



**Universiteit
Leiden**
The Netherlands

International course on water and water management in the Philippines 2011

Weerd, M. van; Aquino, D.M.; Masipiqueña, M.D.; Persoon, G.A.

Citation

Weerd, M. van, Aquino, D. M., Masipiqueña, M. D., & Persoon, G. A. (2011). International course on water and water management in the Philippines 2011. In . Leiden: Leiden University and Isabela State University. Retrieved from <https://hdl.handle.net/1887/138313>

Version: Not Applicable (or Unknown)

License: [Leiden University Non-exclusive license](#)

Downloaded from: <https://hdl.handle.net/1887/138313>

Note: To cite this publication please use the final published version (if applicable).

International course on water and water management in the Philippines

3 – 30 January 2011



Merlijn van Weerd, Dante Aquino, Mercy Masipiqueña and Gerard Persoon (editors)



Hoogheemraadschap van
Rijnland

Universities of Leiden and Oxford

**LOUWES
FUND** 
research on water and food

International course on water and water management in the Philippines

Merlijn van Weerd, Dante Aquino, Mercy Masipiqueña and Gerard Persoon (eds)

Cover: participants of the water course 2011

© 2011 Isabela State University and Leiden University

The opinions expressed in this publication do not necessarily reflect the views of Leiden University, Isabela State University, the Mabuwaya Foundation, Hoogheemraadschap Rijnland or individual authors and editors.

Please cite as follows: Weerd, M. van, D. Aquino, M. Masipiqueña and G. Persoon (Eds). 2011. International course on water and water management in the Philippines. Report. Isabela State University, Cabagan, the Philippines and Leiden University, Leiden, the Netherlands.

International course on water and water management in the Philippines

Editors

Merlijn van Weerd

Dante Aquino

Mercy Masipiqueña

Gerard Persoon

With contributions by:

Ben Elizer Redoble, Jolien Rip, Bart van Velzen, Ryan dela Cruz, Arthur Castro Jr., Koen van Ekdom, Pauline Hutten, Imee M. Oliveros, Jacinto O. Calingay Jr, Thomas Wissingh, Eline Holtes, Mylene M. Gumiran, Grace B. Bayang , Suzanne van de Hoeven, Nicolien Pul, Vicky Y. Agpoon, Josie C. Robles, Jessie Post, Lotte Krijnen, Dorina R. Soler, Israel Bryan G. Estrabo, Jr., Tom Alkemade, Sara van Damme, Crezel V. Llanilo

Leiden University and Isabela State University
Leiden, the Netherlands
2011



“Let’s call it the Winter Course!”

“But there are no winters in the Philippines.”

“ Well, it does not matter how we name this initiative, as long as we work together.”

And so it started. It was Friday the first of October 2010. In a concluding meeting, that ended the reconnaissance visit which was under the supervision of Dr. Romeo R. Quilang, president of the Isabela State University, it was all settled.

In January 2011 the Dutch students went to the Philippines to meet their Filipino counterpart students, with whom they would participate in the Winter Course of 2011. The Dutch students went to the Philippines with the following main goals:

- Getting to know your counterpart student from a different country and a different discipline;
- Getting to understand what ‘integrated water management’ and ‘river basin management’ looks like in practice.

The Rijnland District Water Control Board feels an obligation in sharing knowledge on the subject of integrated water management. With the millennium goals in mind, we understand that sharing knowledge does not limit itself to the boundaries of your country. Our cooperation with Leiden University led us to the Philippines and in our case specifically to the Isabela State University and the Cagayan Valley Programme on Environment and Development (CVPED).

In this booklet you find the experiences of the group of students participating in the Winter Course. We are proud of the results and the fact that we could contribute to this activity.

I sincerely hope that many more Winter Courses may follow!

Timo van Tilburg
Head of the Policy Department
The Rijnland District Water Control Board

Leiden, The Netherlands

Acknowledgements

In 2006 and 2007 two summer courses of six weeks each were organized in the Philippines for 30 participants: 15 international and 15 Filipino students. This course was organized under the umbrella of CVPED, the Cagayan Programme for Environment and Development. This cooperation programme between Leiden University and Isabela State University was started in 1987. In December 2009 however this cooperation programme came to an end unfortunately. This also implied the end of the range of joint educational activities, including the summer courses.

By a stroke of good fortune however renewed contact at a personal level between staff members of the Water Board (Hoogheemraadschap) Rijnland and Leiden University resulted in an interest of Rijnland to partly fund a course in the Philippines on water use and water management. This course was organized by the Faculty of Social Sciences of Leiden University, Isabela State University and the Mabuwaya Foundation in January 2011. The interest of students in a full time interdisciplinary and intercultural course was as high as during the earlier courses. The present booklet is the outcome of the work done by the students during their one month's of training and fieldwork. Based on the positive results of the first water course, Rijnland, Isabela State University and Leiden University decided to continue this collaboration in the years to come.

The January 2011 Course would not have been possible without the funding and logistical support of Hoogheemraadschap Rijnland (coordinated by Timo van Tilburg), the Louwes Fund for research on Water and Food, the Faculty of Social Sciences of Leiden University (coordinated by Gerard Persoon), Isabela State University (coordinated by Dante Aquino and Mercy Masipiqueña) and the Mabuwaya Foundation (coordinated by Merlijn van Weerd).

Rose Bonifacio and Lennie Santos-Borja of the Laguna Lake Development Authority, Imee Reyes and May Caballero of the World Agroforestry Centre (ICRAF) and Letty Afuang of the University of the Philippines helped organise the visits to organisations in Los Baños and accommodation there.

Essential support during the preparation and implementation of the course was provided by the Mabuwaya Foundation team: Marites Balbas, Wilda Calapoto, Arnold Macadangdang, Dominic Rodriguez, Sam Telan, Jessie Guerrero, Willem van de Ven, Eso Tarun and Onia Gunayon. Isabela State University provided accommodation and meals during the stay of the students in Cabagan, coordinated by Rose Araño and Tess Balagasay. The ISU bus, driven by Percival Talosig and Nicanor Ramirez, brought us from Manila to Cabagan, via Los Baños and Imugan. Randy Macapallag of ISU made sure the audio-visual equipment was working during lectures and presentations in Cabagan.

Several persons representing government, non-government and international organisations warmly welcomed the students at their offices or field sites and provided a unique insight in their work: Tony Manila and Josie de Leon of the Protected Area and Wildlife Bureau (PAWB). Roy Padilla and colleagues of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). Dave de Vera of the Philippine Association For Intercultural Development (PAFID). Rodel Lasco of the World Agroforestry Centre (ICRAF). Beatrisa Martinez of the International Rice Research Institute (IRRI). Philip Alviola of the Museum of Natural History Los Banos. Marlyn Apacionado of the Laguna Lake Development Authority. Marlon Pielago of the local government unit of Teresa, Rizal. Pastor Delbert Rice of the Kalahan Educational Foundation (PEF).

Lectures were given at the Environmental Information Centre (EIC) building in Cabagan. The following persons kindly freed time to share their knowledge and expertise on a wide variety of subjects with the students: Orlando Balderama, Ninia Lumauan, Romeo Corral, Milagros Rimando, Robert Araño, William Savella, Ruben Bastero, Willie Salliling, Tomas Reyes, Cecilia Mangabat and John Acay. Isabela State University President Romeo Quilang and Cabagan Campus Director Hans Aggabao provided inspiring speeches during the opening program and the concluding workshop. The Ambassador of the Netherlands in the Philippines Robert Brink likewise inspired students with a speech during the concluding workshop.

During fieldtrips, the group was very kindly received and toured around by Gualfredo Martinez of the National Irrigation Authority in Tumauni and by John Acay and colleagues of the Conservation International/Toyota reforestation project in Peñablanca.

The Metropolitan Tuguegarao Water District (MTWD) provided support to water sample analysis.

Last but not least, the students experienced the famous Philippine hospitality while staying with host families in the field sites. The Mayors and Local Government Unit employees, Barangay Captains and Council members, interview respondents, guides and host families in the field sites in Peñablanca, Tuguegarao, Tumauni, San Mariano, Ramon, Cabatuan, Bagabag and Lamut are warmly thanked for their generosity, hospitality and support.

The Editors

Table of Contents

	Page
Message by Timo van Tilburg/Hoogheemraadschap Rijnland	4
Acknowledgements	5
Table of Contents	7
Introduction	8
Participants, Coordinators and Supporting staff	10
Course Program	13
Field work sites and field research teams/projects	16
Student Reports	27
1.1 Magat Dam by Ben Elizer Q. Redoble and Jolien Rip	28
1.2: A pilot study about the causes of the sedimentation in Lake Magat by Ryan Dela Cruz and Bart van Velzen	45
1.3: The effects of flooding and the flood control facilities along Magat River by Koen van Ekdom and Arthur A. Castro	54
2.1: Forest cover and land use in an upland area of Tumauni by Jacinto O. Calingay Jr. and Thomas F. Wissingh	64
2.2: The Tumauni irrigation system: rules and regulations in theory and practice by Imee Oliveros & Pauline Hutten	73
2.3: Willingness of Farmers to help with the reforestation of the mountains in Antagan by Suzanne E.M. van der Hoeven and Crezel V. Llanillo	83
2.4: Information-supply on new irrigation techniques and rice varieties in Antagan by Eline Holtes and Mylene Gumiran	94
2.5 Determining Pesticide Usage and Consequences in the Tumauni Community by Vicky Y. Agpoon and Nicolien Pul	107
3.1 The functioning of the Protected Area Management Board in the Peñablanca Protected Landscape and Seascape and its future priorities in the area by Josie C. Robles & Jessie Post	123
3.2: The information gap. Research about farmers and their knowledge and techniques by Grace Bayang and Sara Van Damme	143
3.3: No sickness, clean water . Perceptions about water, water management and water quality in San Roque and Tuguegarao by Israel Bryan Estrabo jr and Tom Alkemade	154
3.4: The impact of ecotourism at the Callao Caves on the environment and the livelihood of the Agta community in Aggugadan by Dorina R. Soler and Lotte C.W. Krijnen	169
Daily blogs	178

Introduction

Water is perhaps the most critical natural resource currently under threat world-wide. Developing countries in particular face complex challenges as the demand for clean drinking water, irrigation water and water for the generation of hydroelectricity grows rapidly. Water becomes increasingly scarce while its quality declines. Climate change leads to changing patterns of water availability and increased risks of floods and droughts.

Water supports a great variety of resources, functions and services. In order to safeguard these for the future, sustainable management is essential yet not adequately practiced. The formulation of policies for sustainable water resource management is a complex process. Water resource management is typically associated with multiple stakeholders and a wide range of social, environmental and economic needs. Moreover, effective management of water resources is achieved through the linkage of sustainable land and water uses across the whole of a river basin crossing boundaries of different administrative units. Global institutions highly promote the participation of local communities, claiming that water resource management and development are central to sustainable growth and poverty reduction. Nevertheless, communities face numerous barriers in their efforts to establish sustainable water and land resource management systems, in efforts to protect water sources and watersheds and adapt to weather-related disasters.

The Faculty of Social Sciences (FSW) of Leiden University, in cooperation with Isabela State University and the Mabuwaya Foundation in the Philippines organised an international, interdisciplinary course on water issues and water management in the Cagayan River basin in Northeast Luzon in the Philippines in January 2011. Twenty four students participated in this course, 12 through Leiden University and 12 through Isabela State University. The students had different backgrounds (anthropology, biology, forestry, public administration, civil engineering etc.)

The focus of the course was on the utilization and importance of fresh water, water scarcity and super abundance, climate change and water, water and biodiversity conservation, conflicts over water and the role of communities and government in water management. The objective of the course was to gain experience with working in an international, interdisciplinary team on a problem-oriented research assignment. Apart from gaining knowledge about water issues and water management in a developing country, students learned practical fieldwork skills and the application of research methods and techniques.

The course consisted of an introduction to water issues and water management in the Philippines by various government and non-government organizations in Manila and Los Baños.

