myths from the Philippines the creator-god takes the form of a crocodile (Gray 1979). These crocodile-gods were seen as the guardians of the underworld: they were invoked to secure a safe passage for the dead to the next life (Maxwell 1990: 98). Miguel de Loarca (1582: 129), an influential member of the Catholic clergy in Manila, wrote:

> 'It is said that the souls of those who [are] eaten by crocodiles […] which is considered a very honorable death, go to heaven by way of the arch which is formed when it rains, and become gods. The souls of the drowned remain in the sea forever.'

These crocodile-gods lived in a parallel world, often literally interpreted as an underwater village. Third, people believed in malevolent spirits and witches, most often called *aswang*, which could take the form of a crocodile (Gardner 1906: 195). Father Antonio Mozo (1673: 16), for example related that:

> '[I]n two islands, called Zebu and Panay […] dwell a people who are called the Mundos; they have the same barbarian characteristics of fierceness and barbarism […], but they have besides this a peculiarity which renders them intractable, for they have among them some fearful wizards. […] Instructed and misled by the demon, those barbarians do fearful things, especially to revenge themselves, to the continual terror of those about them. The natives say that these wizards, change into crocodiles, follow them when in their canoes, and do not stop until they seize some person whom they hate; also that they change themselves into other animals, in order to commit other wicked acts – as likewise that, availing themselves of various enchantments, they commit horrible murders, with a thousand other diabolic acts […].'

These *aswang* ate people and disinterred corpses. But simple pre-cautions, such as making noise or avoiding being alone, could be taken against these creatures (Alejandro 2002; Scott 1994: 81).

It is important to note that not all crocodiles were seen as the personification of the ancestors, gods or witches. Enchanted crocodiles could be distinguished from normal crocodiles by having extraordinary traits, such as being very large, docile, strangely coloured, crippled, wearing a necklace, or having four toes instead of five

(Wilken 1885; Kruyt 1935).[7] The Franciscan priest Juan Francisco de San Antonio (1738: 154) wrote:

> 'It is definite that crocodiles do not have a tongue. However, I am told that a crocodile who had swallowed a man whole and was later followed and killed, the man being found complete in its stomach, had a large black tongue. It is not known whether this is because it was of a special type. […] It was the strangest one seen by my informant during his whole life. This happened in 1736 in the Macabebe River in Pampanga. The man who was thus swallowed was Captain Culango who owned a tavern in the village called Manlauay, well known by the natives.'[8]

Conversely, not all spirits were crocodiles. The *anito*, *diwata* and *aswang* could manifest themselves in many possible ways, not necessarily in the form of a potentially dangerous animal. They could also take the form of harmless animals such as nightjars, owls, or kingfishers, which were feared as much as crocodiles (Colin 1663: 77; Gardner 1906: 193).

The peace pact

A drawing by the Tagalog artist Francisco Suárez provides a rare glimpse of daily life in the early 18th century (figure 2.2). Crocodiles were common throughout the Philippine archipelago and people often lived in close proximity to crocodiles. The Spanish colonizers were puzzled by the apparently indifferent attitude of the *indios* towards crocodiles. This can be best illustrated by a quote of the Augustinian friar Casimiro Diaz (1890: 212-213) who lived in Pampanga in 1717:

> 'In another way they exhibit other rash actions, by which it is seen that their rashness is rather the daughter of ignorance and barbarity than of valor […] The same thing happens in the rivers where there are crocodiles, although they see them swimming about; for they say the same as do the Moros (i.e. Mahometans), that if it is from on high it must happen, even though they avoid it. […] The world is just so. If it is written on the forehead that one is to live, than he will live; but if not, then he will die here.'

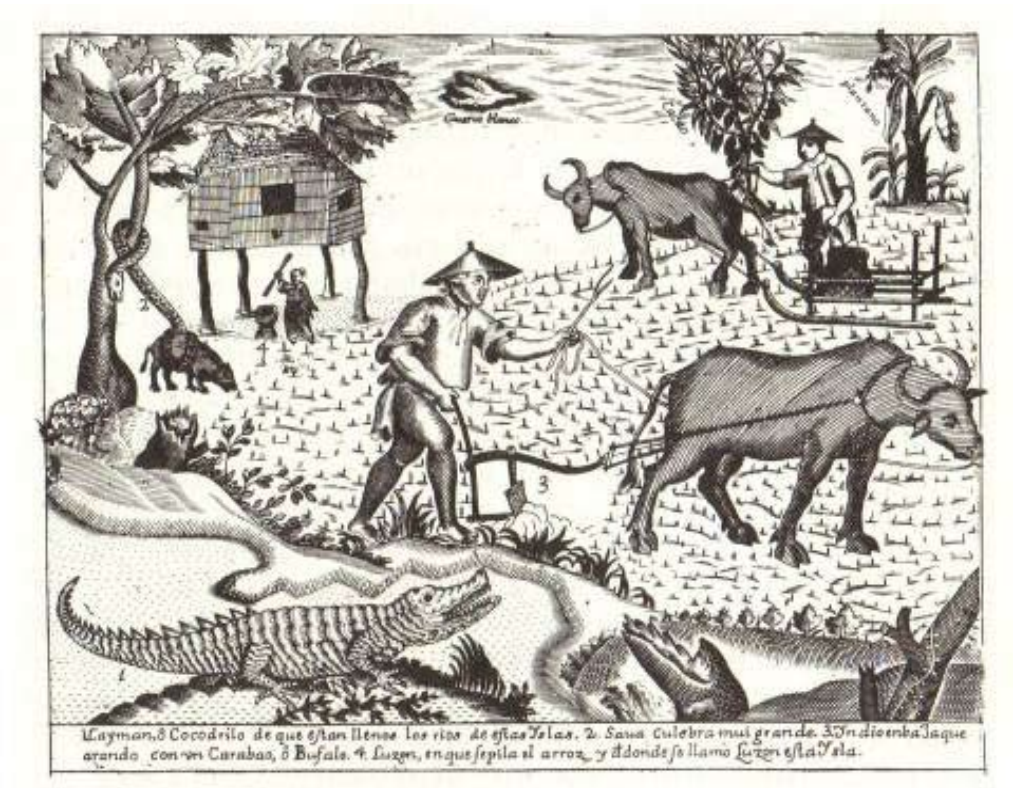
In some areas people built bamboo fences as precaution against man-eaters: the *patiwa* described by Antonio de Morga (Nocheseda 2002: 71).[9] But in general people seemed to take not much notice of the danger posed by crocodiles and adopted no rigid safety measures (see Bowring 1859: 130-131; Worcester 1898: 514). During a visit to Leyte, the German ethnologist Fedor Jagor (1875: 269) described the almost submissive attitude of the natives:

> 'The principal employment of our hosts appeared to be fishing, which is so productive that the roughest apparatus is sufficient. There was not a single boat, but only loosely-

> bound rafts of bamboo, on which the fishers, sinking, as we ourselves did on our raft, half a foot deep, moved about amongst the crocodiles, which I never beheld in such number and of so large a size as in this lake. Some swam about on the surface with their backs projecting out of the water. It was striking to see the complete indifference with which even two little girls waded in the water in the face of these great monsters. Fortunately the latter appeared to be satisfied with their ample rations of fish.'

Here, the prejudice of the Europeans obstructed a comprehensive analysis. A comparative Southeast Asian perspective enables us to contextualize these anecdotes and better understand the relationship between people and crocodiles in pre-Hispanic Philippine cultures.[10]

Figure 2.2: Fragment from Murillo Velarde's *Carta hydrographica y chronographica de las Islas Filipinas* by F. Suárez (1734). Note the caption: '1. Caiman or crocodile of which the rivers of these isles are full. […].'



In Malay cosmology crocodiles never arbitrarily attacked people. On the contrary, crocodile attacks were seen as a selective punishment of the *anitos* that followed socially unacceptable behaviour. Man-eating crocodiles were seen as divine arbiters: '*alguazil* of the water' (Chirino 1604: 201; Kruyt 1935: 14; Adams 1979: 93;

Bakels 2000: 366-367; Nocheseda 2002: 65).[11] Crocodiles guarded the social order and avenged the transgression of taboos. Crocodile attacks were considered the victims' own mistake. In this perspective it was futile to be afraid of, or to take precautions against crocodiles.

It was believed that crocodiles personally knew and were closely related to the local community (Hose & McDougall 1901: 186; Boomgaard 2007: 17). People constructed personal relationships with crocodiles through reincarnation, descent, marriage, friendship or blood pacts. In the marshes of Mindanao the *datus* traced their ancestral lineage to mythical crocodiles (Polenda 1989). In the Cordillera Mountain Range on Luzon the Kalinga called themselves *buwaya* (de Raedt 1993). And in the Visayan Islands it was believed that women could give birth to crocodiles. In 1668 the Jesuit Francisco Alcina wrote:

> 'One of [the] parishioners gave birth to a crocodile twin. She was the wife of Pakotolini of Tubig, who had been raised in a Jesuit house as a church boy, and the little creature was delivered together with a normal child. The parents moved away to get rid of it, but it not only followed them but regularly brought them a wild hog or deer, or large fish.' (cited in Scott 1994: 114-115).

These personal alliances have been extensively documented in the ethnographic literature from insular Southeast Asia. The Dutch ethnologist George Wilken wrote that the Bugis believed that the deceased changed into crocodiles: they placed offers in the water for those who had become crocodiles (Wilken 1885: 70). The Kanyah, Kenyah and Iban in Sarawak believed that they were related to crocodiles (Hose and McDougall 1901: 190-99).[12] Also the Batak in Sumatra thought they descended from crocodiles and therefore could not eat crocodile meat (Wilken 1885: 69). And in Nusa Tenggara people traced their origins to a powerful crocodile that had married a girl from the village (Schulte Nordholt 1971: 323; Middelkoop 1971: 436-440; Adams 1979: 92).

Consequently there were strict taboos on killing crocodiles or eating their meat. Doing so was also considered an unwise provocation: crocodiles were known to take revenge (Boomgaard 2007: 19). There was one clear exception: when a crocodile attacked a human that specific animal was killed, irrespective of the fact that the crocodile might have acted as an instrument of the gods (Hose & McDougall 1901: 186). Obviously the killing of the man-eater had to be justified. People searched the stomach of the crocodile for stones and pebbles, which proved its guilt. It was thought that each stone represented the soul of a victim (de la Gironiére 1854: 221; Skeat 1900: 292-293).[13] When the man-eater was killed, offers were made to restore the peace between crocodiles and people (Kruyt 1935: 9; Nocheseda 2002: 93; Gavin 2003: 98). People and crocodiles could again live together in peace.

These personal bonds in effect included crocodiles into the moral order. The laws and logic that regulated social life also applied to the relationship between people

and crocodiles. To assure that crocodiles and people could peacefully co-exist, there were specific rules and obligations for both parties (Kruyt 1935: 12-13; Bakels 2000). The well-being of the community depended on its harmonious relations with crocodiles. People's attitudes towards crocodiles were respectful, tolerant and non-aggressive. Violations from either side were punished. When a crocodile attack took place people sought a logical explanation and killed the man-eater in retaliation. This 'peace-pact' gave meaning to a dangerous and unpredictable world and enabled people to co-exist with crocodiles (Kruyt 1935: 10).

THREE-HUNDRED YEARS IN THE CONVENT, ONE-HUNDRED YEARS IN HOLLYWOOD

When the *datu* Soliman, Ache, and Lakandula surrendered to Miguel López de Legazpi in 1571, crocodiles were still invoked:

> 'The oaths of these nations were all execrations in the form of awful curses. *Matay*, "may I die!" *Cagtin nang buaya*, "may I be eaten by the crocodile!" […] When the chiefs of Manila and Tondo swore allegiance to our Catholic sovereigns, […], they confirmed the peace agreements and the subjection with an oath, asking the sun to pierce them through the middle, the crocodiles to eat them, and the women not to show them any favor or wish them well, if they broke their word.' (Colin 1663: 78-79).

Four hundred years later the bond between crocodiles and people has been broken. Crocodiles are exterminated in most parts of the Philippines. Catholicism and a surging global demand for crocodile leather transformed Filipino perceptions of crocodiles and redefined the moral order.[14] Crocodiles are no longer seen as guardians but as dangerous pests. But the fear of the beast paradoxically increased as crocodiles disappeared from the landscape.

In the medieval perception of the Spanish friars crocodiles were the personification of the devil (Cohen 1994). They brought with them Biblical notions of the Leviathan, an image that suited the Indo-Pacific crocodile well (Kiessling 1970). In the eyes of the friars, crocodiles did not only pose a physical threat to communities but a challenge to the faith itself. The adulation of crocodiles in the Philippines re-enforced the evangelical notion of an epic struggle against paganism. The slaying of the dragon and the subsequent conversion of the infidels are recurrent themes in medieval Christian mythology, for example in the legends of St. Martha, St. George and the dragon, and Philip the Evangelist (Hédard & Fréchet 2005: 96). It perfectly fitted the Philippine context where people made offerings to statues of crocodiles. The religious orders actively tried to destroy these pagan idols and liberate the *indios* from the evil crocodiles (Bankoff 1999: 40). Conversion could save people from the danger posed

by crocodiles:

> 'In this same year occurred a miraculous conversion of an infidel. This latter was crossing the river of Manila in one of those small boats so numerous in the islands, which do not extend more than two dedos out of the water. As there are many caimans in this river (which in that respect is another Nile), one of them happened to cross his course, and, seizing him, dragged him to the bottom with a rapidity which is their mode, by a natural instinct of killing and securing their prey. The infidel, like another Jonas, beneath the water called with all his hearth upon the God of the Christians; and instantly beheld two persons clad in white, who snatched him from the claws of the caiman; and drew him to the bank safe and sound; and as a result of this miracle he was baptized, with his two sons, and became a Christian. The very opposite befell another Christian, who forgot of God, passed every night to the other side of the river to commit evil deeds. God, wearied of waiting for him, sent his '*alguazil* of the water' – which is the name of the cayman – who, seizing him executed upon his person the divine chastisement for his wickedness.' (Chirino 1604: 201).

During the Spanish occupation crocodiles became symbols of evil and danger. The dragon captured at the feet of a Saint became an icon in art and literature.[15] Figure 2.3, a painting from the parish church of San Mariano, is exemplary: a Saint saves his congregation by trampling a crocodile.

The novels of Jose P. Rizal, the Filipino novelist and nationalist whose execution set off the Philippine revolution, provide another illustration of the changes that occurred in peoples' perceptions of crocodiles. Rizal used the Spanish chronicles as a source of inspiration to 'awaken [the] consciousness of our past […] and to rectify what has been falsified and slandered' (Rizal 1889 cited in Hall 1999). There are numerous references to 'caymans' in the works of Rizal, who despite being a keen naturalist apparently did not know that there were two species of crocodiles in the Philippines. One of the most famous is a passage in *Noli Me Tangere* when a crocodile is encountered, and killed, during a fishing trip on Laguna de Bay:

> 'All because we didn't hear mass, sighed one. But what accident has befallen us, ladies? asked Ibarra. The cayman seems to have been the only unlucky one. All of which proves, concluded the ex-student of theology, that in all its sinful life this unfortunate reptile has never attended mass – at least I've never seen him among the many other caymans that frequent the church. […] The body of the cayman writhed about, sometimes showing its torn white belly and again its speckled greenish back, while man, Nature's favorite, went on his way undisturbed by what the Brahmin and vegetarians would call so many cases of fratricide. (Rizal 1886: 156-160).

Clearly, the association of crocodiles with greed and egoism was already commonly accepted in 19th century Philippines. In his book *El Filibusterismo* Rizal took things a step further: crocodiles became symbols of nepotism and colonial suppression. Rizal portrayed the Spanish friars as crocodiles, and paid with his life.[16]

Figure 2.3: Painting in the parish church in San Mariano by C. Domelod (1999).

The conversion of marshes and the clearance of riparian forests fuelled by a growing human population must have had an impact on crocodile populations during the Spanish occupation, particularly in Luzon and the Visayas (Bankoff 2007). But it was the frontier mentality of the American imperialists that fundamentally altered the relationship between crocodiles and people in the Philippines: for the Americans crocodiles were not only dangerous pests but also valuable resources.[17] After the Philippine Revolution and the treaty of Paris of 1898 that ended the Spanish-American War, the United States started to explore and exploit its newly acquired colony. The Taft Commission, tasked to investigate the conditions in the Philippine Islands, stereotyped crocodiles as dangerous man-eaters:

> 'Crocodiles are extremely abundant in many of the streams and freshwater lakes, and are sometimes met with in the sea along the coast. They frequently attain a very large size. […] In certain parts of the archipelago they occasion no little loss of life, while in other regions the natives may be seen bathing with apparent impunity in streams where they are known to abound. The natives explain this by saying that the taste for human flesh is acquired, and that having once tasted it by accident a crocodile is content with nothing else and becomes a man-eater' (Philippine Commission 1901: 318-19).

The early explorers and naturalists often exaggerated the dangers of the Orient for their overseas' readers (figure 2.4). Even the zoologist Joseph Steere who collected the paratype specimen of the Philippine crocodile in Mindoro in 1888 coloured his story with 'a violent bite from the captive crocodile' (Schmidt 1938: 89). More empirically-oriented observers however, such as W. Cameron Forbes the U.S. Governor-General of the Philippines from 1908 to 1913, wrote that crocodile attacks on humans were in fact 'comparatively rare' (Forbes 1945: 17).[18]

Commercial crocodile hunting in the Philippines started in the 1920s and intensified after World War Two (Jenkins & Broad 1994; Thorbjarnarson 1999). Crocodile hunters were widely admired and rewarded for their 'exemplary service to the community' (Ortega 1998: 102). No reliable quantitative records exist of the trade in crocodile leather. But a figure published by the American geographer Frederick Wernstedt gives an indication of the scale of the slaughter: in 1953 five tons of crocodile skins were exported from the port of Cebu (Wernstedt 1956: 346). By the end of the 1960s crocodile populations were depleted up to the point that commercial hunting was no longer considered a 'remunerative occupation' (Wernstedt & Spencer 1967: 108). In the 1970s and 1980s skins, specimen, teeth and organs were sold on markets in Manila as tourist curiosa (Ross 1982). The reclamation of 'crocodile infested swampland' (DBP 1979: 2) further contributed to the disappearance of crocodiles in most parts of the archipelago.

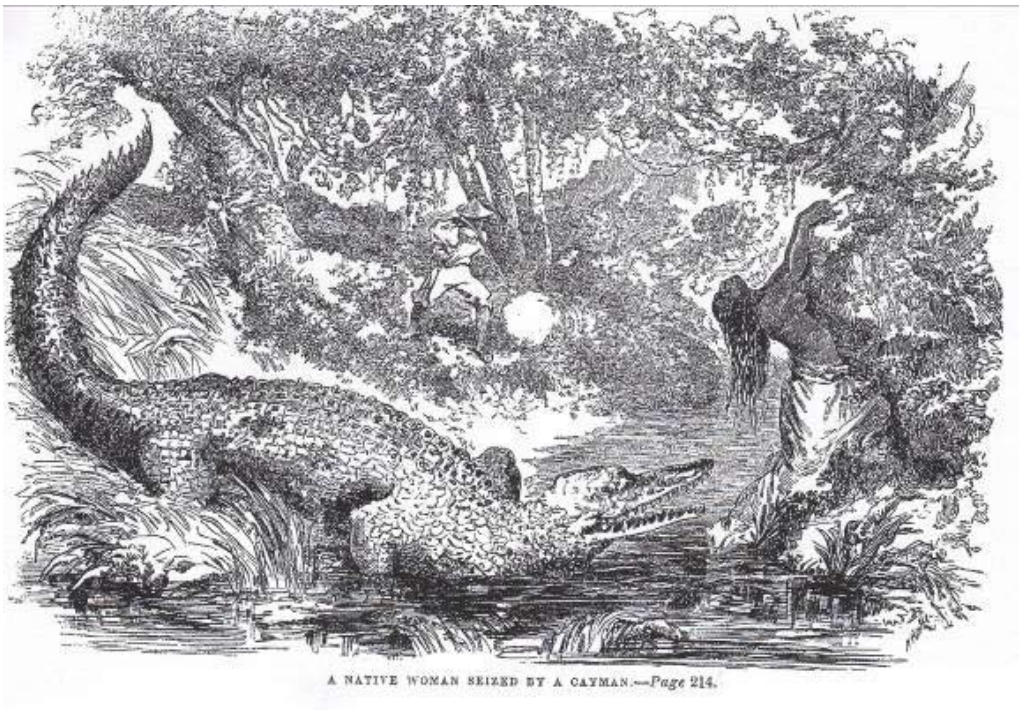
As early as 1977 the Philippine Government played with the idea of establishing crocodile farms 'to minimize the dangers being posed by these dangerous reptiles to

men as well as to animals and to turn to a more productive purpose instead' (PCARR 1977: 1130). It took another ten years and Japanese funding before these ideas were put in practice. Responding to the decline of crocodiles in the Philippines, a captive breeding programme for the species was established in 1987 in Palawan: the Crocodile Farming Institute (CFI). The underlying idea was to develop a crocodile leather industry to 'instil in trappers/catchers the relative economic importance of a ferocious, living crocodile relative to a harmless dead one' (Ortega *et al*. 1993: 126). CFI succeeded in breeding both crocodile species in captivity. But captive-bred crocodiles were never reintroduced to the wild as policy makers assumed that rural communities would resist such an intervention:

> 'People's attitudes would have to be changed by challenging old and accepted, even if unscientific, notions about the crocodile [...] so that people in the rural areas would come to appreciate the crocodile as a viable wildlife species in our environment that needs to be appreciated and conserved' (Palawan State College 1991: 11).

However, no efforts were made to mobilize support and engage rural communities in in-situ crocodile conservation.[19]

Figure 2.4: Cover illustration of the book *Twenty years in the Philippines (1819-1839)* by H. Valentin (de la Gironiére 1854).



A remarkable transformation has taken place in the way people regard crocodiles in the Philippines: from divine guardian to devil, from symbol of social injustice to commodity, and from obstacle to economic development to 'endangered pest' (Knight (2000: 13). Nowadays crocodiles are the 'most maligned, unfairly-treated and misunderstood species in the country' (Malayang 2008: 17). Mainstream Filipino society has become increasingly alienated from crocodiles. Most people now only see crocodiles on TV or in commercial advertisements. Hollywood horror movies such as Lake Placid, and Discovery Channel documentaries such as Crocodile Hunter, have entrenched an image of the crocodile as dangerous monster in contemporary mainstream Philippine culture (Vivanco 2004). But in the remote rural areas people often have very different perceptions of crocodiles.

CROCODILES IN THE NORTHERN SIERRA MADRE

I interviewed Marcella Impiel in April 2003 in Cadsalan, a village in the municipality of San Mariano in the uplands of the northern Sierra Madre.[20] Her words are illustrative for indigenous people's attitudes towards crocodiles in the remote rural areas of the Philippines:

> 'We're afraid of the crocodile. I do not allow my children to swim alone in the river. If a crocodile faces you it will blow at you and you will get beriberi.[21] Crocodiles are very powerful. They have a special sense. Therefore you should not say bad things about the crocodile. My grandmother said: if you kill a crocodile you will get sick. The crocodile always takes revenge. Even if you cut your hair the crocodile will recognize you. Even on land it will strike you. But the crocodile will not bite innocent people. If you do not harm the crocodile, the crocodile will not harm you.'

In the northern Sierra Madre crocodiles have survived in the ancestral lands of the Agta and the Kalinga. Here, a delicate mix of respect, fear and indifference characterizes the relationship between people and crocodiles.

The Agta

The Agta are a Negrito forest-dwelling people inhabiting the Sierra Madre mountain range on Luzon.[22] Fishing, hunting and gathering are important livelihood strategies (figure 2.5). Settlements are located along forest streams, or in the coastal area near river estuaries: the habitat of Philippine crocodiles and Indo-Pacific crocodiles respectively. The Agta differentiate between *bukarot* and *buwaya*, and often have detailed knowledge of the occurrence and behaviour of crocodiles in their ancestral

domains. They respectfully call large crocodiles *Apo* (Sir) or *Lakay* (old man). The Agta sometimes find half-eaten sea-turtles on the beach: 'a gift from the old crocodile' (pers. comm. D. Gonzales 2004). If people see an Indo-Pacific crocodile taking shelter in a cove, it is interpreted as a sign of an approaching typhoon.

Both crocodile species are feared but the Agta do not take specific precautions, even in areas where Indo-Pacific crocodiles occur. Agta fishermen occasionally encounter crocodiles underwater but are unconcerned about the risks. In the past, fishermen requested permission of the crocodiles to catch fish and asked to be left alone in the water, but this practice has largely disappeared. Fishermen claim that crocodiles will not attack them:

> 'My father knew an underwater cave in Dipagsangan. There was always a large crocodile in the cave. The crocodile allowed my father to enter the cave and spear fish. They were friends and blood brothers. My father asked the crocodile not to harm his family. When my father died, the crocodile was also gone' (pers. comm. E. Prado 2006).

These personal bonds are common throughout the northern Sierra Madre. Fishermen know individual crocodiles and say that these animals do not pose a threat to them.

Crocodile attacks on humans are rare in the northern Sierra Madre. In 1996 a boy, Arnel de la Peña, was bitten in his leg by an Indo-Pacific crocodile in Dibulos Creek in Divilacan; he luckily survived the attack. Several respondents said it was his own mistake:

> 'Crocodiles never forget and always take revenge. Arnel cut the tail of a small crocodile and threw stones at it. After a few years he was bitten in his legs by the same crocodile. A crocodile will always remember you' (pers. comm. R. Gonzalez 2005).

The moral of stories like this is that people should respect crocodiles: 'if you harm a crocodile, the crocodile will harm you' (pers. comm. W. Cabaldo 2004). Killing a crocodile is considered an unwise provocation. Not so much because of the physical danger posed by crocodiles, but because of the risk that 'an evil spirit will bite your soul' (pers. comm. M. Molina 2005). The Agta think that some crocodiles are guarded by spirits; these *enkantado* crocodiles are considered dangerous. Some respondents say that these enchanted crocodiles are very large, wear a necklace, have two tails or are completely black.

The hunter-gatherer lifestyle of the Agta has relatively little impact on crocodiles and wetlands. People do not eat crocodile meat, but when a nest is found the eggs are collected and eaten. In general the Agta are indifferent towards the crocodiles that inhabit their ancestral domains.

Figure 2.5: An Agta girl, Bianca Almonte, fishes for gobies in Disulap River. Photo by J. van der Ploeg (2007).

The Kalinga

The Kalinga are shifting cultivators in the forest frontier of the northern Sierra Madre. They inhabit two remote watersheds in San Mariano: Catalangan and Ilaguen.[23] A remnant Philippine crocodile population survives in these river systems. It is said that in the past the Kalinga and crocodiles peacefully coexisted: 'people used to cross the river on the back of crocodiles' (pers. comm. A. Fransisco 2004). The Kalinga say that crocodiles are dangerous animals but claim that the crocodiles that live in their ancestral domains are an exception: they are 'friendly' (pers. comm. W. Languido 2003). Killing crocodiles is a taboo and can cause sickness: 'you cannot kill something that is stronger than you' (pers. comm. Baliwag 2004). If people become sick because of a crocodile, they can be cured by placing a cross with chalk on their forehead and performing a ritual.

Crocodiles play an important role in Kalinga culture. During festivities and healing rituals (*patunnuk*) the Kalinga make rice cakes in the form of a crocodile: offers to the ancestors. Transmogrification and metempsychosis are recurrent themes in Kalinga society. The Kalinga believe that crocodiles are the embodiment of the ancestors, and sometimes make a small food offer for the ancestor crocodiles when

crossing a river (Knibbe & Angnged 2005: 71) (figure 2.6). People narrate that their chief could change at will into fierce crocodiles; and they joke that today's *punong barangay* (the elected village leader) has luckily lost that ability. The Kalinga believe that the *bugeyan*, the traditional healer, still has the ability to change into a crocodile. In trance she risks becoming a crocodile (pers. comm. M. Espiritu 2005) (figure 2.7). Faith healers can also command crocodiles to attack people as a punishment for anti-social behaviour. People tell stories of other remarkable transformations:

> 'A girl never wanted to share her beetle nut with her family. She was possessed by a spirit and became sick. Her parents cooked nice food, but she did not want to eat. Every night she went to the river to swim. One night she said to her parents: "you can eat my beetle nut, I am a crocodile now." She cried and said goodbye. Then she went to the river and became a crocodile' (pers. comm. T. Catalunia 2003).

In another popular Kalinga folktale, a woman hit her children too hard and subsequently turned into a crocodile. As it is widely thought that crocodiles eat their own offspring, people consider this a logical punishment.[24]

Traditional beliefs and practices prove to be surprisingly resilient. Three hundred fifty years after Father Alcina wrote about women giving birth to crocodiles in the Visayas, the Kalinga in the northern Sierra Madre think that some people are born with a spiritual crocodile-twin:

> 'The girl and the crocodile grew up together. But one day the father got angry with the crocodile and tried to kill it. The crocodile escaped but his tail was chopped off. You can still see this twin crocodile without tail in the river. We call him *putol*. The crocodile regularly visits and protects his sister' (pers. comm. B. Robles 2003).

Different versions of this story are told throughout the Sierra Madre. Some narrators claim the enchanted crocodile was released by her human parents with a necklace. Others say it killed his human brother. Poldo Velasco recited another version of the crocodile-twin story:

> 'A woman gave birth to twins: one was a girl and the other a crocodile. They grew up together, although the crocodile was mostly in the water. His sister talked to him and said: 'please do not eat dogs or humans. Otherwise I will kill you'. But one day a dog went missing, and she suspected it was her sibling who did this. She went to the river and called: 'all of you crocodiles, related to my sibling, come to me!' Many crocodiles came, really a lot. The river was full of them. Then she said: 'there is still one missing!' So she asked them to look for her sister crocodile. A few moments later her sister crocodile came. 'So you were the one who ate the dog' she said. And she killed her sister crocodile' (cited in Knibbe & Angnged 2005: 72).

The Kalinga try to find a logical explanation for crocodile behaviour. In Cadsalan crocodiles are often observed in the creek near the traditional cemetery. People concluded that these crocodiles were the personification of the ancestors and therefore would not disturb these animals. Aggressive behaviour of individual crocodiles is justified: 'even a chicken protects its chicks' (pers. comm. Robles 2006). In 2003 a boy, Marlon Robles, was attacked by an adult Philippine crocodile in Dinang Creek in San Mariano; luckily he escaped unharmed. People explained that the father of the boy had tried to kill a crocodile and that the crocodile attacked in retaliation:

> 'There is a spell on the crocodiles. Nobody can kill them. Boy Robles has tried to kill the crocodiles but he did not succeed. Now the crocodiles are taking revenge and are attacking his family' (pers. comm. F. Languido 2003).

But the Kalinga don't see a fundamental problem in living in close proximity to crocodiles: the peace pact is still honoured.

Figure 2.6: Kalinga offering to the ancestors along Dilumi Creek. Photo by Y. Zwart (2009).

Social change

The historical continuity of people's attitudes towards crocodiles is remarkable in the northern Sierra Madre. But it also masks fundamental changes. In the 1960s commercial logging companies started operating in the forests of the Sierra Madre. Commercial crocodile hunters systematically killed crocodiles for the leather trade. Some elder respondents remember how 'Moro hunters' killed crocodiles by luring the animals with a prayer and stabbing them underwater: 'their magic made them invulnerable to the wrath of the spirits' (pers. comm. T. Francisco).[25] In several areas, the army shot crocodiles to 'protect the local populace' (pers. comm. Lt. J. Arburo 2004). Immigrant farmers settled in the forest frontier and organized hunting parties to 'clean the river from crocodiles because they posed a threat to our children and pigs' (pers. comm. R. Corpus 2004). These Ilocano and Ibanag immigrants generally see crocodiles as vermin. They believe that crocodile meat is an excellent medicine against asthma; that crocodile scales have magical power during cockfighting; and that a crocodile penis is an aphrodisiac.

Nowadays, the Agta and Kalinga form minorities in the northern Sierra Madre. Immigrants have dispossessed the indigenous people of most of their ancestral lands. The Agta have maintained their cultural distinctiveness to a large degree, but are generally excluded from social and economic life. The Kalinga, in contrast, have undergone a rapid process of 'Ilocanization' (Keesing 1962: 326). Most Kalinga have been converted to Christianity and have adopted the production and consumption patterns of their Ilocano and Ibanag neighbours. The Agta and the Kalinga are marginalized groups, often stigmatized by lowland communities. As a result people are reluctant to talk about their traditions and beliefs, afraid of being labelled as 'stupid', 'backward' or 'superstitious'. During interviews people explain that only enchanted crocodiles attack people, but add that they personally 'no longer believe in these stories' (pers. comm. P. Maneia 2003).[26] Traditional values and practices are changing as markets, schools, chainsaws and televisions become more accessible.

In the remote villages one finds a mix of often contradicting stories and anecdotes. Some people claim that enchanted crocodiles attack people whereas normal crocodiles are harmless, others say that normal crocodiles attack people and that enchanted crocodiles are 'friendly' and carry people across rivers. Indigenous people and immigrant farmers in the northern Sierra Madre creatively fuse Malay beliefs, European fairytales and Hollywood movies into one contemporary reality. In June 2001, for example, a Philippine crocodile was killed in the municipality of Divilacan. The animal was buried. When it started raining intermittently for several days, people made a link between the rains and the dead crocodile: the crocodile needed water. As a result the crocodile was exhumed and thrown into the sea to appease the crocodile-spirit and prevent a flood. Another example comes from the municipality of Palanan

where treasure-hunters drained an underwater cave in 2004. They were convinced that a Japanese plane loaded with gold had crashed in the cave during World War II. The fact that crocodiles were observed in the area strengthened this idea: 'everybody knows that crocodiles protect treasures' (pers. comm. L. Salazar 2004). This chaotic and often inconsistent mix is in my view not a sign of deculturation but a characteristic element of oral history. Folktales, myths and movies form the logical framework wherein new experiences and observations are flexibly incorporated. People in Divilacan for example say that there used to be an Indo-Pacific crocodile that was so large that bamboo grew on its back. Seeing this animal was an omen for a good harvest. But this is no longer the case: 'the bamboo died because of the use of pesticides' (pers. comm. J. Centeno 2004).