In Manila, the Protected Area and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR) provided background on water, wetlands and biodiversity conservation. The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) of the Department of Science and

Technology (DOST) presented the climate of the Philippines and climate change scenarios. The Philippine Association For Intercultural Development (PAFID) lectured on the Indigenous People (IP) of the Philippines and their work with IP communities for land rights and in conservation, notably in the Ikalahan Ancestral Domain in Imogan, Nueva Vizcaya.

In Los Baños, the group visited the International Rice Research Institute (IRRI) to learn more about rice cultivation and the importance of water management for rice farmers. The World Agroforestry Centre (ICRAF) provided a background on climate change, reforestation, forest protection and Payments for Environmental Services (PES). Students and staff also visited the Botanical Gardens in Los Baños and the Natural History Museum. The Laguna Lake Development Authority (LLDA) showcased two of their projects: the Ecotourism project at Pangil and the Solid Waste Management Project at Teresa.

On our way to Cabagan, Isabela we visited the Kalahan Educational Foundation (KEF) and the Ikalahan Ancestral Domain in Nueva Vizcaya where we learned, among others, about the role of Indigenous People in watershed protection. After a cold night high in the mountains we visited Magat Dam, downstream of the forest that the Ikalahan are protecting.

In Cabagan at Isabela State University, a series of lectures was given by external and academic presenters on water related subjects. Two field sites were visited for an in-depth introduction to water issues: the National Irrigation Administration (NIA) rice irrigation project in Tumauni and the Conservation International/Toyota watershed reforestation pilot project in Peñablanca.

The students worked in couples (interdisciplinary, multi-cultural) on the development of a small field study proposal on a water-related issue. Field work was conducted by these couples during seven days in three research sites in upland areas of Isabela, Cagayan, Nueva Vizcaya and Ifugao Provinces. After field work, data was analysed during three days and presented during a concluding workshop on water issues for which external participants (representatives of government and societal organizations working with water) were invited. The Ambassador of the Netherlands in the Philippines, Mr Robert Brinks, was a special guest during this workshop.

The hard work done, all students participated in the release of 20 individuals of the Worlds' most threatened crocodile, the Philippine crocodile *Crocodylus mindorensis*, back into the wild in the municipality of San Mariano. A visit to the famous Rice terraces of Banaue, a World wonder of indigenous engineering and water management, concluded the 4-week course.

This booklet contains a short description of the three field work sites and a summary of the field studies by the participating students followed by the full student reports and concluded with the Blogs that students maintained on the course website. Student contributions have been slightly edited and formatted to improve readability.

Participating students (alphabetically first name)



Arthur Castro Jr.

Agricultural engineering
4th year
ISU Echague, COE



Bart van Velzen

Biology
Master 2nd year
University of Amsterdam



Ben Elizer Q. Redoble

Agricultural engineering
4th year
ISU Echague, COE



Crezel V. Llanilo

Forestry
3rd year
ISU Cabagan, CFEM



Dorina R. Soler

Development Communication
3rd year
ISU Cabagan, CDCAS



Eline Holtes

Cultural Anthropology
bachelor 3rd year
Leiden University



Grace B. Bayang

Agriculture
3rd year
ISU Cabagan, PTIA



Imee M. Oliveros

Agricultural Technology
3rd year
ISU Cabagan, PTIA



Israel Bryan Estrabo Jr.

Biology
3rd year
ISU Cabagan, CDCAS



Jacinto O. Calingay Jr.

Forestry
3rd year
ISU Cabagan, CFEM



Jessie Post

Public Administration
Post-bachelor
Leiden University



Jolien Rip

Civil Engineering
Bachelor 3rd year
Technical University Delft



Josie Robles

Environmental Science
3rd year
ISU Cabagan, CFEM



Koen van Ekdorn

Civil engineering
Bachelor 2nd year
Delft University



Lotte Krijnen

Cultural Anthropology
Master
Leiden University



Mylene M. Gumiran

Sociology
3rd year
ISU Cabagan, CDCAS



Nicolien Pul
Biology and Science
Communication and Society
Master 2nd year
Leiden University



Pauline Hutten
Public Administration
Bachelor 3rd year
Leiden University



Ryan dela Cruz
Environmental Science
3rd year
ISU Cabagan, CFEM



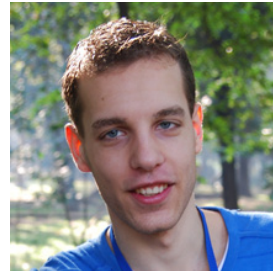
Sara Van Damme
Antropology
Bachelor 4th
Leiden University



Suzanne van der Hoeven
Biology
3rd year
Leiden University



Thomas Wissingh
Biology
Bachelor 3rd year
Leiden University



Tom Alkemade
Cultural Anthropology
bachelor 3rd year
Leiden University



Vicky Y. Agpoon
Environmental Science
3rd year
ISU Cabagan, CFEM

Coordinators and supporting staff



Dr. Dante M. Aquino
Professor, College of Forestry
and Environmental
Management
CVPED coordinator
Isabela State University



Dr. Gerard Persoon
IIAS Professor Environment and
Development
Faculty of Social Sciences
Leiden University



**Dr. Mercedes
Masipiqueña**
Professor, College of Forestry
and Environmental
Management
Isabela State University



Drs. Merlijn van Weerd
Director, Mabuwaya
Foundation
Course Coordinator, Faculty of
Social Sciences
Leiden University



Marites Balbas
Community organizer,
Mabuwaya Foundation



Wilda Calapoto
Financial and administration
manager, Mabuwaya
Foundation



Arnold Macadangdang
Field assistant, Mabuwaya
Foundation



Samuel Telan
Research and Conservation
Officer, Mabuwaya Foundation



Proceso Tarun

Utility man
Mabuwaya Foundation



Dominic G. Rodriguez

Research and Conservation
Officer, Mabuwaya Foundation



Jessie Guerrero

Research and Conservation
Officer, Mabuwaya Foundation



Randy Macapallag

Audiovisual technician
Isabela State University



Percival P. Talosig

Driver
Isabela State University



Nicanor M. Ramirez

Driver
Isabela State University



The official Water Course 2011 Football team (enforced with Rodel Lasco and Karl Villegas) before their match against the international ICRAF/IRRI team on 6 January 2011 (2-0...., for the home team)

Course Program

Program Week 1 Tuesday January 4 – Sunday January 9, 2011: Manila, Los Baños and Imogen

Tuesday January 4:

Arrival students at Pension Natividad, Manila

13.30 - 17.30 Guided visit of Intramuros
17.30 - 20.30 Welcome Dinner at Bayview Restaurant

Sleep at Natividad

Wednesday January 5

7.30 Departure Pension Natividad for Quezon City
9.00-11.00 Visit the Protected Areas and Wildlife Bureau (PAWB), presentation by Dr Tony Manila
11.00-14.00 Visit the Philippine Association For Intercultural Development (PAFID), presentation by Mr Dave de Vera and lunch
14.00-15.30 Visit the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
15.30-16.30 Travel back to Pension Natividad
19.00 Dinner at the Korean Palace

Sleep at Natividad

Thursday January 6

7.00 Departure Pension Natividad for Los Baños
9.00-12.00 Visit the Natural History Museum and Botanical Gardens of the University of the Philippines
12.00-13.00 Lunch at the IRRI/ICRAF Cantine
13.00-14.30 Visit the International Rice Research Institute (IRRI)
15.00-17.00 Visit the World Agro forestry Centre (ICRAF), Presentation by Dr Rodel Lasco
19.00 Dinner at Kamayan sa Palaisdaan

Sleep at the SEARCA Guest House

Friday January 7:

7.00 Departure SEARCA Guest House
9.00-10.00 Visit Ecotourism project at Pangil by the Laguna Lake Development Authority(LLDA)
10.00-12.30 Travel from Pangil to Teresa
12.30-13.30 Lunch
13.30-15.00 Visit Solid Waste Management Project at Teresa by the LLDA
15.00-17.00 Travel from Teresa to Quezon City
19.00 Dinner in Quezon City

Sleep at UP Diliman

Saturday January 8

7.30 Departure UP Diliman for Imugan, Santa Fe, Nueva Vizcaya
Around 15.00 Visit the Kalahan Education Foundation (KEF) in Imugan, Presentation by Pastor Delbert Rice

Dinner and sleeping at KEF

Sunday January 9:

7.00 Exploration of forest in Imugan
10.00 Departure Imugan for Magat Dam
13.00 Visit Magat Dam
17.00 Arrival Cabagan, Isabela

Dinner at Cabagan, sleep at the Environmental Information Centre (EIC) on the Isabela State University (ISU) Campus Cabagan.

Program Week 2: Monday January 10 – Thursday January 13, 2011: Lectures and workshops at Isabela State University in Cabagan

Monday January 10:

8:30 Welcome and Opening Program Isabela State University

Introduction by the Master of Ceremonies (MC) Marites Balbas
National Anthem and prayer by ISU students
Overview water course by Merlijn van Weerd
Welcome Message by Campus Director Hans Aggabao
Message by ISU President Romeo Quilang

9.00-9.15 Coffee Break
9.15-10.00 Introduction to Cagayan Valley in relation to water by Dr Orly Balderama (ISU)
10.00-10.45 Water and watershed management in Cagayan Valley by Dr Orly Balderama (ISU)
10.45-11.30 Climate and climate change in Cagayan Valley in relation to water management by Dr Orly Balderama (ISU)
11.30-11.45 Introduction to CVPED by Dr Dante Aquino (ISU/CVPED)
11.45-12.00 Introduction to Mabuwaya and presentation staff by Tess Balbas (Mabuwaya)
12.00-12.15 Tour of the EIC Building and CVPED/Mabuwaya Office by Wilda Calapoto and Arnold Macadangdang (Mabuwaya)
12.15-13.15 Lunch
13.15-14.00 Water and water management issues in Region II by Dr Dante Aquino
14.00-14.45 Drinking water of Tuguegarao City by Ninia Lumauan and Romeo Corral of the Water board Tuguegarao
15.00-17.00 Tour of ISU Campus and Cabagan by Kalesa, and return by Tricycle
18.00-19.00 Dinner
19.00-20.00 Introduction to the 3 field work sites / research themes by Merlijn van Weerd

Tuesday January 11:

8.00-8.15 Opening day 2 program by Dr Dante Aquino
8.15-9.00 Biodiversity of the Philippines and Region II by Merlijn van Weerd
9.00-9.45 Biodiversity Conservation in Region II by Dr Roberto Araño
9.45-10.00 Coffee Break
10.00-10.45 The Northern Sierra Madre Natural Park by PASu William Savella
10.45-12.00 Indigenous People of Region II and the IPRA Law by NCIP Regional Director Ruben Bastero

12.00-13.00	Lunch
13.00-14.00	Irrigation in Region II by NEDA Regional Director Milagros Rimando
1400-1700	Visit Tumauni NIA irrigation Project
1800-1900	Dinner
1900-2000	Film showing he went to the forest (film by Imke Gilsing)

Wednesday January 12:

8.00-8.15	Opening day 3 program by Merlijn van Weerd
8.15-9.00	Agricultural Water Management in Northern Sierra Madre Uplands by Willie Salliling
9.45-10.00	Coffee Break
10.00-10.45	Watershed research project San Pablo by Dean CFEM Dr Tomas Reyes
10.45-11.30	Forest protection and land use policies in the Philippines by Cecilia Mangabat
11.30-2.00	Introduction to field work by Arnold Macadangdang
12.00-13.00	Lunch
13.00-14.00	Toyota/CI project Penablanca by John Acay
14.00-15.00	Thesis Defense DEVCOM students by DEVCOM students
15.00-15.30	Workshop Grouping and selection of research sites by Dante/ Merlijn/ ISU/ Mabuwaya staff
15.30-17.30	Workshop Defining research questions and data needs by Dante/ Merlijn/ ISU/ Mabuwaya staff
1800-1900	Dinner
19.00-20.00	Introduction to Philippine crocodile conservation by Mabuwaya staff

Thursday January 13:

8.00-8.15	Opening day 4 program by Dante Aquino
8.15-9.00	How to develop a research proposal? By Dante Aquino and Merlijn van Weerd
9.00-12.00	Development research proposals
12.00-13.00	Lunch
13.00-15.00	Presentation of research proposals by the students
15.00-17.00	Preparation of field forms and preparation for the field
18.00-19.00	Dinner

Program Week 3: Friday January 14 – Thursday January 20, 2011: Fieldwork

Program Week 4: Friday January 21 – Saturday January 29, 2011: Data analysis, reporting and field trips

Friday 21 January: start data analysis and reporting

Saturday 22 January: visit Penablanca/Calao Caves and dinner and bowling in Tuguegarao

Monday 24 - Tuesday 25 January: data analyses and reporting

Wednesday 26 January: presentation of field study results

Thursday 27 – Friday 28 January: visit to crocodile rearing station, Dunoy Lake and release of Philippine crocodiles into the wild

Friday 28 January: Travel to Banaue Rice Terraces

Saturday 29 January: visit Banaue Rice Terraces and return to Manila (Dutch students) and Cabagan (ISU students)

Field work sites and field research teams/projects

Project 1: Magat Dam and Magat River

In the first week we visited the Magat Dam, an impressive water management structure located upstream from Cabagan. The dam does not only regulate the amount of water in Magat River, it also serves as a reservoir of irrigation water and as an energy plant. A positive story, it seems. However, the prospects for the dam are not too well: sediments make the basin slowly unfit to contain enough water. Experts think that in 10 years the dam will no longer function properly.

In the meantime, downstream farmers complain about the water management by the dam authority. The water often comes down in large quantities, causing farmer's fields to flood. Moreover, water is being released when there normally would not be any, disturbing the natural farming calendar.

What exactly are the problems with Magat Dam and the future prospects of the Dam? What is causing the siltation of Magat Lake and the upstream areas of Magat River? What are the effects of floods downstream of Magat Dam and does the early flood warning system work properly?

Three teams studied these questions. Ben and Jolien dug into the problem of siltation of the Magat reservoir and described the functions of the dam. Ryan and Bart went upstream to look into the causes of siltation of the Magat River system. And Koen and Arthur went downstream to find out if and how farmers are warned about releases of water from Magat and how these releases impact their life.

Field study 1.1: An Analysis of the Functions of the Magat Dam and the Effects of Siltation



Team: Ben Elizer Q. Redoble & Jolien Rip

Region: Magat Dam

Residence: ISU Echague guesthouse (1 night), other nights ISU Cabagan

Method: Data gathering thru NIA & S.N. Aboitiz Offices

Main Conclusion: The remaining lifespan of the dam is too short, due to the steady accumulation of sediments. Actions should be taken with short and long term solutions such as building of Sabo dams and reforestation respectively. There is a need for a region-wide master plan which should be promptly implemented and approved by the various concerned stakeholders of the Magat Dam River and its reservoir.

Field study 1.2: A Pilot Study about the causes of the siltation of Magat Dam



Team: Ryan Dela Cruz and Bart van Velzen

Region: Upstream of Magat Dam

Residence: Captain Daniel, Santa Lucia, Bagabag, Nueva Vizcaya and Captain Jerry, Salamague, Lamut, Ifugao

Method: interviews, observations (making pictures), visits to the Municipal office of Lamut and Bagabag and to the Magat Dam authority.

Main conclusion: The farmers have no good comprehension of the total erosion problem and the causes of erosion through slash and burn farming and logging. Government knows about the problems of the erosion, however not a lot of action is being taken. Erosion has a low priority.

Field study 1.3: Effects of Floods and the Flood Warning Systems downstream of Magat Dam



Team: Koen van Ekdorn and Arthur Castro

Field sites: Downstream Of Magat Dam

Residence: Upi, Gamu and Del Pilar, Cabatuan and Gen. Aguinaldo, Ramon

Method: Interviews with the residents of the flood prone areas and with the authorities.

Main conclusion: The warning systems are working properly. The residents are aware of the warning system. Authorities have existing disaster management plans. The effect of the floods is increasing as you go downstream of the Magat Dam. The people need protection from the river.

Project 2: The Irrigation Project of Tumauni and the Northern Sierra Madre Natural Park

The Tumauni area contains 2000 hectares of rice fields under the National Irrigation Administration (NIA), of which in 2010 only half could be properly irrigated. Obviously, that is not enough. The water for irrigation is being tapped from the river, but the river level itself is very low. This causes trouble for the rice farmers, but also for the people who live downstream. They live there because of the presence of the river, but lately there is not much water going their way. The water comes from the Sierra Madre Mountains, which is a protected area: the Northern Sierra Madre Natural Park. Deforestation of the mountains causes erosion and also affects the regulatory functions of the forest in releasing water. Now too much water comes down when it rains heavily causing floods and erosion and too little water is retained to be released during drier periods. The managers of the Natural Park and the indigenous people who live there might have very different views on how to manage the forest and the water. Or do they maybe advocate quite the same, since they have the same objective of protecting the natural environment...?

Five teams conducted their research in the Tumauni municipality. Jacinto and Thomas and looked at upland land use. Imee and Pauline focused on rules and regulations of the irrigation system. The consequence of deforestation on water availability was the focus of Suzanne and Crezel. Eline and Mylene were interested in the information supply-system to rice farmers. And Nicolien and Vicky looked at the use and impact of pesticides in the area.

Field study 2.1: Forest cover and land use in an upland area of Tumauni



Team: Jacinto O. Calingay Jr. and Thomas F. Wissingh

Region: Upland area of Tumauni

Residence: Antagan I

Method: Collect information with interviews and take coordinates during hiking

Main Conclusion: Timber poaching and slash and burn farming occurs in the uplands and farmers are aware of this. But there are no actions taken against these activities. Upland farmers participate in charcoal making as a side income. Reasons for the activities are poverty among the farmers. We constructed a map of the upland area of Tumauni from the coordinates gathered during the field work.

Field study 2.2: NIA Irrigation System: Rules and Regulations, in Theory and in Practice



Team: Imee M. Oliveros and Pauline Hutten

Region: Tumauni, Isabela

Residence: Antagan I

Method: we talked to the employees of NIA, IAs presidents and to the farmers

Main Conclusion: the rules and regulations are not implemented well. There are still people who are doing things that are not good to the irrigation system. A proper solution to this is to monitor more strictly and inform all farmers about the rules and regulations and the consequences of what they are doing.

Field study 2.3: Willingness of Farmers to Help with the Reforestation of the Mountain area.



Team: Suzanne van der Hoeven and Crezel V. Llanillo

Region: Tumauni

Residence: Antagan I

Method: Collect information through interviews.

Main Conclusion: Farmers are aware of the problems that cause water shortage. They think that NIA and the local people are responsible for solutions. The farmers are willing to pay an extra fee or volunteer to help with reforestation. Now there just needs to be a good reforestation program that works and stops illegal logging.

Field study 2.4: Information Supply System of Tumauni



Team: Eline Holtes and Mylene Gumiran

Region: Tumauni, Isabela

Residence: Antagan I

Method: Snow ball interview method

Main Conclusion: it is striking to see that 24 of our 25 respondents would like to receive information about new irrigation techniques and rice varieties, while only 8 of them have ever actually received that. So not all the information reaches the farmers. Maybe that is due to the many different levels through which the

information has to flow down. Somewhere in the system is a gap and our guess is that this gap is based in one of the lowest levels of the system. We think that either the IA presidents do not really give the information to the barangay officials or these officials do not bring this information house to house. This assumption is based on the fact that only one third of the respondents have ever received information.

Field study 2.5: Determining Pesticide Use and impact in Tumauni



Team: Nicolien Pul and Vicky Agpoon

Region: Tumauni, Isabela

Residence: Antagan I

Method: Gather information (NIA, Agricultural Technician, pesticide supplier Baquiran's store, Barangay Secretary in Antagan 1, 2 and Namnama), Interviews with farmers (questionnaire), sampling of water.

Main Conclusion: Although farmers know that pesticides are hazardous to their health, they are not well aware of the effects of pesticides on the environment. Integrated Pest Management (IPM) strategies, introduced to the farmers during community lectures to reduce the use of pesticides, are not well implemented. Some of the respondents say that the strategies are not effective, labor intensive and that the strategies are difficult to apply. Other farmers that do apply IPM still need to spray pesticides, especially when pests are severe.

After spraying, pesticides probably flow back in the irrigation canal and the creeks in the area. Therefore, the pesticides might pose a hazard to the health of people living in the irrigated area. Especially to those people living close to the canals and creeks because these people use the water for bathing, washing and recreation.

Project 3: The drinking water of Tuguegarao City and the Penablanca watershed

Tuguegarao is the capital city of the Cagayan Province. The city is booming: in the last 10 years the population has doubled. The Metropolitan Tuguegarao Water District supplies water to most of the households. This is not always easy, as the water is sometimes difficult to obtain. Their main source is groundwater, but to be able to provide as many people as possible with water, they also make use of the water from rivers and mountain streams. The mountain area to the East of Tuguegarao is very important as a source of drinking water for the city. The forests here regulate water availability, holding it when there is a lot of rain, releasing it in times of drought. This area is protected as the Penablanca Protected Landscape and Seascape. The nearby Calao Caves are the main tourist attraction of Cagayan Province. How is this area managed? How do farmers use water here? And how is drinking water collected here for Tuguegarao City?

Four teams conducted their research in the Penablanca/Tuguegarao area. Josie and Jessie studied the management of the protected area. Bryan and Tom looked at the source of water for Tuguegarao and the quality of drinking water in the city and at the source. Grace and Sara interviewed rice farmers and tried to find out if and how they were receiving information about better farming techniques. Dorina and Lotte were interested in the impact of tourism on a group of Indigenous People, the Agta, in the Calao Cave area.

Field study 3.1: The Working of PAMB in the Penablanca Protected Landscape & Seascape (PPLS) and its Future Priorities



Team: Josie C. Robles & Jessie Post

Region: Penablanca, Cagayan

Residence: San Roque

Method: interviews with 8 PAMB members, the PASu and 28 local residents

Main Conclusion: The PAMB of PPLS does not completely follow the NIPAS Act. The actual composition is a little different than how it's supposed to be. The biggest issues in PPLS are illegal activities in the forest. The majority of our respondents think that the PAMB should therefore prioritize forest management in the future. Aside from solving the ground level problems, there are also many administrative issues, which need to be improved.

Field study 3.2: Lowland Farming Techniques and Information Gap



Team: Grace B. Bayang and Sara Van Damme

Region: Malibabag, Peñablanca

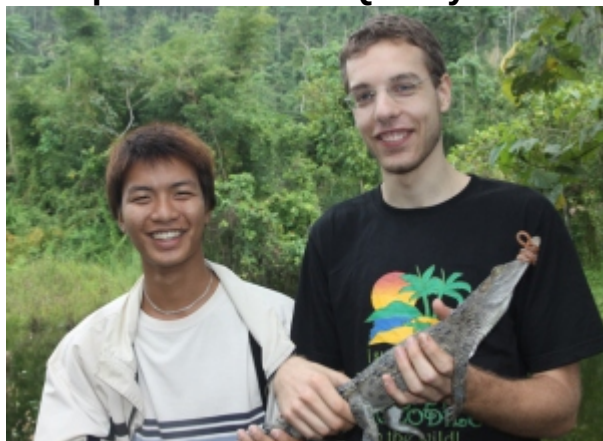
Residence: Malibabag

Method: Conduct interviews with the NIA, Municipal officers and farmers

Main Conclusion: The farmers in the barangay Malibabag came up with different ways of cultivating the land. For instance: using a carabao and rotor, fertilizer

application, seed selection and different amounts of the water to be applied in their fields. The farmers receive information from the DA, NIA and other sources such as their grandparents, parents, the TV, radio, supply store owners and PAGASA.