The argument that crocodiles survived in the ancestral domains of the Agta and the Kalinga because of low population densities, rudimentary technology and the absence of markets can easily be refuted. Indigenous people in the northern Sierra Madre tolerated crocodiles; they could have exterminated the crocodiles had they wished so. Indifference, respect and fear of the spirits assured that crocodiles were not purposively killed. Conversely, the Kalinga and Agta have not actively protected crocodiles or critical wetland habitat in their ancestral lands. There is, in essence, no need to protect ancestors, spirits or witches. Obviously immigration and acculturation have profound impacts on traditional belief and knowledge systems that structured people's relations with crocodiles. But that does not make these indigenous experiences less relevant. Agta and Kalinga culture provides a valuable counterweight against the commonly held view that negative attitudes of rural communities form a major obstruction for *in-situ* crocodile conservation in the Philippines. As such the perceptions of the Agta and the Kalinga are more than relicts from a distant past: they are proof that people and crocodiles can coexist in intensively-used landscapes in the Philippines in the 21st century. The experiences of the Kalinga and the Agta provide very practical solutions for specific problems: when a crocodile attacked Marcella Impiel's livestock in Cadsalan in 2001 she did not kill the crocodile, but decided to transfer her house a little further from the creek and to prevent her pigs from roaming freely at night. It solved the problem.

DISCUSSION

It is argued that negative attitudes of rural communities hamper *in-situ* crocodile conservation. In this view removing crocodiles from the wild and breeding them in captivity is considered the only solution to safeguard crocodile populations in the Philippines (Ross 1982: 27; WCSP 1999: 76-79).

There are several flawed assumptions in this reasoning. As this chapter has

shown people who live in close proximity to crocodiles do not necessarily consider crocodiles a pest. In fact, indigenous peoples in the northern Sierra Madre tolerate crocodiles. Here, as well as in the mangrove forests in Palawan and the marshes in Mindanao, rural communities have a tradition of co-existence with crocodiles that goes back for more than four hundred years. As a result crocodiles have survived in the ancestral domains of these peoples. Ignoring this fact not only inhabits the design of effective conservation interventions but also adds to the marginalization and disenfranchisement of indigenous peoples. Paradoxically people who have no actual experiences with crocodiles are more afraid of and hostile towards crocodiles. When people are 'disengaged' incoherent representations and irrational fears of crocodiles prevail (Ingold 1994: 19).

A narrow focus on the utilitarian value of crocodiles does not seem to be a practical conservation strategy in the Philippines. There are no undisturbed wetlands and too few crocodiles left in the wild for a community-based sustainable harvesting and ranching programme in the Philippines. Crocodile farming certainly has economic potential but requires large capital investments. At present, the crocodile leather industry in the Philippines is dominated by six wealthy hog and poultry farmers, who are operating closed-cycle crocodile farms (Mercado 2008: 29). Crocodile farming has so far not generated economic benefits for rural communities living in crocodile habitat, and it is highly unlikely it will do so in the near future. In most areas where crocodiles occur, tourism is not a viable option: civil insurgency and the lack of infrastructure makes travelling to the northern Sierra Madre, the Balabac Islands in Palawan, and the Ligauasan and Agusan marshes in Mindanao difficult. The exclusive focus on sustainable use and captive breeding deviates scarce resources from *in-situ* conservation efforts. Removing crocodiles from the wild contributes to local extinctions and reinforces the idea among policy makers and the public that cohabitation is impossible. Moreover it ignores the fact that people have found ways to co-exist with crocodiles in human-dominated landscapes. But the sustainable use model has failed to conserve crocodiles and improve the well-being of people in the Philippines.

The pre-colonial heritage and the practical knowledge and experiences of indigenous people offer an alternative perspective for the modernist and utilitarian views of policy makers and conservationists (Schama 1995; Scott 1998; Maffi & Woodley 2010). Philippine history and culture provides a conservation ethic entrenched in society and history and adaptive to local circumstances. In areas where crocodiles survive in the wild, indigenous beliefs and practices towards the species often prevail. Here people know crocodiles from their own experience and treat them with respect. These are not archaic remnants of a forgotten past, irrelevant for modern life. On the contrary, the worldviews and ecological knowledge of the Kalinga and Agta offer pragmatic solutions for living with crocodiles. With common-sense precautionary measures, such as tying livestock at night and avoiding areas where crocodiles are known to occur, human-

crocodile conflicts are minimized. These experiences provide a different narrative: one that stresses cohabitation, instead of 'threats to livelihoods' and 'economic importance.' It enables the design of a conservation strategy that positively enhances the capacity and knowledge of rural communities to conserve the resources they value.

The experiences in the northern Sierra Madre suggest that crocodiles can effectively be conserved in human-dominated landscapes (van der Ploeg & van Weerd 2004; van der Ploeg *et al.* 2008b). Setting aside cultural prejudice the municipal government of San Mariano proclaimed the Philippine crocodile as the flagship species of the municipality. Village councils prohibited the use of destructive fishing methods, established crocodile sanctuaries and maintain riparian buffer zones. A public awareness campaign engages people in crocodile conservation: posters are distributed, community dialogues are organized to address peoples' questions and concerns, and schoolchildren are brought to the field to see the Philippine crocodile in the wild (van der Ploeg *et al*. 2008a; van der Ploeg *et al.* 2009). Farmers and fishermen now know that the Philippine crocodile is protected by law.[27] More important perhaps is that people take pride in the occurrence of a rare and iconic species in their village; that fishermen enjoy talking about crocodile ecology and behaviour; and that children become excited about seeing a crocodile in the wild. For many people in San Mariano these immaterial values seem to be an important motivational factor to tolerate the species in their midst.

There is broad support for these conservation interventions at the grassroots level. Confronted with declining fish stocks and the effects of flooding, people want authorities to ban fishing with dynamite and to act against destructive land use practices such as the conversion of creeks and ponds and logging along river banks. In this view the well-being of the community depends on the conservation of watersheds, wetlands and crocodiles. For rural communities living in crocodile habitat, crocodile conservation is not an externally imposed alien concept but builds on existing cultural values.

In 1890 Jose P. Rizal published an annotated version of Antonio de Morga's *Sucesos de las Islas Filipinas* (1609):

> '[O]ther nations have great esteem for the lion or the bear, putting them on the shields and giving them honorable epithets. The mysterious life of the crocodile, the enormous size that it sometimes reaches, its fatidic aspect, without counting anymore its voraciousness, must have influenced greatly the imagination of the Malayan Filipinos' (Rizal cited in Nocheseda 2002: 75).

Crocodiles still capture the imagination of many Filipinos. This forms a strong foundation to conserve the species in the wild, also for poor rural communities in remote areas.

Figure 2.7: Mrs. Garatiyu, a Kalinga traditional healer (*bugeyan*). Photo by J. Hulshoff-Pol (2005).

Table 2.1: Local terminology for crocodiles in the Philippines.

Area	**Language**	***C. porosus***	***C. mindorensis***	**Reference**
North Luzon	Ilocano (Iloko)	*buaya*	*Bokkarut*	Vanoverbergh 1928: 11
Cagayan Valley	Itawis	?	*Lamag*	pers. obs.
	Ibanag	*binuaya / buaya / bubuaya*	*bukarut / lamag*	pers. obs.
	Yogad	*bwaya*	*bukarot / lamág*	pers. obs.
	Gaddang	-	*lamig*	Reid 1971: 65
	Isneg	*buwaya*	*bokarót*	Vanoverbergh 1972
	Bugkalot (Ilongot)	-	*buwaya*	Aquino 2004: 290
Sierra Madre	Agta (Dupaninan)	?	*bukahot / lamag*	Headland 2007 pers. comm.
	Kasiguranin	*buwaya*	?	
	Dumagat	*buya*	?	
	Umirey	*mangato* (?)	?	
	Kalinga	-	*lamag*	pers. obs.
Cordillera	Bontoc	-	*buaya / bo'waya*	Reid 1971: 65
Zambales	Sambal	*buaya*	?	Reid 1971: 65
Central Luzon	Kapampangan	*dapo*	?	Forman 1971
South Luzon	Tagalog	*mamuaya / manbuaya / namumuaya*	*tigbin*	de San Antonio 1624
Bikol	Bikol	*bu'aya*	*barangitaw*	de Lisboa 1865
Masbate	Masbatenyo	*buwaya / bwaya*	?	Wolfenden 2001
Mindoro	Mangyan	*buaya*	*barangitaw / burrangás / burranggaris*	Barbian 1977
Central Visayas	Sebuano	*boàya / balanghítao / balanğita*	?	de la Encarnacion 1885
East Visayas	Waray (Samar-Leyte)	*binuaya*	*barangitáw*[28]	Tramp 1995
Surigao	Mamanwa	*buaja /bowaza*	?	Reid 1971: 65

Table 2.1 (continued)

Agusan	Manobo (Agusan)	*búaya / bu'ada*	*ngusó* (?)	Elkins 1968
Bukidnon	Binukid (Manobo)	*bu'qaya / vuaya*	?	Polenda 1989: 275
Davao del Norte	Mandaya (Mansaka)	*bowaya*	*sapding*	Svelmoe & Svelmoe 1990
Lanao	Maranao	*boaia / lotoi*	*balangitao / dagoroqan*	McKaughan & Macaraya 1967
Ligauasan	Maguindanao (Moro)	*buhaya / bohaya*	?	Juanmartí 1892
Cotabato	T'boli	*bwenghel*	?	Paterno *et al*. 2001
Zamboanga	Subanon	*buaya*	?	Reid 1971: 65
Sulu	Tausug	*buaya / buqayah*	?	Reid 1971: 65
Basilan	Yakan	*buwaye*	-	Behrens 2002
Calamian Islands	Kalamianon	*bukayaq*	?	Reid 1971: 65
North Palawan	Batak	*buaya*	*bungut*	Eder 2006 pers. comm.
South Palawan[29]	Tagbanwa	*buaya*	*bungot*	Reid 1971: 65

ENDNOTES

1. Based on: van der Ploeg, J., M. van Weerd & G.A. Persoon. 2011. A cultural history of crocodiles in the Philippines; towards a new peace pact? *Environment and History* 17 (2): 229-264.Jan van der Ploeg conducted the literature review, collected the ethnographic data and wrote the article. Merlijn van Weerd assisted in the field and commented on the text. Gerard Persoon encouraged the publication of the paper, and provided comments and corrections on different versions of the text.
2. While acknowledging my moral engagement and active involvement with crocodile conservation in the Philippines, I do not advocate a romantic view of indigenous people living in harmony with nature since time immemorial, or aim to construct a 'usable past' for contemporary political gains (McNeill 2003: 15). Nor do I suggest a linear evolution from primitive to modern ideas about wildlife.
3. I mainly relied on the fifty-five volumes of the *Philippine Islands, 1493-1898* edited by Emma Blair & James Robertson (1907). Unless otherwise indicated, I have used their translation of the Spanish archives. For clarity I refer in the text to the date and author of the original publication. In the literature search I have not limited myself to the Philippines, but included references and historical anecdotes from insular Southeast Asia. The article *De krokodil in het leven van de Posoërs* [The crocodile in the life of the Poso] of Albert Kruyt (1906), a Dutch missionary in Sulawesi, is perhaps the most interesting

primary source on the relation between crocodiles and people in Southeast Asia. Charles Hose and William McDougall (1901) also provide valuable insights on the relations between crocodiles and people in the Malay world.

4. B*uwaya* or a derivate thereof is the common denominator for crocodile throughout Southeast Asia (Table 2.1). In areas where both crocodile species occur, such as in the northern Sierra Madre, *buwaya* refers to *C. porosus* and other names are used for *C. mindorensis*, such as *lamag* in Ibanag or *bukarot* in Ilocano. However, in upland areas where only *C. mindorensis* occurs, such as the Central Cordillera on Luzon, people have adopted the generic name for crocodile for *C. mindorensis*: *buwaya*. It is difficult for laymen to distinguish a Philippine crocodile from an Indo-Pacific crocodile, especially in the wild. There are several morphological differences that distinguish the two crocodile species. In addition, there are differences in habitat preference: the Indo-Pacific crocodile is generally restricted to mangroves, lakes and marshes in the lowlands, whereas the Philippine crocodile occurs mainly in upland river systems.
5. Most of the Spanish lexicographers had spent years in Mexico and probably knew the spectacled caiman (*Caiman crocodilus*) and the American crocodile (*Crocodylus acutus*) which occupy similar ecological niches as the Philippine crocodile and the Indo-Pacific crocodile respectively.
6. Crocodiles are a popular character in Filipino folktales (Eugenio 2002: 19). In folktales the crocodile is generally the dupe who is tricked by a monkey or a turtle (Fansler 1921: 374-79; Hart & Hart 1966: 323; Eugenio 1985: 161; Eugenio 1994: 144).
7. Crocodiles have five toes on the front limb without webbing between them. On the hind limb crocodiles have four toes, of which three are clawed and have webbing between them. The hind limb also has a small rudiment of a fifth toe.
8. The reason why crocodiles have no tongue is a popular theme in Philippine folktales (Ratcliff 1949: 282). In fact, the tongue of all crocodile species is attached along its entire length to the floor of the mouth, and cannot be protruded.
9. Albert Kruyt, a Dutch missionary, photographed these bamboo fences in Central Sulawesi (1906: 6).
10. It is tempting to provide an ecological explanation for the indifference of people towards crocodiles. It seems plausible that in areas where the Indo-Pacific crocodile occurred, people feared crocodiles and took precautions; whereas in the habitat of the much smaller Philippine crocodile people would be indifferent to crocodiles. On closer inspection however this lowland-upland dichotomy does not hold. In several areas in the Philippines, for example on the Pacific coast of Sierra Madre, both crocodile species occur. In these areas people differentiate between the species but do not take specific precautions against *Crocodylus porosus*. Although there are no records of fatal attacks on humans, the Philippine crocodile poses a risk to humans, particularly during breeding season.
11. In the Spanish Empire an *alguazil*, a derivation from the Arabic *visir*, was a municipal judge.
12. In Borneo, people engraved crocodile images on rocks, and constructed life-size outlines of crocodiles with clay, wood and stones. These crocodile images were ritually killed during a ceremony (*ulung buaya*). After the ceremony, the crocodile image continued to serve as a symbol of leadership, as platform for juridical sessions, a ritual site for offerings, or as boundary marker between warring groups (Hose & McDougall 1901; Harrison 1958; Datan 2006). In the Philippines, however, such large megalithic relics were never recorded.
13. Large crocodiles often have several stones, gastroliths, in their stomach to aid digestion.
14. Pre-colonial Philippines was subject to Indian, Chinese and Islamic influences, which obviously left traces in material and oral culture. The *naga* and the dragon, for example, are symbols that are closely associated with crocodiles, and which have been adopted throughout the archipelago (Maxwell 1990). The popular folktale about the crocodile and the monkey probably originates from Indian literature (Francisco 1964). These influences are, however, now so thoroughly mixed up that it is almost impossible to disentangle them (Skeat 1900: p. xii-xiii). Nevertheless it is important to highlight one aspect: Muslims

generally consider crocodile meat *haram*, and will thus not kill crocodiles for food. Persoon and de Iongh (2004) already pointed to the differences between Islamic and Christian communities in Southeast Asia and the implications for wildlife conservation: a point of particular relevance for the conservation of crocodiles in Mindanao and Luzon.

15. Nevertheless some remarkable transformations took place in this image: St. Martha the Patron Saint of housewives in Europe, became in the Philippines the Patron Saint of the duck egg (*balut*) industry after driving crocodiles out of Pasig River (Nocheseda 2002). Her victory over the crocodiles is still celebrated every year in the municipality of Pateros. A similar fiesta is held in the municipality of Gattaran to celebrate the disappearance of crocodiles from Cagayan River.
16. A bronze sculpture made by Rizal of a dog attacking a crocodile to save her pup represents the Filipino people and the Spanish rulers, respectively. The association between crocodiles and landlords is still a popular theme in Filipino literature (see for example: Hernandez 1983).
17. See Bankoff 2009 on the origin of the utilitarian conservation ethic in the Philippines.
18. In the Dutch Indies, the colonial government created a premium system to eradicate crocodiles. The system officially started in 1935 but was terminated because most people refused to kill crocodiles (Knapen 2001)! To our knowledge no systematic pest eradication system was set-up in the Philippines.
19. Since 1992 there has been growing awareness of the plight of the country's endemic wildlife. Since 2004 crocodiles are protected by law. However, most people are simply not aware of environmental legislation.
20. This paragraph is based on around 150 unstructured interviews with Agta, Kalinga and immigrant farmers (mainly Ilocano, Ibanag and Ifugao) in the northern Sierra Madre between 2002 and 2008. Most interviews were conducted in Ilocano, the lingua franca in north Luzon, with the help of an interpreter. Specific quotes were selected if they were considered representative for a general theme. The name of the respondent and the year when the interview was conducted are provided for each quote.
21. Beriberi is a nervous system ailment caused by vitamin B1 deficiency. Symptoms include weakness, pain, weight loss, emotional disturbances and swelling of limbs.
22. There are approximately 10,000 Agta in the Sierra Madre on Luzon (Early & Headland 1998). The Northern Sierra Madre Natural Park in the province of Isabela, where I conducted most of the fieldwork, is home to 1,700 Agta distributed over more than 80 settlements (Minter 2009).
23. It is important to differentiate the Kalinga of the Sierra Madre from the Kalinga of the Central Cordillera: these are two different ethno-linguistic groups. In Ibanag the word 'kalinga' means enemy. The Christian communities in the Cagayan Valley called all infidel mountaineers Kalinga which might explain why these separate groups are both called Kalinga. The Kalinga of the Sierra Madre, also known as Irraya, Kalibugan or Catalangan, were first described by a German explorer, Carl Semper, in 1861 (Scott 1979). Felix Keesing (1962) postulated that the Sierra Madre Kalinga are Ibanag and Gaddang who rebelled against Spanish rule and retreated to the foothills of the Sierra Madre. The local government of San Mariano estimates that there are approximately 2,500 Kalinga living in the municipality. This is most likely an underestimation: many Kalinga nowadays identify themselves as Ilocano. At present there are also several Cordillera Kalinga migrant communities in the northern Sierra Madre, particularly in the municipality of Divilacan.
24. This myth is widely known throughout the Philippines and insular Southeast Asia. It probably finds its origin in the maternal care of crocodilians: several crocodile species crack the eggs to assist the young in hatching and carry the hatchlings to the water in their jaws (Navarrete 1676: 305; Skeat 1900: 286; Alvina 2007).
25. Throughout northern Luzon people narrate how in the 1960s and 1970s professional hunters searched the rivers and creeks at night, killed crocodiles, dried the skin and distributed the meat to local people. It is generally assumed that these hunters were from Mindanao: hence people refer to them as 'Moro.'

In fact it is probable that these professional crocodile hunters were Orang Bugis from Sulawesi, who controlled the crocodile leather networks in insular Southeast Asia. Most crocodile skins from the Philippines were exported to tanneries in Singapore (Hemley & Caldwell 1986).

26. Interestingly, this ambivalence has been a recurrent element in the anthropological literature on human-wildlife relations for more than 100 years (see: Hose & McDougall 1901: 190; Martin 1978: 155-156).
27. As a result the Philippine crocodile population in San Mariano is slowly recovering from 12 individuals in the wild in 2000 to 64 in 2009.
28. One is tempted to conclude that *barangitaw* is a common denominator for the Philippine crocodile in the Visayas. Marcos de Lisboa, for example, defined *barangitaw* in his *Vocabulario de la lengue Bicol* (1865) as a 'type of crocodile found in fast flowing rivers'. However, Juan Felipe de la Encarnacion (1885) defines the Cebuano word *balanghítao* as an '*especie de caiman muy maligno*': a very malicious caiman species. And here one would conclude that *balanghítao* refers to the Indo-Pacific crocodile. To make matters more complicated, the Cebuano word *barang* means 'witch'. Thus *balanghítao* could best be translated as a witch-crocodile. This shows the limitations of using ethnographic and linguistic sources for determining the historical distribution of the two crocodile species in the Philippines.
29. The fact that two separate names are used for crocodiles in Batak and Tagbanwa suggest that two crocodile species occurred in Palawan. However, there are no records of Philippine crocodiles on Palawan (but see Schultze 1914).

3. WHAT LOCAL PEOPLE THINK ABOUT CROCODILES: CHALLENGING ENVIRONMENTAL POLICY NARRATIVES IN THE PHILIPPINES[1]

INTRODUCTION

In January 2007 the undersecretary of the Department of Environment and Natural Resources (DENR), Jose Ferrer, gave a keynote speech at a scientific forum in Manila. His speech exemplifies the way policymakers in the Philippines think about conserving crocodiles:

> 'If there are any creatures that are capable of provoking a range of emotions from us, they are crocodiles. […] When we see crooks in government, we call them crocodiles, when we see fat-bellied policeman on the streets, we call them crocodiles. […] But how do you conserve a creature despised by so many? After World War II, demand for crocodile skin skyrocketed. Hunters were all too happy to relieve the reviled Indopacific Crocodile of its profitable skin and uncontrolled harvests reduced the wild population dramatically. Not that many people cared. To most, the only good crocodile was a dead one. […] Several years after we first implemented the Philippines' crocodile recovery program, Indopacific Crocodile numbers (although in captivity) are now approaching densities not seen before. Tourism has become a major force with crocodiles as a star attraction. Even those who still dislike crocodiles acknowledge their economic importance and would never want to see them vanish. Such is the importance of linking conservation with people. […] Local people must see that their crocodiles are important, not only to the environment, but to themselves. […] Those of us who admire crocodiles need only to know that they exist, but this opinion is very much the exception for the people who have to share their habitat with crocodiles. When animals threaten your livelihood, or even your life, it influences your opinion about those animals.' (Ferrer 2008: 7-9).

This view has dominated Philippine environmental policy, science and conservation over the past 25 years. Policymakers assume that rural communities are antagonistic towards conserving crocodiles in the wild. It is argued that these negative attitudes can only be transformed by providing economic incentives: in a context of rural poverty crocodile conservation can only be justified when it generates revenues through sustainable use (Ross 1982; Ortega *et al*. 1993; WCSP 1997).

In this chapter I question this reasoning. I argue that it is based on several flawed assumptions on people's attitudes towards crocodiles and environmental conservation. In rural areas where crocodiles still occur in the wild, such as the northern Sierra Madre on Luzon, people do not necessarily oppose the enforcement of environmental legislation protecting crocodiles and wetland habitat. The narrow focus of policymakers on economic incentives ignores the cultural values of rural communities, and risks further marginalizing poor people by deviating attention and resources from environmental protection. Despite the optimism of undersecretary Ferrer, the Philippines' crocodile

recovery program has been a failure: crocodiles remain severely threatened in the wild (Ross 1998; van Weerd 2010), and people living in crocodile habitat have not profited from tourism or the sale of crocodile leather. But as the speech of the undersecretary reveals, this utilitarian rhetoric still dominates environmental policy in the Philippines. In this chapter I will investigate what policymakers think about rural communities and crocodiles, and why these ideas remain, even in the face of contrary empirical evidence, so pervasive. This is important as the erroneous assumptions of officials and institutions responsible for environmental conservation and human welfare can have detrimental consequences for people and nature (Dove 1992).

Environmental policy often rests on a set of simplified assumptions about a problem and how it can be solved (Hoben 1995). These assumptions take the form of a narrative: a story that provides a logical framework for defining and simultaneously solving an environmental problem. Ferrer's speech highlights several distinctive characteristics that make policy narratives so potent. First, simplifications are useful to deal with the many uncertainties that characterize social and environmental change, and necessary to mobilize resources and support in the political arena (Li 2002). Second, policy narratives tend to promote universally applicable, technical solutions (Long & van der Ploeg 1989; Fergusson 1994). The Philippines' crocodile recovery program was inspired by the successful experiences in Papua New Guinea, where commercial crocodile ranching has become a major economic activity and has contributed to the rapid recovery of crocodile populations.[2] Third, narratives are deeply embedded in policy, society and culture to the extent that they become 'conventional wisdom' (Leach & Mearns 1996). And finally, policy narratives tend to obscure uncertainties and alternative perspectives (Keeley & Scoones 2003; Sheil & Wunder 2002). Facts and ideas that do not fit the dominant view are dismissed as being ineffective, unscientific or simply impossible. These characteristics make it difficult, even in the face of contradicting empirical evidence, to challenge the hegemonic narrative.

Criticism on the sustainable use paradigm is often dismissed as 'resurgent preservationist thinking' (Wilshusen *et al*. 2002).[3] Since the 1980s the idea that the protection of wildlife can best be achieved by giving rural communities a direct economic interest in the survival of species has gained prominence, mainly in response to the negative social impacts of protected areas in developing countries (Western & Wright 1994; Hutton & Leader-Williams 2003). Exclusionary and punitive efforts have been replaced by a more participatory incentive-based strategy: a paradigm shift from 'preservation through protectionism' to 'conservation through sustainable use' (Pimbert & Pretty 1997; Adams & Hutton 2007). Implicitly, this is often presented as a radical break: a move from old ways of preserving nature to 'new conservation' (Hulme & Murphree 1999: 277). In this view preservation is equated with the authoritarian protection of pristine wilderness by the neo-colonial State; and conservation with community-based natural resource management and wise use (table 3.1). This ideological dichotomy

between preservation and conservation is however unhelpful for a good understanding of the evolution of environmental policy in the Philippines, and risks impeding wildlife conservation efforts on the ground.

Table 3.1: Preservation versus conservation (adapted from Blaikie & Jeanrenaud 1997: 61; Pimbert & Pretty 1997: 302; Campbell 2002: 31).

	Preservation	**Conservation**
Policy tool	Protected areas 'Fines and fences'	Sustainable use 'Use it or lose it'
Philosophy	Intrinsic values	Utilitarian values
Rural communities	Destructive Ignorant Irrational	'Stewards of the environment' Traditional Ecological Knowledge Marginalized Egalitarian
Nature	Pristine wilderness	Human-dominated landscapes
Wildlife and people	Conflict	Coexistence
Governance	Authoritarian Centralized ('top-down') Technocratic Protectionist 'Fortress conservation'	Participatory Devolved ('bottom-up') People-oriented Co-management 'Community-Based Natural Resource Management'

In this chapter I question the premises that underlie crocodile conservation in the Philippines, specifically the views of government officials that negative attitudes of rural communities inhibit in-situ wildlife conservation, that the enforcement of environmental legislation is ineffective and illegitimate, and that cash benefits are a precondition to mobilize public support for wildlife conservation. In the next section I provide details on the research methodology. In the third section I document the changing views of Philippine policymakers on the role of rural communities in environmental conservation. I will then present a qualitative case study of the Crocodile Farming Institute (CFI), the national crocodile recovery program to which the undersecretary Ferrer refers in his speech. In the fourth section I describe a community-based conservation project in the northern Sierra Madre on Luzon: the Crocodile, Rehabilitation, Observance and Conservation (CROC) project of the Mabuwaya Foundation. I document how hostile attitudes towards crocodiles are transformed by raising awareness, show that there is a broad societal basis to strengthen environmental law enforcement, and suggest that cultural values such as pride in the occurrence of a rare and iconic species can

form an important motivation for rural communities to support wildlife conservation. In the conclusion I investigate the implications of this 'counternarrative' for crocodile conservation in the Philippines (Roe 1995: 1065). A single case study can obviously not counter a paradigm. But the experiences in the northern Sierra Madre call for a more critical, and above all empirical, examination of evidence that supports the dominant conservation narrative. Such a reversal of thinking is urgently needed to break the impasse that has characterized crocodile conservation in the Philippines over the past 25 years.

METHODS

This chapter is largely based on my research, education and conservation activities in the northern Sierra Madre over the past twelve years. After the rediscovery of a remnant Philippine crocodile population in the municipality of San Mariano in 1999, I was involved in the design and implementation of a conservation project to protect the species in the wild: the CROC project, which was later institutionalized as the Mabuwaya Foundation (van Weerd 2000; van der Ploeg *et al*. 2008b). This participatory action research obviously implies a certain bias. But my long-term involvement in the conservation of the species also provides a unique inside-view of environmental policy discourses in the Philippines. My field experiences in the northern Sierra Madre offer new insights on how to mobilize local support for the protection of threatened species, and question the ideological positions in the conservation versus preservation debate.

The qualitative case-study presented in section 4 was constructed through formal interviews and informal conversations with key respondents: CFI staff members, DENR officials, crocodile farmers, scientists and members of the IUCN Crocodile Specialist Group. In addition I conducted an extensive literature review of reports, workshop proceedings and newsletters produced by CFI.[4] Section 5 is based on fieldwork in the northern Sierra Madre over the past twelve years. I rely on field observations and unstructured interviews with local government officials, forest guards, village leaders, farmers and fishermen. Information on the number of crocodiles surviving in the wild has been collected by staff members of the Mabuwaya Foundation on a quarterly basis since 1999.

BACKGROUND

Crocodiles in the Philippines

Commercial hunting for crocodile skins in the Philippines started during the American

colonial period and intensified after World War II. Professional hunters systematically searched, killed and skinned crocodiles throughout the country. No specific legislation was enacted to regulate the harvesting and selling of crocodile skins in the archipelago; and by the end of the 1960s crocodile populations were severely depleted (van der Ploeg *et al*. 2011a). In 1975, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) banned all international trade in Philippine crocodile skins. Ten years later the Philippines' saltwater crocodile population was also placed on CITES Appendix I.

In 1981 Charles A. Ross, an American biologist working for the Smithsonian Institute, conducted the first nation-wide crocodile survey, and estimated that there were less than 500 Philippine crocodiles surviving in the wild (Ross 1982). Fifteen years later the IUCN Crocodile Specialist Group revised this figure to less than 100 mature individuals (Ross 1998). Based on this small population and the continuous rapid decline of the wild population, the Philippine crocodile is classified on the IUCN Red List as Critically Endangered (IUCN 2010). The species is currently restricted to a few localities in northern Luzon and the headwaters of the Liguasan Marsh on Mindanao (van Weerd 2010). Saltwater crocodiles are also threatened with extinction in the Philippines (WCSP 1999). But with large and well-protected populations in Papua New Guinea and Australia the species is not globally threatened (IUCN 2010).[5]

Responding to the alarming decline of crocodile populations, the Philippine government initiated an ex-situ conservation program for the saltwater and Philippine crocodile in 1987: CFI. In 2000 the government created the Philippine Crocodile Recovery Team and drafted a recovery plan for the Philippine crocodile (Banks 2005). Since 2004 both species are officially protected under Philippine law: the Wildlife Act (Republic Act 9147) prohibits the killing of crocodiles. Crocodiles occur in several protected areas: specifically the Northern Sierra Madre Natural Park on Luzon, Naujan Lake National Park on Mindoro, Balabac Island Marine Reserve on Palawan, and the Liguasan Marsh Game Refuge and Agusan Marsh Wildlife Sanctuary on Mindanao (WCSP 1997; Mallari *et al*. 2001). The DENR is the mandated government agency to conserve crocodiles in the Philippines. But despite these policy interventions the two crocodile species in the archipelago remain severely threatened in the wild. Crocodiles continue to be killed for their meat, out of fear or for fun. The widespread use of destructive fishing methods poses a heavy toll on remnant crocodile populations (van Weerd & van der Ploeg 2004). The reclamation and degradation of freshwater wetlands inhibit a recovery of the two species in the wild (DENR & UNEP 1997; Thorbjarnarson 1999).

Philippine environmental policy

The sustainable use of natural resources has been the guiding principle for Philippine

environmental policy since the turn of the 20th century.[6] In order to reduce forest degradation and maximize government revenues the American colonial foresters tried to create favorable conditions for private investment in the forestry sector. Rural communities were viewed as squatters and portrayed as resource destroyers, and efforts were made to punish and resettle these *kaingineros* (Magno 2001). In 1932 the Insular Bureau of Forestry established the first national parks and game refuges in the archipelago, and stressed the need to resettle slash-and-burn farmers from these public lands (Villamor 2006). But plagued by a shortage of trained personnel, defects in administration and communication, low morale of field staff, public discontent of forestry regulations and levies, and lack of support from local authorities, the forestry service was unable to enforce its own decrees (Bankoff 2009).

The Third Philippine Republic (1946-1972) reaffirmed the State's claim to all forests and wildlife, and continued to see corporate logging and mining as the engines of economic growth. During these 'years of plunder' State-sponsored logging and mining concessions ravaged the Philippine forests and wetlands (Broad & Cavanagh 1993; Vitug 1997). In 1975 environmental destruction, rural poverty and civil unrest forced the Marcos regime (1965-1986) to adopt substantial policy reforms. Presidential Decree 705, known as the Revised Forestry Code, reorganized the corruption-plagued forestry service. The decree aimed to control illegal harvesting, rehabilitate critical watersheds and grant stewardship rights to forest-dwelling people. But the policy reforms had little effect on the ground (Grainger & Malayang III 2006).

The fall of the Marcos dictatorship in 1986 marked a paradigmatic change in the relationship between the State and rural communities. The Aquino (1986-1992) and Ramos (1992-1998) administrations initiated a range of 'people-centered' policy reforms that emphasized participatory decision making and equitable access to natural resources (Utting 2000). Community-based natural resource management became the national strategy to foster sustainable development and social justice. Underlying these reforms was the idea that environmental protection is not possible without also addressing the livelihood concerns of the rural poor. It radically transformed the rights of rural communities and the responsibility of government in natural resource management. Rural communities were granted access to natural resources under long-term tenure arrangements. Providing basic services to rural communities became a key task for the DENR: foresters were called upon to 'cease being known as enforcers of regulations, but rather as development workers' (Custodio & Molinyawe 2001: 203). Decision-making powers were devolved to local governments and human-rights activists and scientists were appointed on key positions in the new DENR. This transition is embodied by Dr. Angel Alcala, who headed the department from 1992 to 1995. Alcala, Philippines' foremost herpetologist, had pioneered the creation of community-based marine protected areas and established an ex-situ research program for the Philippine crocodile at Silliman University (Alcala *et al*. 1987). As DENR Secretary

he oversaw the forestry service transition from a centralized regulatory body favoring extractive industries towards a 'rural development agent' advocating community-based approaches (Magno 2001: 280). Having worked more than 20 years with subsistence fishing communities in the Visayas, Alcala knew from his own experience that punitive measures were ineffective and difficult to justify (Goldoftas 2006). To ensure the consent and cooperation of impoverished people living in and adjacent protected areas it was in his view necessary to generate economic benefits from these reserves; in the case of marine sanctuaries through ecotourism and spill-over effects (Alcala & Russ 2006). In 1992 the landmark National Integrated Protected Area System (NIPAS) Act was passed through Congress (Republic Act 7586), which provided a regulatory framework for people's participation in the management of protected areas. Substantial investments were subsequently made by international donors to build the capacity of the DENR, municipal governments and civil society organizations to manage protected areas, conserve wildlife and alleviate poverty (Persoon & van Weerd 2006).

At the local level however, the idealistic rhetoric of community-based resource management is contradicted by how these policies are implemented (Severino 1998). The DENR remains plagued by political patronage, corruption, institutional conflicts and high overhead costs (Utting 2000). Wildlife conservation and the management of protected areas are still considered somewhat trivial issues in the DENR bureaucracy: the Protected Areas and Wildlife Bureau (PAWB) is the smallest of the six bureaus of the department. In the regional, provincial and community offices of the DENR there is little attention for wildlife conservation. In these field offices the paradigmatic policy changes have passed largely unnoticed. With urban middle-class backgrounds and a vocational education in extractive forestry, most Philippine foresters still consider rural communities ignorant and incapable of managing resources, and see crocodiles as vermin. A hierarchical bureaucratic culture, a low esteem for field activities and the professional bias of DENR personnel towards timber extraction further hamper the enforcement of environmental legislation on the ground (van den Top 1998).