Field study 3.3: Drinking Water Quality Tuguegarao and San Roque, Perceptions of Water Quality and Water Management



Team: Israel Bryan Estrabo jr. and Tom Alkemade

Region: Tuguegarao, San Roque

Residence: San Roque

Method: Random Questionnaire and water samples

Main Conclusion: The water quality of the water in San Roque is of inferior quality compared to the water in Tuguegarao. The water of 5 of the 8 pump wells in San Roque was not meeting the Biological Standard for Drinking Water. Most of the people in San Roque think that their water is clean but in fact it is not. They base their perceptions on the fact that they do not become sick of it. In Tuguegarao the people think that their water quality is good, which in this case is correct. Most residents in Tuguegarao are happy with the services by the Water District. The people of San Roque want to be connected to pipe water.

Field study 3.4: The Impact of Eco Tourism at Callao Cave on the Environment of the Area and the Livelihood of the Agta Community in Aggugadan



Team: Dorina R. Soler & Lotte Krijnen

Region: Penablanca, Cagayan

Residence: Aggugadan

Method: We conducted interviews with key informants at offices, tourists at Callao Cave, people working at the cave, and inhabitants of the surroundings, including the Agta community living downstream from the Callao Cave.

Main Conclusion: The ecotourism at Callao Cave is not very eco. There are mainly negative impacts on the environment, like waste problems, vandalism and insufficient sanitary facilities. 3 Agtas were tourist guides, but difficulties in cooperation between them and the local guides made them quit. They would like to be involved again. Possible environmental improvements of the ecotourism activities at Callao Cave could provide extra jobs, which could be good for the Agta people living in Aggugadan.

Student Reports

I Magat Dam



Dorina Soler and Wilda Calapoto at Magat Dam

1.1: Magat Dam

Ben Elizer Q. Redoble and Jolien Rip

INTRODUCTION

The Magat Dam and its reservoir are located on the boundary of Isabela and Ifugao Provinces in Northeast Luzon. The dam does not only provide water for rice irrigation, it also manages the amount of water that is flowing through Magat River and it serves as an energy plant. An all positive story, it seems. However, the prospects are not too well: sediments make the basin slowly unable to contain enough water. The forecasted climate change and extreme ENSO phenomenon are also potentially contributing to its deterioration. Insiders think that in 10 years, the dam will no longer function properly.

RESEARCH QUESTION

What is the future of Magat Dam in relation to the climatic and geologic factors that are detrimental to its efficiency and useful life span?

METHODS

Sub topics

In our study we gathered information about the following sub-topics:

- *General information about the dam*
 - Introduction, brief history, location, project benefits, amount of hydro power generated
- *Siltation*
 - Causes of siltation
 - Deforestation
 - Earthquakes
 - Start of abnormal siltation deposition
 - Overview of siltation over the period 1982-2011
 - Projection of average siltation in the future
 - Factors that are speeding up the siltation process
 - Siltation prevention or removal
- *Water storage*
 - In the beginning of its operation (1982)
 - At the present time (2011)
 - Projection of water storage in the future
- *Power generation*
 - The players
 - Power generation from 1982-2011
 - Problems

Itinerary

The study encompassed 7 days from the 14 - 20 January 2011.

14th of January (Friday)

Our first stop was at the Magat River Integrated Irrigation System (MARIIS) Dam and Reservoir Division headed by Engr. Florentino Baniqued who explained to us the need of a new Rule Curve. After a quick lunch, we visited the Command Centre for the Magat Flood Forecasting Warning and Monitoring Section where we were given an overview of the flood monitoring and water release advisory in the event of monsoon, typhoons and other weather disturbances that require flood management.

17th of January (Monday)

We visited Isabela State University –Echague Campus, the College of Engineering under Dr. Editha F. Ausa, who helped us get an appointment with Dr. Orlando F. Balderama, director of Research and Development Division of the University. Dr. Orly gave us insights on the advantages and disadvantages of Magat Dam, the Flushing Method as an alternative to ridding the reservoir of the sedimentary deposits, the overview of the Cagayan Valley Flood Mitigation Master Plan (2005-2030) and most of all a referral and audience with Engr. Antonio Ramos.

18th of January (Tuesday)

We met Engr. Antonio Ramos, former Director of NIA Region 2 who is presently working as consultant for S.N. Aboitiz. He explained to us the position of S.N. Aboitiz, the daily IDR allocations made by NIA, the need for the revision of a new Rule Curve and most importantly, we gained entry and access to S.N. Aboitiz hydro power generation facility. In the afternoon we were provided with the schematic diagram of the Magat Dam thru the auspices of Engr. Josue Sabio at the head office of NIA Region 2.

Our study took place in the Magat Dam area. We needed data on weather forecasts and history, hydro power and siltation deposits. Most of our data were available at the MARIIS Dam, its Magat Flood Forecasting Weather Monitoring Section and S.N. Aboitiz Power. We analyzed and arranged the data by comparison and contrasting to construct the bigger picture in which we incorporated discussions about future studies of Magat Dam.

From this study we obtained alternative perspectives and additional information regarding possible future studies of containing the severe implications of siltation, climatic phenomenon as well as geologic factors that can compromise the structural integrity, water and power generation capacity of the dam in the years to come.

RESULTS

General description and history of Magat Dam

The Magat Dam is located in the Magat River at the boundary of the municipalities of Alfonso Lista and Ramon in the province of Ifugao and Isabela, respectively, both on the island of Luzon. The Magat River is the largest tributary of the Cagayan River, the longest river in the country.

The Magat Dam, the principal feature of the Magat River Multi-Purpose Project (MRMP) was inaugurated in Oct. 27, 1982 by then President Ferdinand E. Marcos. The construction of Magat Dam and its appurtenant structures was authorized by P.D. 693 signed on May 7, 1975 following a preliminary study made by the National Irrigation Administration through the assistance of the United States Reclamation Bureau (USRB) and the United States Agency for International Development (USAID). The total project cost was P3.4 billion, this was jointly financed by the Philippine Government and the World bank which extended a \$150 million loan to finance the foreign exchange requirement. In addition \$9 million was obtained from the government of Bahrain for the purchase of equipment for diversion tunnels, soil laboratory and model testing.

The project was an effort by the National Irrigation Administration (NIA) to increase irrigation capacity, mitigate floods and generate hydro-power. It was designed to have an economic life span of 100 years with the foreseen average sedimentation rate of 5.5 million cubic meters per year (MCM/yr) or equivalent to a catchment sediment yield of about 20 ton/ha.-yr.

The Magat watershed has an area of 413,000 hectares. The potential for erosion is great: the rainfall is high, the slopes of the watershed are steep and the soil is erodible. River flows are discharged to the Magat River by several river systems, namely; Sta. Fe, Sta. Cruz, Matuno, Ibulao and Alimit. The reservoir has a capacity of 1,113 million m³ (MCM) of which 963 MCM is for the live storage (EL 147m to EL 193m) and 150 MCM is for the dead storage (EL 147m and below).

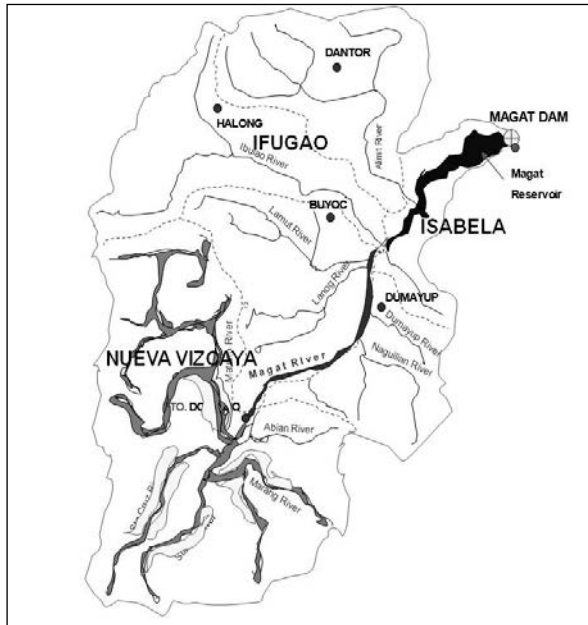


Figure 1: The Magat Watershed area (MARIIS 2005)

Project benefits

Irrigation

- Service area = 85,000 hectares riceland cultivated twice a year
- Production = 8.5 million cavans of rice / year
Where 1 cavan = 50 kilos
Approx. P5.95 billion @ P14/kg of Palay (2011 price level)
- No. of Farmers = 62,000

Hydropower

- Capacity = 360 MW
- Production = 900,000 MW / year (10-yr ave.)
Approx. P2.25 billion @ P2500/MW (2011 price level)
- Service Area = Luzon Grid
- Local service representatives (Region 2) = Cagayan 1&2, Iselco 1, Quielco, Nuvelco

Fish Production

- Production = 1,430 tons / year (2004 data)
Where 1 ton = 1000 kg
Approx. P121.5 million @ P85/kg (2011 price level)
- No. of Fisherfolks = 1000
- Fish Stocks = 30 M / year

Other (Recreation, Tourism & Domestic Water Supply)

Magat reservoir

The water used for irrigation and power generation starts at elevation 160m up till an elevation of 193m above sea level. Below an elevation of 160 m irrigation and hydro power generation is no longer possible due to water cavitation that will result in turbulence in the penstock. At elevation 173.5m to 193.5m the spillway is located,

this is used to safeguard the dam from damage due to overcapacity and flood control management. It has 7 units of 19.5m radial doors to close and open the orifice in the event of increased stream flow during monsoon or typhoons or for water level control. A 3.5 m buffer is set for its 197m high water capacity.

The dead storage is located at 147 m and below. This water cannot be used for irrigation and power, because there are no gates for the water to escape below this elevation. At this level, silt is deposited and just below 147m is where the flushing valves are located. Between elevations 147m and 153m the power inlet is located with a diameter of 5.8m. This inlet serves as the water conduit to supply the power generating turbines through the four 580m long penstocks that have a discharge capacity of 480 cu. m/s. Water metering devices to record the water flow volume are located in this inlet. The power plant has four turbines with a maximum generating capacity of 360MW upgradable to 180MW (thus a total of 540MW) of generated power. A flushing orifice is located below the 147m mark. With a size of 6 x 12,5 meters this was designed to irrigate at low level water supply. The flushing orifice can also be used to flush sediments from the reservoir. However, the orifice currently is closed with rocks and cannot be opened.

Table 1: General features of Magat Dam (NIA 2011)

Magat High Dam	
Height	114 meters
Crest Length	4,160 meters
Vol. of Rock and Earth Materials	18 million m ³
Concrete	1.0 million m ³
Spillway	
Length	500 meters
Width	164 meters
Discharge Capacity	30,600 m ³ /sec
Radial Gates	7 sets
Orifice Gates	2 sets
Reservoir	
Storage Capacity at Full Supply Level	1113 million m ³
Area at Full Supply Level	45 km ²
Area at Min. Supply Level	15 km ²
Elevation above sea level at Full Supply Level	193 m
Maximum Flood Level	197.6 m
Live Storage (El. 193m-147m)	962.8 million m ³
Diversion Tunnels	
Number	2
Diameter	12 m
Average Length	630 m
Powerhouse	
Installed Capacity	360 MW
Additional Capacity	180 MW
Total Capacity	540 MW

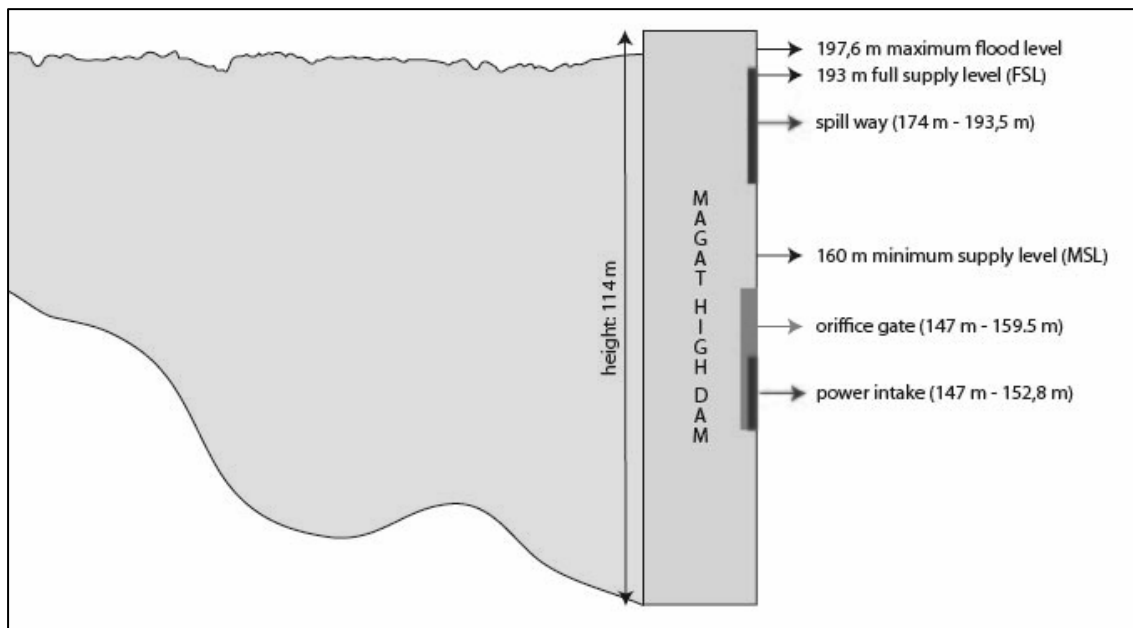


Figure 2: Schematic drawing of the Magat Dam (drawing by JR based on information by NIA)

Sedimentation & Water Storage

Magat Dam was designed with a foreseen average sedimentation rate of 5,5 million m^3/year (NIA 1978). After 100 years, the sediment was expected to reach the orifice and hydropower inlets.

Results of bathymetric surveys show that the average sedimentation rate is much higher than the expected $5.5 \text{ M m}^3/\text{year}$ (NIA 2010). This is probably the result of slash and burn farming and logging activities upstream, causing severe erosion. The main reservoir and its adjacent areas are supposed to be restricted areas but these are now inhabited by fish cage operators and their families. These settlers remove the soil cover through cultivation, which also causes erosion. The 1990 Luzon earthquake caused massive landslides in the Magat Watershed area, making the situation even worse by increasing the sedimentation rate abruptly.



Figure 3: Erosion in Leseb, Bauko, Mt. Province (photo courtesy O. Balderama)

Magat Dam Reservoir Rule Curve

The Rule Curve (R.C.) is the ideal reservoir elevation in order to supply the irrigation requirement of the service area of MARIIS on a year-round basis.

The current rule curve for Magat Dam was designed in 1985, and now because of the changes in reservoir capacity and distribution and amount of rain throughout the year, there is a need to recalculate it (pers. comm. F. Baniqued). NIA director Florentino Baniqued is currently developing a new rule curve.

The reservoir elevation is normally below the Rule Curve during the period January to May and starts to be above the R.C. by the month of July up to December (Fig 3).

The elevation level of the reservoir is of course related to the amount of water that flows in. In 1998, a very dry year, the elevation level was very low (Fig 5), even below the needed 160 m of elevation to provide the necessary irrigation water.

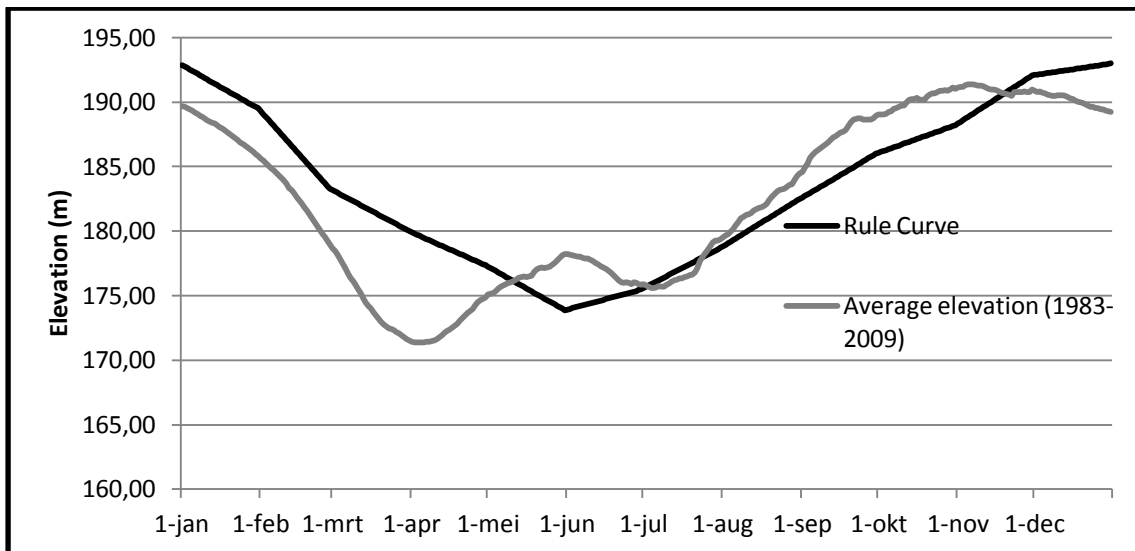


Figure 3: Magat Reservoir Rule Curve & Average Reservoir Elevation (NIA 2010)

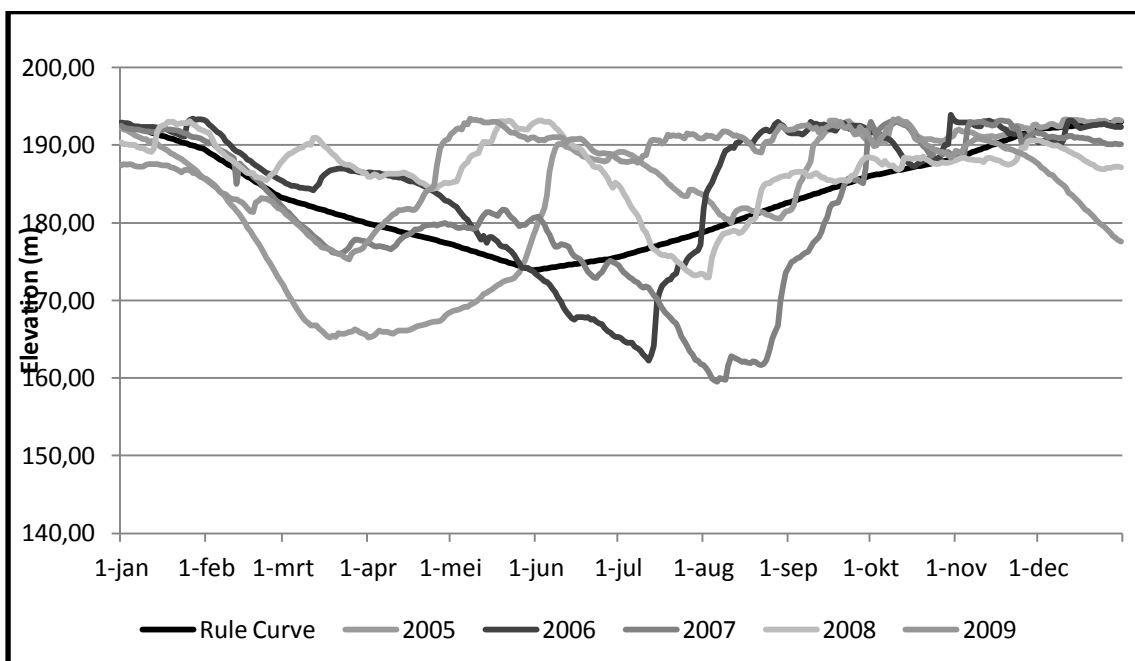


Figure 4: Magat Reservoir Rule Curve & Actual Reservoir Elevation 2005-2009 (NIA 2010)

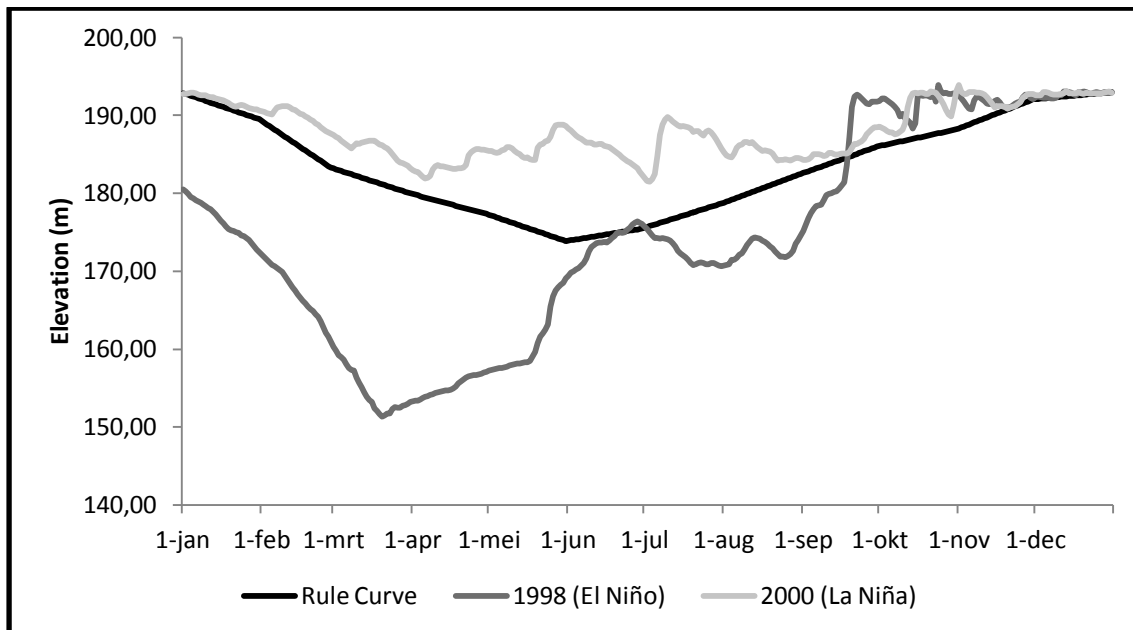


Figure 5: Magat Reservoir Rule Curve & Actual Reservoir Elevation – comparison of a dry year with a wet year (NIA 2010)