Under President Estrada (1998-2001) corruption in the DENR thrived and further policy reforms were suspended. The increasingly authoritarian Macapagal-Arroyo administration (2001-2010) again saw extractive industries, especially mining, as the engine of economic growth and aimed to reverse the trend towards decentralization and participatory decision making (Hutchcroft 2008). The Wildlife Act of 2004 for example combined a technocratic view of resource management with a complete disregard of the societal context of the Philippine uplands (van der Ploeg & van Weerd 2004). It prescribes a minimum penalty of six years in jail for 'destroying wildlife species' or 'squatting in critical habitat.'

'CONSERVATION THROUGH SUSTAINABLE USE': THE CROCODILE FARMING INSTITUTE

As early as 1977 policymakers and scientists played with the idea of establishing crocodile farms 'to minimize the dangers being posed by these dangerous reptiles to men as well as to animals and to turn to a more productive purpose instead' (PCARR 1977: 1130). In 1983 the Bureau of Forestry Development in cooperation with the Japan Reptile Skin and Leather Association made detailed plans to develop a large-scale crocodile leather industry in the Philippines. Eventually this initiative led to the creation of the Crocodile Farming Institute in 1987.

Based in Puerto Princesa on Palawan, CFI had two main objectives: (1) to conserve the two endangered crocodile species in the Philippines, and (2) to promote the socioeconomic well-being of local communities through the development and introduction of crocodile farming technology (Ortega 1998). This 'bold and imaginative project in the true spirit of conservation through sustainable utilization' (CFI 1995: 3) was made possible through a 2.6 million US$ grant from the Japanese International Cooperation Agency (JICA). The Philippine government also invested 1.6 million US$ in the construction of the farm. The underlying idea of CFI was to develop a leather industry along the lines of the successful crocodile ranching program in Papua New Guinea: regulate hunting, establish private commercial crocodile ranches, engage rural communities in the collection of eggs, and improve the processing and marketing of skins (Blake & Loveridge 1975; Dembner 1990). It was envisioned that the sustainable use of crocodiles would provide an incentive to conserve crocodiles in the Philippines:

> 'By […] providing local inhabitants within protected areas the opportunity to derive economic returns through regulated harvests, ranching crocodiles is the most effective and sustainable program of conservation' (Ortega *et al*. 1993: 133).

In theory the project design was elegant (figure 3.1). In practice, however, the sustainable use model failed.

Saltwater crocodiles were captured from the wild to breed in captivity. A 'pilot grow-out crocodile farming program' was developed in which juvenile saltwater crocodiles were to be loaned out to farmers to be reared (CFI 1995: 8). The profits of the sale of the leather would be shared between the farmers and the government. Initially CFI aimed to target 'low-income Filipinos in the countryside' (*Ibid*: 9). But concerns about the farmers' capacity to invest, animal welfare and possible competition over feedstock for crocodiles with food production for human consumption led to a different strategy. In 1999 six agricultural entrepreneurs were selected to set up commercial crocodile farms with technical support of CFI. The idea was that mortalities from hog and poultry farms would provide a reliable source of feedstock for crocodiles, and at the same time save money on the destruction of so-called 'double dead meat' (Mercado

Figure 3.1: The Crocodile Farming Institute aims to conserve the Philippine crocodile (front) by generating public revenues through farming saltwater crocodiles (back). Photo by J. van der Ploeg (2004).

2008: 3). But instead of buying juvenile crocodiles yearly from CFI, these entrepreneurs associated in Crocodylus Porosus Philippines Inc. (CPPI) eventually opted to start breeding saltwater crocodiles themselves. They now own approximately 6,000 saltwater crocodiles and have the capacity to breed thousands saltwater crocodile hatchlings per year. Members of the IUCN Crocodile Specialist Group provide technical advice to CPPI on crocodile farming, tanning procedures and CITES regulations. The farms, located near urban areas, function as closed-circuit crocodile farms: eggs and hatchlings are not harvested from the wild as was originally envisioned, but bred in captivity. As such the farms do not have, nor create, a direct economic interest in preserving crocodiles in the wild or wetland habitat.[7] Problems with husbandry and government permits have so far hampered the export of crocodile leather (Limketkai 2008). Meanwhile saltwater crocodile populations in the wild continued to decline and rural communities living in crocodile habitat have not profited from the emerging leather industry, as was originally envisioned by CFI.

CFI's conservation efforts for the Philippine crocodile focused almost exclusively on captive breeding. From the start it was argued that negative public attitudes towards crocodiles and the lack of law enforcement in protected areas made in-situ conservation of the species impossible. It was argued that 'with the country's economy in bad shape'

and 'peace and order problems in parts of the Philippines' it was 'impractical', 'extremely difficult' and 'very expensive' to conserve crocodiles in the wild (Ortega 1992: 2-4). In an evaluation of the activities of CFI, the IUCN Crocodile Specialist Group endorsed this reasoning:

> 'There remain only minor pockets of habitat in which *C. mindorensis* exists today, and none appears to be protected. […] perhaps most important, the species is widely regarded as vermin in the Philippines and the probability of [it] surviving in the wild is low' (Messel *et al.* 1992: 99).

In this view captive breeding was 'the only option left' (Ortega 1998: 108). From 1987 to 1994 CFI acquired 235 Philippine crocodiles to stock the farm in Palawan. Most came from an existing crocodile farm in Mindanao (the Davao Crocodile Park), but individuals were also caught from the wild. Concerns that the farm was thereby contributing to the decline of the Philippine crocodile were waived:

> 'Under normal circumstances the removal of breeding adults from depleted wild populations to stock a farm is to be discouraged, because it depresses the reproductive rate of the wild population and slows its recovery. However, it's wrong to leave small nucleus of breeding adults in areas where they are being killed by local people and where their habitat is being alienated to create rice terraces. It would be foolish not to place them in a captive breeding program where their survival is guaranteed and where they can contribute to a conservation program. Such is the situation in the Philippines. Abandoning *C. mindorensis* in the wild, before real protection can be accorded to them in reserves or sanctuaries would probably have resulted in the final extinction of the species in the Philippines' (Messel *et al*. 1992: 100).

CFI successfully bred Philippine crocodiles in captivity in 1989. Five years later it had more than 700 Philippine crocodiles (Ortega 1998).

Several wetlands were identified as potential sites where these animals could be reintroduced and, in the long term, form a basis for a crocodile ranching program. But negative attitudes, habitat degradation and the civil insurgency were considered to form insurmountable obstacles:

> 'The [Agusan] marsh is being affected by the growing community of Manobo tribal people residing in the marsh, illegal logging, downstream effects of mining, illegal fishing, wildlife poaching and trading, exotic fish seeding, and slash-and burn farming. […] Liguasan Marsh in Cotabato on the other hand has always been under the control of the Moro Islamic Liberation Front (MILF), a secessionist group. Much of its original area has been converted to agricultural lands and much of this kind of development is still expected to happen' (Ortega 1998: 107).

In Manguao Lake on Palawan CFI had to re-evaluate its plans to reintroduce the species

because of opposition from local politicians and communities (Palawan State College 1991). As a result CFI largely abandoned its plans to create wetland sanctuaries and reintroduce Philippine crocodiles in the wild.[8]

In 1994 technical support and funding from the Japanese Government was ended. The management of CFI was transferred to PAWB. In 2000 CFI was renamed the Palawan Wildlife Rescue and Conservation Centre (PWRCC). The following year the management of PWRCC was transferred from PAWB to the government-controlled Natural Resources Development Corporation (NRDC), in an attempt to cut the annual operational costs, which amounted to PhP. 8 million (US$ 160,000) per year. PWRCC had to sustain its own operation costs, mainly through entrance fees from tourists. At present PWRCC maintains around 540 Philippine crocodiles and 450 saltwater crocodiles in captivity (figure 3.2).

CFI successfully bred crocodiles in captivity and succeeded in establishing a crocodile industry. It made headway in educating the general public about the economic importance of crocodiles (figure 3.3). But little was done to inform rural communities living in crocodile habitat on the risks and benefits conserving crocodiles.[9] The activities of CFI have not led to the protection of crocodiles in the wild, or to the improvement of rural livelihoods. Nonetheless, the attention of the national government, scientists and international donors continues to be almost exclusively focused on market-based approaches to conserve crocodiles. Research activities are focused on husbandry, genetics and diseases of the captive population, and discussions on protecting crocodiles in the wild tend to revert to the management of the captive population.

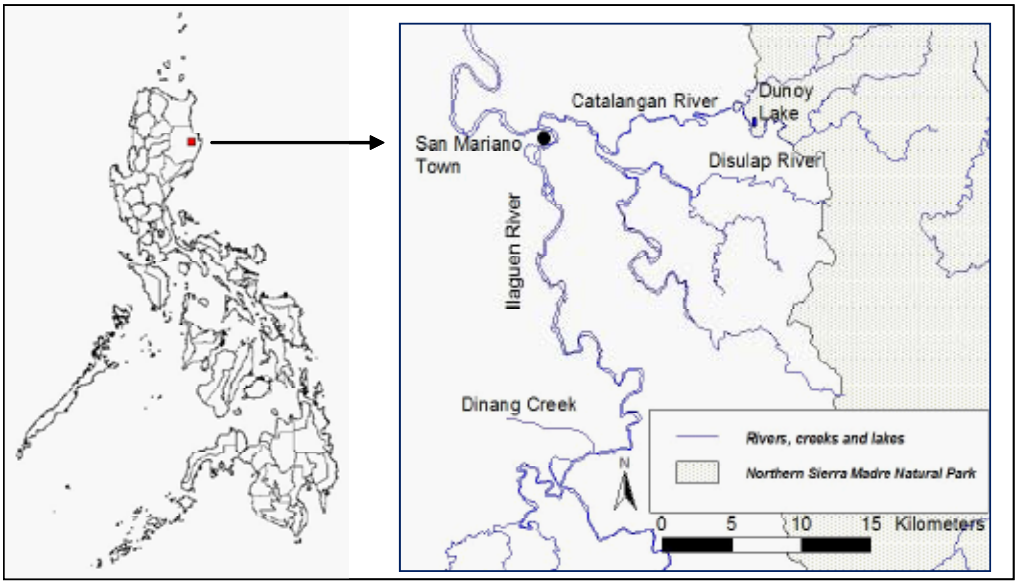
Figure 3.2: The Crocodile Farming Institute maintains around 540 Philippine crocodiles in captivity. Photo by M. van Weerd (2006).

Figure 3.3: The Crocodile Farming Institute educates the public on the sustainable use of crocodiles. Photo by J. van der Ploeg (2004).

‘SOMETHING TO BE PROUD OF!’: THE CROCODILE REHABILIATION, OBSERVANCE AND CONSERVATION PROJECT

In 1999 surveys by staff of the Northern Sierra Madre Natural Park Conservation Project (NSMNP-CP) confirmed the presence of a remnant Philippine crocodile population in the northern Sierra Madre (van Weerd 2000).[10] In cooperation with local governments and Isabela State University (ISU), a research and conservation project was designed to protect the species in the wild. In 2002 conservation efforts were continued under the CROC project (van der Ploeg *et al*. 2008b). In 2003 the Mabuwaya Foundation was established, a non-profit organization dedicated to the conservation of the species in its natural habitat. Field activities are funded by international conservation organizations and zoos. Conservation efforts have concentrated on three sites in the municipality of San Mariano: Disulap River, Dunoy Lake and Dinang Creek (figure 3.4).

Figure 3.4: Philippine crocodile breeding sites in the municipality of San Mariano: Dunoy Lake, Disulap River and Dinang Creek.



San Mariano (N 17° E 122°) is one of the 37 municipalities of Isabela Province and covers an area of approximately 1,500 km2. Around 45,000 people live in the 36 barangays of the municipality. The population is rapidly growing (2.25 percent per year), largely due to immigration. San Mariano is an ethnic melting pot: the majority of the people are Ilocano, Ibanag and Ifugao migrants who settled in the area in search for arable land. The Kalinga and Agta, the indigenous peoples of the northern Sierra Madre, nowadays form small minorities. San Mariano is one of the poorest municipalities of the

country: 60 percent of the people live on less than 1 US$ per day (NSCB 2007). Most people depend directly on the land: corn, banana, rice and sugarcane are dominant crops. Fishing is an important part of people's daily subsistence. Harvesting timber is another important livelihood activity for many rural households. In the 1960s San Mariano became one of the centers of the corporate logging industry in Cagayan Valley. Logging and slash-and-burn farming deforested large parts of the municipality. Corporate logging was banned in 1992. In 1997 the remaining forests were included in the Northern Sierra Madre Natural Park (NSMNP), the largest terrestrial protected area of the Philippines. Law enforcement is however virtually non-existent: DENR officials are unable and unwilling to enforce environmental legislation in this remote rural area. Violations by the rural poor are informally sanctioned: a practice locally called 'humanizing the law' (van den Top 1998: 219).[11]

As in other parts of the Philippines, commercial hunting depleted the Philippine crocodile population in San Mariano. Older respondents remembered how 'Moro hunters' systematically searched the rivers, enchanted crocodiles, stabbed them underwater, distributed meat and sold the skins. In many other cases, local people 'cleaned the river from crocodiles' to protect children and livestock (van der Ploeg *et al.* 2011a: 253). In some areas the army shot crocodiles 'to protect the local populace' (*Ibid*). Crocodiles were occasionally trapped in fish nets or fish traps, or killed when fishing with dynamite, electricity or pesticides. Crocodile nests were destroyed and the eggs consumed. Hatchlings were collected to be sold to pet dealers. Agricultural encroachment of riparian forests and the conversion of wetland habitat into irrigated rice fields also posed severe threats to the remaining crocodiles. Most people were unaware of environmental legislation protecting crocodiles and wetlands.

In-situ crocodile conservation activities are spearheaded by the local government of San Mariano. After an intensive lobby of the NSMNP-CP, the *Sangguniang Bayan* (municipal council) proclaimed a stretch of Disulap River as a crocodile sanctuary in 2001, and declared the Philippine crocodile as the flagship species of the municipality (van Weerd & General 2003). In 2004 the municipal council deputized 12 people to guard the breeding sites: the *Bantay Sanktuwaryo* (sanctuary guards). These local wardens, farmers and fishermen who live adjacent to crocodile habitat, receive a small monthly allowance and health insurance. They report violations of the municipal ordinance to the barangay officials and the municipal mayor, and guard crocodile nests.

In cooperation with ISU, the Mabuwaya Foundation designed a public awareness campaign to inform rural communities on the conservation of the Philippine crocodile. Centered on the theme 'the Philippine crocodile something to be proud of!' the campaign aimed to foster a sense of pride in the occurrence and protection of the species. The foundation distributed posters, calendars, comic books and newsletters to rural communities living in crocodile habitat; placed billboards on strategic locations to inform people on legislation protecting crocodiles and wetlands; brought schoolchildren

to the NSMNP to see crocodiles in the wild; organized puppet shows and cultural dances (figure 3.5); and facilitated community consultations to discuss crocodile conservation with fishers, farmers and village leaders. These environmental education activities have raised people's awareness of environmental legislation protecting crocodiles in the wild and transformed people's attitudes towards the species. In 2007 I interviewed 549 people on Philippine crocodile conservation to quantify the impact of the public awareness campaign for the Philippine crocodile in San Mariano through a counterfactual comparison. Sixty-seven percent of people living in close proximity to Philippine crocodile habitat now know that the species is legally protected, compared to a mere 10 percent in areas that were not subjected to the public awareness campaign. In the three breeding sites 79 percent of the people now support the conservation of the species in the wild, in contrast to 21 percent in the control group. Sixty-five percent of people in villages adjacent to Dunoy Lake, Disulap River and Dinang Creek think that crocodile conservation benefits the community, against only 11 percent in other areas. As a result, Philippine crocodiles are no longer purposively killed (see van der Ploeg *et al*. 2011c for details on methods, results and discussion).

Training workshops were organized to capacitate barangay kagawads (village councilors) and tanods (civilian law enforcers) to design and enforce environmental legislation (Cureg *et al*. 2005) (figure 3.6). Barangay councils have subsequently adopted 17 ordinances protecting crocodiles and wetlands, for example by banning the use of destructive fishing methods or proclaiming no-fishing zones. There is broad societal support for these local legislative measures. People are confronted with environmental degradation, especially the decline of freshwater fish stocks and the degradation of watersheds, and want government to address these issues. Barangay ordinances are discussed during community consultations and barangay council meetings: as a result everybody in the village is aware of these regulations and local officials feel empowered to enforce them. In February 2005, for example, a farmer was fined PhP. 500 (US$ 10) by the barangay captain of San Jose for burning a part of the buffer zone of the Disulap River municipal crocodile sanctuary. And in April 2006, three teenagers were fined PhP. 1,500 for using pesticides to catch fish in Diwagden Creek. The fact that people are penalized for violating environmental legislation is unprecedented in the northern Sierra Madre.

Crocodiles are no longer purposively killed in the northern Sierra Madre, although isolated incidents still occur and crocodiles are accidentally caught in fish traps and gill nets. Village officials report that the use of destructive fishing methods has substantially decreased. Fishers claim that as a result of protective measures fish stocks are recovering.[12] However the conversion of freshwater habitat for rice cultivation and the clearing of riparian forests continue to threaten the Philippine crocodile population in the northern Sierra Madre. In order to facilitate a recovery of the Philippine crocodile population it will be necessary to continue the conservation project for a considerable

Figure 3.5: A public awareness campaign mobilized broad public support for crocodile conservation in the northern Sierra Madre. Students perform a crocodile dance show in barangay Cadsalan. Photo by J. van der Ploeg (2006).

Figure 3.6: The Mabuwaya Foundation organizes training workshops to capacitate local government officials. Here, *barangay tanods* arrest two fishermen in a role playing game. Photo by M. van Weerd

period (figure 3.7). A major challenge remains the financial sustainability of conservation activities, as the CROC project mainly relies on foreign funding.

CONCLUSION

Efforts to conserve crocodiles in the Philippines have focused almost exclusively on sustainable use. The commoditisation of the species has however failed: the two crocodile species that occur in the Philippine archipelago remain severely threatened in the wild and communities living in crocodile habitat have not profited from ranching or ecotourism. The 'use it or lose it' narrative has shifted financial resources away from in-situ environmental protection (Thorbjarnarson 1999), and reinforced the perception of policymakers, scientists, conservationists and the public that crocodiles cannot be protected or reintroduced in the wild (Alcala 2008). But despite these shortcomings, the idea that only economic incentives can transform people's antagonistic attitudes towards crocodiles continues to underpin conservation policy and practice in the Philippines.

In this chapter I challenged this dominant environmental policy narrative. In the northern Sierra Madre a public awareness campaign has mobilized public support for the conservation of the Philippine crocodile in the wild. Defying cultural prejudice the local government of San Mariano proclaimed the Philippine crocodiles as the flagship species of the municipality. Village councils banned destructive fishing methods and created small protected areas to protect the species and its freshwater habitat. Philippine crocodiles are no longer purposively killed and the population in the northern Sierra Madre is recovering, although it remains critically small. The San Mariano case demonstrates that much can be gained by disseminating information on environmental legislation to rural communities and capacitating local governments to design and enforce environmental legislation (Baland & Platteau 1996). In rural areas such as the northern Sierra Madre, there is a broad social basis to protect ecosystem services on which poor rural households depend. By integrating Philippine crocodile conservation in sustainable wetland management it is possible to engage local governments and rural communities in the protection of the species and its freshwater habitat. The experiences in the northern Sierra Madre also suggest that the conception of incentives purely in terms of cash benefits is too narrow and potentially counterproductive (Berkes 2004). Too often the 'promises' of policymakers fail to materialize, which lead in rural communities to feelings of disappointment and mistrust (Goldoftas 2006: 69). By focusing on economic benefits conservationists also risks deviating attention and funding away from environmental conservation (Utting 2000). Cultural values, such as pride in the occurrence of an iconic species, interest in ecology or joy of seeing a large animal in the wild, can also form an important incentive for poor rural communities to support wildlife conservation (Infield 2001).

Figure 3.7: Schoolchildren release a captive-raised juvenile Philippine crocodile into the wild. Photo by M. van Weerd (2010).

Throughout the Philippines there are numerous examples of small-scale conservation projects implemented by small civil society organizations that succeed in engaging rural communities in the preservation of threatened species (Posa *et al.* 2008). Much can be gained if these local experiments can be replicated in other areas of the country, with institutional and financial support of national government and international donors.[13] Such counternarratives enable us to move beyond ideological simplifications that contrast preservation with conservation. By equating preservation with centralized decision making and the authoritarian protection of wilderness on the one, and conservation with participatory planning and wise use on the other hand, scholars risk making a caricature of conservation action on the ground. In practice things are more complex: the 'old' preservationist ideology and the 'new' conservation orthodoxy often intermingle (Hulme & Murphree 1999). The preservation-conservation dichotomy confounds multiple dimensions, and thereby risks minimizing the space for novel solutions (Borgerhoff Mulder & Coppolillo 2005). It is, for example, essential to differentiate between governance and normative values (table 3.2). Such an analysis reveals that many State-led conservation programs such as CFI are 'strong on participatory rhetoric but in practice tend to follow a top-down approach where most of the critical decisions are prescribed by the funding agency and the government' (Utting 2000: 176), and that many community-based conservation initiatives such as the CROC project aim to preserve species by appealing to intrinsic values.

Table 3.2: Moving beyond the preservation-conservation debate (adapted from Borgerhoff-Mulder & Coppolillo 2005: 300; Robinson 2011: 962).

		Normative values	
		Intrinsic values	**Utilitarian values**
Governance	**National government (centralized)**	-National parks -Captive breeding	-Extractive reserves -Sustainable use
	Civil society (decentralized)	-Local initiatives for the protection of flagship species -Private reserves	-Integrated conservation and development projects -Ecotourism -Community conservancies

In the end conservation projects and policies must be designed by what works in a specific context, not on the basis of ideology (Robinson 2011). 'Fortress conservation' can be effective and legitimate in areas where uncontrolled resource extraction will

lead to irreplaceable environmental damage, but not in human-dominated landscapes where the rule of law is absent. Sustainable use can function as an income generating mechanism and thereby generate local support for conservation, but not for critically endangered species such as the Philippine crocodile. The challenge is to free the conservation discourse of moral prejudice and ideological narratives, and instead focus on the design of integrative and innovative strategies that effectively conserve wildlife.

ENDNOTES

1. Based on: van der Ploeg, J., R.R. Araño & M. van Weerd. 2011. What local people think about crocodiles: challenging environmental policy narratives in the Philippines. *Journal of Environment & Development* 20 (3): 308-328. Jan van der Ploeg conducted the interviews and wrote the paper. Robert Araño was instrumental in the design of an in-situ Philippine crocodile conservation strategy in the northern Sierra Madre, and provided comments on the paper. Merlijn van Weerd designed and supervised the quarterly monitoring and conservation activities of the Mabuwaya Foundation, and assisted in the collection of primary and secondary data for this paper. The title of this chapter is derived from Marshall Sahlins (1995) book: 'How "natives" think: about Captain Cook for example.'
2. So-called 'epistemic communities' are instrumental in the dissemination (and endurance) of these blueprint solutions (Haas 1992). JoAnn McGregor (2005) has highlighted the role of the IUCN Crocodile Specialist Group, a network of international 'crocodile experts', in promoting sustainable use.
3. The preservation ideology originated in the United States in the late 19th century. Inspired by John Muir and his activism to safeguard Yosemite Valley, it aims to create protected areas free from human interference (Worster 1977). Preservationists believe that wilderness should be valued in its own right, and argue that the State has to protect wildlife from the insatiable demands for development of a rapidly growing human population. Conservationists, in contrast, think that nature can only be safeguarded if it is valued economically. It's main architect, Gifford Pinchot, the founder of the U.S. Forestry Service, campaigned for the sustainable and efficient use of renewable resources 'for the enduring good of men' (Pinchot cited in Worster 1977: 266).
4. Much of the grey literature is difficult to find. Cited reports of the IUCN Crocodile Specialist Group, DENR and CFI, and Project reports of the Mabuwaya Foundation can be obtained through the authors.
5. The saltwater crocodile is a 'forgotten species' in the Philippines, largely neglected by government and conservation organizations (Alcala 2008: 21). The only in-situ conservation initiative for the saltwater crocodile of which I am aware is the sanctuary created by the municipal government of Maconacon in barangay Reina Mercedes in the northern Sierra Madre in 2007.
6. Few people have been as influential in shaping the Philippine environmental policy discourse as Gifford Pinchot. Pinchot toured the islands for six weeks in 1902, during which he reorganized the Insular Bureau of Forestry and drafted a report that provided the basis for the 1904 Forestry Law (Bankoff 2009).
7. For an elaborate discussion on the increasingly tenuous links between the crocodilian skin industry and the conservation of wild populations of crocodilians see McGregor (2005). In an effort to secure government permits to export crocodile leather, Crocodylus Porosus Philippines Inc. has recently supported several initiatives to conserve the Philippine crocodile in the wild.
8. Most probably Philippine crocodiles never naturally occurred on Palawan. Genetic concerns about inter-island hybridization and ethological concerns about adaptation to the wild of captive-bred crocodiles continue to obstruct the reintroduction of Philippine crocodiles in the wild (but see van Weerd *et al*.

2010).

9. 'Information, Education and Communication' (EIC) was an important objective of CFI (CFI 1995: 34). Informative posters and newsletters were distributed to government offices, lectures about crocodiles were given in schools on Palawan, and a 'crocodile conservation week' was organized annually in Puerto Princesa (Ortega 1998). Nowadays PWRCC mainly focuses on providing organized tours on the breeding facility for tourists: the breeding facility in Puerto Princesa attracts around 40,000 visitors per year, making PWRCC a top tourist attraction in Palawan. But these activities mainly target the urban middle-class and tend to reinforce the dominant policy narrative that crocodiles cannot be preserved in the wild.
10. The NSMNP-CP aimed to strengthen the management of the Northern Sierra Madre Natural Park. This integrated conservation and development project was funded by the Netherlands government and implemented by PLAN International.
11. In fact concerns for people's livelihoods are often used by DENR officials to mask incompetence, corruption or political interference (Utting 2000; van der Ploeg *et al.* 2011b).
12. Fish spillovers of no-fishing areas can effectively reduce poverty of local resource users (Leisher *et al.* 2010).
13. The conservation of biodiversity in the developing world will continue to depend to a large extent on external funding (Ferraro & Kiss 2001; Clémençon 2006).

4. CREATING SPACE FOR CROCODILES: ENVIRONMENTAL GOVERNANCE IN THE PHILIPPINES[1]

INTRODUCTION

The Philippine crocodile is a relatively small freshwater crocodilian. This endemic species was widely distributed throughout the archipelago but is now thought to be restricted to a few upland localities in North Luzon and Mindanao (van Weerd & van der Ploeg 2004). Indiscriminate hunting and habitat loss have decimated the population below critical threshold levels throughout the Philippine archipelago.[2]

Responding to the alarming results of Philippine crocodile surveys in the 1980s (Ross 1982; Ross & Alcala 1983), the Philippine government established an ex-situ conservation program in 1987: the Palawan Wildlife Rescue and Conservation Center.[3] Captive breeding was considered the only viable option to guarantee the survival of the species (WCSP 1997). The center has successfully bred Philippine crocodiles in captivity, but no crocodiles have so far been reintroduced in the wild. Negative community attitudes towards crocodiles and the absence of any form of effective protection of the species and its habitat make the reintroduction of the Philippine crocodile in the wild almost impossible (Banks 2005).

The rediscovery in 1999 of a small and fragmented Philippine crocodile population in the municipality of San Mariano, Isabela Province in northeast Luzon (van Weerd 2000) and the subsequent conservation efforts (van Weerd & General 2003) created new opportunities for the survival of the species in the wild (van Weerd & van der Ploeg 2004). In this remote municipality in the northern Sierra Madre an alternative conservation strategy was developed. Here, conservation activities have focused on protecting the Philippine crocodile 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.

The aim of this chapter is to document the Philippine crocodile conservation activities in the municipality of San Mariano, and place them in the wider context of natural resource management and environmental governance in the Philippines. I give special attention to the pivotal role of the municipal government in the protection of the species. I argue that the devolution of power to the municipalities has been instrumental for the design of a legitimate and effective policy to protect crocodiles in the wild. In the current sociopolitical context that characterizes the uplands of northeast Luzon, only local governments are able to effectively enforce laws protecting the Philippine crocodile and its freshwater habitat.

In many parts of Southeast Asia processes of decentralization and devolution are responses to the failure of centralized forms of government to solve certain problems,

especially those pertaining to environment and development (Persoon *et al*. 2004).[4] Some authors have argued that this is essentially a top-down attempt to extend the authority and influence of the central State in remote upland areas (Magno 2001; Edmunds & Wollenberg 2004; Ribot *et al*. 2006). Interestingly, this State initiated devolution process has created a context in which local politicians, rural communities, and civil society groups are able to design new institutions for the sustainable management of natural resources at the local level (Contreras 2003). Throughout the Philippines people are currently experimenting with participatory approaches to conserve wildlife and natural resources. In contrast to the punitive national laws or the technocratic and capital-intensive captive breeding projects of the national government, these efforts epitomize adaptive and flexible co-management approaches that strengthen multifunctional local institutions and ingenuity (Scott 1998). This article aims to contribute to the growing body of empirical case studies describing local experiences to creatively overcome environmental degradation and rural poverty.

It is important, at the outset, to clarify my own position and methodology. This chapter is largely based on my experiences designing and implementing a Philippine crocodile conservation strategy in northeast Luzon. I supervised several students of Isabela State University and Leiden University who systematically collected data on peoples' perceptions and awareness in San Mariano and conducted interviews to obtain information of threats and potential conservation actions. Crocodile populations were monitored on a quarterly basis (van Weerd & van der Ploeg 2004). Most important perhaps in understanding the problems surrounding the centralized government bureaucracy was my participation in formal meetings with government officials, scientific seminars, sessions of the municipal council and community consultations, and, above all, my informal contacts with key informants over a period of time. All in all, I think that this longitudinal participatory action research enabled me to gain an in-depth understanding of the processes and context of environmental governance in contemporary rural Philippines.

A SHORT HISTORY OF CROCODILES IN SAN MARIANO[5]

On one of the earliest maps of northern Luzon, drawn by the Spanish friar Alejandro Cacho in 1740, the western slopes of the northern Sierra Madre near the confluence of the Cagayan River and the Abuan River were called '*buaya*' (Antolin 1789) (figure 4.1). It suggests that crocodiles were common in the wetlands of San Mariano. Early explorers talk about 'rivers full of crocodiles, all of a ferocious temper' (De Witt Willcox 1912: 148). The indigenous peoples of the area, the Agta and Kalinga, depended heavily on the rivers and streams for fish, but had a limited impact on the Philippine crocodile population. These indigenous communities still have strong cultural taboos on eating

crocodile meat, and in many cases attach supernatural powers to the animal. 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.

Figure 4.1: Map of northeast Luzon (North is oriented downwards) by A. Cacho (1740). Note the location *buaya* in the foothills of the Sierra Madre.

After the Revolution of 1898 and under the new colonial administration of the United States, San Mariano experienced an 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 associated with the devil and regularly killed, but human population was too low to severely threaten the Philippine crocodiles: in 1939 there were 7,046 people in San Mariano (Keesing 1962: 262).

Large-scale commercial logging of the vast forests began after independence. With the construction of a highway in the 1960s, which facilitated over-land transport to Manila, logging corporations started operating in the forests of the northern Sierra

Madre. During the logging boom from 1969 to 1992, 22,000 hectares of primary forest were logged annually in the northern Sierra Madre (van den Top 2003). A large inflow of impoverished immigrants from Ilocos followed the logging companies and settled in the region. The Kalinga and the Agta were respectively assimilated or pushed further into the depleted forests (Scott 1979). As of today, the majority, 53 percent, of the people in San Mariano are of Ilocano origin (Huigen 2004). These farmers can still recall the days that crocodiles were widely distributed in San Mariano: in the 1960s people still regularly observed large crocodiles in the Pinacanauan and Disabungan rivers. The frontier attitude of those days led to rapid and destructive resource extraction. Like everything else during those 'years of plunder' (Broad & Cavanagh 1993), crocodiles were seen mainly as a commodity. In the 1970s, commercial hunters systematically killed crocodiles in the river systems of the municipality for the leather trade. The violent insurgency during the Martial Law years (1976-1986) also had a negative effect on the crocodile population. There were several cases in which the army or the communist rebels killed crocodiles to safeguard the local people from these supposedly dangerous creatures. A widespread possession of firearms made crocodiles more vulnerable to humans.

As a result, the crocodile population collapsed. A small and fragmented population of Philippine crocodiles has survived in remote areas of the municipality of San Mariano (van Weerd 2000; van Weerd & van der Ploeg 2004). Three localities have been identified as breeding locations: Dunoy Lake, Disulap River, and Dinang Creek. Inaccessibility and remoteness seem to have offered some form of protection for the crocodiles. In Disulap River, for example, the limestone cliffs and underwater caves provide excellent hiding places for the crocodiles. More important it seems is the presence of indigenous communities. In Dunoy Lake and Dinang Creek, the Agta and Kalinga respectively could have easily killed the Philippine crocodiles had they wished so. Traditional belief systems and resource use practices have prevented the killing of crocodiles, and although these cultural attitudes are now rapidly changing they still give some form of protection to the species.[6]

After democracy was restored in the country during the People Power Revolution in 1986, the new Philippine Constitution introduced major policy reforms. In response to the centralized and autocratic government of President Ferdinand Marcos, under which the small and well-connected elite in Manila profited from resource destruction, local governments were given more autonomy (Vitug 1993). Civil society blossomed, and a wide variety of environmental civil society organizations advocated environmental protection and rural development, a process that was also fuelled by renewed international attention for biodiversity conservation in the Philippines (van den Top & Persoon 2000; Vitug 2000). In San Mariano, several civil society organizations concentrated on the protection of the Northern Sierra Madre Natural Park. The plight of the Philippine crocodile, however, was ignored, simply because of the fact that

scientists and conservationists were unaware of its existence in the municipality.

Social and economic changes continue to threaten the remnant crocodile populations in San Mariano. Destructive fishing methods regularly kill crocodiles. Freshwater swamps and marshes, prime Philippine crocodile habitat, are converted into rice paddies. Crocodiles are sometimes captured: purposively for the pet trade or accidentally in fishing nets (figure 4.2). These factors, combined with a strong growing human population, in 2000 San Mariano had 40,995 inhabitants (Huigen 2004), jeopardize the survival chances of the species in San Mariano.