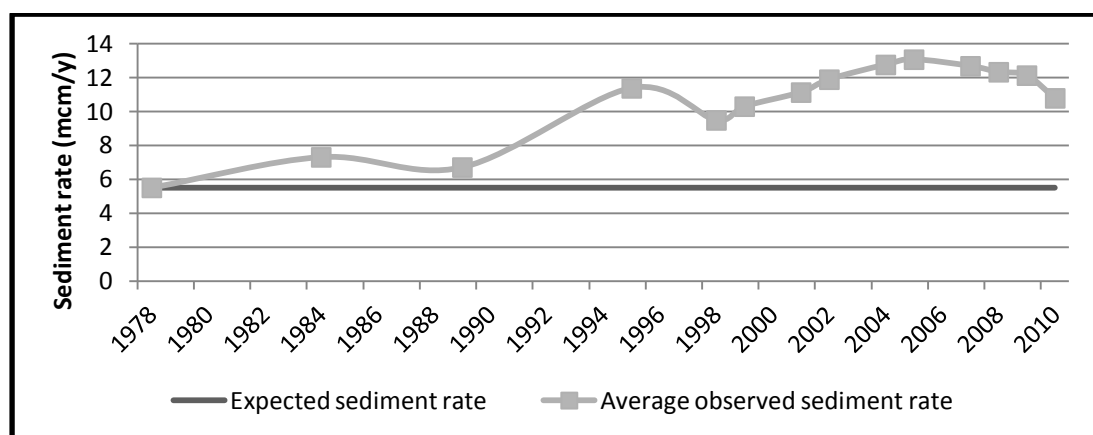
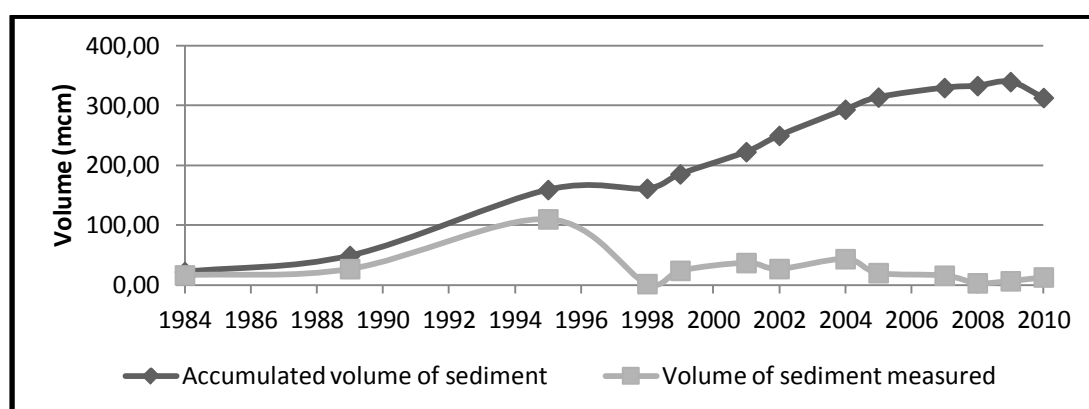
Overview of sedimentation rates over the period 1978-2010

As mentioned above, the expected sedimentation rate was 5.5 million m^3/year . However, since the construction of the dam the average sedimentation rate has been higher (table 2). Over the period 1978-2010, the average sedimentation rate was 12.12 million m^3/year . This is more than double the expected rate! According to the hydrographic surveys conducted until 2010, the total volume of sediments deposited is 297.05 million m^3 (mcm). The volume of sediments in the live storage (el. 147-193) is 190.41 mcm and the volume in the dead storage is 106.64 mcm. The current siltation rate of the live storage is 8.48 mcm/year, and the siltation rate of the dead storage is 3.01 mcm/year.

The accumulated volume of sediments and the sediment rate increased very quickly in the period 1989-1995 (fig 6 and 7), this is because of the earthquake in 1990. Figure 8 shows there is a relationship between the amount of rainfall and the volume of sediment measured. This is the reason why the measured volume of sediment was very low in 1998 and 2008. In these years there was an extreme drought, which means there was no rain to move the sediment into the river. The accumulated volume of sediment decreased in 2010, because of typhoon Emong in August 2009. The typhoon probably caused a tremendous amount of turbulence in the reservoir, flushing sediments downstream. In 2010, the height of sedimentation at range 1 (closest to the dam) was 135 m, only 12 m below the power intake and orifice gates (situated at an elevation of 147 m) (fig 9).

Table 2: Sedimentation data from 1978-2009 (NIA 2010)

Year of survey	Volume of sediment measured (MCM) (up to Elev. 200m.)	Accumulated volume of sediment (MCM) (Up to Elev. 200 m.)	Average observed sedimentation rate (MCM/YR) (Up to Elev. 200 m.)
1978			5.5
1984	16.50	22.00	7.3 (1982-1984)
1989	27.00	49.00	6.7 (1982-1989)
1995	110.13	159.13	11.37 (1982-1995)
1998	2.00	161.13	9.48 (1982-1998)
1999	24.13	185.26	10.29 (1982-1999)
2001	37.16	222.42	11.12 (1982-2001)
2002	27.16	249.58	11.88 (1982-2002)
2004	43.65	293.23	12.75 (1982-2004)
2005	20.29	313.51	13.06 (1982-2005)
2007	15.94	329.45	12.67 (1982-2007)
2008	3.31	332.76	12.32 (1982-2008)
2009	6.70	339.46	12.12 (1982-2009)
2010	13.10	312.82	10.78 (1982-2010)

**Figure 6:** Average and expected sediment rate of the Magat River and Reservoir (NIA 2010)**Figure 7:** Volume of sediment in the Magat River and Reservoir up to elev. 200 m (NIA 2010)

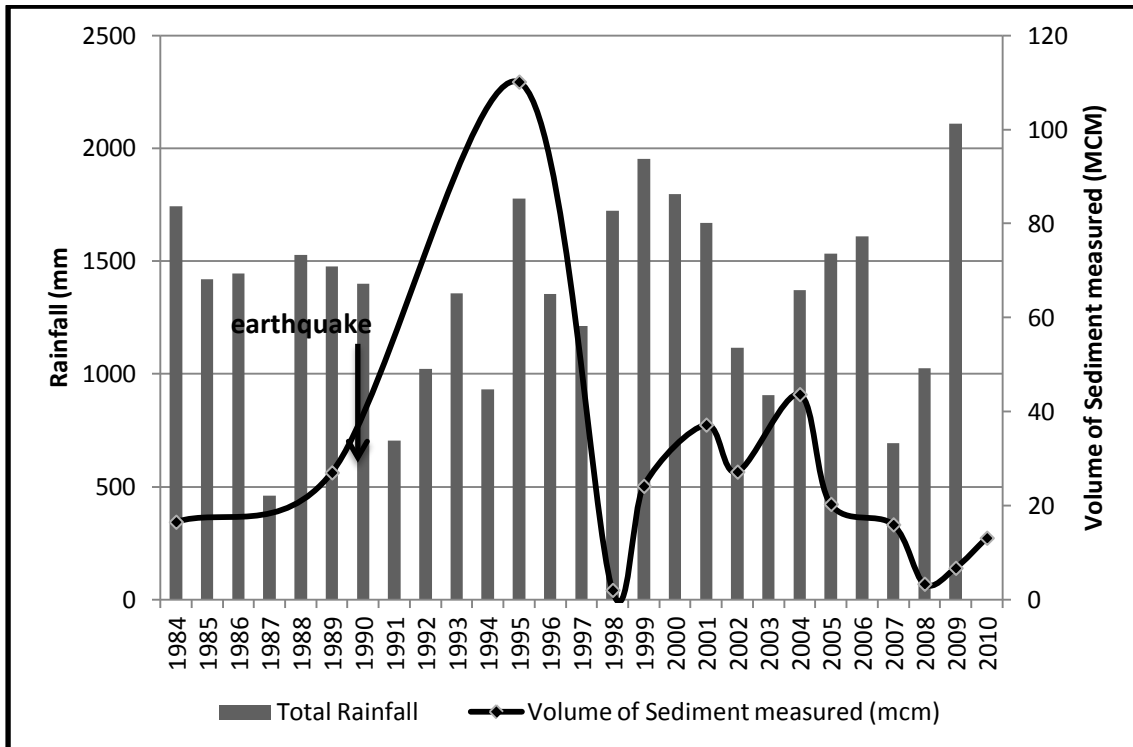


Figure 8: Relation between rainfall & the volume of sediment measured in the Magat River and Reservoir (NIA 2010)

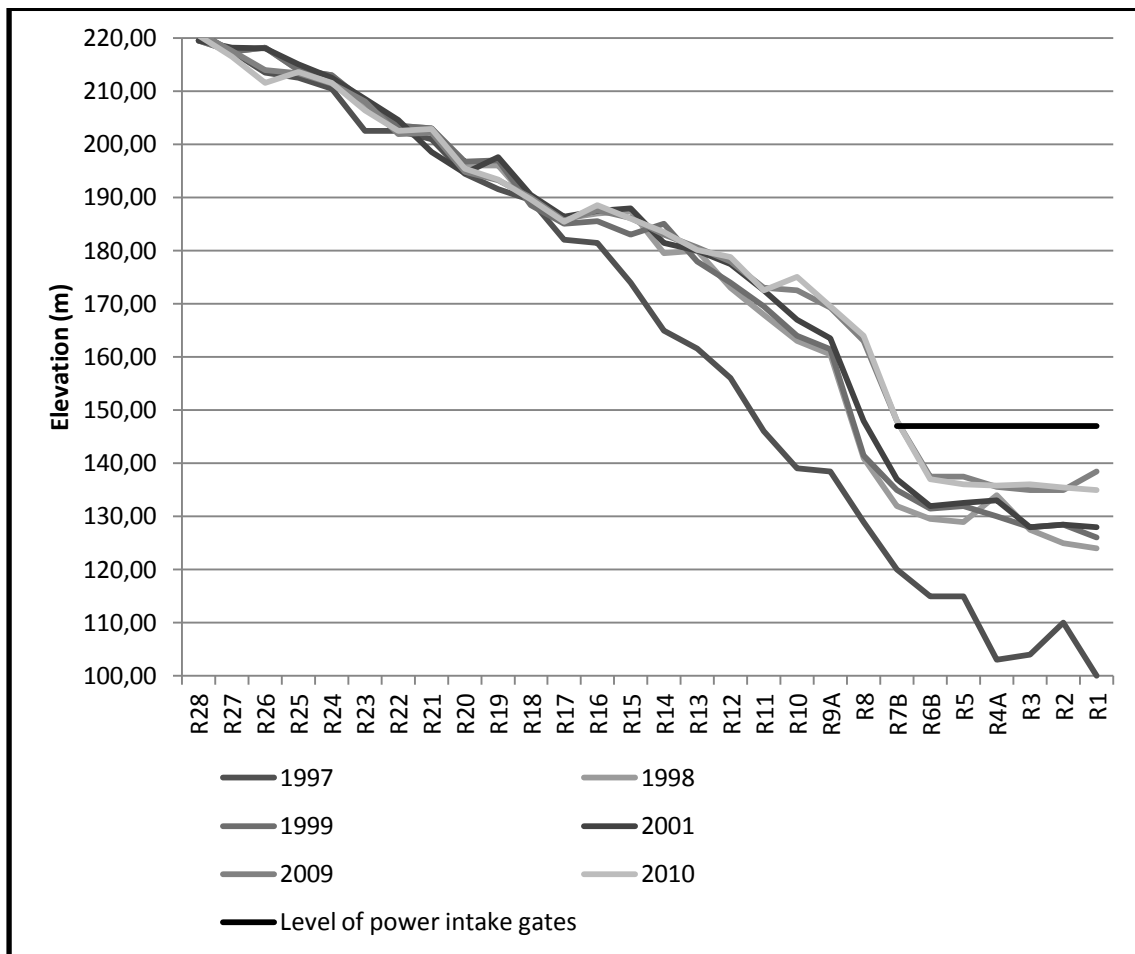


Figure 9: Profile along the centerline of the Magat River and reservoir (NIA 2010)

Overview of water storage over the period 1978-2010

The storage capacity has decreased significantly, but it is still sufficient to provide enough water for the farmers and use for hydro power. Figure 10 shows that the total reservoir capacity has decreased with an average of 10.9 mcm/y (slope of the trendline). This is almost the same as the average computed by NIA.