Figure 4.2: Hunting, the use of destructive fishing methods and habitat conversion continue to threaten the remaining Philippine crocodile population in San Mariano. Photo by J. van der Ploeg (2007).

National legislation

Since 2004 the Philippine crocodile is legally protected by virtue of the Wildlife Act. Several other national policies also offer protection to Philippine crocodiles in the wild.[7] The Department of Environment and Natural Resources (DENR) is the government

agency responsible for the enforcement of the national laws that govern the country's natural resources.[8] The department is tasked with the protection of the country's wildlife, including its crocodiles. Following Executive Order 192 of 1987, the functions of the DENR were decentralized to the twelve administrative regions, and subsequently to the provinces, and the local level. The enforcement of environmental laws has become the exclusive responsibility of these localized offices (van den Top 2003; Oposa 2002). San Mariano falls under the jurisdiction of the local office of Naguilian, the provincial office of Isabela, and the regional office of the Cagayan Valley.

Unfortunately, the lack of financial resources, political support, and technical capacity of the DENR seriously hinders the enforcement of these national laws. The department is responsible for managing half of the Philippines' total land area, but has an underdog position in the ranks of the government (van den Top 2003). To give an indication of its political importance: the department receives 1.7 percent of the total budget allocation to national government agencies (CPBD 2003). Lack of financial resources and manpower is often cited as a reason for weak enforcement of environmental laws and policies (NORDECO & DENR: iv). The community office of Naguilian, for example, with a jurisdiction consisting of around 100,000 hectares, has 53 staff members of which five are assigned to the protection of wildlife. Political patronage and a hierarchical bureaucratic culture traditionally focused on resource extraction, and a low esteem for field activities, further weaken the capacity of the DENR to effectively monitor and implement the national policies that could protect the Philippine crocodile in the wild (Utting 2000).

Consequently, crocodiles remain *de facto* outlawed: the department is unable to stop the use of destructive fishing methods, despite stiff penalties provided for in the Fisheries Code of the Philippines (Republic Act 8550), and it considers slash-and-burn farming in critical crocodile habitats unavoidable notwithstanding its illegality as specified in Wildlife Act.[9] In the uplands of San Mariano law enforcement is hampered by sporadic civil violence. Related to this, department officials also consider the strict implementation of laws unethical given the socioeconomic position of the violators, and fear that punishment would fuel the insurgency, a widespread practice called 'humanizing the law.' In addition, department personnel often cite the lack of information dissemination as a reason not to enforce rules and regulations: how does one penalize a farmer for clearing his fields in a crocodile habitat, when he or she is not aware that this is unlawful?[10]

The DENR, in short, suffers a serious credibility crisis: 'the idealistic and ambitious objectives of the department are in sharp contrast with its public image as a corrupt and inefficient organization' (van den Top 2003: 234). Ironically, department officials are often called *buwayas*, crocodiles, by local people in San Mariano. The inability of the DENR to effectively enforce national laws and policies at the local level is a major problem for the effective protection of crocodiles in the wild, and for

biodiversity conservation and environmental protection in the Philippines in general. In the absence of structural administrative reforms, this grim local reality forces us to consider alternative solutions for wildlife conservation in the Philippine uplands.

Local alternatives

In March 1999, Mr. Samuel Francisco, a fisherman from the village of San Isidro, accidentally caught a crocodile hatchling in Disulap River, thereby revealing its previously unknown existence in northeast Luzon. This by-catch triggered new initiatives for in-situ Philippine crocodile conservation. Surveys were carried out to determine the status and distribution of the Philippine crocodile population in San Mariano. These surveys highlighted the difficulties of preserving the species in the wild. Local attitudes towards crocodile conservation were outright negative; not out of fear for the crocodile as people considered it relatively harmless, but because upland farmers feared that crocodile conservation would have a negative impact on their livelihood.[11] A complicating factor was the absence of the rule of law.

The Local Government Code provides the legal framework for the devolution of power and authority over natural resource management to the local government units.[12] The devolution of the functions of the DENR to the municipal government has provided the municipal mayor and the municipal council with considerable influence over environmental management, at least in theory. In the municipality of San Mariano, it has opened a window of opportunity for effective protection of the Philippine crocodile in the wild. After the discovery of three breeding crocodile populations in San Mariano, conservationists actively lobbied to get the support of the municipal authorities of San Mariano for a long-term in-situ conservation strategy for the species. The strategy focused on the proclamation and management of crocodile sanctuaries with the consent and cooperation of local people: a space where crocodiles could reproduce safely (van Weerd & General 2003). The first step was to create a comprehensive policy protecting the species in the wild.[13] On 23 July 1999, the *Sangguniang Bayan* (municipal council) approved Municipal Ordinance 1999-025, which prohibits 'the collection and annihilation of Philippine crocodiles in the municipality.' It includes a modest penalty for violators: 'one thousand pesos or imprisonment for fifteen days.' For the first time in Philippine history, the Philippine crocodile had a protected status.

This municipal ordinance marked the start of an intensive involvement of the municipal government in crocodile conservation. On 21 January 2000, the municipal council enacted Municipal Ordinance 2000-002 declaring the Philippine crocodile the flagship species of the municipality, a remarkable action in a country where crocodiles are generally associated with corrupt government officials. On 7 September 2001 the Sangguniang Bayan approved Municipal Ordinance 01-17, declaring the upper part

of Disulap River as a municipal sanctuary for the Philippine crocodile (figure 4.7). The proclamation of the crocodile sanctuary can be seen as a model for devolving authority over natural resource management to local governments. A series of public consultations with local communities residing near the municipal sanctuary was organized. These community meetings sought to balance conservation goals with the developmental needs of the community. During these community consultations specific management agreements were negotiated upon, for example on the extent of the buffer zone.[14] The municipal government formed a protection team composed of local people, the *Bantay Sanktuwaryo,* to monitor and enforce the rules and regulations of the crocodile sanctuary. In 2004, the Sangguniang Bayan approved Municipal Ordinance 04-011 allotting 70,000 pesos (€1,166) per year for the honorarium and insurance of this local protection group to enforce the rules and regulations protecting crocodiles in Disulap River and other crocodile breeding areas in the municipality.

In order to mobilize local support for crocodile conservation the local government unit prioritized the delivery of basic social services to barangays with a crocodile population. Farm-to-market roads were improved to assist farmers, and also to stimulate ecotourism. In barangay Disulap, the municipal government financially supported a proposal of the local people's organization to provide security of tenure for their upland possessions.[15] Upland farmers in the Philippines generally do not have formal ownership, a title, of the land they cultivate. Most upland areas in the Philippines are still classified as forest lands and thus belong to the State. Farmers were assisted in secure land tenure in several villages in San Mariano, with mixed results. In barangay Cadsalan the local government unit also co-financed the construction of pump wells, meant to provide clean water and minimize human-crocodile interaction. In addition, the municipal government prioritized the construction of a rural health clinic in this remote village. These activities created a lot of goodwill and awareness of local communities towards crocodile conservation.

An intensive communication and awareness raising campaign, conducted in cooperation with Isabela State University, highlighted the flagship status of the crocodile. Centered on the theme 'the Philippine crocodile: something to be proud of!' the public awareness campaign aimed to counter negative community attitudes towards crocodiles, and mobilize public support for the conservation of the species. Newsletters, posters, flyers, and a comic album were distributed in the municipality. Billboards were placed in strategic locations throughout the municipality (figure 4.3). A bulletin board highlighting the Philippine crocodile was placed prominently in the lobby of the municipal hall.

Figure 4.3: Billboards informing people on the Philippine crocodile are placed at strategic locations in San Mariano. Photo by J. van der Ploeg (2007).

Raising public awareness and empowerment of local officials have turned out to be a key factor for crocodile conservation in San Mariano. Most people, including barangay officials, are simply not aware of the national environmental policies and laws. Barangay officials, usually farmers with limited education, often do not know their specific responsibilities, and particularly lack information on environmental legislation. This is a serious hindrance for effective law enforcement at the local level, especially if it's is largely based on self-imposed control. Two training workshops on environmental legislation and law enforcement techniques were organized to enhance the capacity of village leaders. In November 2004, 122 barangay officials attended a five-day workshop. Environmental lawyers explained the different national laws pertaining to wetland and crocodile conservation and the duties and responsibilities of barangay officials (Cureg *et al*. 2005). The participants made plans to conserve wetlands in their respective village (figure 4.4). This resulted in the enactment of barangay ordinances prohibiting destructive fishing methods and creating small sanctuaries. In February 2006, a second workshop was organized. Here, classroom lectures were complemented with on-site role playing games in the Disulap River crocodile sanctuary. Follow-up community consultations were organized to discuss crocodile conservation with barangay officials, fishermen and landowners in fifteen barangays in San Mariano.[16] As a result of these

trainings and consultations local officials feel empowered. They are better aware of their roles and responsibilities under the law, and feel supported by the majority of the people. There exists strong societal support to act against illegal fishing, as local people are confronted with declining in fish catches. The Philippine crocodile has become a flagship for local environmental stewardship: a symbol for sustainable management of wetland resources.

Figure 4.4: A *barangay kagawad* (village councilor) present the conservation action plan of barangay Cadsalan during a community consultation. Photo by M. van Weerd (2004)

The crocodile conservation activities in San Mariano were featured in one of the most popular television shows on prime time, *Magandang Gabi Bayan!*, hosted by then Senator, and former Vice President, Noli de Castro. Other TV stations, GMA7 and the National Geographic Channel, also made documentaries on the Philippine crocodile in San Mariano. Several national newspapers covered the conservation activities in San Mariano. A local radio station, *Bombo Radyo*, discussed crocodile conservation during their talk shows. This media attention created further awareness among the citizens of San Mariano: crocodiles became the talk of the town. Most people in San Mariano now know it is illegal to kill the species. A transformation has taken place in the attitudes of local communities towards crocodiles. The fact that the Philippine crocodile survives

in the municipality has become a special source of pride. More importantly, the actual killing of crocodiles has largely stopped.

DISCUSSION: LOCAL SOLUTIONS TO LOCAL PROBLEMS

Over the past years, the municipality of San Mariano has taken a number of steps to conserve the Philippine crocodile. The involvement of the municipal government has proven to be an important factor in the effective protection of the species in the wild. It created a breakthrough in the downward spiral of local extinctions, negative community attitudes, and passive governance that has long characterized crocodile conservation in the Philippines. As such, the conservation strategy in San Mariano appears to be a success story in the legislative efforts to devolve authority on natural resource management from the national agencies to the local level.

This discussion focuses on three arguments that challenge the validity and effectiveness of devolving power from the national to local governments. First, it is often said that local governments are not inclined to focus on global conservation priorities but focus on local development; hence a centralized expert system is needed to preserve the common good. Second, it is argued that devolution of power fuels institutional confusion in which corruption and incompetence thrive. And third, the scientific literature on decentralized natural resource management mentions that without reforming underlying sociopolitical structures, devolution will lead to resource capture by powerful local elites. Together these arguments form what has been labeled 'the Achilles heel of localization' (Bryant & Bailey 1997: 74).

Here I will argue, based on the experiences in San Mariano that, contrary to these arguments, the devolution of power to the local government units is instrumental for effective wildlife conservation in the Philippines. The main reason for this outcome is that the enforcement of laws protecting crocodiles and other wildlife is only possible if it is considered legitimate by the majority of local people (Brechin *et al*. 2003); a role that only local governments can play in the contemporary sociopolitical context of the Philippine uplands.

Cash for crocodiles

The first argument often used to question the devolution of power to local governments is that only a supra-local expert system can assure the preservation of natural resources without a direct utilitarian value, such as crocodiles or biodiversity in general (Bryant & Bailey 1997). The central State, in this view, remains indispensable because it is the only actor in a position to address ecological problems at larger scales and on a longer

term. Essentially this is a question of scale: not all environmental problems, especially those where there is no direct benefit for the local people, can be solved at the local level.

The San Mariano case proves that municipal governments can preserve a globally threatened species even when there are no direct local benefits. The extremely low population and the shy nature of the Philippine crocodile rule out any short term cash benefits for the municipality through sustainable harvesting or ecotourism, a fact fully recognized by local government officials. The only benefits derived from crocodiles by the municipality are immaterial: a source of pride and media attention. Of course, the municipal government has a focus on rural development. But this does not contradict conservation efforts as is so often assumed.

In their book 'Decentralization and biodiversity conservation' Ernst Lutz and Julian Caldecott (1997: 161) argue that:

> 'Decentralization […] is not driven by public interest in conservation but rather by a desire for better access to the fruits of economic development through democratic participation. Conservation will only benefit from this only to the extent that ecosystems and the biodiversity they contain are seen as resources to sustain development; in order words as valuable resources, that some may wish to control for their own benefit. If no such perception exists, then conservation benefits will accrue from decentralization only accidentally and, if biodiversity continues to be perceived as valueless by newly empowered groups, only temporarily. Because conservation requires permanent solutions to problems of species extinction and environmental degradation, it must involve changing perceptions and values among the people who control the fate of ecosystems.'

The San Mariano experience shows that this view is too simplistic. In San Mariano there has been a fundamental shift in how people perceive crocodiles: from dangerous pests to 'something to be proud of!' It can even be argued that the success of crocodile conservation activities is due to the fact that at the moment the crocodiles do not represent any commercial value. The extremely low population and the ban on international trade in Philippine crocodile hides make hunting non-profitable. Ironically, crocodile conservation succeeded because crocodiles were not valuable resources.

Interestingly, critics of decentralized biodiversity conservation focus on what the local governments supposedly can not do. But this line of reasoning inverts the argument: after all, it is the lack of capacity of the central government that forces us to find alternatives for sustainable natural resource management. In fact, the incompetence, ignorance and corruption in the ranks of the supra-local actor tasked with environmental conservation have allowed the Philippine crocodile to go nearly extinct. Critics also underestimate the capacity of municipal government to understand the supra-local importance of conserving a critically endangered species. In San Mariano, the local officials were informed and trained by civil society organizations; but without

the political will from the local government unit itself the conservation of the Philippine crocodile would never have taken place.

This brings me to another argument often used against the devolution of authority to the local level: it is often thought that the influence of civil society organizations and other grassroots groups can be disproportionate and can effectively undermine good governance at the local level (see for example Bryant & Bailey 1997; van den Top & Persoon 2000; Utting 2000; Contreras 2000). The simplistic focus on a single pressing issue of civil society, such as Philippine crocodile conservation, can influence local governments to put aside more pressing and relevant issues, or so it is argued. In San Mariano crocodile conservation has been put on the agenda by non-governmental environmentalists. Although the continued involvement of civil society is necessary, especially to provide technical expertise, to say that these groups can have disproportionate influence is to disregard the capacity of municipal government officials. The local government unit of San Mariano, for example, has always stressed that crocodile conservation has to be linked to rural development; it has increased accessibility of remote crocodile areas by providing farm-to-market roads for affected communities, a development that conservationists would normally rather not advocate. Local communities and the municipal government have been able to access funds for rural development that otherwise would not have been available. The partnership between civil society and the municipal government, what Gerhard van den Top and Gerard Persoon (2000: 176) have called the 'leapfrogging of the murky waters of the nation State', has actually resulted in conservation action for a globally threatened species.

Devolution, according to the skeptics, should be checked and balanced by a continuing role for central government to safeguard supra-local and intergenerational interests, and intrinsic values (Lutz & Caldecott 1996). In San Mariano devolution has helped to increase local responsibility for Philippine crocodile conservation, making this process more relevant and interesting for local people; not because of its utilitarian value but on intrinsic grounds.

Confusion over crocodiles

The second argument often used against the transfer of power and authority to the local level is that it will lead to more institutional confusion, which paralyzes government. Devolution, it is argued, has to be accompanied by a coherent and supportive macro policy (Utting 2000). A structural problem that characterizes biodiversity conservation in the Philippines is the overlapping jurisdiction of the DENR and local government units, leading to a 'continuing confusion over government lines of responsibility and authority' (Garrity *et al*. 2001: 132). The parallel processes of devolution of power from the DENR

to the municipal governments and the decentralization of the department offices to the regional, provincial and local levels create systematic confusion about the division of tasks and responsibilities of the national agency and the local government units. As Rowena Reyes-Boquiren (2002: 104) observes:

> 'The institutional arrangement for addressing biodiversity loss is highly bureaucratized, compartmentalized, and segmented, oftentimes resulting in competition, conflicts, duplication, disjointed action and the like. The bureaucratization is reflected in the enforcement of policies and program implementation […]. A key area for advancing conservation is the harmonization of policy conflicts and program implementation issues.'

This is familiar talk for everybody working on natural resource management in the Philippines. Crocodile conservation in San Mariano permanently has to deal with institutional uncertainties and questions, caused by the department bureaucracy, that usually lead to delays: this applies to the deputation of the Bantay Sanktuwaryo, the issuance of appropriate land tenure instruments to farmers in crocodile habitat, the implementation of a biodiversity monitoring system in the Disulap River crocodile sanctuary, the applications for permits to conduct ecological research, the authorization of the municipal rescue center, and so on. Red tape and bureaucracy make conservation activities sometimes grind to a halt.

A fundamental problem is that most people, including most government officials, think that only the DENR can enforce environmental laws. This has profound consequences for law enforcement: apparently, a difference is made between environmental laws to be enforced by the DENR and 'normal' laws to be enforced at the barangay level by the *barangay tanods* (village police) or at the municipal level by the Philippine National Police.[17] Another problem is the sheer size of the department bureaucracy and its enormous responsibilities. Officers in charge tend to change position frequently, usually without properly turning over their responsibilities, and there is little or no communication between different bureaus and divisions. Institutional conflicts between the DENR and other government agencies (such as the National Commission on Indigenous Peoples or the Department Agrarian Reform), occasional rifts with civil society groups and personal conflicts resulting in bureaucratic resistance further aggravate this bureaucratic confusion.

Summarizing, the mandate, jurisdictions and responsibilities of the municipal government and the DENR are far from clear for most government officials, let alone for local people. This is indeed hampering environmental governance, and is a major cause of the failed implementation of environmental laws and policies. But in San Mariano progress has been made because the municipal government has assumed a leading role and has been able to function despite the DENR bureaucracy. Concerns about the effects of devolution on macro-coherency are valid, but in many cases it is the

supra-local structure itself which creates the confusion. In effect, this structure becomes an argument for devolution: confusion is avoided when the authority lies solely with local governments. The national government, however, does play an important role in creating a macro-coherent framework for environmental conservation by ratifying international agreements and creating national legislation, tasks that can obviously never be adopted by local governments. A distinction should be made between the creation and the implementation of the framework. The boundaries of what is possible are set by the macro policy, ensuring that municipal governments do not allow illegal activities or jeopardize international agreements. The implementation possibilities are greatly enhanced by involving local governments through devolution.

Crocodiles in Congress

A more fundamental concern raised about the Local Government Code is that the devolution of power to the municipal governments, before any significant sociopolitical reforms have taken place, will simply replicate the plunder of the past at the local level:

> 'The Local Government Code aimed to correct longstanding imbalance in political and economic power between 'Imperial Manila' and the provinces. For centuries, Metro Manila siphoned resources and people away from the provinces for a kind of 'national development' that widened the economic gap between these urban centers and the rural periphery. It is questionable whether devolution is the way to redress the resulting social and political imbalances. In environmental terms, devolution carries the risk of replicating the past national development pattern in the provinces. […] It remains to be seen whether local institutions can take the place of a weakened DENR in balancing these pressures and channeling these along a more sustainable course than the one pursued by the nation as a whole.' (van den Top 2003: 338)

Arguably, local elites will capture the natural resources of the municipalities if not checked by a centralistic expert system like the DENR. Given the longstanding tradition in the Philippines of using public office for personal gain or for defending the interests of the elite, it is feared that the transfer of responsibilities to local authorities will result in abuse of power and corruption (Aguilar 1994; Utting 2000; Contreras 2000).

San Mariano is, of course, no benign exception. In this remote municipality too the 'pork barrel State' (Coronel *et al*. 2004) infiltrates all aspects of public life. But the absence of clear material benefits in crocodile conservation has not influenced the conservation activities for the species. Crocodile conservation has largely been an apolitical oddity for local government officials. The *Sangguniang Bayan* members generally see crocodiles as something exciting and fun to be discussed during a session break, or as a way to generate positive media attention. Remarkably for the Philippine

context, conservation action for the species continued after the elections in 2004 which brought in a new municipal Mayor and Sangguniang Bayan members.

In this context it is relevant to note that grassroots political reforms are taking place in Isabela: in the 2004 elections the people of San Mariano massively voted against the political dynasty that has controlled southern Isabela for generations (figure 4.5). Grace Padaca, a political outsider who campaigned on a platform of transparency and accountability, won a land-slide victory over the incumbent governor Faustino Dy Jr. Her re-election as governor of the province of Isabela in the elections of 2007, despite widespread election fraud and political violence, is widely seen as a milestone for genuine political reform in the Philippines. Crocodiles have nothing to do with it, but local people are holding their politicians accountable for their actions. The words of Maria Cacha and Julian Caldecott (1996: 102) might provide a counterweight against the prevailing pessimistic views of devolution and the state of Philippine politics:

> 'The reform process that began in the mid-1980s has a long way to go before all the damaging effects of [a history of social strife and environmental degradation] can be turned to benefit. Nevertheless, much progress has been made, and the pace of change has accelerated during the early 1990s. The former centralized and coercive style of governance, development and conservation essentially has been abandoned in favor of a model based on participation, accountability and community tenure in the rural areas. […] Although abuses persist and shortages of funds and skill exist among the newly empowered local government units, the decentralization process continues to accelerate and is probably now irreversible.'

Legitimacy

Of course there are dangers associated with the transfer of power and authority to the local level. But, as the San Mariano case has shown, the local government has successfully handled the threats facing the Philippine crocodile in the municipality. The municipal ordinances are generally respected; not because of strict law enforcement, but because the majority of the people voluntarily complies with the measures of the municipal government to protect crocodiles. This is in sharp contrast to the national regulations of the DENR that are widely seen as illegitimate and are often simply disregarded.

During the Marcos dictatorship, the DENR (then called the Ministry of Forestry), became equated with corruption, patronage, and the unequal distribution of wealth:

> 'One structural factor that results in widespread violations of policies and constrains the capability of DENR to curtail these violations is the degree of *legitimacy* that the citizenry attribute to the government in general, the acceptance, even approbation, of the State's rules of the game, its social control, as true and right ... [and] the acceptance of the

> State symbolic configuration within which the rewards and sanctions are packaged.' (van den Top 2003: 327, emphasis added)

After democracy was restored to the country in 1986, the new administration reinforced the concepts of decentralization, democratization, and people's participation in mainstream policy formulation: the Local Government Code of 1991 and the National Protected Area System Act of 1992 are clear examples of this recognition of the sociopolitical dimension of natural resource management. [18] The pendulum swung back during the eleventh and the twelfth Congresses: the Wildlife Act is again a testament to a centralistic and technocratic vision of resource management, combined with a complete ignorance and disregard of the socioeconomic and political context of the Philippine uplands. An example from the field can make this clear.

Figure 4.5: Political dynasties rule the Philippines but fundamental political reforms are taking place in Isabela. Photo by J. van der Ploeg (2007).

In San Mariano, the municipality prohibited the hunting of crocodiles in 2001. Three years later Congress approved the Wildlife Act, which gave the Philippine crocodile nation-wide legal protection. Whereas the municipal ordinances prescribe a fine of 2,000 pesos (€ 33) or fifteen days of imprisonment for catching, hunting, collecting or killing a Philippine crocodile, the Wildlife Act specifies a minimum fine of 100,000 pesos (€ 1,666) and imprisonment of at least six years for killing crocodiles

(Oposa 2002: 122-123). This apparent contradiction reveals much about the difficulties surrounding the enforcement of national laws. The point here is that the draconian penalties in the Wildlife Act can and will never be implemented in poor rural areas. The strict implementation of the Wildlife Act, akin to the presidential decrees of the Martial Law period, is widely regarded as unjust. The question, then, is which law to apply in case of a violation? The answer, in the Philippine judicial system, basically lies in the hand of the prosecutor, who can decide on which law or ordinance to base his case. For now it suffices here to note that the municipal ordinances appear to be far more effective. In contrast with the national law, the penalties of the municipal ordinances are realistic and considered to be a just punishment for the offence by local people, and as such are taken seriously.

The key to effective law enforcement is to create rules that are understood and supported by the majority of the local community. In contemporary Philippine society only self imposed enforcement will be effective; and only local governments seem to be able to define rules that are considered to be just, correct and appropriate; in other words, legitimate. As Steven Brechin *et al*. (2003: 14-15) state:

> 'Since conservation and other agencies will likely never have enough resources to universally enforce the law and since confusion over the legitimacy of enforcement acts at times creates conflict, a more practical, long term approach would be to negotiate agreements that participants view as legitimate and feasible.'

The municipal government of San Marino has succeeded in defining rules protecting the Philippine crocodile that are widely accepted by local people as important and fair. There are several reports of violations of barangay ordinances that were actually penalized in San Mariano. In barangay San Jose, for example, the barangay captain penalized three teenagers who used pesticides to fish and filed a fined two farmers who encroached in the 10 meter buffer zone on the crocodile sanctuary in Disulap River (figure 4.6). But in general barangay officials (and often also the municipal mayor and councilors) usually try to avoid passing cases to the higher authorities: people prefer to settle things in the village. In itself that is not a problem: the essence is to prevent any violations. This experience suggests that local governments can be very effective in creating laws that work, and that future strategies to protect crocodiles in the Philippines should make use of the authority of the barangay and municipal governments.

Figure 4.6: A member of the local protection group, the *Bantay Sanktuwaryo*, inspects a violation of the buffer zone of the Disulap River municipal Philippine crocodile sanctuary. Photo by J. van der Ploeg (2007).

CONCLUSION: THE IMPORTANCE OF LOCAL GOVERNMENTS FOR WILDLIFE CONSERVATION

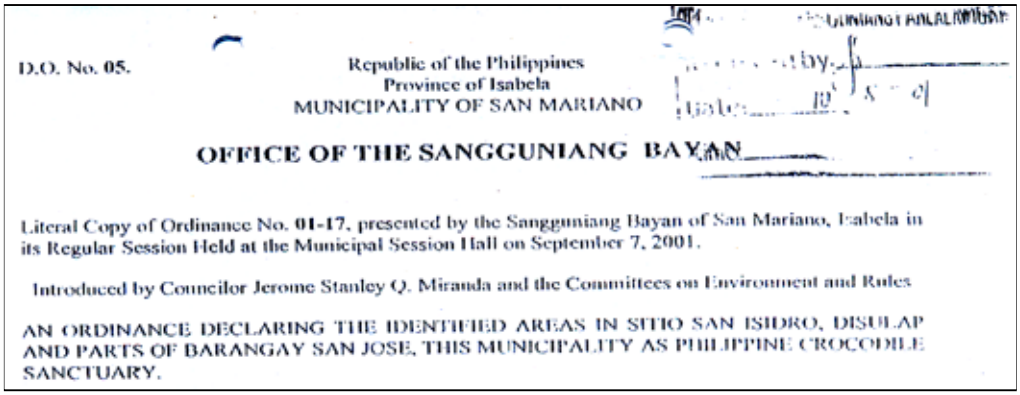
In this chapter I have argued, based on the experiences in the municipality of San Mariano, that in the contemporary Philippine context only local governments can effectively protect the critically endangered Philippine crocodile in its natural habitat. In this remote municipality in the northern Sierra Madre, an alternative strategy has been developed in response to the failure of centralized attempts to protect the Philippine crocodile in the wild. In the absence of any credible form of law-enforcement by the national government, the municipal government and conservationists negotiated a set of rules and regulations with rural communities that effectively protect the species and its habitat. This approach largely depends on self imposed control by local people. The Local Government Code of 1991 made such an alternative model for natural resource management possible by ‘creating space’, to use the words of Antonio Contreras (2003: 3), to initiate conservation action at the local level. As such it was not a purposive response of the central State to its own failure, but rather a spontaneous and

organic grassroots initiative: an anomaly tolerated, at best, by the central bureaucracy (Contreras 2003; Magno 2001; Scott 1998).

This is not to say that devolution can solve all problems pertaining to the conservation of crocodiles in the Philippines. Some form of centralized control and supportive macro policy remains necessary to tackle supra-local threats such as international trade and climate change especially in a rapidly globalizing world (Persoon *et al*. 2004; Utting 2000; Agrawal & Gibson 1999; Lutz & Caldecott 1996). Local efforts to manage natural resources can only succeed in the Philippines if the structural institutional reforms of the DENR that started in 1987 will continue.

As this chapter shows, the devolution of authority over natural resource management to the local governments has opened a window of opportunity for in situ conservation of endangered wildlife in the Philippines. Throughout the archipelago, civil society groups are working closely together with local government units to conserve biodiversity (see for example: Widman *et al*. 2003; Contreras 2003; Lavides *et al*. 2004). It remains to be seen whether the experiences of these single species programs can be applied to other forms of natural resource management, especially when vital vested economic interests are at stake. But so far this approach seems currently to be the most effective in addressing the serious problems the Philippines is facing with regard environmental conservation. The coming years will show whether these local efforts suffice in creating the necessary conditions for the recovery of the Philippine crocodile in the wild.

Figure 4.7: Main sections of municipal ordinance 01-17 declaring Disulap River a crocodile sanctuary



D.O. No. 05.

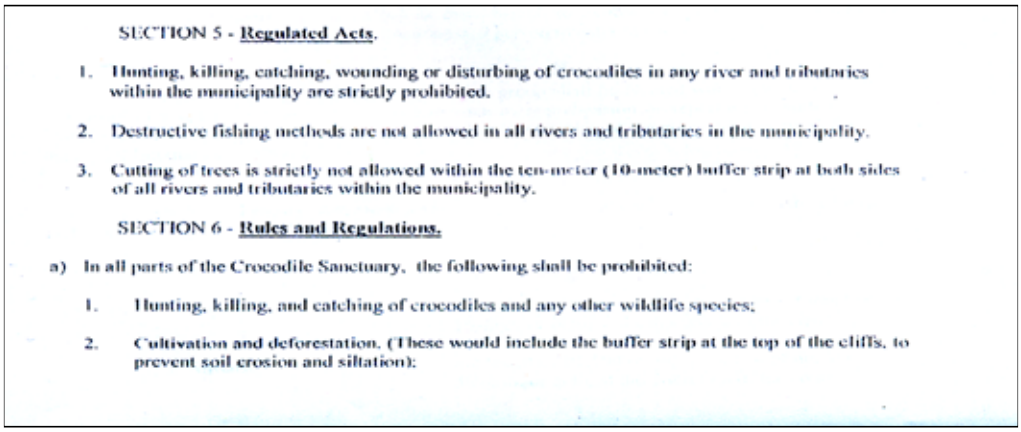
Republic of the Philippines
Province of Isabela
MUNICIPALITY OF SAN MARIANO

OFFICE OF THE SANGGUNIANG BAYAN

Literal Copy of Ordinance No. **01-17**, presented by the Sanggunian Bayan of San Mariano, Isabela in its Regular Session Held at the Municipal Session Hall on September 7, 2001.

Introduced by Councilor Jerome Stanley Q. Miranda and the Committees on Environment and Rules

AN ORDINANCE DECLARING THE IDENTIFIED AREAS IN SITIO SAN ISIDRO, DISULAP AND PARTS OF BARANGAY SAN JOSE, THIS MUNICIPALITY AS PHILIPPINE CROCODILE SANCTUARY.



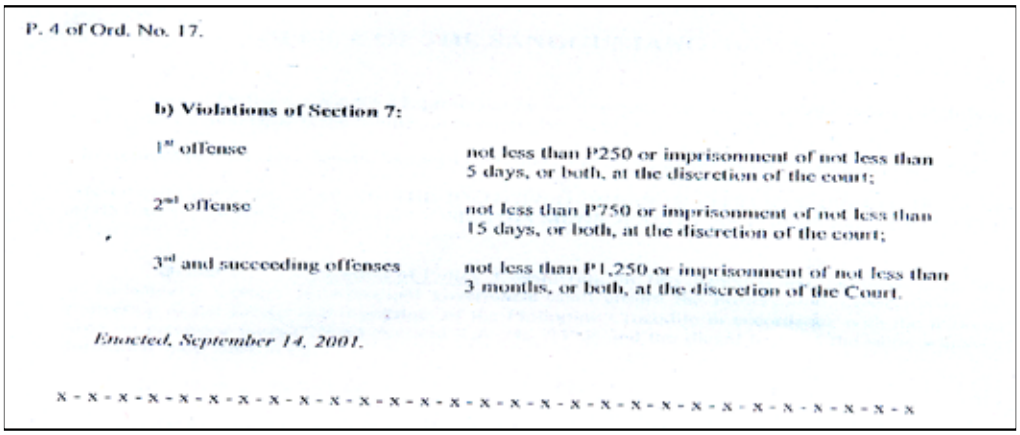
SECTION 5 - **Regulated Acts.**

1. Hunting, killing, catching, wounding or disturbing of crocodiles in any river and tributaries within the municipality are strictly prohibited.
2. Destructive fishing methods are not allowed in all rivers and tributaries in the municipality.
3. Cutting of trees is strictly not allowed within the ten-meter (10-meter) buffer strip at both sides of all rivers and tributaries within the municipality.

SECTION 6 - **Rules and Regulations.**

a) In all parts of the Crocodile Sanctuary, the following shall be prohibited:

1. Hunting, killing, and catching of crocodiles and any other wildlife species;
2. Cultivation and deforestation. (These would include the buffer strip at the top of the cliffs, to prevent soil erosion and siltation);



P. 4 of Ord. No. 17.

b) Violations of Section 7:

1st offense	not less than P250 or imprisonment of not less than 5 days, or both, at the discretion of the court;
2nd offense	not less than P750 or imprisonment of not less than 15 days, or both, at the discretion of the court;
3rd and succeeding offenses	not less than P1,250 or imprisonment of not less than 3 months, or both, at the discretion of the Court.