Table 3: Comparison of the storage capacity over the period 1978-2010 (NIA 2010)

Elevation (m)	Storage capacity in 1978 (mcm)	Storage capacity in 2010 (mcm)	Sediment volume (mcm)	Capacity lost (%)
200	277.80	262.02	15.78	5.68
193	107.54	109.13	-1.59	-1.48
190	294.33	255.47	38.86	13.20
180	230.49	189.38	41.11	17.84
170	178.78	130.21	48.57	27.17
160	126.34	75.58	50.76	40.18
150	84.35	42.37	41.98	49.77
140	47.87	14.21	33.66	70.32
130	26.77	SILTED	26.77	100
120	13.88	SILTED	13.88	100
110	2.93	SILTED	2.93	100
100	0.02	SILTED	0.02	100
Total	1391.10	1078.37	312.73	22.48
Total live storage (Elev. 147-193)	962.8	772.48	190.31	19.71
Total dead storage (Elev. 147 and below)	150.52	43.87	106.64	71.19

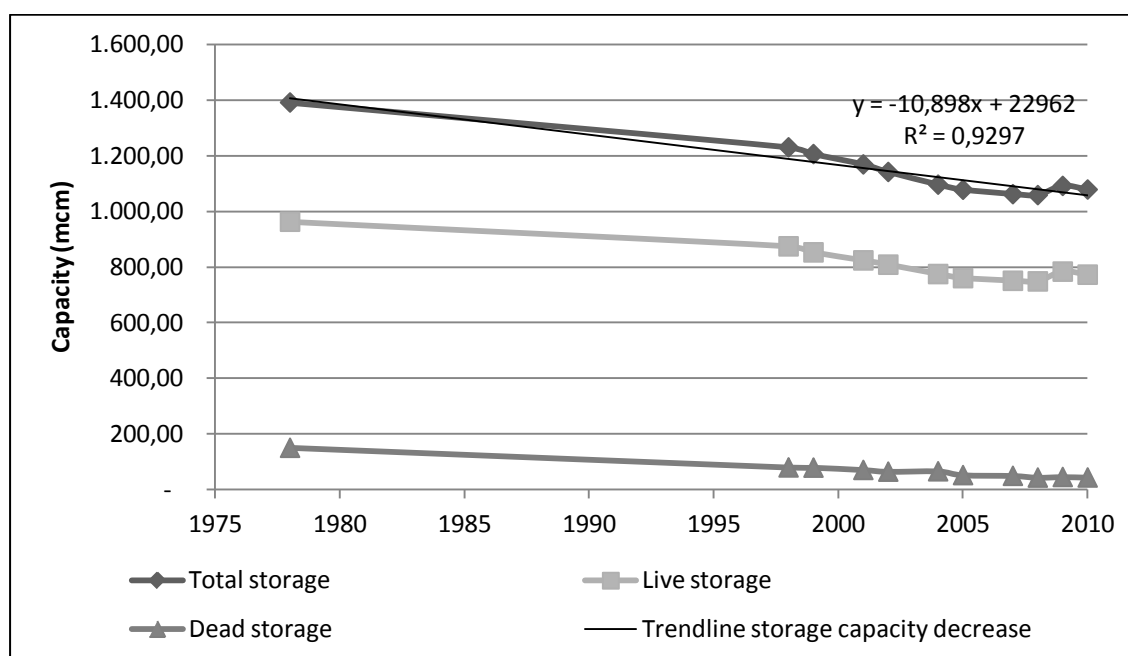


Figure 10: Storage capacity of the Magat Dam Reservoir over the period 1978-2010

Projection of sedimentation and water storage in the future

The total storage has decreased by 22% over the last 32 years. The dead storage decreased by 71%. This means an annual dead storage loss of 3 mcm/year (this is the same as the average sedimentation rate in the dead storage). If this rate continues, the sediments will reach the orifice and power intake in 14.5 years (2025).

If we use the sedimentation rate of 2009 (before typhoon Emong) this will already be in 11.5 years (2022)! But as the sedimentation rate is highly dependent on rainfall and other natural causes such as earthquakes, it is almost impossible to predict what is exactly going to happen in the future.

Table 4: Sediment volumes and average sedimentation rate of the Magat River and reservoir over the period 1998-2010

	1998	1999	2001	2002	2004	2005	2007	2008	2009	August 2009	2010
Total volume (mcm)	158.9	181.3	218.5	240.1	282.6	300.8	131.1	321.4	328.9	284.24	296.9
Average sediment rate (mcm/y)		22.41	19.85	20.28	20.61	20.26	17.12	16.24	15.45	11.38	11.49
Volume in dead storage (mcm)	70.47	71.11	79.57	85.70	94.60	98.14	100.7	106.9	112.4	104.90	106.6
Average sediment rate (mcm/y)		0.63	3.03	3.80	4.02	3.95	3.37	3.64	3.81	3.12	3.01
Volume in live storage (mcm)	88.50	110.2	138.9	154.4	188.0	202.7	212.3	214.4	216.5	179.34	190.3
Average sediment rate (mcm/y)		22.41	19.85	20.28	20.61	20.26	17.12	16.25	15.45	11.38	11.50

Hydro power

Stakeholders

S.N. Aboitiz (SNAP): SNAP-MAGAT is the joint venture between Aboitiz Power Corporation and SN Power Invest AS of Norway. On December 14, 2006 it submitted the highest bid for the purchase of the 360-megawatt Magat Hydroelectric Power Plant and was subsequently awarded as winning bidder on January 9, 2007. On April 26, 2007 the Power Sector Assets and Liabilities Management (PSALM) Corporation turned over the control of the plant to SNAP. (SNAP website 2011)

National Irrigation Administration (NIA): The National Irrigation Administration of the Republic of the Philippines is a Government-Owned and Controlled Corporation (GOCC) tasked with the development and operation of irrigation systems all over the country. The NIA manages the irrigation and distribution of water through the Irrigation Diversion Requirement (IDR) and also allocation for hydroelectric generation. (NIA website 2011)



Figure 11: The S.N. Aboitiz power plant (photo by JR, 2011)

The WESM (Wholesale Electricity Spot Market): WESM is a venue where electricity made by power-producing companies are centrally coordinated and traded like any other commodity in a market of goods. Prices are driven by the law of supply and demand to buyers with the objective of giving the best price for consumers of electricity including the ultimate end-user. The establishment of the WESM is a landmark achievement for the Philippine Power Industry. It marks a fundamental change from a monopoly industry to a competitive market. As a wholesale market, it is open to distributors, directly connected customers, large users, and eventually, supply aggregators. As a spot market, electricity is traded on a real time basis or on the “spot”. Both the Department of Energy (DOE) and the Energy Regulatory Commission (ERC) perform regulatory oversight functions over the WESM (Website of WESM 2011).

Power generation

The hydroelectric plant is a peaking power plant, which means it operates when there is a high demand for electricity in the Luzon power grid. Everyday NIA releases an update on how much water is to be used by S.N. Aboitiz for hydroelectric generation which is also the amount of water allocation for irrigation. This update, in the form of an IDR (Irrigation Diversion Requirement), varies daily depending on the projections of NIA. Only in cases of excessive inflows, the IDR can be exceeded. The IDR is the allowable parameter of SNAP on how much water is to be utilized from the reservoir.

The water meter in the power inlet measures how much water is flowing through the penstock. The water that is released from the plant is then used to irrigate approximately 85,000 hectares of riceland. Because the plant has the flexibility of choosing the quantity and time of power delivery, the plant maximizes revenue by producing and selling energy at the peak times of the day, when power prices are highest. The quantity of power and price requested by WSEM is delivered by SNAP the next day, and the process is repeated.

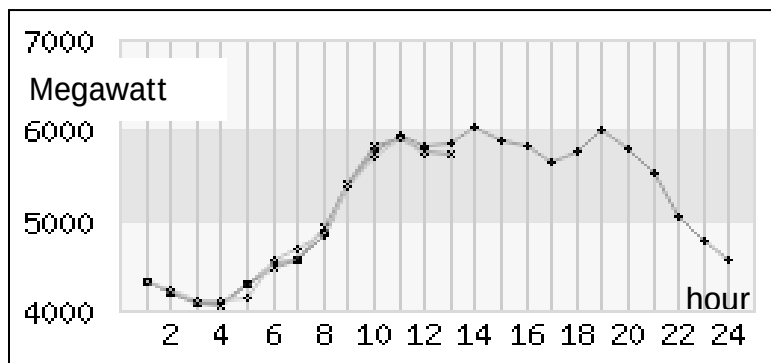


Figure 12: Luzon Market Demand of electricity on 19 January 2011 (WSEM 2011)

The IDR that NIA releases daily are the parameters used by SNAP in its power generation production. At the moment, the Turbines no. 1, 2 and 3 are the only ones functioning pending the completion on the refurbishment of Turbine no.4. The off-peak functions of the turbines are relegated as follows (which varies depending on power needs and turbine designation): Turbine no.3 is the Regulating Reserve; this is controlled directly by the National Power Corporation Control Centre, it is used to control fluctuations in power demand. Turbine no. 1 is relegated as the Contingency Reserve to serve as back-up if any plant goes down in the Luzon grid. To back up Turbine no.1 a Dispatchable Reserve is made through Turbine no.2 which is primarily used for any power requirement that the Contingency Reserve turbine cannot provide (pers. comm. controller of SNAP power room).

The turbines can generate 1MW /m³ of water, and at P3.2 centavos/m³. SNAP has a break-even point at a selling price of P4.80/MW. Power prices are highest during the dry/summer season but due to lower stream flow (thus a lower IDR) less power can be generated then. Additional water allocation with respect to the IDR can be requested but with pending approval and additional water cost procurement on behalf of SNAP. Approximately 20% of the power generated is distributed among local cooperatives i.e. ISELACO 1, QUIELCO, CAGAYAN 1 & 2. The remaining power is then sent to the Luzon grid for power consumption markets in Central Luzon and Metro Manila (pers. comm. T. Ramos).

Issues with Power generation

Despite the simplicity of the process, problems arose that are detrimental to the efficiency and productivity of the plant.

These are:

- The IDR is set by NIA. Lower IDR at high power demands means lower prospective revenues for SNAB.
- About twice the agreed price per m³ is charged by NIA to SNAP in the event of excess water consumption with respect to the IDR allocation.
- In the event that the power production agreed upon with WSEM is not met, SNAP is forced to pay 5 times the agreed trading price as penalty.
- The Rule Curve of the Magat Reservoir is outdated.
- Environmental factors that affect the stream flow for power generation:
 - o ENSO extreme frequency recurrence and/or climate change
 - o Deforestation, which causes extreme stream flows or droughts
 - o Riverbed sedimentation

DISCUSSION

The rate of sedimentation is relative to the amount of rainfall and other geologic factors such as earthquakes. The distribution and amount of rainfall might change in the future due to climate change and/or the ENSO phenomenon. Earthquakes are notoriously hard to predict. Thus it is hard to assess what the rate of sedimentation in the future will be.

One can question what the accuracy of the measurements of the sediment yield is. The volume of the deposited sediment is obtained as the difference between the total reservoir capacity at the time of the survey and the capacity in the beginning of the operation of Magat Dam. In this way the result is obtained by taking the difference of two large, approximately equal numbers. A small error in the calculated reservoir capacity may result in a difference between the measured and the actual volume of deposited sediments (White 1990). Thus, the variation in sediment yield might not be explained altogether as a change in rainfall and runoff.

However, the sediment rate in the dam reservoir as well as the upper contributing river system is alarming and should be reason for prompt attention. The consideration of the removal and the prevention of the causes and effects of sedimentation should be a joint effort where the stakeholders (the government and the private sectors) should participate enthusiastically and actively.

The root cause of the intense sediment rate is deforestation. To address this, areas with high soil erosion rates such as open grasslands and slash & burn farms should be prioritized for rehabilitation. The projected reforestation area is small in comparison with the total area of the watershed. Forest stewardships are neglected and abused for personal economic gains.

Since trees takes time to mature to be effective in sedimentation control, other sediment restraining facilities such as sabo dams or check dams should be constructed in the mean time.

Sedimentation occurs naturally, so apart from the sediment mitigation solutions, removal of sedimentary deposit should also be taken into account. Dredging is not considered to be an option because it will stop the irrigation and power generation of the dam during the process. The expense is astronomical with respect to the economic deliverables of the dam.

Some say a possible solution to remove the sediments might be to flush out the sediments from the reservoir through the lower level orifice gates. But flushing is not effective unless drawn down to an extent that flow velocities over large areas of the deposited material are sufficient to create high sediment transport rates. This low water level has to be maintained for a significant period of time to remove the high sediment volumes deposited over the years (White 1990). The long period of low water level will have a major impact on the power output, making it unviable economically. In addition to this, the flushing should also be a unified concerted

effort by different LGUs of the whole region (Region 2) to manage the sediments flowing from Magat River to the Cagayan River.