Enacted, September 14, 2001.

x - x - x -

ENDNOTES

1. Based on: van der Ploeg, J. & M. van Weerd. 2004. Devolution of natural resource management and Philippine crocodile conservation in San Mariano, Isabela. *Philippine Studies* 52 (3): 346-383. Jan van der Ploeg and Merlijn van Weerd jointly designed and led the in-situ community-based conservation strategy for the Philippine crocodile in the northern Sierra Madre. Jan wrote the paper. Merlijn provided comments on earlier versions of the text.
2. The IUCN Red List classifies the Philippine crocodile as Critically Endangered defined by a continuing declining mature population of less than 250 individuals in fragmented sub-populations, which each do not hold more than 50 mature individuals (Criterion C2a) and a population reduction of more than 80 percent during the last three generations based on declining areas of occupancy, extent of occurrence, and the quality of habitat (Criterion A1c). When a species is classified as Critically Endangered it is facing an extremely high risk of extinction in the wild in the immediate future (IUCN 2010). The other crocodile species that occurs in the Philippines, the estuarine crocodile (*Crocodylus porosus*), is restricted to coastal habitats. Although threatened with extinction in the Philippines, this species is not globally threatened (Ross 1998).
3. The Palawan Wildlife Rescue and Conservation Center is formerly known as the Crocodile Farming Institute. The Japanese International Co-operation Agency provided the financial and technical support to set up this ex-situ crocodile conservation program from 1987 to 1994.
4. Devolution refers to the transfer of power and authority from the central government to the local governments. In essence, decision making is delegated from the departments in the capital to the provinces and the municipalities. In this chapter I generally refer to the devolution of authority from the DENR to the municipal government of San Mariano. In the Philippines, this devolution process was initiated by 1986 Constitution and stipulated in the 1991 Local Government Code. Decentralization, in contrast, refers to the activities of national government at the local level. Here, departments create offices at the local level to improve policy implementation.
5. The following paragraphs draw heavily on Persoon & van der Ploeg (2004).
6. This is in stark contrast to the wetlands used and controlled by Ibanag or Ilocano farmers. These ethnic groups, like most people in the Philippines nowadays, regard crocodiles as a dangerous pest to be exterminated or a delicious snack.
7. Republic Act 9147, the Wildlife Resources Conservation and Protection Act of 2001, usually referred to as the 'Wildlife Act' aims to: 'conserve and protect wildlife species and their habitats' (Oposa 2002: 117). The Wildlife Act specifically mentions the jurisdiction of the DENR over crocodiles and other wetland species; the Department of Agriculture on the other hand has jurisdiction over all declared aquatic critical habitats and all aquatic resources. After a three year delay, the DENR, the Department of Agriculture and the Palawan Council for Sustainable Development issued their joint implementing rules and regulations pursuant to the Wildlife Act (Joint DENR-DA-PCSD Administrative Order No. 01). In October 2004, the Wildlife Act came into force. The following national policies give some form of legal protection to the critically endangered Philippine crocodile and its freshwater habitat: (1) Republic Act 7586, the National Integrated Protected Areas System Act of 1992, defines the terms of establishing protected areas in the Philippines. Hunting of wildlife is prohibited in protected areas, except in some specific circumstances, for example for traditional or religious purposes of indigenous communities. A large part of San Mariano falls under the Northern Sierra Madre Natural Park, which is one of the ten priority sites established under the National Integrated Protected Areas System (NIPAS). (2) Republic Act 8550, the Philippines Fisheries Code of 1998, ensures the rational and sustainable development, management and conservation of the fishery and aquatic resources in Philippine waters and protects the right of local fishers. Chapter 2, Section 11, mentions that the 'department shall declare closed

seasons and take conservation measures for rare, threatened and endangered species in concurrence with concerned government agencies' (Oposa 2002: 385). Note that this act is to be implemented by the Department of Agriculture, whereas the other acts in this note fall under the jurisdiction of DENR. (3) Republic Act 9125, the Northern Sierra Madre Natural Park Act of 2002, is of special importance for San Mariano. The forested areas of San Mariano were largely identified as strict protection zones in the general management plan of the Northern Sierra Madre Natural Park. In the management plan of the park, a crocodile habitat management zone, encompassing the watersheds of the Catalangan and Disulap rivers, is identified in San Mariano (DENR 2001b). In addition, there are various international agreements and conventions to which the Philippines is a signatory: (a) the Philippine crocodile is listed on Appendix 1 of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), banning all international trade in the species or species derived products (CITES 1998); (b) the Convention on Biological Diversity was ratified by the Philippine Senate in 1993 urging for a national strategy for biodiversity conservation; and (c) the Philippines ratified the Ramsar Convention to protect internationally significant wetlands. The Philippine constitution gives a ratified international treaty the same weight and value as a statue of Congress (de Leon 2002: 47).

8. The DENR is the mandated government agency for environmental protection. The department is responsible for: (a) the conservation, management and development of the country's natural resources, including those in reservation and watershed areas and lands of the public domain; (b) the preservation of the cultural and natural heritage through wildlife conservation and segregation of national parks and protected areas; and (c) the enforcement of policies, standards and rules and regulations for the control of pollution and conservation of the country's genetic resources, biodiversity and endangered habitats (Oposa 2002: 2). The department was created pursuant to Executive Order No. 192 of 1987, which merged the Ministry of Natural Resources, the National Pollution Control Commission, and the National Environmental Protection Council. There are six bureaus under the cabinet secretary: (a) Mines and Geosciences, (b) Forest Management, (c) Land Management, (d) Ecosystem Research and Development, (e) Environmental Management, and (f) Protected Areas and Wildlife. Attached to the DENR is the Natural Resources Development Corporation, the corporate arm of the ministry responsible for promoting natural resource development through investment in technology and forest management ventures (Oposa 2002). The Palawan Wildlife Rescue and Conservation Center is currently managed by the Natural Resources Development Corporation in an attempt to create financial sustainability and continuity for ex-situ crocodile conservation efforts.
9. Under Philippine law killing a crocodile in the Northern Sierra Madre Natural Park carries a penalty of six years and one day in jail and a fine of one 1 million pesos (€ 16,666). Dynamite fishing carries a maximum penalty of 12 years imprisonment, fishing with chemicals 10 years, and electricity fishing 2 years (Peña 2001: 199; Oposa 2002: 413).
10. In fact, awareness and knowledge of department officials themselves about wildlife conservation in general, and national policies protecting crocodiles in particular, is low: of 20 department officials interviewed in 2003 in five different offices, 12 (60 percent) were not aware of the existence of the Animal Welfare Act. Nine officials (45 percent) had never heard about the Wildlife Act. The National Integrated Protected Area System Act and the Revised Forestry Code were better known: only seven officials (35 percent) did not know these acts. Awareness was defined during this study as simply knowing the title of the law. Obviously, awareness of specific provisions or penalties is much lower.
11. The communist rebels, who basically control the remote uplands of San Mariano, reinforced these fears as they suspected crocodile conservation to be a front for a government organized land grabbing scheme (Baringkuas 2003).
12. Republic Act 7160, the Local Government Code of 1991, Section 3i, reads: 'local government units shall share with the national government the responsibility in the management and maintenance of

ecological balance within their territorial jurisdiction, subject to the provisions of this Code and national policies' (Santiago Defensor 2000: 5). The local government consists of: (1) the provincial government, with the Provincial Governor as chief executive and the *Sangguniang Panlalawigan* as legislative body responsible to adopt measures for the preservation of the natural ecosystem in the province; (2) the municipal government, with the municipal mayor as chief executive and the *Sangguniang Bayan* as the legislative body responsible for the approval of ordinances for the protection of 'the environment and impose appropriate penalties for acts which endanger the environment, such as dynamite fishing and other forms of destructive fishing, illegal logging and smuggling of logs, smuggling of natural resources products and of endangered species or flora and fauna, slash and burn farming, and such other activities which result in pollution […] of rivers and lakes' (Section 447; Oposa 2002: 640); and (3) the *punog barangay*, or *barangay* captain, who shall enforce all laws and ordinances which are applicable in the *barangay*, including those relating to the protection of the environment (Section 389; Oposa 2002: 639). In this chapter I focus only at the *barangay* and municipal levels.

13. In San Mariano, the Philippine crocodile can be found mostly outside the Northern Sierra Madre Natural Park, with the exception of Dunoy Lake. A conventional conservation program, based on minimizing people-crocodile interactions and complete protection of crocodile habitat, is there therefore not a possibility. Resettling people from crocodile inhabited areas will not be accepted by the local people and local government in the current sociopolitical context (van Weerd & General 2003).
14. In short, the regulations of the Disulap River Philippine crocodile sanctuary include: (1) no hunting or disturbing crocodiles and other wildlife, (2) no destructive fishing methods, (3) no cultivation and infrastructure development, (4) no deforestation, and in currently cultivated areas reforestation has to take place, and (5) nesting areas can be closed for entry. A 10 meter buffer zone on each site of the river should protect the breeding and nesting sites of the crocodiles, minimize human-crocodile interaction, and protect the river banks from erosion. The Local Government Code specifies that the DENR retains the ultimate say in deciding whether resource management plans developed by local government units are acceptable in the light of national environmental considerations (Santiago-Defensor 2000).
15. The NARRA project of the San Isidro Agro-Forestry Development Multi-Purpose Cooperation, a farmers cooperative, and the municipal government of San Mariano aimed to reforest 26 hectares in the watershed of Dunoy Lake and Disulap River. The project won 1 million pesos (€ 16,666) during the first Innovative Development Marketplace organized by the World Bank in January 2004. The municipal government allocated 852,000 pesos (€ 13,750) to the project, especially to rehabilitate the road to the project site.
16. These meetings are often held in the *barangay* hall or under a tree near the (proposed) crocodile sanctuary. Specific problems are often voiced out during community meetings: for example fears about land grabbing or misconduct of officials. It provides an opportunity for crocodile conservationists to present their side of the story, gain peoples' trust and try to convince the community about the importance of Philippine crocodile conservation. People can ask specific questions and ventilate their concerns. Often an agreement is made during these community meetings on the conditions on which people will conserve crocodiles.
17. Obviously, the Local Government Code (Sec. 388) and the Revised Penal Code, specify that the *punong barangay*, the *barangay* council, and the *barangay tanod* are 'person in authority' in their respective jurisdiction responsible for the enforcement of laws, including environmental laws. In addition, community members can organize a so-called *posse comitatus* to implement environment and natural resources laws in their jurisdiction (Oposa 2002: 638).
18. In fact, during Martial Law, the perception of high ranking government officials that regional, environmental and social cases were linked with the political left discouraged decentralization and effective conservation (Cacha & Caldecott 1996).

5. DO CROCODILES HAVE RABIES? INITIATING A DIALOGUE ON IN-SITU PHILIPPINE CROCODILE CONSERVATION[1]

INTRODUCTION

In 2008 the Mabuwaya Foundation organized community dialogues in 15 villages in the northern Sierra Madre. These meetings took two days and included: lectures on the Philippine crocodile, wetland conservation and environmental legislation (figure 5.1); film showing and a puppet show; and a planning workshop on community-based wetland conservation action. More than 750 people attended these meetings and asked questions, raised issues and proposed solutions. Here I will present 4 short dialogues (translated from Ilocano) that are illustrative of local peoples' perceptions of protecting crocodiles in the wild. The questions of people and the answers of our team show the importance (and also the difficulties) of engaging rural communities in crocodile conservation.

Figure 5.1: Barangay captain Jose Wanol lectures on Philippine crocodile conservation during the community consultation in barangay Del Pilar. Photo by M. Balbas (2008)

'WHY DO WE HAVE TO PROTECT CROCODILES?'

On May 24 the Mabuwaya Foundation organized a community consultation in Cadsalan, a remote village in the municipality of San Mariano and one of the key Philippine crocodile conservation sites. In 2008 three Philippine crocodile nests were recorded in Dinang Creek.

> Boy Robles (farmer): "Why do we have to protect crocodiles? It seems that crocodiles are more important than people. The government made a law to protect crocodiles, but they don't help the people."
> Jessie Guerrero (Mabuwaya Foundation): "Of course crocodiles are not more important than people. We conserve the Philippine crocodiles for the benefit of people. The Philippine crocodile occurs only in the Philippines and is almost extinct, that's why we have to protect it. It is part of our cultural heritage. In other countries people earn money with crocodiles, for example through tourism."
> Elymar Appaccag (barangay councilor): "If you want to protect your crocodile you should place a fence around the creek, or transfer the crocodiles to a safe place."
> Jessie: "Our goal is to protect the Philippine crocodile in the wild. We don't want to create a zoo. And if we place a fence the crocodiles cannot move out and people can no longer fish in the creek."
> Sofia Manuel (barangay health worker): "Does a crocodile bite contain rabies?"
> Jessie: "Only mammals can have rabies. Crocodiles are reptiles. I have been bitten many times by the crocodile hatchlings and never got sick."
> Cherielyn Lopez (teacher): "How many eggs can a crocodile lay?"
> Jessie: "There can be up to 23 eggs in a Philippine crocodile nest. The incubation period is 60 to 90 days. The crocodiles lay their eggs in April and the nest will hatch in July. You can easily recognize a crocodile nest: it is a large mound made of leafs. Our project has a breeding reward: for every surviving hatchling the project will award 500 pesos to the barangay fund. The finder of the nest will also get a reward."
> Alvin Labuguen (sanctuary guard): "Last year someone stole 20 eggs from the crocodile nest in Dinang Creek and ate them"
> Jessie: "Wow, pity for the community. For 20 hatchlings the project would have paid 20 times 500 pesos, is 10,000 pesos! Also pity for the thief: I'm sure he had stomach pains after eating 20 eggs!"

Everywhere people asked why crocodiles should be protected (figure 5.2). Most people in the project area now know that the Philippine crocodile is protected by law. But people question the motivation of preserving crocodiles. The Mabuwaya Foundation formulated six reasons: (1) the national law (obviously begging the question but people often accept this as an excellent reason); (2) ecological values (crocodiles as flagship species for wetlands conservation - see below); (3) cultural values (crocodiles are an important part of Philippine culture and history); (4) economic benefits (the possibility of ecotourism); (5) intrinsic or religious values (crocodiles have the right to live); and (6) immaterial benefits (it's interesting, exciting and fun to conserve crocodiles). Particularly

the fact that this endemic species has been exterminated throughout the country but survives in their village appeals to people.

Figure 5.2: People ask questions during a community consultation in barangay Tappa. Photo by D. Rodriguez (2009)

‘ARE CROCODILES DANGEROUS?’

On February 8 the Mabuwaya Foundation held a meeting in Disulap to discuss the management of the municipal Philippine crocodile sanctuary in Disulap River (figure 5.3). The foundation has worked 10 years with this community, but people still have many questions.

> Marites Balbas (Mabuwaya Foundation): “There are several zones in the crocodile sanctuary. In the nesting season from April to July all activities are prohibited in the strict protection zone, because crocodiles can be aggressive when they guard their nest. In other areas fishing, bathing and washing clothes are allowed.”
> Johnny de Gollo (farmer): “There is no problem with the sanctuary. But a crocodile

attacked my pig far from the sanctuary. And the crocodile did not even finish everything: it just ate the intestines of the pig. That's not good. The crocodile is greedy. I'm afraid that one day it will attack a child"
Marites: "But did you ever hear of a Philippine crocodile attack on people?"
Aizah Nojadera (teacher): "No, but what will happen if the crocodile population will grow? We will experience ecological imbalance. The crocodile will have to eat more."
Mari-Tes: "fifty years ago there were many crocodiles in San Mariano. Now there are only very few. If the population will grow they will find a place. There is enough food in the river for the crocodile: fish, rats, insects, snails…"
Aizah: "I'm not against the crocodile, but I thought that large crocodiles ate people."
Marites: "You have seen too many movies! The Philippine crocodile grows up to 3 meter. We never heard a story of a Philippine crocodile attacking people. But be careful: when the crocodile has a nest, she can be aggressive. That's why there is a strict protection zone in the sanctuary."
Johnny: "But what about my pig?"
Paul de Gollo (barangay captain): "Your pig should not wander around: it should be tied near the house"

Fear for crocodiles is another recurrent theme during the consultations. People are concerned about the safety of their children and livestock. The communication, education and public awareness campaigns of the Mabuwaya Foundation stress that the Philippine crocodile is extremely weary of people, and that there are no recorded

Figure 5.3: Community consultation in barangay Disulap. Photo by M. van Weerd (2007)

fatal attacks on humans. In fact most people know from their own experience that Philippine crocodiles do not pose an imminent threat to humans. But the teacher in the dialogue above phrased out a common concern: what will happen if the Philippine crocodile population will recover? Crocodiles might not be dangerous today, but how about tomorrow? Actually, the Mabuwaya Foundation had never though about this issue. There is an urgent need to integrate these concerns and questions in the design of communication materials.

'HOW CAN WE BENEFIT FROM CROCODILE CONSERVATION?'

The Mabuwaya Foundation held a community consultation in Buyasan on May 26. Buyasan lies on the bank of the Ilaguen River and fishing is an important livelihood strategy for the community. Philippine crocodiles are occasionally caught in nets or fish traps.

> Elvis Sales (fisherman): "The fishermen complain that crocodiles destroy their fishnets. The fishermen are afraid to fish because of the crocodiles. Sometimes they see crocodiles underwater. What can you do about that?"
> Visitacion Aglugub (housewife): "Why are your afraid? We wash our clothes in the creek. Often the crocodile is very near, but it never attacked us. Sometimes the crocodile wants to play with us. When I was washing clothes the crocodile once took the shirt. As long as you don't harm the crocodile, the crocodile will not harm you."
> Juan Telan (farmer): "How can we benefit from the conservation of crocodiles?"
> Jerome Miranda (municipal councilor): "It is simple: if we protect the Philippine crocodile, we protect the fish that we eat. We have to stop the use of electricity fishing, because it depletes the fish stocks on which we depend. Let us join hands to protect our environment!"
> Bonbon Aglugub (fisherman): "Yes, there used to be many fish in Buyasan. The problem is that people from other villages come here and fish with electricity. There is no *ludong* [Bluespot mullet] anymore in the river."
> Marites: "It is the responsibility of the barangay officials to protect the environment. The officials can declare a fish sanctuary or enact a barangay ordinance prohibiting destructive fishing methods. It protects the Philippine crocodile and benefits people."
> Melchor Marrallag (fisherman): "But in most cases the army and the police are the ones doing illegal fishing!"
> Elmer Tales (barangay tanod):"Can we apprehend offenders?"
> Jerome: "Yes, based on the Local Government Code, the barangay officials can arrest people who violate the barangay ordinances. The barangay officials should make a decision on this. You are the ones who can decide what is best for the people and for the crocodiles"
> Rogelio Macapia (barangay captain): "We would like to declare Bulawan Cave and Dilatngan Creek as our fish sanctuary. If we see people fishing with electricity we will confiscate the battery."

In the remote rural areas of the Philippines, such as Buyasan, most people earn less than 1 US$ a day. There is a clear need to link crocodile conservation with people's well-being. But a sustainable harvesting or ranching program is clearly not a possibility with this critically endangered species. And the economic returns of a community-based crocodile-tourism enterprise in San Mariano are highly uncertain. The Mabuwaya Foundation has therefore adopted a broader ecosystem approach to conserve wetlands. Rural communities in the Philippines rely heavily on freshwater ecosystems. Fishing is an important livelihood activity, especially for the poor. People are directly confronted with the effects of overfishing and erosion as a result of logging and unsustainable land use practices. There is broad public support to conserve critical wetlands and ban destructive fishing methods. In this view the Philippine crocodile becomes the flagship species of community-based wetland conservation.

'HOW MANY EGGS DO CROCODILES LAY?'

On June 18 staff of the Mabuwaya Foundation met with the community of Dibuluan (figure 5.4). Dibuluan is a small Kalinga settlement on the forest frontier. The Kalinga are the indigenous people of the northern Sierra Madre. A Philippine crocodile population survives in this area.

> Rudy Revilla (member of the farmer's cooperative): "What if my carabao is eaten by a crocodile? Do I have the right to kill the crocodile in return?"
> Dominic Rodriguez (Mabuwaya Foundation): "No. According to the Wildlife Act you can only kill a crocodile if there is an imminent danger to humans. Anyway, did you ever see a Philippine crocodile attacking a buffalo?"
> Rudy: "No."
> Dominic: "The Wildlife Act specifies a penalty of 100,000 pesos or 6 years in jail for killing a Philippine crocodile."
> Onofre Daniel (village councilor): "It's good that we know the laws and the penalties now. It is up to us if we want to violate the law. For me, I will not try. It's hard to be in prison"
> Bernalie Coca (daycare worker): "I attended this meeting because I wanted to know the importance of the Philippine crocodile. First, I found the crocodile useless. But during the lectures I learned many new things and now I am interested in crocodile conservation."
> Myla Tagaoan (village councilor): "Yes, the lectures were as clear as the blue sky. It was not boring."

What should we do if a crocodile attacks livestock? What is the penalty if someone kills a crocodile? What to do if you accidentally catch a crocodile? During the village meetings people often pose practical questions. It provides an opportunity for the team of the Mabuwaya Foundation to disseminate information on Philippine crocodile

conservation, and better understand and respond to peoples' concerns. In fact people raise relatively few problems with crocodiles during the community consultations: in general people tolerate the species. Surprisingly, most questions deal with Philippine crocodile ecology and behavior: How big is an adult crocodile? How long can a crocodile stay underwater? How does a nest look like? People are often fascinated by crocodiles and have a genuine interest in the species. This is an important motivation for people to preserve crocodiles.

Figure 5.4: The Philippine crocodile mascot 'Krokey' dances with a village councilor after the community consultation in barangay Dibuluan. Photo by M. Balbas (2008)

INITIATING A DIALOGUE ON CROCODILE CONSERVATION

During the village meetings in the northern Sierra Madre the Mabuwaya Foundation engaged rural communities in a dialogue on Philippine crocodile conservation. It enabled the foundation to contextualize the fears and concerns of local people, and to directly address these issues. It provided an opportunity to share information, find common ground to solve specific problems, and integrate crocodile conservation in broader

discussions on rural development and environmental management. As a result rural communities feel that their voice is heard and their concerns taken into account. Such a participatory approach is instrumental to mobilize local support for the conservation of endangered crocodilians in the developing world (Brechin *et al.* 2003).

ENDNOTE

1. Based on: van der Ploeg, J., M.G. Balbas & M. van Weerd. 2009. Do Philippine crocodiles have rabies? Initiating a dialogue on in-situ crocodile conservation. *Crocodile Specialist Group Newsletter* 28 (3): 8-10. Jan van der Ploeg wrote the paper. Mari-Tess Balbas organized and led the community consultations, and transcribed and translated the dialogues. Merlijn van Weerd provided comments on earlier versions of the text.

6. ASSESSING THE EFFECTIVENESS OF ENVIRONMENTAL EDUCATION: MOBILIZING PUBLIC SUPPORT FOR PHILIPPINE CROCODILE CONSERVATION[1]

INTRODUCTION

Communication, Education and Public Awareness (CEPA) campaigns play an increasingly important role in biodiversity conservation (Jacobson & McDuff 1998; Monroe 2003). The negative social impacts of State and market mechanisms to conserve biodiversity has stimulated a search for community-based approaches that advocate the participation of local resource users in decision-making processes and the integration of conservation and development objectives (Ghimire & Pimbert 1997; Berkes 2004). It is now widely recognized that disseminating information to and enhancing the knowledge of rural communities is essential for the sustainable management of natural resources (Baland & Platteau 1996; MEA 2005a). Conservation projects use a variety of social marketing techniques such as posters, comic books, billboards, flipcharts, newsletters and radio plugs to raise public awareness, change attitudes and influence behavior (Sutherland 2000). But only scant data exist on the cost-effectiveness of these efforts (Fien *et al*. 2001; Ferraro & Pattanayak 2006; Brooks *et al.* 2009). It is estimated that 40 to 50 percent of all CEPA campaigns fail, but as most of these education and communication efforts are not assessed the organizers never find out (Ostergaard 2002). CEPA campaigns can be significantly improved if experiences would be more thoroughly documented, compared and substantiated with scientific evidence (Sutherland *et al*. 2004; Steward *et al*. 2005). This is particularly relevant in developing countries, such as the Philippines, where financial resources for conservation are scarce, governments typically lack the capacity to enforce environmental legislation and poor rural communities often regard restrictions on resource use as arbitrary and illegitimate (Sodhi *et al.* 2004).

This paper assesses the effectiveness of a CEPA campaign for the conservation of the Philippine crocodile in the wild in the northern Sierra Madre on Luzon, the Philippines. Commercial hunting has led to the disappearance of this endemic species throughout most of its historic range (Ross & Alcala 1983). At present the species only survives in the northern Sierra Madre on Luzon and the Liguasan Marsh on Mindanao. With less than 100 mature crocodiles in the wild, the species is classified on the IUCN Red List as Critically Endangered (IUCN 2010). Since 2004 the Philippine crocodile is legally protected (by virtue of the Wildlife Act, Republic Act 9147). However most people in the Philippines, including many government officials, are unaware of the protected status of the species, or consider the enforcement of environmental legislation of low importance (van der Ploeg & van Weerd 2004). Philippine crocodiles continue to be killed for food or out of fear, most often without a response from the authorities. People

think crocodiles pose a threat to children and livestock. Moreover in Philippine society crocodiles are associated with egoism and greed: corrupt government officials and selfish athletes are called *buwaya*, crocodile in Filipino. These negative public attitudes inhibit in-situ crocodile conservation (Banks 2005).

In 1999 a conservation project was set up to save the species in the wild. Conservation efforts focus on 15 remote *barangays* (villages) in the municipality of San Mariano. In cooperation with the department of development communication of Isabela State University (ISU) a CEPA campaign was designed to mobilize broad public support for the conservation of the species in the wild. This goal is reflected in the slogan of the campaign: 'the Philippine crocodile; something to be proud of!' The underlying logic of the campaign is that by disseminating information on legislation protecting crocodiles, the killing of the species would stop. Between 2002 and 2008 the Philippine crocodile conservation project spent US$ 80,000 on environmental communication and education; approximately 25 percent of the total budget. In this chapter I aim to determine whether the CEPA campaign succeeded in raising awareness on the protected status of the Philippine crocodile, change attitudes towards the in-situ conservation of the species, and influence behavior of people living in Philippine crocodile habitat.

Changes in awareness, attitudes and behavior are affected by a diverse set of context-related factors that can often not be attributed to a specific intervention (Sollart 2004; Schacter 2002). Therefore, following Fien *et al*. (2001), I assess the CEPA campaign for the Philippine crocodile in San Mariano in terms of the material products of the project (outputs), the number of people exposed to the outputs (outreach), the changes brought about by the outputs in people's awareness and attitude (cognitive and affective outcomes), and the longer term cumulative effect of the CEPA campaign on people's behavior (impact) (figure 6.1).

METHODS

Study area

The municipality of San Mariano is located in the foothills of the northern Sierra Madre mountain range in the province of Isabela (figure 6.2). Approximately 45,000 people live in this remote rural area. Over the past century Ilocano, Ibanag and Ifugao immigrants have settled in the area. The Kalinga and Agta, the indigenous people of the northern Sierra Madre, now form small minorities (< 10 percent). San Mariano is one of the poorest municipalities of the Philippines: 60 percent of the people live on less than US$ 1 per day (NSCB 2005). The official literacy rate in the rural area is 81 percent, but only 37 percent of the inhabitants have attained secondary education (high school). Most people depend on farming: corn, rice and bananas are major cash crops. Harvesting

timber is another important source of cash income for many households. In 2001 the forests of the municipality were included in the Northern Sierra Madre Natural Park, the largest terrestrial protected area of the Philippines (IUCN protected area category II). Wetlands are intensively used by rural communities for fishing, washing and shading livestock, and the land around it for farming and logging.

A small and fragmented remnant Philippine crocodile population was discovered in 1999 in the municipality of San Mariano. Three breeding sites were identified in San Mariano: Dunoy Lake in barangay Dibuluan, Disulap River in Disulap and San José, Dinang Creek in Cadsalan. Hunting, the use of destructive fishing methods (fishing with dynamite, electricity and pesticides) and the reclamation of freshwater wetlands posed a severe threat to the remnant population (van Weerd & van der Ploeg 2004). CEPA activities focused on people living in or directly adjacent these 3 breeding sites. Crocodiles are occasionally reported in other villages in San Mariano. In these areas the Mabuwaya Foundation also disseminated information on crocodiles but much less systematic and frequent than in the core area. Philippine crocodiles no longer occur near San Mariano town; few CEPA activities were therefore conducted in the urban area.

Figure 6.1: Logical model to assess the effectiveness of CEPA campaigns (adapted from Fien *et al.* 2001; Ostergaard 2002; Schacter 2002).

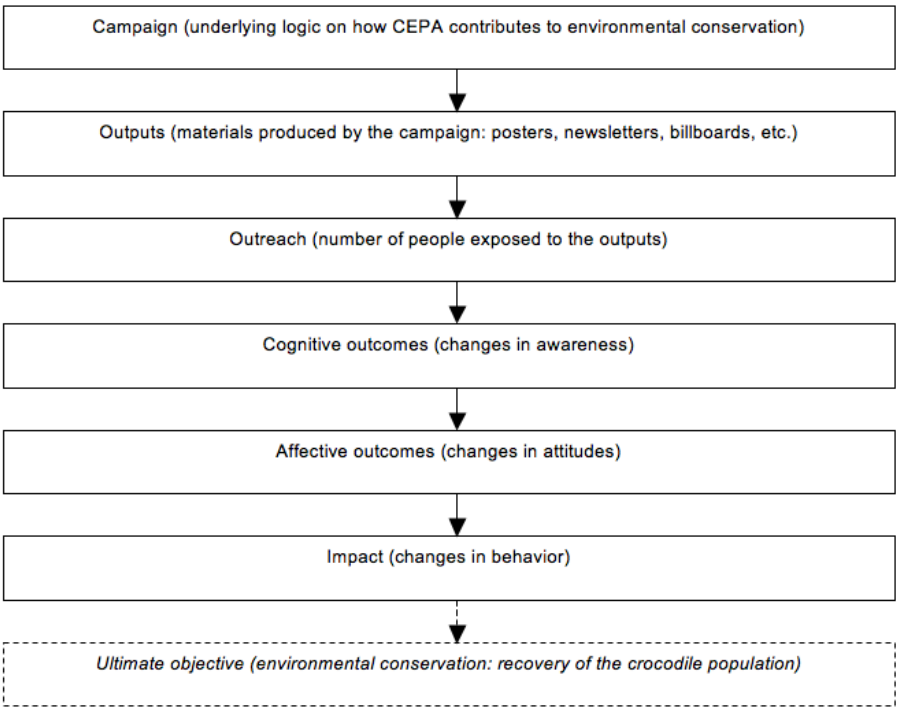
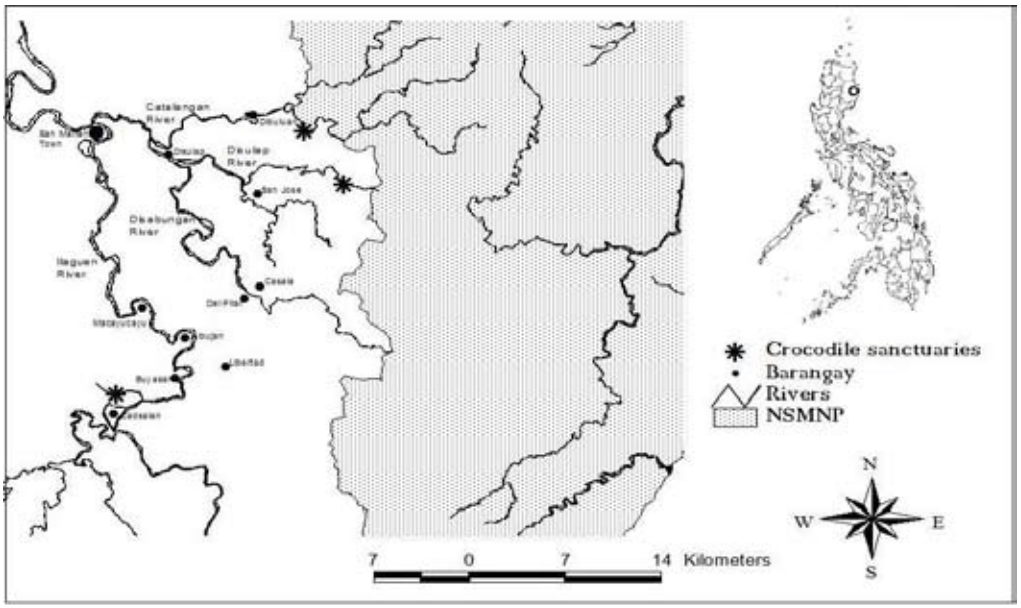


Figure 6.2: The municipality of San Mariano



Note: Philippine crocodile sanctuaries are marked with an asterisk. People living in barangays adjacent to these protected areas were specifically targeted in the CEPA campaign (Dibuluan, Disulap, San Jose and Cadsalan = core area). People in barangays where Philippine crocodiles are occasionally observed were exposed less frequently to the CEPA outputs (Casala, Del Pilar, Macayucayu, Ibujan, Buyasan and Libertad = peripheral area). Two barangays in San Mariano town that were not specifically targeted in the CEPA campaign were also included in the research (Zone 1 and Zone 2 = urban area). Barangays Batong Laban and Lapi (= control group) are located north of the municipality of San Mariano, outside this map.

Data collection and analysis

I designed a structured questionnaire which included: (1) questions on the socioeconomic background of the respondent; (2) open and fixed-response questions on the Philippine crocodile and its conservation; (3) questions on the CEPA outputs (using pile sorting in which the respondents were asked to rank order photographs of CEPA outputs in terms of what was most useful for them); and (4) statements to measure attitudes towards crocodiles (using a standard 5-point Likert scales ranging from 'strongly agree' to strongly disagree'). Seven ISU students were trained to administer the questionnaire face-to-face. The questionnaire was translated in Ilocano, the lingua franca in North Luzon, and pre-tested with respondents in a village outside the research area.

A stratified random sample was drawn in 14 barangays, forming a gradient from being intensively subjected to CEPA outputs (the core area) to not receiving any information on crocodiles (the control group). Four barangays in San Mariano were

selected that have been the focus of intensive CEPA efforts (the core area): Dibuluan (total population 1,248), Disulap (1,866), San Jose (1,708), and Cadsalan (1,138). In addition, data was collected in 6 barangays in San Mariano that have been exposed to the CEPA campaign on a less frequent basis (the peripheral area): Buyasan (705), Del Pilar (1,374), Ibujan (688), Libertad (755), Macayucayu (603) and Casala (1,033). People were also interviewed in two barangays in San Mariano town (the urban area), where people were much less exposed to the CEPA campaign: Zone 1 (1,633) and Zone 2 (1,919). In the absence of reliable baseline data, 2 barangays were selected that served as a control group: Batong-Labang (2,379) in the municipality of Ilagan, and Lapi (2,602) in the municipality of Peñablanca.

This control group enables a counterfactual comparison (Ferraro & Pattanayak 2005; Schonbäg 2002). This naturalistic experiment is based on the assumption that these 4 areas differ only in their exposure to the CEPA campaign. This assumption was tested by comparing the socioeconomic background of the respondents in the 4 different areas. There were no significant differences between the age and sex of respondents in the control area and those in San Mariano. People in the urban area (San Mariano town) are better educated and more affluent than people in the core, peripheral and control areas. The areas also differ in terms of ethnicity. Batong Labang consists of Ilocano, Tagalog and Ifugao migrants, whereas most people in barangay Lapi are Itawis. Another possible confounding effect is that Philippine crocodiles were exterminated in Batong Labang and Lapi in the 1980s. The absence of crocodiles could in theory influence attitudes towards the species as people no longer know the species from their own experience.

In every village 40 respondents were randomly selected from a list of all inhabitants (the barangay profile), excluding children below 7 years old. When someone could not be interviewed on 3 separate attempts, another respondent was selected from a reserve list. A total of 549 respondents were interviewed. In Disulap only 28 respondents participated because people were busy harvesting corn. In Libertad 41 respondents were interviewed because a fisherman insisted of being interviewed. Nobody refused to participate in the research. Interviews took approximately 50 to 60 minutes. People were interviewed individually whenever possible. No payments were made for information. Respondents did not directly associate the ISU students with the Mabuwaya Foundation, the Department of Environment and Natural Resources (DENR) or the Local Government Unit (LGU); I therefore think that ‘politically correct’ answers were largely avoided. To minimize possible biases straightforward and simple questions were asked to the respondents (for example: is the Philippine crocodile protected by law?), which resulted in categorical variables (yes; no; don’t know).

Data from the questionnaire was encoded and analyzed in SPSS 15.0. Likert scales scores were transformed into nominal variables because respondents seldom strongly agreed or strongly disagreed with the statements. As I am primarily

interested in comparing the different areas against one another in order to determine the effectiveness of the CEPA campaign, I did not take a proportionate sample nor weighted the results. I used a binary logistic regression analysis (forced entry) to examine the effect of 12 CEPA outputs (billboards, wall paintings, posters, radio plugs, comic books, newsletters, school presentations, cultural show, puppet shows, school field visits, community consultations and training workshops) on cognitive outcomes (the likelihood that the respondents know that crocodiles are protected in the wild) and affective outcomes (the likelihood that the respondents support in-situ crocodile conservation). I compared the respondents who reported not being exposed to a specific output with the respondents who reported having seen the output, using odds ratios. The odds ratio determine whether the probability of a certain event is the same for two groups: in this particular case whether awareness of legislation of respondents is higher if they see a poster than if they did not see it, or whether support for in-situ conservation of respondents who have watched a cultural show is higher that of respondents who haven't. Odds ratios are now widely used in epidemiological studies, because they are a useful indicator of the strength of the relationship between two categorical variables (Tambashe *et al.* 2003). To test whether differences between the 4 different areas were statistically significant, I used a Pearson's chi-square test (a non-parametric test with unrelated comparison groups).

To assess the long-term impact of the CEPA campaign I relied on field observations and ethnographic methods. The Mabuwaya Foundation monitors the Philippine crocodile population in San Mariano on a quarterly basis using spotlight night surveys (van Weerd & van der Ploeg 2004). During these quarterly field visits information is gathered on crocodile mortalities, destructive fishing practices, human-crocodile conflicts and land use changes adjacent to the crocodile sanctuaries. Reported crocodile mortalities were verified on site. Informal interviews with fishermen, farmers and village officials provided qualitative insights on changes in people's awareness, attitudes and behavior.

RESULTS

Outputs and outreach

Table 6.1 provides an overview of the outputs and outreach of the CEPA campaign. Following Jacobson (1999) I differentiate between passive, active and interactive outputs.

The Mabuwaya Foundation distributed a quarterly newsletter to government agencies and communities living adjacent to crocodile habitat. Six informative posters were designed, of which 15,500 copies were distributed in San Mariano. Ten 60-

seconds radio plugs were broadcasted by a regional radio station (DWPE in Tuguegarao City). Billboards and wall paintings were placed on strategic locations throughout the municipality. A comic book was distributed to all elementary school children in San Mariano (7 to 12 years old). In addition, the foundation organized 22 puppet shows and gave 60 presentations in elementary schools in the municipality. Students of ISU performed a cultural show in 14 villages during the annual fiesta. Seven hundred high-schoolchildren (13 to 17 years old) and students (18 to 22) were brought to the field for 2 days to see the Philippine crocodile in the wild. The Mabuwaya Foundation also facilitated 48 community consultations to discuss crocodile conservation. Three training workshops were organized to enhance the capacity of barangay officials to enforce environmental legislation.

I compared the cost-effectiveness of these CEPA outputs (the cost per person per day), determined the outreach, and asked the respondents to rank the outputs. Placing a billboard requires a substantial investment (US$ 110); but as many people (around 1,000) see these large placards over a relative long period of time (2 years), billboards are the most cost-effective outputs on a per person per day basis (US$ 0.00015). Wall paintings are also cost-effective outputs. The largest mural is on the market in San Mariano town, which explains the high outreach in the urban area. People value the posters above other outputs and place them prominently on the walls of their homes. The radio plugs have the lowest outreach of all passive (self-interpretive) outputs. In the core area most respondents (63 percent) have seen the comic book. People seem not very interested in the newsletter: it got the lowest score in the preference ranking.

Active and interactive outputs are more costly. The school presentations, school field visits and training workshops were not included in the questionnaire as these outputs focus exclusively on schoolchildren, students and barangay officials. The puppet shows and the community consultations also target a specific audience (respectively elementary schoolchildren and directly affected people such as land claimants), which could explain the low outreach and ranking. The respondents highly ranked the cultural show.

Table 6.1: CEPA campaign for Philippine crocodile conservation in San Mariano

Output	Circulation (number of copies)	Audience[1]	Production cost (US$ per copy)[2]	Exposure time[3]	Cost-effectiveness (US$ per person per day)[4]	Outreach (percentage of population)[5]			Community preference (ranking)[6]	Cognitive outcome (odds ratio)[7]	Affective outcome (odds ratio)[8]
						Core area	Peripheral area	Urban area			
Passive outputs											
Billboard	50	1,000	110.00	2 years	0.00015	81	36	26	3	1.649* (1.062-2.562)	0.884
Wall painting	3	1,000	200.00	2 years	0.00028	39	6	54	5	1.053	0.424** (0.243-0.741)
Poster	15,500	5	1.20	10 months	0.00080	75	21	17	1	2.165 *** (1.370-3.420)	1.432
Radio plug	10	25,000	80	60 seconds	0.00320	17	20	7			
Comic book	8,000	5	1.20	30 school days	0.00960	63	12	10	4		
Newsletter	6,600	2	0.16	1 week	0.01143	34	7	2	8	1.137	2.527* (1.031-6.193)
Active outputs											
School presentation	60	40	10.00	30 minutes	0.25000						
Cultural show	14	400	200.00	30 minutes	0.50000	37	24	15	2	1.547	2.878 ** (1.487-5.569)
Puppet show	22	100	200.00	30 minutes	2.00000	36	21	7	7		
School field visit	37	20	160.00	2 days	4.00000						

Interactive outputs											
Community consultation	48	40	200.00	2 hours	5.00000	23	10	1	6	3.106*** (1.633-5.908)	1.282
Training workshop	3	80	6,600.00	1 week	16.50000						

Notes:

[1] The number of people exposed to a copy of an output (the audience) was estimated by staff of the Mabuwaya Foundation. Community consultations for example are on average attended by 40 people. The audience of the radio plugs was estimated by the regional radio station DWPE, and is limited to the listeners in the municipality of San Mariano.

[2] Production costs exclude distribution costs and salaries. The design of CEPA outputs was integrated in the development communication curriculum of ISU.

[3] Exposure time was defined as the period the outputs can be seen by the audience, and calculated on a per day basis (60 seconds counts as 1 day).

[4] Cost-effectiveness is calculated by dividing the production costs of an output by the audience (the total number of people who see the output) and dividing this by the exposure time (in days). For example, the cost-effectiveness of the posters is computed as follows: 1.2 US$ per copy / 5 people in a household / 300 days (posters are posted in a room of the house for around 10 months) = US$ 0.00080.

[5] Outreach (how many people in a village actually see or hear the outputs) was determined by asking the respondents which CEPA outputs they had seen or heard.

[6] To determine the community preference respondents were asked to rank the photographs of all outputs (Which was the most valuable output for you?).

[7] Odds ratios of having seen a specific output associated with awareness of legislation protecting crocodiles (Is the Philippine crocodile protected by law?). Model: Hosmer & Lemenshow R^2= 6.053, df = 8, $p > 0.1$. Cells without odds ratio are not significant, otherwise * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.

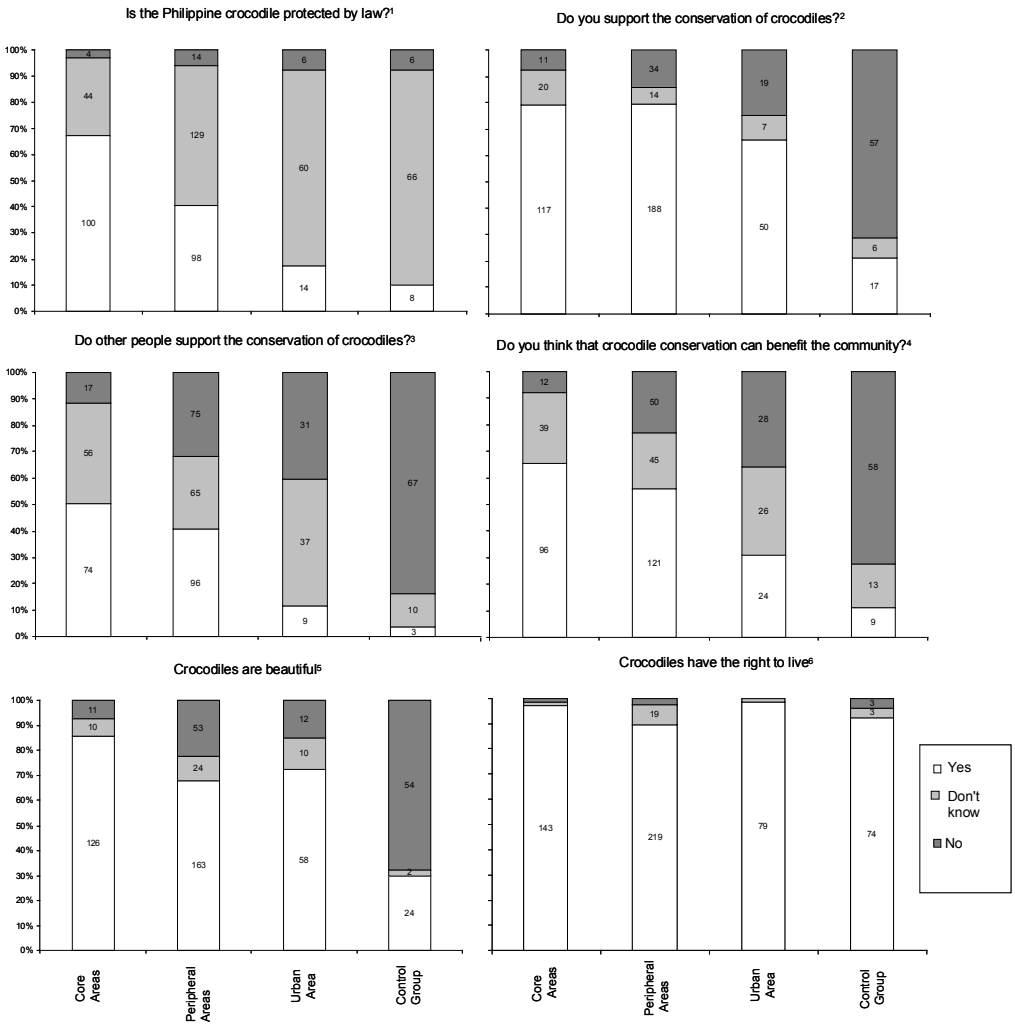
[8] Odds ratios of having seen a specific output associated with being supportive of legislation protecting crocodiles (Do you support the conservation of crocodiles?). Model: Hosmer & Lemenshow R^2 = 9.169; df =8, $p > 0.1$

Outcomes

Table 6.1 compares the cognitive and affective outcomes of the various CEPA outputs. Billboards, posters and community consultations have a measurable positive effect on the respondents' awareness of environmental legislation: people who have attended a community consultation are 3 times more likely to know that crocodiles are protected than people who did not attend these dialogues (odds ratio 3.106). The wall painting, newsletter and the cultural show have a positive effect on people's support of in-situ crocodile conservation. The odds of a respondent being supportive of the conservation of the species after seeing the theater show is almost 3 times higher than of a respondent who did not see it (odds ratio 2.878). I could not quantify the cognitive and affective outcome of the radio plugs, comic book, school presentations, puppet shows, school field visits and training workshops. A possible methodological explanation could be that sample sizes were too small (training workshops are attended by barangay officials only; the comic books, school presentations, puppet shows and school field visits focus specifically on schoolchildren and students).

A counterfactual approach compares the cognitive and affective outcomes of the CEPA campaign in the 4 areas (figure 6.3). In the core area and the peripheral areas, respectively 67 and 41 percent of the respondents are now aware that the Philippine crocodile is protected by law, whereas in the control group 82 percent doesn't know if crocodiles are legally protected. 79 percent of the respondents in the core area and the peripheral area support the conservation of the Philippine crocodile in the wild; against 21 percent in the control group. When asked whether other people in the community support the conservation of crocodiles, 50 percent of the respondents in the core areas said yes; against 4 percent in the control group. The variance in these variables cannot be explained by age, sex, livelihood strategy, affluence, ethnicity or educational level. Sixty-five percent of the respondents in the core area think that Philippine crocodile conservation can benefit the community; in contrast with the control group where only 11 percent think that is the case. Most likely people refer to indirect cash benefits generated through specific attention from government agencies for areas where crocodiles occur: for example the prioritization of road maintenance by the LGU. Another remarkable difference is that 85 percent of the respondents in the core area think that crocodiles are beautiful animals, whereas in the control group only 30 percent see the aesthetic value of a crocodile. Surprisingly 93 percent of all respondents think that crocodiles have the right to live. As this is largely invariable over the areas, including the control group, this cannot be the outcome of the CEPA campaign.

Figure 6.3: Cognitive and affective outcomes



Notes:

[1] n=549, χ^2= 93.9, df = 6, $p < 0.001$;

[2] n=540, χ^2= 148.8, df = 6, $p < 0.001$;

[3] n=540, χ^2= 145.4, df = 6, $p < 0.001$;

[4] n=521, χ^2= 125.2, df = 6, p < 0.001;

[5] n=547, χ^2= 113.8, df = 6, $p < 0.001$;

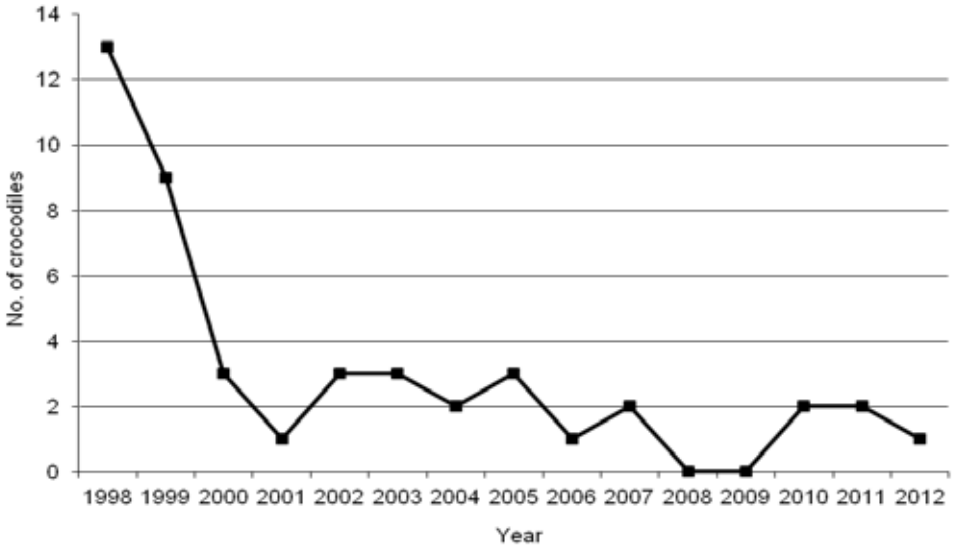
[6] n=548, χ^2= 15.4, df = 6, not significant, $p > 0.0125$

Impact

The CEPA campaign has contributed to the reduction of anthropogenic threats to crocodiles. Philippine crocodiles are no longer purposively killed in San Mariano (figure 6.4). But the species is still accidentally caught in fish nets or snare traps. Instead of eating the eggs people report crocodile nests to the village officials. The use of destructive fishing methods has been banned through barangay ordinances, and there have been several cases in which violators have been warned or penalized by local authorities. In 2007 for example 3 men were fined by the barangay captain of San Jose for fishing with pesticides in a creek near the crocodile sanctuary; an unprecedented case of environmental law enforcement in the northern Sierra Madre. Barangay officials and fishers say that the use of destructive fishing methods has significantly decreased. The clearing of riparian forest for corn production and the conversion of freshwater wetlands to rice paddies however continues, even when farmers are aware of environmental legislation and have a supportive attitude towards conservation.

Ultimately the success of the CEPA campaign will be determined by the number of Philippine crocodiles surviving in the wild. The Philippine crocodile population in San Mariano has increased from 13 non-hatchling crocodiles in 2002 to 64 in 2009. High hatchling mortality in the wild due to natural predation and the reclamation of suitable nursery pools prevent a rapid recovery of the population (van Weerd & van der Ploeg 2012). Environmental communication and education should therefore be part of an integrated strategy that includes habitat restoration, re-enforcement of the population and strengthening environmental law enforcement.

Figure 6.4: Mortality of Philippine crocodiles caused by humans in the municipality of San Mariano (1998-2012). Based on information provided by barangay officials in San Mariano, and verified on site.



DISCUSSION

An assessment of the CEPA campaign for the Philippine crocodile in San Mariano can improve the cost-effective design and implementation of environmental communication and education programs, and further our understanding of people's awareness of and attitudes towards wildlife conservation (figure 6.5).

Cost-effective outputs

Posters, murals and billboards are cheap and effective outputs to disseminate information to rural communities (Tambashe *et al*. 2003; Trewhella *et al*. 2005). In San Mariano it proved challenging to assure that posters reached the target audience: fishers and farmers living in close proximity to crocodile habitat. Too often posters ended up in government offices and schools in urban areas. Adding a calendar made the posters a valuable daily use-item for rural households. Murals and billboards attract a lot of attention and reinforce communal ideals of environmental stewardship, provided that they are in the right spot.

Radio plugs and newsletters should be used with reserve. Radio is a popular medium in the uplands of San Mariano, but the radio plugs had no measurable effect on people's awareness of, or attitudes towards the conservation of the Philippine crocodile. A possible explanation could be that the radio plugs were aired on a government-owned station (DWPE), whereas people prefer to listen to soap-operas on the commercial radio stations. My experiences in the northern Sierra Madre confirm findings that very few people actually read newsletters (Colchester *et al*. 2003). This is perhaps not surprisingly in areas where many people are illiterate. Nevertheless newsletters are useful to disseminate information on crocodiles to specific actors, such as teachers, forest rangers, local government officials and donors.

School presentations and school field visits are effective outputs to raise awareness among school children (Padua 1994; Cook 2008). During the school visits in San Mariano children often see the Philippine crocodile for the first time and react surprised that it is much smaller than on television. Entertainment education, such as theater performances and puppet shows, directly links to the daily life of people (Papa *et al*. 2000). The cultural show during the annual *fiesta* is highly valued by rural communities in San Mariano and positively affects people's attitudes towards crocodile conservation. These active outputs are expensive but can effectively enhance people's support for conservation.

Community consultations can build constituencies and contextualize concerns of directly affected people, and are as such indispensable outputs for environmental communication and education (de Groot & Zwaal 2007). During consultations people

ask questions, narrate their own experiences and forward solutions. These dialogues appear to be particularly effective to address irrational fears of crocodiles. Often people narrate personal experiences with crocodiles and claim the species does not pose a threat. Not surprisingly these views are often more trusted than the opinion of outside conservationists. Village leaders chair the consultations, thereby confirming and sanctioning the conservation message and integrating crocodile conservation in local governance. But sometimes these community dialogues also cause confusion (Jacobson 1999); for example on conflicting institutional mandates between LGU and DENR, informal land rights of farmers, or the role of government officials in illegal logging operations. Specific problems can be confrontational and cause discomfort among the participants.

Training community leaders in environmental legislation is an effective method to enhance capacities, strengthen law enforcement, create a sense of ownership and build trust between conservationists and rural communities (Baral & Heinen 2007). In San Mariano barangay officials who participated in the training workshops subsequently played a leading role in prohibiting destructive fishing methods and monitoring compliance. But as new local officials are elected every 3 years, it is essential to continue this training program over a longer period. This highlights the need for a long-term CEPA campaign that links wildlife conservation to the worldview and concerns of rural communities (Sillero-Zubiri & Laurenson 2001).

Figure 6.5: What is an effective CEPA campaign? A poster of the Mabuwaya Foundation hangs next to a cigarette advertisement in a house in barangay Cadsalan. Photo by J. van der Ploeg (2007)

Cultural values

It is often argued that support for the conservation of potentially dangerous wildlife is strongest among urban, educated and affluent people (Naughton-Treves 2003). People in remote rural areas in contrast often regard predators as pests and a threat to livestock and children (Ericson *et al*. 2008). Also in the Philippines conservationists and policymakers assume that poor rural communities are antagonistic towards crocodiles, and argue that people living in crocodile habitat will only support conservation if they can derive cash benefits, for example through community-based ecotourism or sustainable ranching programs (WCSP 1997).

But the findings of this study contradict these utilitarian views. First, the emphasis on negative attitudes towards wildlife ignores the inherent positive views that people often also hold (Allendorf *et al.* 2006). Most respondents in this study for example acknowledged the intrinsic value (the right to live) of crocodiles, also in the control group. An effective CEPA campaign can enhance these inherent positive values and transform them into support for environmental conservation (Nolt 1996). Second, negative attitudes towards wildlife and legislation are not immutable. The CEPA campaign in San Mariano succeeded in changing people's knowledge of and feelings towards crocodiles and their conservation. Disseminating information on environmental legislation is an essential first step in transforming people's attitudes and behavior (Baland & Platteau 1996; Keane *et al.* 2010). Third, economic benefits are not a precondition for people's support for environmental conservation. Cultural values, such as pride, interest and fun, can in fact form an important incentive to support in-situ conservation, also for poor rural communities in the developing world (Padua *et al.* 1994; Butler 2000). In San Mariano people have become interested in the ecology of the species and take pride in the conservation of a rare and iconic animal in their village. Environmental communication and education can foster these positive values and provided a sound foundation for community-based conservation.

CONCLUSION

Substantial gains can be made in environmental conservation by investing more in communication and education, particularly in the developing world. Most conservation projects have a CEPA component, but these activities are usually based on intuition, anecdotal information and personal preferences, and dependent on the intermittent availability of funding. This is reflected in the relative paucity of quantitative impact assessments of CEPA campaigns in the scientific literature. As a result the impact of environment communication and education is often underestimated. It is therefore essential that the experiences and lessons of CEPA campaigns across the world are more systematically evaluated and compared.

ENDNOTE

1. Based on: van der Ploeg, J., M. Cauilan-Cureg, M. van Weerd & W.T. de Groot. 2011. Assessing the effectiveness of environmental education: mobilizing public support for Philippine crocodile conservation. *Conservation Letters* 4(4): 313-323. Jan van der Ploeg designed the study, prepared the questionnaire, trained the interviewers, analyzed the data and wrote the paper. Myrna Cauilan-Cureg supervised the ISU students in the field and assisted with data encoding. Merlijn van Weerd made the map, and supervised the quarterly monitoring activities of the Mabuwaya Foundation. Wouter de Groot provided comments on the text.

7. WHY MUST WE PROTECT CROCODILES? EXPLAINING THE VALUE OF THE PHILIPPINE CROCODILE TO RURAL COMMUNITIES[1]

INTRODUCTION

In May 2008 the Mabuwaya Foundation organized a community consultation in Lumalug, a small village in the northern Sierra Madre mountain range on Luzon, to present a plan to declare the small stream that runs through the village as a protected area. Dinang Creek harbours the largest reproducing Philippine crocodile population remaining in the wild. The staff of the foundation explained to the villagers that the Philippine crocodile is protected by law and solicited people's support for the preservation of the species. But then a farmer stepped forward and asked a simple, straightforward question: 'why?' We did not have a good answer.

Why must we protect crocodiles? Perhaps surprisingly, conservationists are ill equipped to address this fundamental question (Barry & Oelschlaeger 1996; Van Houtan 2006). Too often arguments to conserve wildlife lack a scientific basis, or are irrelevant from a local perspective. This is particularly problematic in developing countries such as the Philippines, where rural poverty, weak governance, cultural differences and scarce financial resources hamper conservation efforts on the ground. In such a context, communicating a sound normative foundation for nature conservation forms a major challenge (Berkes 2004).

Over the past 12 years I have been involved in a conservation project for the Philippine crocodile in the northern Sierra Madre. In 2003 I founded the Mabuwaya Foundation, a small non-profit organization dedicated to the conservation of the species in its freshwater habitat. In cooperation with Isabela State University the foundation disseminates information on the ecology and conservation of the species to people living in crocodile habitat. As a result most people living in Philippine crocodile habitat now know that the species is legally protected, and crocodiles are no longer purposively killed (van der Ploeg *et al*. 2011c). But farmers and fishers often do not understand *why* it is important to preserve the Philippine crocodile in the wild.

In theory there are several reasons to conserve nature. Environmental philosophers differentiate between instrumental and intrinsic values (Passmore 1980; Rolston III 1988). Instrumental values emphasize the importance of biodiversity to human societies. Most often this takes the form of economic values such as monetary benefits derived from the sale of crocodile leather, or of environmental services such as eating fish caught from the wild, drinking clean water or preventing erosion (Balmford *et al*. 2002; MEA 2005b). Some scholars stress the cultural importance of nature, which includes aesthetic, recreational, spiritual scientific and psychological values (Ratcliffe 1976; Wilson 1992). Intrinsic values in contrast emphasize the value of species as

ends-in-themselves regardless of whether they are also useful to mankind.

In practice however conservationists tend to focus on economic values to justify conservation policies (McCauley 2006; Infield 2001). Especially in developing countries, market-based approaches to protect nature and alleviate poverty appear attractive to mobilize local support. Aesthetic and moral concerns are often dismissed as romantic western constructs that have little practical value for impoverished communities in the Third World. In a comment in the scientific journal *Nature* Eric Meijaard and Douglas Sheil (2008: 159) for example stated that 'cuddly animals don't persuade poor people to back conservation.'

In this chapter I argue that utilitarian arguments to convince rural communities to protect the Philippine crocodile in the wild are often oversimplified, inaccurate or irrelevant from a local perspective. By using these flawed arguments, conservationists risk losing credibility and alienating local people from nature conservation. Intrinsic and cultural values such as pride, love and curiosity offer in fact a more realistic and honest foundation to preserve the species.

ECONOMIC VALUES

One of the main reasons to conserve crocodiles in the wild is that people can derive cash benefits through *sustainable use*. As the Swiss naturalist Charles Guggisberg (1972: 183) argued:

> 'In view of the materialistic times we live in, the economic value of crocodilians -especially with regard to the skin trade- is sure to furnish by far the strongest arguments for assuring their survival.'

In several countries crocodile ranching has become an important income-generating activity and provides an incentive to conserve crocodiles and wetland habitat (Webb *et al*. 1987). Rural communities in Papua New Guinea for example earn money through the sale of juvenile crocodiles to commercial crocodile farms and therefore actively protect crocodile nests (Cox 2009). Over the past 25 years sustainable use has been the guiding principle of crocodile conservation in the Philippines. In 1987 the Philippine government set up a crocodile ranching program to conserve crocodiles and alleviate rural poverty: the Crocodile Farming Institute. It was envisioned that setting up a crocodile leather industry would provide people living in crocodile habitat an incentive to conserve the species. In the words of Gerardo Ortega, the former executive director of the Crocodile Farming Institute: 'to instill in trappers the relative economic importance of a ferocious living crocodile, relative to a harmless dead one' (Ortega *et al.* 1993: 126).

The regulated harvest of crocodile skins is however not a viable conservation

strategy for critically endangered species such as the Philippine crocodile (Thorbjarnarson 1999). With less than 100 mature individuals surviving in the wild, extractive use is simply not an option; and will not be so in the foreseeable future. The Crocodile Farming Institute had to abandon its plans to develop a crocodile leather industry and has instead focused on breeding crocodiles in captivity. The reasoning that local people living in Philippine crocodile habitat can make money with the harvest of crocodile skins is unrealistic: the benefits of a sustainable use program are too distant and insecure to use as a justification for in-situ crocodile conservation. Nonetheless policymakers and conservationists continue to promote the economic importance of crocodiles in the Philippines (van der Ploeg *et al*. 2011b).

In cases where direct use is problematic conservationists tend to promote non-consumptive uses, particularly *ecotourism*. In this view rural households can earn money by guiding, or catering to, tourists. In northern Australia for example saltwater crocodiles bring in much needed 'tourist-dollars', which form an important incentive to protect the species in the wild (Ryan & Harvey 2000). A similar success-story from the Philippines is the community-based whale shark tourism enterprise in Sorsogon Province that succeeded in improving people's incomes and minimizing illegal fishing (Pine *et al*. 2007). It is however unlikely that crocodile tourism can generate substantial benefits for communities in the northern Sierra Madre. Poor accessibility, equity issues and a civil insurgency form major constraints for the development of ecotourism infrastructure in this remote rural area. Moreover, the linkage between organized crocodile-watching tours and effective protection of the species and its wetland habitat level is not as straightforward as is often assumed (Brown 1998). All the same, ecotourism remains a popular 'green development fantasy' and is actively promoted by local governments.

In many cases conservationists use *indirect benefits* (indirect in the sense that they are not generated through the use of crocodiles, or dependent on the survival of the species in the wild) to convince people to protect nature and wildlife (Ferraro & Kiss 2002). Most conservation organizations nowadays integrate developmental activities in their projects to mobilize local support (Adams *et al*. 2004). Improving rural livelihoods is obvious an important and legitimate goal in itself, especially in areas where most households live below the poverty threshold. But things become problematic when developmental aid is presented or perceived as a reason to conserve wildlife. Paige West (2006) for example documents how local people in the Crater Mountain Wildlife Management Area in Papua New Guinea understood that they would get healthcare, education and consumer goods in return for their cooperation in protected area management. Such expectations inevitably lead to disappointments for both parties, as the promised or expected economic benefits often do not materialize and unsustainable resource use continues (Oates 1999). In the northern Sierra Madre, the Mabuwaya Foundation facilitated the construction of water pumps to minimize human-crocodile interactions, local governments prioritized the maintenance of farm-to-market roads in

villages where Philippine crocodiles occur, and the DENR issued tenure instruments to farmers living adjacent to crocodile sanctuaries on the condition that they maintain a riparian buffer zone. These integrated conservation and development projects generated a lot of goodwill and built trust between government officials, conservationists and rural communities. However developmental aid should not be used as an argument to conserve crocodiles in the wild. The effectiveness, legitimacy and sustainability of such a contract between conservationists and rural communities to conserve biodiversity in exchange for development, is doubtful (Utting 2000).

ECOLOGICAL VALUES

Another often heard reason to protect crocodiles in the wild is that these large predators play an important role in maintaining the productivity and diversity of wetland ecosystems on which people depend (Cott 1961). In their book *Soul of the Tiger* Jeffrey McNeely and Paul Spencer Sochaczewski (1988: 205) for example write:

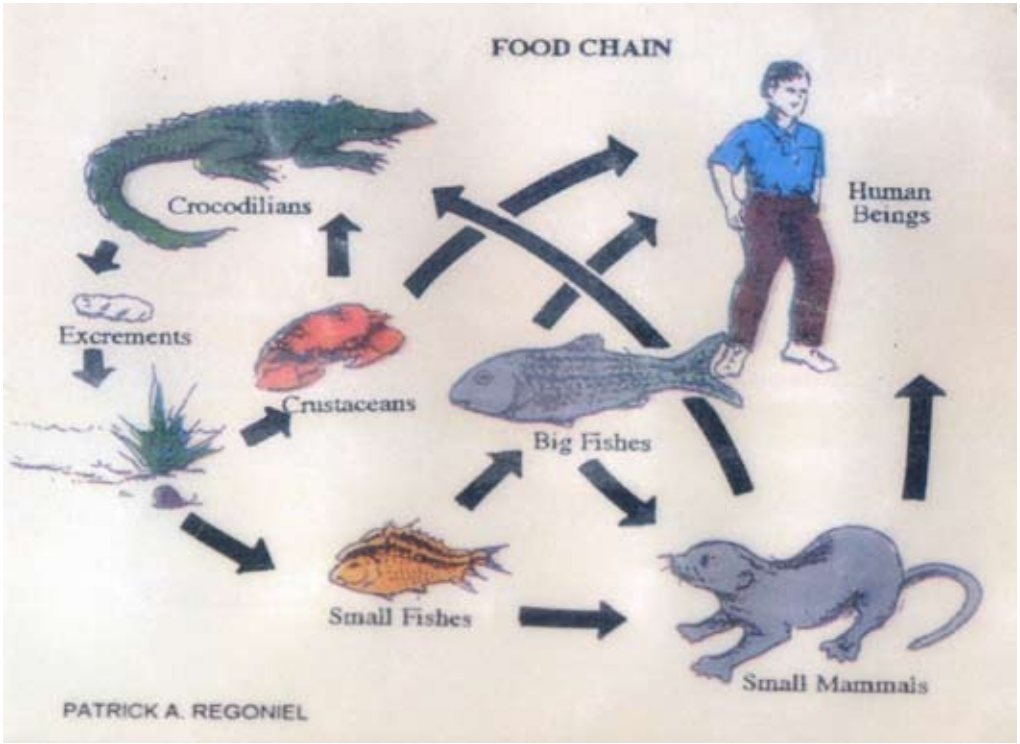
> 'Studies have shown that the presence of crocodiles in a river actually *increase the yield of fish*, which by itself justifies the veneration village societies have for the beasts. Crocodiles eat ailing fish in a significant higher proportion than healthy fish, thus improving the common health of the fish stock. By preying on the most common fish, they balance the fish population; any species which suddenly becomes dominant is put back in its proper proportion. Crocodile droppings are nutritious for the fish and contain critically important chemicals.'

There is in fact little empirical evidence for the a that crocodiles improve fish catches. Carlos Peres and Anina Carkeek (1993) describe how black and spectacled caimans (*Melanosuchus niger* and *Caiman crocodilus*) in the Amazon damage gill nets and thereby reduce the efficiency and profitability of commercial fishing operations. In doing so the caimans indirectly benefit subsistence fishermen whose fishing lines are rarely damaged. This hardly seems a convincing reason to protect these species in the wild. Indeed the authors acknowledge that 'as a result commercial fishermen are antagonistic towards caimans and many medium-sized to large individuals are shot on sight' (Peres & Carkeek 1993: 228-229). Moreover, local fishermen profoundly dislike the caimans and do not seem to understand the role the animals play in curbing overfishing.

Crocodilians are seen as *keystone species* in freshwater ecosystems. American alligators in Florida for example create and maintain deep ponds that provide a refuge for many species of fish, frogs and snakes during dry periods (Mazzotti *et al*. 2008). It is argued that the extinction of such a large predator could disrupt fundamental ecological processes and damage the entire ecosystem. Taking these insights one step further, Ben Malayang (2008: 18), a former undersecretary of the DENR, argues

that 'the disappearance of crocodiles would appear to be one major contributory factor to the demise of our large river systems.' This reasoning however does not stand close inspection. Freshwater wetlands in the Philippines have been altered by pollution, over-exploitation, flow modification, habitat degradation and invasive species (DENR & UNEP 1997). Rivers have been dammed, watersheds logged, and once abundant fish species wiped out by fishing with dynamite, electricity and pesticides. Over the past 60 years freshwater wetlands in the Philippines have undergone unprecedented ecological changes. Obviously, these transformations are not caused by the extermination of the Philippine crocodile. Conversely, it seems improbable that these ecosystems will be restored to their original state by reintroducing these apex predators (see for example Terborgh & Estes 2010).

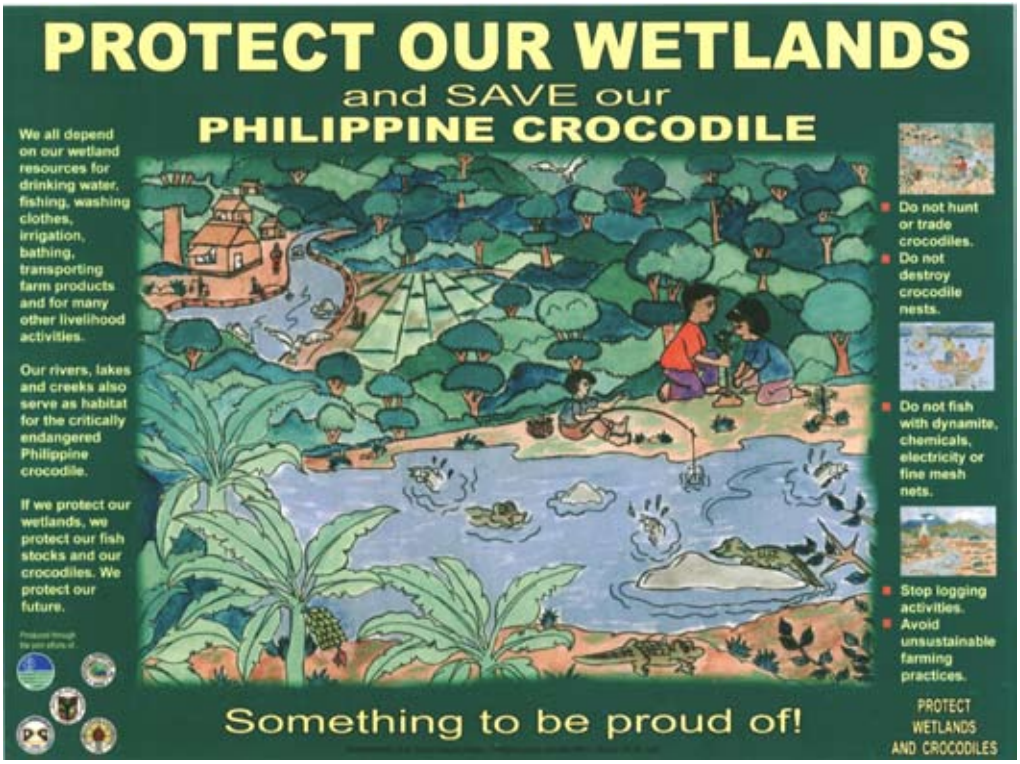
Figure 7.1: Poster of the Crocodile Farming Institute explaining the role of crocodiles in freshwater ecosystems.



In the 1990s the DENR tried to convince the Filipino public to protect crocodiles by arguing that crocodile 'excrements' fertilize the rivers and thereby maintain the food chain (figure 7.1). The Wildlife Conservation Society of the Philippines argued that 'crocodiles are important to aquatic ecosystems, not only in keeping the balance by

controlling population growth of prey species, but also valuable in the maintenance of residual waterholes during dry periods and inhibition of encroachment of aquatic plants by their constant movement' (WCSP 1997: 81). Actually, very little is known about cascading trophic interactions and disturbance dynamics in freshwater wetlands in the Philippines. In any case, fishermen in the northern Sierra Madre do not believe that more crocodiles will lead to higher fish catches: in their perception crocodiles eat fish and destroy fishnets.

Figure 7.2: Poster of the Mabuwaya Foundation explaining the value of wetlands (2005).



In dialogues with rural communities the Mabuwaya Foundation therefore does not focus on the ecological value of crocodiles but emphasizes the importance of wetlands (figure 7.2). Freshwater ecosystems provide important *environmental services* for poor rural communities in the northern Sierra Madre. Rural communities are confronted with declining fish catches, erosion and flooding. By adopting a broader ecosystem approach the foundation aims to mobilize societal support for Philippine crocodile conservation. With considerable success: village councils banned the use of destructive fishing methods and proclaimed 18 fish sanctuaries. This facilitates the

recovery of the species and directly benefits the community: fishermen report that fish catches are increasing in areas adjacent to the sanctuaries. The Philippine crocodile is the flagship species for these community-based conservation efforts. But strictly speaking crocodiles are not necessary to maintain fish stocks, provide clean water and regulate floods. To paraphrase David Reed (2002): 'the environment is not a crocodile.' The fact that freshwater ecosystems deliver a wide range of services on which rural communities depend is in itself not a valid reason to protect the species.

CULTURAL VALUES

A third justification to conserve crocodiles in the wild is that crocodiles contribute to human well-being. The conservation of species and habitats is important for aesthetic, recreational, scientific, spiritual and psychological reasons (Adams 1996).

It can be argued that crocodiles form an important part of Filipino *culture heritage*. In the pre-colonial Malay World crocodiles were worshiped as the embodiment of the ancestors, spirits or gods. Throughout the archipelago crocodiles were symbols of sexual fertility and physical power, and associated with agricultural productivity. Crocodiles were seen as the guardians of the underworld: divine creatures that guarded the social order. This veneration is reflected in oral history and material culture. But Catholicism, colonialism and capitalism fundamentally transformed people's attitudes towards crocodiles (van der Ploeg *et al*. 2011a). Nowadays most people see crocodiles as man-eaters that should be exterminated. Movies, advertisements, comic books and zoos reinforce the image of crocodiles as treacherous and voracious beasts. In mainstream Filipino culture crocodiles are associated with greed and corruption. Few people are aware of the role of crocodiles in Philippine culture and history (although Elias epic fight with a crocodile in Rizal's novel *Noli me Tangere* is probably the only thing most high-school students remember of the compulsory Filipino Language and Literature classes). All-in-all not an ideal starting point to convince people to protect crocodiles in the wild.

Interestingly, not everyone sees crocodiles as dangerous animals. In the remote rural areas of the Philippines, people have more tolerant attitudes towards crocodiles. The Magindanaon on Mindanao for example believe they descend from crocodiles. The Tagbanwa on Palawan claim that their ancestors made a blood pact with crocodiles. And the Kalinga on Luzon think that crocodiles are the embodiment of the ancestors. These *spiritual values* have provide some form of protection for the species. Indigenous people in the northern Sierra Madre claim that crocodiles do not pose a danger as long as people 'respect' the animals. In Lumalug for example, women example regularly place an offering near the creek to appease the 'grandfather crocodile.' There is much debate on whether traditional beliefs and practices form a sound conservation ethic (Diamond

1986; Johannes 2002). In any case, many people in Lumalug say they 'no longer follow these superstitious beliefs.' Assimilation, modernization and evangelization are rapidly eroding the traditional belief systems. Basing the Philippine crocodile case on these mystic values therefore does not seem a promising strategy.

When it becomes difficult to nurture existing cultural values, conservationists can try to create a new conservation ethic. Susana Padua for example describes how conservationists succeeded in turning the black lion tamarin (*Leontopithecus chrysopygus*) from a pest into a source of pride and excitement for rural communities in Brazil (Padua 1994). Over the past years the Mabuwaya Foundation tried to foster a sense of *pride* in the occurrence and conservation of the Philippine crocodile (figure 7.3). The slogan of the public awareness campaign reflects this objective: 'the Philippine crocodile: something to be proud of!' The foundation distributed posters, newsletters and comic books to households living in crocodile habitat, gave lectures in schools to raise awareness on the plight of the critically endangered species, and brought schoolchildren to the field to see crocodiles in the wild. Students of Isabela State University performed crocodile dance shows in remote villages during the annual town fiesta. Training workshops were organized to enhance the capacity of village leaders to protect crocodiles and wetlands. As a result attitudes towards in-situ Philippine crocodile conservation are changing: the fact that this iconic species has been exterminated in most parts of the country but survives in their village is a strong motivation for local people to support conservation action.

Cultural values can play an important role in making global conservation priorities such as the Philippine crocodile locally relevant. The role of pride, joy and interest in building a local constituency for conservation has however been largely ignored by conservationists and policy makers (Posey *et al*. 1999; Infield 2001). It is often argued that aesthetic or moral values are insufficient to convince people to protect wildlife, especially in the world's poorest regions. For people that struggle to make a living the argument that crocodiles are an emotional and intellectual enrichment may sound hollow: 'beneficence, awe, reconciliation, and communion are not entirely probable attitudes for the poverty stricken living in overcrowded barrios' (Orr 2000: 144). Yet people in villages like Lumalug are often interested in the natural history of the species and enjoy sharing stories about crocodiles. I have spent many pleasant evenings talking with people about enchanted crocodiles, encounters with crocodiles under water and the magical properties of crocodile scutes. Obviously, people have more important problems on their mind than the plight of the Philippine crocodile. But the claim that poor people have no need or ability to affiliate with nature can not be upheld (Kellert 1996). Such a claim risks ignores people's history, culture and identity and reduces them to being nothing else than poor.

Figure 7.3: Billboard with the slogan of the public awareness campaign for the Philippine crocodile: '*banag a maipagpannakkel!*' (something to be proud of!). Photo by M van Weerd (2008).

INTRINSIC VALUES

Conservationists' last argument to justify the protection of crocodiles in the wild is their *intrinsic value*. John Muir, one of the founding fathers of the environmental movement, for example reasoned that people have the moral obligation to preserve crocodilians not only because of their suitability for human use but also for their own good:

> 'Many good people believe that alligators were created by the Devil, thus accounting for their all-consuming appetite and ugliness. But doubtless these creatures are happy and fill the place assigned them by the great Creator of us all. […] How narrow we selfish, conceited creatures are in our sympathies! How blind to the rights of all the rest of creation! […] Through alligators naturally repel us, they are not mysterious evils. They dwell happily in the flowery wilds, are part of God's family, unfallen, undepraved, and cared for with the same species of tenderness and love as is bestowed on angels in heaven or saints on earth. […] Honorable representatives of the great saurians of an older creation, may you enjoy your lilies and rushes and be blessed now and then with a mouthful of terror-stricken man by way of dainty' (Muir 1916: 98)

It is however often argued that the idea that nature has intrinsic value and needs to be preserved is a typically western construction (Grove 1991), which might be appealing to educated urban elites but has little practical value for impoverished people living in crocodile habitat: '*Erst kommt das Fressen, dann kommt die Moral*.' The preservation of wildlife and wilderness on intrinsic grounds has in the past led to the exclusion and marginalization of rural communities (Ghimire & Pimbert 1997). Conservationists who stress that crocodiles should be conserved for their own sake, risk being portrayed as naïve romanticists, or worse as 'green imperialists' or 'eco-colonialist,' who are utterly disconnected from socio-economic realities in the Third World (Crowe & Shryer 1995: 26).

The idea that crocodiles have an intrinsic value has in fact a broad social basis in the northern Sierra Madre. In 2007 I administered a questionnaire among 549 people on Philippine crocodile conservation to assess the impact of the public awareness campaign of the Mabuwaya Foundation. One of the questions asked was if people agreed or disagreed with the proposition: 'crocodiles have the right to live.' The results were surprising: 93 percent of the respondents agreed with the statement (see for methods, other results and discussion: van der Ploeg *et al*. 2011c). Interestingly, there was no correlation with education, affluence, ethnicity, sex or the perceived risks and benefits of conserving crocodiles. Apparently most people in the northern Sierra Madre, irrespective of their income, descent or livelihood strategy, somehow endorse the notion that crocodiles have an intrinsic right to exist.

This universal tendency to affiliate with nature provides a starting point to mobilize broad public support for conservation (Wilson 1992; Kellert 1996). Education can nurture this inherent 'love for nature' and transform it into active support for environmental protection, also in the developing world (Kals *et al*. 1999: 180). In fact, conservation organizations in Europe, the US and Australia rely heavily on intrinsic values to raise awareness and generate funding. But in the tropics the same conservation organizations largely ignore the potential of preserving wildlife on moral grounds (Kuriyan 2002).

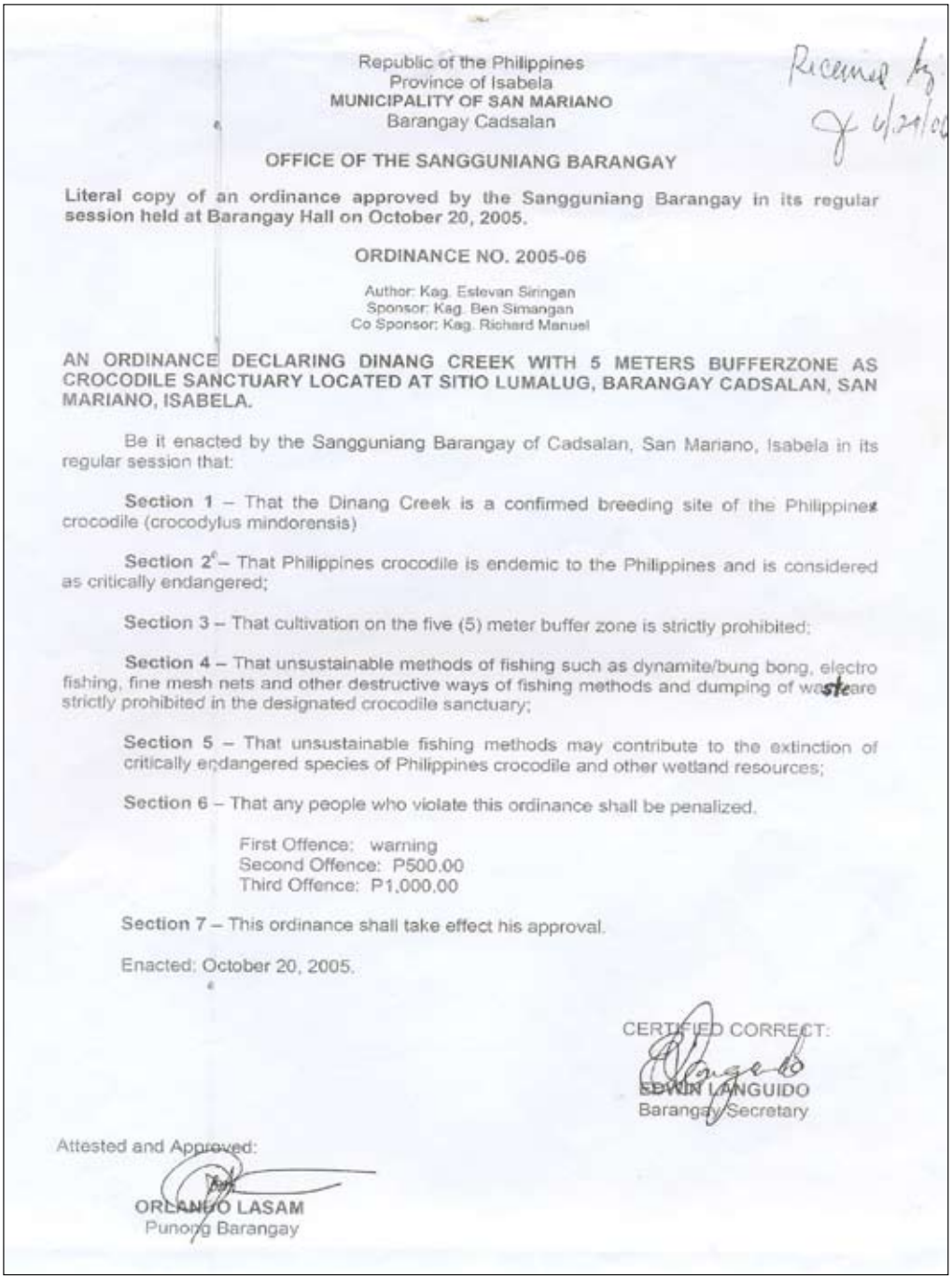
CONCLUSION

To build an inclusive constituency for the conservation of the Philippine crocodile it is essential to communicate a clear and, perhaps even more important, sincere conservation ethic. Conservationists, scientists and policy-makers mainly rely on utilitarian logic to justify in-situ crocodile conservation. The danger of focusing solely on economic values and environmental services is twofold. First, by promising tangible benefits to rural communities conservationists often create unrealistic expectations. This undermines the credibility of conservation organizations and can ultimately alienate

local people from nature conservation. It is one thing to deceive ourselves; it is another to misinform poor rural communities.

Second, by framing conservation as an economic issue conservationists risk to obscure other valid motivations to conserve crocodiles in the wild (Jepson & Canney 2003; Martin *et al*. 2008). 'Why' an editorial in *the Economist* (2010: 16) rhetorically asked 'should local governments spend money protecting something that does not bring in any cash? Why should a farmer give up his land for a worthless creature that often eats his livelihoods?' Such presumptuous questions neglect cultural and intrinsic values that form a legitimate reason to conserve wildlife and inspire changes in people's behaviour. In the end conservationists must not be guided by such ideological preferences, but by what works best in a specific context (Robinson 2011). Love, pride and interest are in fact the best (and probably only) arguments to mobilize local support for Philippine crocodile conservation. In Lumalug it proved sufficient to convince the barangay council to declare a Dinang Creek as a crocodile sanctuary (figure 7.4). To paraphrase Douglas McCauley (2006: 28): by appealing to people's hearts, rather than to their crocodile leather wallets, conservationists can motivate people to conserve the Philippine crocodile in the wild.

Figure 7.4: Barangay ordinance 2005-06 declaring Dinang Creek a Philippine crocodile sanctuary.



Republic of the Philippines
Province of Isabela
MUNICIPALITY OF SAN MARIANO
Barangay Cadsalan

Received by
6/20/05

OFFICE OF THE SANGGUNIANG BARANGAY

Literal copy of an ordinance approved by the Sangguniang Barangay in its regular session held at Barangay Hall on October 20, 2005.

ORDINANCE NO. 2005-06

Author: Kag. Estevan Siringan
Sponsor: Kag. Ben Simangan
Co Sponsor: Kag. Richard Manuel

AN ORDINANCE DECLARING DINANG CREEK WITH 5 METERS BUFFERZONE AS CROCODILE SANCTUARY LOCATED AT SITIO LUMALUG, BARANGAY CADSALAN, SAN MARIANO, ISABELA.

Be it enacted by the Sangguniang Barangay of Cadsalan, San Mariano, Isabela in its regular session that:

Section 1 – That the Dinang Creek is a confirmed breeding site of the Philippines crocodile (crocodylus mindorensis)

Section 2 – That Philippines crocodile is endemic to the Philippines and is considered as critically endangered;

Section 3 – That cultivation on the five (5) meter buffer zone is strictly prohibited;

Section 4 – That unsustainable methods of fishing such as dynamite/bung bong, electro fishing, fine mesh nets and other destructive ways of fishing methods and dumping of wastes are strictly prohibited in the designated crocodile sanctuary;

Section 5 – That unsustainable fishing methods may contribute to the extinction of critically endangered species of Philippines crocodile and other wetland resources;

Section 6 – That any people who violate this ordinance shall be penalized.

First Offence: warning
Second Offence: P500.00
Third Offence: P1,000.00

Section 7 – This ordinance shall take effect his approval.

Enacted: October 20, 2005.

CERTIFIED CORRECT:

EDWIN LANGUIDO
Barangay Secretary

Attested and Approved:

ORLANDO LASAM
Punong Barangay

ENDNOTE

1. Based on: van der Ploeg, J., M. Cauilan-Cureg, M. van Weerd & G. Persoon. 2011. 'Why must we protect crocodiles?' Explaining the value of the Philippine crocodile to rural communities. *Journal of Integrative Environmental Sciences* 8 (4): 287-298. Jan van der Ploeg wrote the paper. Myrna Cauilan-Cureg and Merlijn van Weerd have been instrumental in the design of the communication, education and public awareness campaign of the Mabuwaya Foundation in the northern Sierra Madre, and many of the ideas forwarded in this paper were jointly developed. Gerard Persoon commented on earlier versions of the text.

8. PHILIPPINE CROCODILE ATTACKS ON HUMANS IN THE NORTHERN SIERRA MADRE[1]

INTRODUCTION

Over the past 10 years the Mabuwaya Foundation has worked with local governments and rural communities to preserve the Philippine crocodile in the wild on Luzon (van Weerd & van der Ploeg 2012). Most people living in Philippine crocodile habitat now know that crocodiles are protected by law and support the conservation of the species in the wild (van der Ploeg *et al.* 2011c). But two recent crocodile attacks on people have eroded public and political support for the conservation of the Philippine crocodile.

INCIDENTS

On February 19, 2010, a Philippine crocodile attacked a pregnant woman in Dinang Creek in barangay Cadsalan, a remote village in the municipality of San Mariano, Isabela Province. Around 13:00, Glenda Arribay went to the creek to take a bath. When she squatted on an overhanging tree to scoop water, a large crocodile seized her lower right leg. As she fell in the water, the crocodile released her. Screaming for help, she swam back to the tree and pulled herself up. The crocodile however bit her again in the same leg. She kicked the crocodile several times on its head with her left leg while clinging to the roots of the tree. The crocodile released her and disappeared underwater. She pulled herself out of the water and called for help. Her husband, who was working on a nearby field, heard her cries and rushed to the scene. Glenda had severe wounds on her leg. Villagers gave emergency aid and antibiotics, and then brought her to the hospital in San Mariano town. She was hospitalized for 7 days. Her wounds healed well, and four months later she gave birth to a healthy son. Glenda herself thinks the attack is a case of mistaken identity. At the time of the attack her dog accompanied her to the creek, and sat next to her on the overhanging tree. She thinks that the crocodile attack was directed at the dog and that she was bitten by mistake. Dogs are regularly taken by Philippine crocodiles.

On August 27, 2010, around 12:00, Mario Jose was attacked by a Philippine crocodile along the Catalangan River in barangay Dibuluan, San Mariano. The specific conditions of the attack remain obscure. According to several people, Mario was setting his fish nets in an oxbow lake when saw a crocodile. He tried to scare away the animal by throwing stones. But instead of fleeing, the crocodile attacked him. Other people claim he was electro-fishing, and that he was bitten when he stun the crocodile. In any case, the crocodile bit twice in his right leg and disappeared underwater. People heard

Mario's calls for help and carried him back to his house. He had several deep punctures is his calf, and was brought to the hospital in San Mariano. His wounds healed well and after 14 days Mario returned home.

REACTIONS

People's responses to these crocodile attacks ranged from pragmatism to hysteria. During a television interview Glenda mentioned that the crocodiles in Dinang Creek generally do not pose a threat to humans: 'we are used to swim with crocodiles' (figure 8.1). Other people in Cadsalan also react remarkably rational to crocodile attacks. Most people in the village are Kalinga, who believe that crocodiles are the embodiment of the ancestors (van der Ploeg *et al.* 2011a). These indigenous people see crocodile attacks on humans as the result of human misbehavior. Some villagers actually blamed Glenda Arribay for the attack, and question why she was taking a bath alone in an area where everybody knows that there are large crocodiles. Also in Dibuluan people thought that it was Mario Jose's own fault (figure 8.2). Throwing stones to a crocodile is seen as an unwise provocation: 'as long as you respect crocodiles, the crocodiles will not harm you.' Of course, people in these remote villages are concerned about the threat posed by crocodiles, particularly to children. But people know from their own experience that the chance of being bitten by a crocodile is very small, and that simple precautionary measures can minimize the risk.

Outsiders however tend to be much less sensible. The attack on Glenda Arribay was widely publicized in the national media. Some of these reports were fairly accurate and balanced. Others misrepresented and sensationalized the story. 'Croc devours preggy Ilocana' read a headline on Pinoy Ako Online, a Philippine news website. ABS-CBN produced a 'docudrama' of the attack in Dinang Creek entitled 'I survived', which reinforced all existing stereotypes of the 'masculine monster myth' (Plumwood 1995).

Journalists often implicitly held the Mabuwaya Foundation responsible for the attacks. GMA7, the largest television network in the Philippines, for example reported that the attack on Glenda Arribay occurred near the 'crocodile breeding farm of the Mabuwaya Foundation', implying that the crocodile escaped from captivity. The foundation indeed raises juvenile Philippine crocodiles in captivity in San Mariano town (approximately 25 km from Dinang Creek); but no crocodiles have escaped from the rearing station or were released in or near Dinang Creek. Other newspapers linked the attack in Cadsalan to the release of 50 captive-bred Philippine crocodiles in Dicatian Lake in the municipality of Divilacan, on the other side of the Sierra Madre mountain range (GMANews 2010a). The underlying question in many of these reports is why these dangerous animals are being protected.

Reactions of the general public are characterized by incomprehension and ignorance. People's remarks on various websites exemplify this: 'How could a normal person swum in a creek with tons of crocs? I can't believe it! So stupid. Might the croc is hungry!!![*sic*]' (ABS-CBN 2010). People in the urban centers often have little knowledge of the conservation status of the Philippine crocodile or of the living conditions in the remote rural areas. For many people the idea of living with a potentially dangerous predator is inconceivable.

Policymakers also expressed their alarm about the crocodile attacks. Concerned about the safety of the public, the local government unit of San Mariano temporarily suspended the release of captive-raised Philippine crocodiles to the wild. The vice-governor of Isabela remarked that people could kill crocodiles if they posed a threat to humans, although he later retracted his comment (GMANews 2010b). At the national level, policymakers often do not differentiate between the Philippine crocodile and the saltwater crocodile. The secretary of the Department of Environment and Natural Resources for example recently expressed the concern that 'the reptiles could attack locals in surrounding areas' (AFP 2011).

Figure 8.1: Edward and Glenda Arribay in the hospital in San Mariano during a television interview (source: ABS-CBN News 2010).

Figure 8.2: Mario Jose recovers from a Philippine crocodile bite. Photo by F. Koopmans (2010)

PREVENTION

It is in fact remarkable that there are so few crocodile attacks on humans in the Sierra Madre. People intensively use the creeks and rivers where Philippine crocodiles occur: men regularly fish at night with spears; women spend much time on the edge of the water washing clothes or fetching water; and children often play in or near the water. The only other documented Philippine crocodile attack occurred in July 2000, also in Dinang Creek. The time of the year, the location and the behavior of the animal suggest that the crocodile attacked to defend its nest.

However the incidence of crocodile attacks on humans is likely to increase as the crocodile population is recovering and human populations are also rapidly growing (*cf.* Caldicott *et al*. 2005). It is therefore essential to try to identify interventions that effectively prevent crocodile attacks on humans. This is particularly important as basic healthcare facilities are lacking in this remote rural area, and people generally do not have medical insurance and often lack the money to pay for medicines.

Improving people's awareness of the risks posed by crocodiles, for example by placing signposts advising against entering the water, is generally seen as a necessary precautionary measure (Gruen 2009). After the attack in Cadsalan students of Isabela State University designed a poster with several practical suggestions how to minimize human-crocodile conflicts (figure 8.3). Two-thousand copies were distributed among people living in Philippine crocodile habitat in the northern Sierra Madre. The poster fosters traditional values such as respect for crocodiles. The Mabuwaya Foundation also places billboards along crocodile sanctuaries to inform people on the presence of the species.

Crocodile attacks can also be prevented by providing safe access to water (Wallace *et al*. 2011). During a community consultation in Cadsalan in March 2010 villagers suggested to construct several wells in the village in order to minimize human-crocodile interactions. Four pump wells were subsequently constructed in Cadsalan (van Weerd *et al*. 2011). These wells now provide a source of safe drinking water for the community, but have not reduced human activities in the creek: children still play in the water and women continue to do the laundry.

So-called 'crocodile-proof fences' have proved an effective method to reduce human-crocodile conflicts in Southern Africa (Aust *et al*. 2009). Constructing protective barriers in which people can bath safely could be a possible precautionary measure in the northern Sierra Madre. But fencing all crocodile sanctuaries, as people sometimes suggest during community consultations, is obviously not feasible from an economic, social and ecological point of view.

Participatory land-use planning is regarded as long-term solution for human-crocodile conflicts (Dunham *et al*. 2010). The Mabuwaya Foundation supported barangay councils in the design and implementation of legislation protecting crocodiles and

freshwater habitat. In Cadsalan for example the barangay council declared Dinang Creek a Philippine crocodile sanctuary, and prohibited the cultivation of the riverbank. The idea is that such a buffer zone will protect basking and breeding sites, ensure prey availability, minimize erosion and prevent human-crocodile conflicts. To restore the natural vegetation along the creek, villagers planted 1,455 trees. In addition 4,597 fruit-tree seedlings were provided to affected farmers to compensate for the loss of land and stimulate a transition towards sustainable land use (van Weerd *et al*. 2011). The results so far are not encouraging: most seedlings have died, and several farmers continue to cultivate the 5 m buffer zone. Villagers generally do not think buffer zones are a viable solution to prevent human-crocodile conflict, as it will take several years before such a natural buffer zone is in place.

The relocation of problem-crocodiles is generally regarded as a last resort to prevent attacks on humans, but there are doubts about its effectiveness (Walsh & Whitehead 1993). A serious concern is that problem-animals often end up in captivity thereby depleting the population in the wild. In March 2009 for example the local government unit and the Mabuwaya Foundation captured a Philippine crocodile in barangay Paninan that repeatedly approached humans. It was subsequently released in the Disulap River crocodile sanctuary. However in August 2010 the foundation had to recapture the animal after it repeatedly attacked livestock. The adult male crocodile is now held in captivity. Moreover, people often do not want the removal of crocodiles. In Cadsalan people objected to catching the problem-crocodile that attacked Glenda Arribay. This refusal reflects traditional beliefs towards crocodile-ancestors, as well as an opportunistic assessment of the possibility of receiving developmental support.

CONCLUSION

These precautionary measures can however never wholly assure human safety. Efforts to communicate the risks posed by crocodiles will not guarantee the safety of children. Along similar lines, the proclamation of freshwater protected areas, the restoration of buffer zones or the provision of safe water points will not prevent an occasional crocodile attack. The preservation of a large and potentially dangerous predator in a human-dominated landscape always entails a certain degree of risk. Paradoxically, people living in Philippine crocodile habitat seem more willing to accept this harsh reality than most outsiders.

Figure 8.3: Poster designed by students of Isabela State University (2010)

ENDNOTE

1. Based on: van der Ploeg, J., F. Koopmans, M. Cauilan-Cureg, D. Rodriguez, W. van de Ven, M. Balbas, R. Araño, & M. van Weerd. 2012. Philippine crocodile attacks on humans in the Northern Sierra Madre. *Crocodile Specialist Group Newsletter* 31(2): 20-23. Jan van der Ploeg wrote the text. Femke Koopmans and Dominic Rodriguez conducted interviews on human-crocodile conflicts in the municipality of San Mariano. Myrna Cauilan-Cureg, Willem van de Ven, Mari-Tes Balbas, Robert Araño and Merlijn van Weerd provided comments on the text. The authors are working jointly on the prevention of human-crocodile conflicts in the northern Sierra Madre in the framework of the Mabuwaya Foundation.

9. CONCLUSION

Crocodiles are a conservation success story. Commercial hunting led to the depletion of crocodile, alligator and caiman populations in most parts of the world (Guggisberg 1972). But populations rapidly recovered following protective measures and the regulation of the international trade in crocodile leather. In many countries crocodile cropping, ranching or farming programs now generate substantial cash revenues for communities in remote areas, and thereby provide an economic incentive to preserve crocodiles and their wetland habitat. The sustainable use of crocodiles is widely regarded as a model for linking wildlife conservation to rural development; a pragmatic and more just alternative to a strict protectionist approach (Webb 2002; Adams 2004).

The limits of the sustainable use model are however increasingly becoming clear (Hutton & Leader-Williams 2003). The global crocodile leather market has proved to be highly volatile. Profits derived from extractive use are often captured by a few individuals, and rarely benefit communities living in crocodile habitat. Moreover, extractive use appears not to be a feasible conservation strategy for severely threatened species such as the Philippine crocodile (Thorbjarnarson 1999).[1] Efforts to set up a crocodile leather industry in the Philippines have not improved the management of the few remaining Philippine crocodile populations in the wild, and failed to generate revenues for people living in crocodile habitat. Nonetheless, utilitarian views continue to dominate Philippine conservation policy (see chapter 3). Policymakers and conservationists argue that rural poverty forms a critical constraint on conservation efforts, and that it is imperative to improve the well-being of communities living in crocodile habitat, if not by means of crocodile farming then through ecotourism, or so-called 'alternative livelihood projects'.

In reality, alleviating poverty in remote rural areas is a gargantuan challenge. Basic healthcare, primary education, safe drinking water, electric power and roads are often absent in villages in the northern Sierra Madre such as Dibuluan, Disulap, San Jose, Ibujan, Baliao, Buyasan, Cadsalan and Tappa where Philippine crocodiles still occur in the wild. Raising the income of the approximately 9,000 people living in these barangays to, say, a mere PhP. 40 (US$ 0.8) per day, the poverty threshold as set by the Philippine government, will be extremely difficult, not to say impossible with the scarce financial resources available for conservation in the Philippines. It may require constructing farm-to-market roads, improving sanitation, education and healthcare, granting access to credit, advising farmers on new farming techniques and crop varieties, ensuring fair prices for agricultural products, recognizing land rights, enforcing the rule of law, empowering women and many other interventions. And whether such a rural development strategy will actually mitigate threats to the Philippine crocodile population remains highly uncertain.

Some conservationists therefore advocate a return to strict protectionism,

particularly in densely populated areas where uncontrolled resource extraction will lead to irreversible environmental damage (Rudel & Roper 1997; Wilshusen *et al*. 2002). However, such a resurgent 'fines and fences' approach doesn't seem to be particularly promising in the Philippines. Despite the hefty penalties prescribed in the Wildlife Act of 2004, Philippine crocodiles continue to be killed, most often without any reaction of the authorities. The DENR lacks the political support, resources and capacity to enforce environmental legislation on the ground. Moreover, many government officials consider crocodile conservation wholly unimportant, and sometimes even illegitimate in a context of rural poverty (see chapter 4). Rural communities often consider State-imposed restrictions on resource use as arbitrary and unjust, and resist their implementation. Most protected areas in the Philippine archipelago remain 'paper parks' where hunting, logging, dynamite fishing and wetland conversion continue unabated (World Bank 2003; Persoon & van Weerd 2006).[2]

Others have simply given up on the Philippine crocodile. The prominent conservation biologist John Terborgh for example argues that faced with the reality of rapid population growth, corruption in government and little public support for conservation, it would probably be better to cease in-situ conservation efforts in the Philippines, and instead use the scarce financial resources to maintain the most spectacular endemic species such as the Philippine crocodile in captivity 'as a reminder of our collective impotence to hold back the forces of extinction' (1999: 183-184). His pessimism is widely shared: the Wildlife Conservation Society of the Philippines concluded that 'there is *little future* for Philippine crocodiles in the existing (and proposed) wildlife sanctuaries, and that captive breeding is the only hope for the species until public sentiment and awareness permit effective protection and implementation of reintroduction programs' (WCSP 1997: 78-79, emphasis added).[3] Such negativism ignores that indigenous people living in Philippine crocodile habitat actually tolerate crocodiles in their surroundings, and do not see a fundamental problem with co-existence (see chapter 2). More problematic, it diverts attention and resources away from efforts to conserve the species in the wild.

Over the past years the Mabuwaya Foundation has worked with rural communities and local governments to preserve the Philippine crocodile in its natural freshwater habitat. Conservation efforts focus on raising awareness on the plight of the species, protecting critical freshwater wetland habitat and re-enforcing the Philippine crocodile population in the northern Sierra Madre. The foundation distributes posters, calendars and newsletters, performs dance and puppet shows, organizes field visits to see crocodiles in the wild, facilitates community consultations and assists local government officials in the design and implementation of environmental legislation. As a result, most people living in Philippine crocodile habitat now know that the species is legally protected, and support in-situ conservation efforts (see chapter 6). The local government of San Mariano enacted legislation protecting the species in the wild,

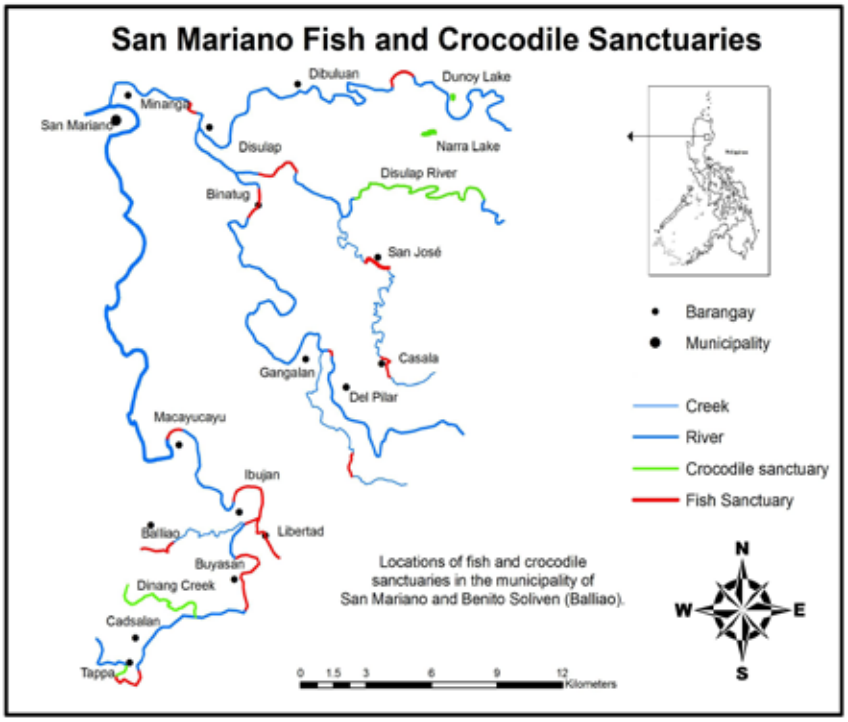
banned the use of destructive fishing methods, proclaimed Disulap River as a Philippine crocodile sanctuary and deputized 12 guards to protect critical nesting sites in the municipality. A head-start program was set up to increase recruitment rates: crocodile nests are protected, hatchlings collected in the wild, raised in captivity and eventually released back into the wild (van Weerd & van der Ploeg 2008).[4]

The experiences in San Mariano challenge the view that rural communities will only conserve crocodiles when they profit financially from it. In this thesis I have demonstrated that community-based conservation efforts in the northern Sierra Madre are primarily motivated by culture, ethics and emotion. Traditional beliefs and knowledge offer, at least most of the time, a foundation for co-existence (see chapter 8). Most people in San Mariano share the idea that the species has the right to exist, and should not be allowed to go extinct. Awe for an elusive predator, interest in ecology and natural history, pride in the occurrence of an iconic species, excitement of seeing a rare animal in the wild, pleasure in sharing stories about a large and potentially dangerous beast, responsibility for the Creation, concern about environmental degradation, respect for the law and an eagerness to 'do good' turn out to be important reasons why people support the conservation of the Philippine crocodile in the wild. Such an argument might easily be dismissed as hopelessly romantic, elitist or even irrational. But people, also poor farmers, fishers and hunters in the Third World, are guided by much more complex motivations than is generally assumed in ecological economics. There is more in life than carrots and sticks. Conservationists need to recognize that knowledge, emotion and culture are at the heart of nature conservation (Milton 2002). Conservation strategies will only succeed if they reflect, strengthen and build upon the wide range of views, values and needs of local people (Robson & Berkes 2010). Here lays, in my view, an important task for anthropology. To design effective conservation measures it is essential to have a detailed understanding of people's relationships with nature; not by making a priori assumptions about antagonism and economic incentives, but by collecting empirical data, formulating novel questions and thinking creatively (*cf*. Walters & Vayda 2009).

I am not suggesting that economic incentives are not important for conservation. San Mariano is one the poorest municipalities of the Philippines, and conservationists working in such a context should evidently take people's basic needs into account (Kaimowitz & Sheil 2007). 'How can we benefit?' remains a recurrent question during community consultations in San Mariano (see chapter 5). Philippine crocodile conservation is in fact intimately linked to rural livelihoods. The widespread use of destructive fishing methods, for example, is not only a severe threat to the species, but also erodes the resource base upon which rural communities heavily depend. There is broad social support to address this problem, and 14 barangay councils have created a freshwater protected area (figure 9.1).[5] The idea is that the establishment of a no-take zone will allow fish stocks to recover, and to 'spill-over' into other areas

where they can be caught by fishers (Alcala & Russ 2006; Leisher *et al*. 2010). These community-conserved areas provide tangible benefits to rural communities, and create the necessary conditions for the recovery of the Philippine crocodile. [6]

Figure 9.1: A network of community-conserved areas in San Mariano (Mabuwaya Foundation 2011)

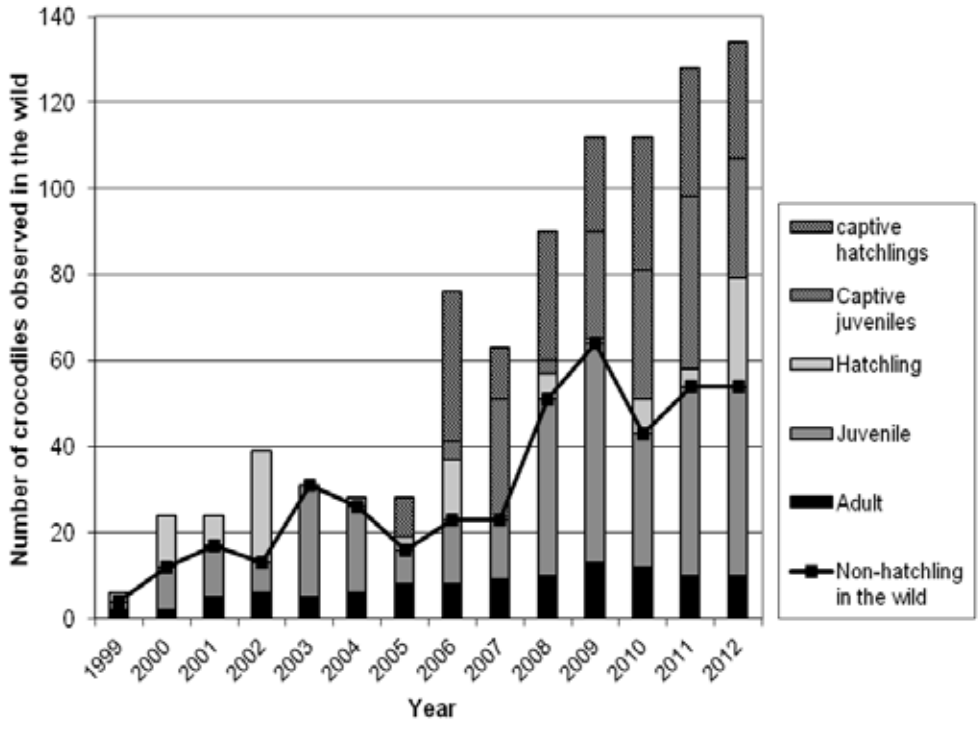


It is however important to be realistic and honest about economic incentives (see chapter 7). Freshwater protected areas enable people to catch and eat more fish, but cannot eradicate poverty. The impact of integrated conservation and development projects, such as distributing fruit trees, constructing water pumps, or setting up a payment-for-ecosystem-services system, on the income of rural households is generally small (Adams *et al*. 2004).[7] Fruit trees prevent erosion and improve nutrition, but do not provide a stable source of cash income for farmers in San Mariano. Water pumps provide clean water, but much more is needed to improve health conditions in remote villages in the northern Sierra Madre. Well-meant efforts to improve the quality of people's lives often lead to mistrust, confusion and friction within communities, and between communities, government and conservationists, especially when the benefits fail to

materialize (Utting 2000). Moreover, the conservation outcomes of these interventions are often unclear (Kellert *et al*. 2000; Ferraro & Kiss 2002). Raising awareness, fostering pride and building the capacity of local government officials is, in the end, a more pragmatic, pro-poor and realistic strategy to mobilize local support for the protection of the Philippine crocodile than crocodile farms and ecotourism enterprises.

Ultimately, the success of the community-based Philippine crocodile conservation project depends on the number of crocodiles surviving in the wild. The crocodile population in San Mariano has been monitored on a quarterly basis since 1999.[8] Figure 9.2 summarizes the results: there has been a marked increase in the number of non-hatchling Philippine crocodiles surviving in the wild, from 12 in 2000 to 54 in 2012, particularly after 2007 when the first captive-raised juveniles were released into the wild.[9] Significantly, the number of successfully hatched crocodile nests has increased, from fewer than two nests per year between 2001 and 2005, to an average of four nests per year since 2008. Extinction is not inevitable: there is a future for the species.

Figure 9.2: Philippine crocodile population in San Mariano (1999-2012)



The fence has long been a powerful and contested symbol for nature conservation. On the one hand, its advocates argue that strict protection is the best, perhaps even the only, solution to preserve wildlife and wilderness in the Anthropocene (Packer *et al*. 2013). On the other hand its opponents warn that 'fortress conservation' has led to the exclusion and marginalization of rural communities, and may in the end be inimical to conservation's cause (Adams & Hutton 2007; Brockington & Igoe 2006). Eric Meijaard and Douglas Sheil (2008) argue that the dollar sign would therefore be a much better symbol for conservation; one that emphasizes the economic value of nature. This utilitarian logic increasingly dominates conservation science, policy and practice, particularly in developing countries. In this thesis I have argued that it is possible to base conservation on other grounds than economic rationality. Pride, interest and respect are important reasons for people in the northern Sierra Madre to protect the Philippine crocodile. The challenge is to integrate these cultural and moral values into conservation strategies (Infield 2001; Adams 2004). In that sense the heart would perhaps be a more appropriate symbol for conservation. Neither fences nor dollars will save the Philippine crocodile. But love perhaps can.

ENDNOTES

1. The Asian crocodilians pose a specific conservation challenge, or at least form a more urgent and pronounced problem than in other tropical regions, a reflection of exceptional high rates of biodiversity loss in South and Southeast Asia (Hoffmann *et al.* 2010; Thorbjarnarson *et al.* 2002; Nair *et al.* 2012). The regulation of trade has not led to improved management of wild crocodile populations in Asia: of the seven species that occur in the humid tropics of Asia, six remain threatened with extinction (Martin 2008; Dudgeon 1992). The Philippine crocodile, Chinese alligator (*Alligator sinensis*), Indian gharial (*Gavialis gangeticus*) and Siamese crocodile (*Crocodylus siamensis*) are all classified as critically endangered on the IUCN Red List (IUCN 2010). Two other Asian crocodilian species, the Malay gharial (*Tomistoma schlegelii*) and the mugger (*Crocodylus palustris*) are respectively classified as endangered and vulnerable. The saltwater crocodile is also severely threatened in South and Southeast Asia, but as populations have recovered in the wild in Papua New Guinea and northern Australia the species has been delisted from endangered to vulnerable in 1990 and from vulnerable to lower risk in 1996 on the IUCN Red List (Webb *et al.* 2010). Crocodile leather is an important export product in several Asian countries: there are for example more than 700,000 Siamese crocodiles on crocodile farms in Vietnam, Thailand and Cambodia (Simpson & Bezuijen 2010). Unfortunately, this is not leading to the management of the wild crocodile populations. The collection of hatchlings in the wild to stock crocodile farms in fact poses a severe threat to the last breeding Siamese crocodile populations in Laos and Cambodia.
2. Most Philippine crocodiles in fact survive outside national parks in intensively used agricultural areas, and the prospects of expanding the protected area system seem unlikely in the current sociopolitical

context.

3. Government efforts to breed the Philippine crocodile in captivity have been successful. But concerns about genetics, habitat, protection and societal resistance have inhibited the reintroduction of the species into the wild. In July 2009 50 captive-bred sub-adult crocodiles from the PWRCC were reintroduced in Dicatian Lake in the Northern Sierra Madre Natural Park (van Weerd *et al.* 2010). The results of this pilot project are however not encouraging. Most crocodiles have died, raising questions about the fitness of the released crocodiles and the suitability of the habitat. *C. mindorensis* seems to prefer small creeks and ponds in the uplands (Ross 2008). However the reintroduction in Dicatian Lake has generated valuable information and insights that can be useful for future reintroductions, and has demonstrated that crocodiles can be reintroduced to the wild with the consent and cooperation of rural communities (van Weerd & van der Ploeg 2012).
4. Eighty-five captive-raised juvenile Philippine crocodiles were released into the wild in San Mariano since the start of the head-start program in 2007.
5. The rules in these community-conserved areas vary across sites and reflect the specific problems, needs and values of rural communities. Barangay Libertad, for example, declared a part of Disalug Creek as a 'sustainable fish sanctuary' where fishing is not allowed. Barangay Tappa, on the other hand, only prohibited the use of '*bung bong,* electro fishing, cyanide fishing, fine nets and other destructive ways of fishing' in the Ilaguen River. Fishing inside the fish sanctuary is also allowed in barangay Casala, but only during the barangay fiesta and the *canao* (the harvest festival). And barangay San Jose specifically prohibited the cleaning of pesticides sprayers in Ditali Creek and the disposal of garbage along the banks.
6. The clearing of riparian vegetation is another serious concern for rural communities. Many farmers are actually eager to plant trees along creeks on their land. Trees provide shade, fodder, fruits, timber and firewood, and reduce soil erosion. But farmers often lack the financial resources to invest in good planting material (Snelder & Lasco 2008). The provision of seedlings, fertilizer and technical advice can overcome these constraints, and stimulate farmers to maintain riparian vegetation. The Mabuwaya Foundation assisted the farmers' cooperative in San Isidro to reforest 16 hectares around Narra Lake: farmers now harvest *kalamansi* and jackfruit. In Dinang Creek the foundation and the municipal government distributed 1,500 timber tree seedlings and 4,500 fruit tree seedlings to farmers living adjacent to the creek in an effort to reforest the buffer zone of the Philippine crocodile sanctuary.
7. Performance-based payments for wildlife conservation are becoming increasingly common (Pattanayak *et al.* 2010; Dinerstein *et al*. 2012). Since 2011, the Mabuwaya Foundation is experimenting with direct payments to encourage people living in Philippine crocodile habitat to protect the species. The 4C project (Cash for Communities Conserving Crocodiles) pays PhP. 1000 for every crocodile surviving in the wild to the village in which the animal is observed. Every year staff members of the foundation count the number of Philippine crocodiles in the wild in cooperation with barangay officials. Based on the results of these participatory counts, money is transferred to the barangay development fund, a savings account managed by the elected village council for local development priorities. The barangay council decides how to allocate the money. The amounts that are involved appear relatively small, but they are substantial for rural communities in the northern Sierra Madre. In 2011, for example, the PhP. 35,000 was awarded to barangay Dibuluan and PhP. 13,500 to barangay Disulap. To receive similar cash

amounts from the municipal government, barangay officials have to go through lengthy bureaucratic procedures. These direct payments generated support for in-situ Philippine crocodile conservation, and provide an incentive to prevent the killing of crocodiles. Above all, communities see the payments as recognition of their efforts to protect the Philippine crocodile. There are of course some concerns: in most cases the money is used for local development purposes, such as painting the school, buying chairs for the annual fiesta or building a multipurpose pavement for drying corn and playing basketball, activities that have no direct impact on the survival of the Philippine crocodile. In some areas people complain that the benefits do not go to people living adjacent to the crocodile sanctuaries. In Dunoy, for example, people think that the money should be spent on development in their *sitio*, and not in Dibuluan. Nevertheless, these conservation payments appear to be an valuable tool to encourage co-existence (*cf*. Dickman *et al*. 2011).

8. Crocodile habitat is traversed at night on foot by small teams of trained observers. Individual crocodiles are located using flashlights and whenever possible separated into three size classes: adult (total length > 1.5 m), juvenile (30 cm to 1.5 m) and hatchling (< 30 cm) (van Weerd & van der Ploeg 2004). These night surveys are a standard method to monitor crocodile populations in the wild (Bayliss 1987). They however tend to underestimate the number of crocodiles: it's often impossible to survey an entire area and crocodiles can be notoriously difficult to detect. Therefore the results of repeated spotlight surveys are usually interpreted as a population index: an indicator of general population trends.
9. It is important to note that these figures represent minimum population counts in the three breeding areas: Dunoy Lake, Disulap River and Dinang Creek. The actual Philippine crocodile population in San Mariano is likely to be larger: some individuals are not counted in these sites, and crocodiles are occasionally observed by people in other areas in San Mariano.

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APPENDIX 1: STUDENT REPORTS

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SUMMARY

The Philippine crocodile is considered to be the most threatened crocodile species on the planet. Commercial hunting for crocodile leather has led to the disappearance of the endemic species in most parts of the Philippines. The species is now strictly protected in the wild by virtue of the Wildlife Act. But the Department of Environment and Natural Resources, the mandated government agency to conserve wildlife, lacks the resources and capacity to enforce environmental legislation. Indiscriminate hunting, the use of destructive fishing practices and the conversion of wetland habitat into rice fields continue to threaten the few remaining Philippine crocodile populations. With an estimated one hundred individuals surviving in the wild, the species is classified as critically endangered on the IUCN Red List of Threatened Species. Most conservationists have given up on the species; they argue that rapid population growth, rural poverty and negative attitudes towards crocodiles inhibit in-situ conservation. In 1997 the Wildlife Conservation Society of the Philippines for example concluded that there was no hope for the Philippine crocodile in the wild.

In 1999 a small and fragmented Philippine crocodile population was rediscovered in the municipality of San Mariano, a remote area in the northern Sierra Madre on Luzon. Here the species survives in densely populated agricultural landscapes. Since 2001 I have been involved in efforts to protect this remnant population. In 2003 I co-founded the Mabuwaya Foundation, a Philippine non-profit organization dedicated to the conservation of the Philippine crocodile in its natural freshwater habitat. Over the past years I conducted anthropological research in order to design novel solutions to preserve the species in the wild. The results of this search are described in this thesis. It is based on seven articles that have been published in academic journals and professional newsletters. Together these articles cover the key social scientific dimensions for analyzing complex conservation problems. The central question in this thesis is how to protect a potentially dangerous predator in a densely populated area characterized by rural poverty, weak governance and rapid social change.

Chapter 2 documents the historical changes in people's views and feelings towards crocodiles in the Philippines. It is often argued that negative attitudes towards crocodiles form a barrier for in-situ conservation. Most people in the Philippines do not differentiate between the Philippine crocodile and the much larger saltwater crocodile that also occurs in the Philippines, and consider all crocodiles to be dangerous man-eaters. Moreover, in the Catholic islands crocodiles are associated with the devil, and are often compared with corrupt politicians. But in the northern Sierra Madre indigenous people tolerate crocodiles in their surroundings. Here, traditional beliefs and practices enable the Agta and the Kalinga to share the landscape with a potentially dangerous predator. Filipino culture is not a barrier for Philippine crocodile conservation as is often presumed. On the contrary: the experiences and views of people living with crocodiles

offer clues for coexistence. It provides a conservation ethic that is deeply entrenched in culture and history, and enables the design of a conservation measures that enhance the capacity and knowledge of rural communities.

Chapter 3 explores why conventional conservation strategies are failing to conserve the Philippine crocodile in the wild. Policymakers argue that the enforcement of environmental legislation in a context of widespread rural poverty is illegitimate and ineffective. They claim that these antagonistic public attitudes towards crocodiles can only be transformed by generating revenues for rural communities, for example through crocodile ranching or farming. This line of reasoning continues to guide policy and practice in the Philippines, despite its failure to conserve crocodiles and improve the well-being of people living in crocodile habitat. The community-based crocodile conservation efforts in the northern Sierra Madre counter this utilitarian logic. The Mabuwaya Foundation succeeded in transforming hostile attitudes towards crocodiles, and mobilized broad societal support for the protection of the Philippine crocodile and its freshwater habitat. These experiences suggest that the conception of incentives purely in terms of economic benefits is too narrow and potentially counterproductive.

Chapter 4 describes in detail the community-based Philippine crocodile conservation efforts in the municipality of San Mariano. Conservationists often fear that democratization and decentralization processes will lead to irreversible environmental damage. But in San Mariano the devolution of power and authority over natural resources has enabled the design of innovative measures to conserve the Philippine crocodile in the wild. The municipal government plays a pivotal role in this process. Defying cultural prejudice, the municipality of San Mariano declared the Philippine crocodile as its flagship species, prohibited the killing of crocodiles and established a crocodile sanctuary in the Disulap River. These local rules are accepted by people as important and legitimate, and are therefore generally respected.

The participation of local resource users in decision-making is now widely seen as an prerequisite for wildlife conservation. Conservationists are encouraged to engage in open dialogues and negotiations with rural communities. But what form such interactions take in practice often remains unclear. Chapter 5 describes four dialogues between rural communities and conservationists, and shows how community consultations can facilitate information sharing, link environmental conservation to broader discussions on rural development and social justice, and ultimately produce agreements that offer a legitimate foundation for conserving wildlife.

Chapter 6 evaluates the public awareness campaign for the conservation of the Philippine crocodile in the northern Sierra Madre in terms of outputs, outreach, cognitive and affective outcomes, and impact through a quantitative counterfactual comparison. The campaign succeeded in raising awareness on, and transforming attitudes towards in-situ Philippine crocodile conservation: most people living in close proximity to crocodiles now support the conservation of the species in the wild. As

a result crocodiles are no longer purposively killed. Substantial gains can be made in community-based conservation by investing more in environmental communication and education, particularly in developing countries. Awareness on legislation and pride in the conservation of a rare and iconic species are strong reasons for poor rural communities to support in-situ wildlife conservation.

Most people in San Mariano now know that the species is legally protected. But many still wonder why. Conservationists mainly rely on economic values to justify in-situ wildlife conservation. In chapter 7 I demonstrate that these utilitarian arguments are often based on inaccuracies and flawed assumptions. By focusing narrowly on economic values, conservationists risk obscuring other valid reasons to protect nature, such as interest, emotions and respect. These cultural and intrinsic values are in fact the best, and probably only valid, arguments to mobilize local support for Philippine crocodile conservation.

Chapter 8 documents two attacks of Philippine crocodiles on humans in San Mariano. Such incidents can erode public support for the conservation of the species. It is essential to prevent human-crocodile conflicts, but precautionary measures such as raising awareness, providing safe access to water or relocating problem crocodiles can never wholly assure human safety. The preservation of a potentially dangerous predator in a human-dominated landscape will always entail a certain degree of risk. The analysis of local reactions to crocodile attacks shows that people living in Philippine crocodile habitat are, paradoxically, more willing to accept this reality than most outsiders.

The central argument forwarded in this thesis is that a narrow focus on economic incentives can undermine efforts to conserve the Philippine crocodile in the wild. It is often argued that rural communities will only protect wildlife if they profit financially from it. In this thesis I have demonstrated that traditions, emotions and ethics in fact form important reasons for people in the northern Sierra Madre to support the conservation of the Philippine crocodile in their surroundings. In contemporary conservation discourses such an argument is easily dismissed as hopelessly romantic, elitist or even irrational. But raising awareness, fostering pride and empowering rural communities to protect the resources they need and value is, in the end, a more pragmatic, pro-poor and realistic strategy to mobilize local support for the protection of the Philippine crocodile than crocodile farms and ecotourism. Conservation efforts can be significantly strengthened if cultural and intrinsic values are taken into account. Pride, interest and respect offer the best hope for the survival of the Philippine crocodile in the 21st century.

SAMENVATTING

De Filippijnse krokodil is één van de meest bedreigde krokodillensoorten ter wereld. In grote delen van de Filippijnen is de endemische soort verdwenen als gevolg van de commerciële jacht voor de internationale handel in krokodillenleer. Tegenwoordig is de Filippijnse krokodil officieel beschermd. Maar ondanks strenge nationale wetgeving vormen jacht, het gebruik van destructieve vismethoden en het verlies van habitat nog steeds een bedreiging voor de overgebleven krokodillen populaties in het wild. Men schat dat er minder dan honderd Filippijnse krokodillen in het wild overleven. Veel natuurbeschermers zien geen toekomst voor de Filippijnse krokodil, en stellen dat de soort alleen in gevangenschap in stand gehouden kan worden.

In 1999 ontdekten onderzoekers een kleine en gefragmenteerde Filippijnse krokodillen populatie in de gemeente San Mariano in de noordelijke Sierra Madre op het eiland Luzon. Sinds 2001 ben ik betrokken bij een project om deze populatie in het wild te behouden. Dit project wordt uitgevoerd door de stichting Mabuwaya in samenwerking met lokale overheden en gemeenschappen. De afgelopen jaren heb ik antropologisch onderzoek gedaan in San Mariano met als doel nieuwe oplossingen te ontwerpen om de soort in het wild te behouden. Dit proefschrift is het resultaat van dat onderzoek. Het is gebaseerd op zeven artikelen die gepubliceerd zijn in wetenschappelijke tijdschriften en professionele nieuwsbrieven. Gezamenlijk bestrijken deze artikelen de belangrijkste sociaal wetenschappelijke dimensies van de bescherming van de Filippijnse krokodil in het wild. Centraal staat de vraag hoe een potentieel gevaarlijke soort te beschermen in arme, dicht bevolkte gebieden met zwakke overheden.

In hoofdstuk 2 analyseer ik de historische veranderingen in mens-krokodil relaties in de Filippijnen. Angst voor krokodillen bemoeilijkt de bescherming van de soort in het wild. De meeste mensen in de Filippijnen zien krokodillen als gevaarlijke menseneters. Op de Katholieke eilanden worden krokodillen geassocieerd met de duivel, of erger nog met corrupte politici. Maar deze negatieve denkbeelden worden niet door iedereen gedeeld. Inheemse volkeren in de noordelijke Sierra Madre, de Agta en de Kalinga, zien krokodillen als de belichaming van de voorouders, en tolereren daarom de soort in hun omgeving. Dergelijke traditionele denkbeelden bieden aanknopingspunten om de soort in het wild te beschermen.

Hoofdstuk 3 beschrijft de pogingen van de nationale overheid om de Filippijnse krokodil te behouden door middel van duurzaam gebruik. Beleidsmakers veronderstellen dat lokale gemeenschappen alleen met economische prikkels gemotiveerd kunnen worden om krokodillen in het wild te beschermen. In deze benadering tracht men door middel van handel in krokodillenleer, ecotoerisme of andere ontwikkelingsprojecten geld te genereren voor arme mensen in afgelegen gebieden. Hoewel krokodillen bijna zijn uitgestorven in het wild en lokale gemeenschappen niet profiteren van de export van krokodillenleer blijft deze utilistische opvatting dominant in beleid.

In hoofdstuk 4 wordt het Filippijnse krokodillen project in de noordelijke Sierra Madre in detail beschreven. Het proces van democratisering en devolutie, dat sinds de val van de dictatuur in 1986 verantwoordelijkheid en zeggenschap over natuurlijk hulpbronnen overdraagt van de nationale naar lokale overheden, creëert ruimte voor natuurbeschermers om in samenwerking met rurale gemeenschappen nieuwe manieren te ontwikkelen om de Filippijnse krokodil in het wild te beschermen. Lokale overheden spelen hierin een cruciale rol. In San Mariano heeft dit geleid tot de effectieve bescherming van de soort in het wild: lokale regelgeving, ontworpen in overleg met vissers en boeren, wordt in tegenstelling tot nationale wetgeving gezien als belangrijk en legitiem, en wordt daardoor beter nageleefd.

De participatie van lokale gebruikers wordt tegenwoordig gezien als een voorwaarde voor natuurbescherming. Maar hoe dergelijke participatieve processen in de praktijk vorm krijgen blijft vaak onduidelijk. In hoofdstuk 5 staan vier vergaderingen tussen dorpsbewoners en natuurbeschermers centraal. Deze dialogen plaatsen de bescherming van de Filippijnse krokodil in een breder kader van armoedebestrijding en rechtvaardigheid. In veel gevallen leiden deze vergaderingen tot concrete afspraken om de soort te behouden. Communicatie is een essentiële voorwaarde voor effectieve natuurbescherming, met name in ontwikkelingslanden.

Hoofdstuk 6 is een kwantitatieve evaluatie van de voorlichtingscampagne voor de Filippijnse krokodil in de noordelijke Sierra Madre. Mabuwaya distribueerde posters, nieuwsbrieven en kalenders, organiseerde lezingen en dans- en poppenkastvoorstellingen, liet studenten en scholieren krokodillen in het wild zien, plaatste informatieborden en faciliteerde dorpsvergaderingen en trainingen. De meeste mensen in San Mariano weten nu dat de soort officieel beschermd is en er is breed draagvlak ontstaan voor het behoud van de soort in het wild. Als gevolg daarvan worden er vrijwel geen krokodillen meer bewust gedood en is het gebruik van destructieve vismethoden afgenomen. Kennis van wetgeving en gevoelens van trots blijken belangrijke redenen te zijn voor lokale gemeenschappen om de bescherming van de Filippijnse krokodil in het wild te steunen.

In hoofdstuk 7 staat een vraag centraal die veel gesteld wordt tijdens dorpsvergaderingen: ‘waarom moet de Filippijnse krokodil in het wild behouden worden?’ Natuurbeschermers benadrukken voornamelijk de instrumentele waarde van natuur, zeker in arme gebieden in ontwikkelingslanden. Maar de ideeën over het economische belang van krokodillen zijn vaak aantoonbaar onjuist. De eenzijdige nadruk op krokodillenleer en ecotoerisme overschaduwt andere redenen om krokodillen in het wild te beschermen en ondermijnt de geloofwaardigheid van natuurbeschermers.

Hoofdstuk 8 beschrijft twee recente aanvallen van Filippijnse krokodillen op mensen in San Mariano. Het is essentieel om dergelijke incidenten te vermijden. Maar preventieve maatregelen zoals voorlichting, het aanleggen van veilige waterplaatsen of het verwijderen van probleemdieren kunnen de veiligheid van mensen helaas nooit

volledig garanderen. Er zijn per definitie risico's verbonden aan het behoud van een grote predator in een dicht bevolkt gebied. Uit de reacties van boeren en vissers in San Mariano op deze aanvallen blijkt dat lokale gemeenschappen rationeler met de risico's van samenleven met krokodillen om gaan dan de meeste buitenstaanders.

De rode draad in dit proefschrift is het belang van culturele en intrinsieke waarden van natuur. Hedendaagse debatten over natuurbehoud door lokale gemeenschappen worden gedomineerd door economische argumenten. Andere redenen om krokodillen in het wild te behouden, zoals tradities, interesse, emotie en respect, worden vaak afgedaan als naïef, elitair of zelfs irrationeel. Maar het geven van voorlichting, het cultiveren van trots en het versterken van lokale regelgeving vormen een realistischer strategie om steun te verwerven voor de bescherming van de Filippijnse krokodil dan het stimuleren van handel in krokodillenleer of het opzetten van een ecotoerisme programma. Als deze culturele en intrinsieke waarden in natuurbescherming geïntegreerd worden is er een toekomst voor de Filippijnse krokodil in het wild.

CURRICULUM VITAE

Jan van der Ploeg was born on the 18th of July 1977 in Nijmegen, the Netherlands. Growing up as a boy in Mozambique and Rwanda he dreamed of becoming a park ranger and protecting African elephants. It turned out to be Philippine crocodiles. Jan finalized his secondary education at the Wagenings Lyceum in 1995, and studied environmental anthropology at Leiden University. He graduated in 2001 on an MA thesis on the political ecology of herder-peasant conflicts, based on extensive fieldwork in North Cameroun. From 2001 to 2008 Jan served as coordinator of the Cagayan Valley Program on Environment and Development (CVPED), the joint research and education program of the Institute of Environmental Sciences (CML) of Leiden University and the College of Forestry and Environmental Management (CFEM) of Isabela State University in the Philippines. In 2003 he co-founded the Mabuwaya Foundation, a non-profit organization dedicated to preserve the Philippine crocodile in the wild on Luzon. The applied research conducted in the framework of the Philippine crocodile conservation project resulted in this thesis. Since 2011 Jan is working at the Institute of Cultural Anthropology and Development Sociology of Leiden University where he is teaching several courses in the field of environment and development.

Barbossa: 'You know the problem with being the last of anything, by and by there be none left at all.'
Jack Sparrow: 'Sometimes things come back mate. We're living proof, you and me.'
Barbossa: 'Aye, but that's a gamble of long odds, ain't it? There's never a guarantee of coming back. But passing on, that's dead certain.'
[...]
Jack Sparrow: 'That's a sad commentary in and of itself.'
Barbossa: 'The world used to be a bigger place.'
Jack Sparrow: 'World's still the same. There's just… less in it.'

Pirates of the Caribbean: At World's End (2007)