The only possible way to execute the plans mentioned above is to have a determined master plan for the whole watershed (such as the Region 02 Flood Mitigation Master Plan), enough funds and unified political will. This way Magat Dam can continue to provide enough irrigation water for the farmers while also generating electricity through the power plant.

ACKNOWLEDGEMENTS

We would like to thank Engr. Florentino Baniqued, Engr. Antonio A. Ramos MBA, Engr. Orlando F. Balderama Ph.D, Engr. Bonifacio Ausa, Engr. Editha F. Ausa Ph.D and Engr. Josue A. Sabio.

REFERENCES

Documentation provided by NIA:

- 1985 Magat Rule Curve (Excel)
- 2009 Sedimentation (Powerpoint)
- Rainfall at damsite station (Excel)
- Sedimentation report 2010 (Excel)
- Elevations Summary 1983-2010 (Excel)
- General Intro (Powerpoint)
- Magat Sedimentaiton (Powerpoint)

Documentation provided by S.N. Aboitiz

- Magat HEP Gross Generation (Excel)

Other references:

- Website of WESM (www.wesm.ph)
- Website of NIA (www.nia.gov.ph)
- Website of S.N. Aboitiz (www.snaboitiz.com)
- Reservoir sedimentation and flushing, W.R. White, 1990 (http://iahs.info/redbooks/a194/iahs_194_0129.pdf)

1.2: A pilot study about the causes of the sedimentation in Lake Magat

Ryan Dela Cruz and Bart van Velzen

INTRODUCTION

The Philippines has many problems with water, sometimes there is too much and from time to time not enough. In this short research project the focus is on Magat Dam and its water management. Magat dam was constructed in 1984 and since the construction the Magat Lake is filling up with sediments. The average observed sediment rate from 1982 till 2010 is 10.78 million cubic meter (MCM)/YR (Sedimentation data 2010). If this sedimentation rate continues in the future the inlets of the electric power plant will be covered with sediments in approximately 14 years (figure 1) (Sedimentation data 2010). Another function of the Magat dam is the irrigation of a large agriculture area downstreams. If the lake is filling up with sediments the water buffer during drought periods becomes too small. In this research the focus is on the causes of the sedimentation upstream of Magat dam and on projects to prevent the sedimentation.

Research questions:

- 1) What are the causes of the sedimentation of Magat Lake?
 - 1a) According to the authorities?
 - 1b) According to farmers?
- 2) Are there any projects to prevent the sedimentation of Magat Lake?

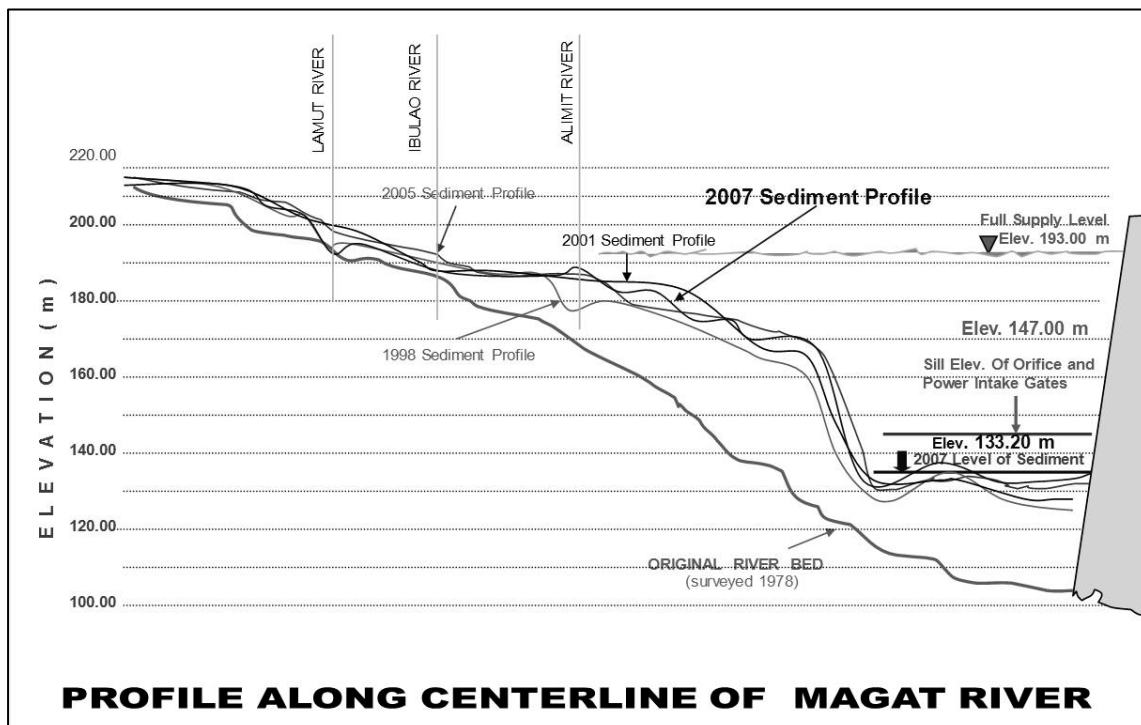


Figure 1: Profile along the centreline of Magat River (Source: Orlando Balderama).

RESEARCH AREA

The watershed of Magat River covers three provinces: Ifugao, Nueva Vizcaya and Isabela. To study the causes of the sedimentation of Magat River and Magat Lake, two barangays were selected upstream of Magat Dam: Salamague and Santa Lucia. The barangays are located in the eastern foothills of the Cordillera Mountains at an elevation of c. 90 m. at the junction of Lamut River and Magat River (CDP plan, MPDC of Lamut) (figure 2). Salamague is a barangay of the municipality of Lamut in the province of Ifugao and has a population of c. 900 (pers comm Captain Jerry, Salamague). Santa Lucia is located in the municipality of Bagabag in the Province of Nueva Vizcaya. Santa Lucia had a population of 2,343 in 2008 with an area of 912.33 ha (CDP plan, MPDC of Lamut).

The climate of the area is relatively dry during the months of December up to the end of April. The wet season is usually during the months of May to the end of November. The average temperature in the locality is about 29.2 Centigrade. The municipality is visited by about 8 – 10 typhoons per year (CDP plan, MPDC of Lamut)

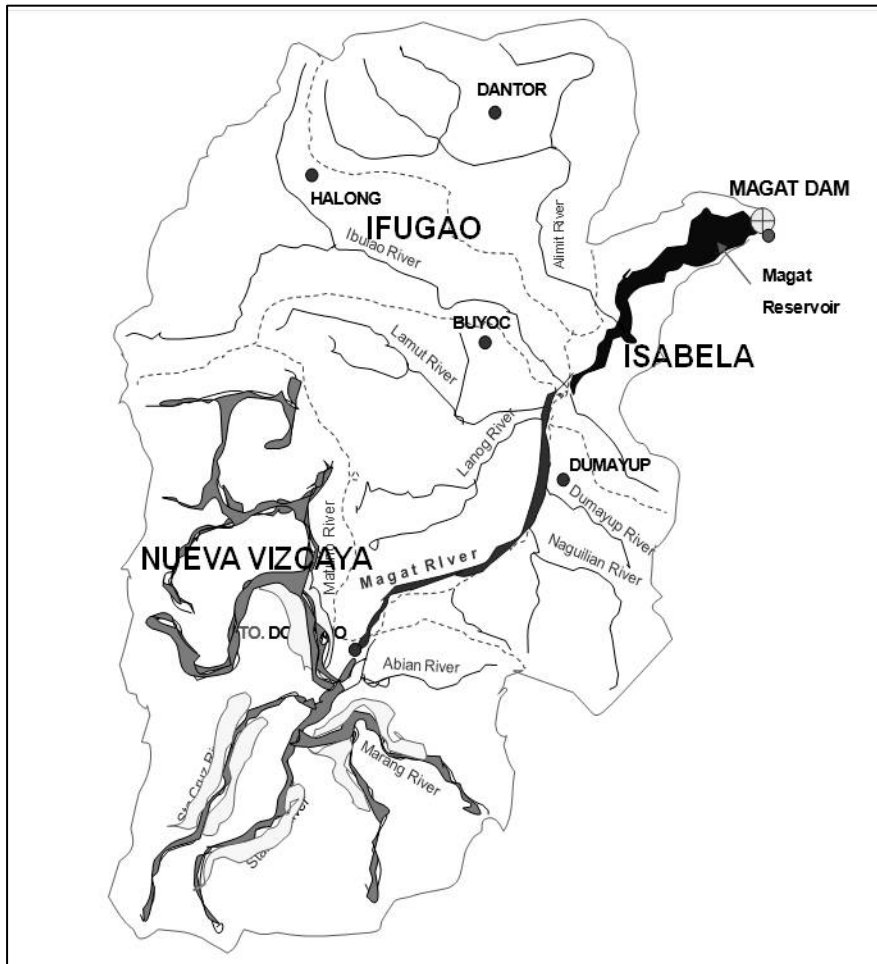


Figure 2: Watershed of Lake Magat (Source: Orlando Balderama).

METHODS

To obtain an overview of the causes of sedimentation and possible projects to combat sedimentation, a seven day fieldwork trip was conducted in the upstream area of Lake Magat. Information was collected in four different manners. First, the Magat Dam authorities were visited to collect information about the siltation rates of Lake Magat. Furthermore the municipality halls of Bagabag and Lamut were visited to gather information about the land-use, populations and projects to prevent siltation and flooding. Additionally, in the barangays Salamague and Santa Lucia residents, farmers and professionals were interviewed. Finally, observations of the area were made and pictures were taken.

Table 1: Time table (Friday 14 January – Thursday 20 January 2011)

Friday	Travel to Bagabag Visit MPDC of Bagabag Travel to Santa Lucia
Saturday	Visit barangay secretariat Santa Lucia Interviewing farmers
Sunday	Visit grassland area, mountains and charcoal makers
Monday	Visit the ENRO and the MPDC of Lamut Travel to Salamague Interview farmers
Tuesday	Interview farmers Visit DENR of Ifugao
Wednesday	Visit ENRO of Bagabag (information about the dikes) Visit DPWH in Bayombong, Nueva Vizcaya (information about the dikes)
Thursday	Visit Magat Dam Authority Travel to Cabagan

RESULTS

Interviews

In Santa Lucia one fisherman and six farmers were interviewed. One of the farmers was also producing charcoal. In Barangay Salamague 8 farmers were interviewed. The main results are shown in the figures 3, 4, 5, 6 and 7. For the questionnaire see appendix I and for the answers see appendix II.

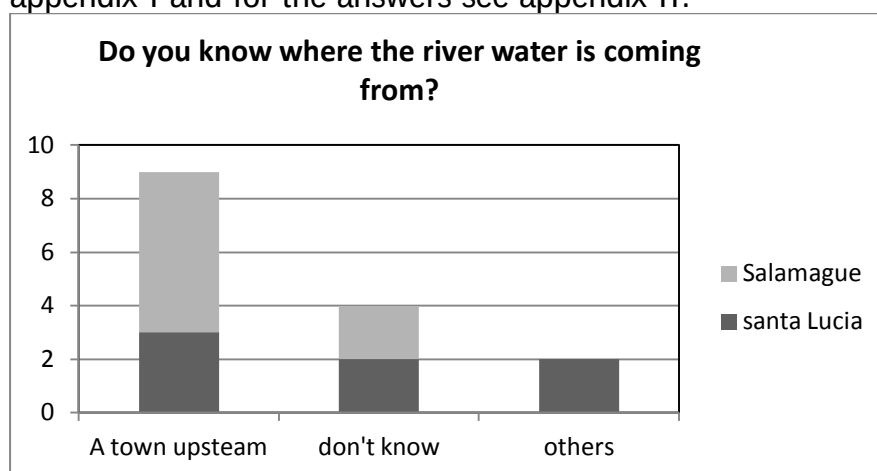


Figure 3: Answers to the question: do you know where the water is coming from?

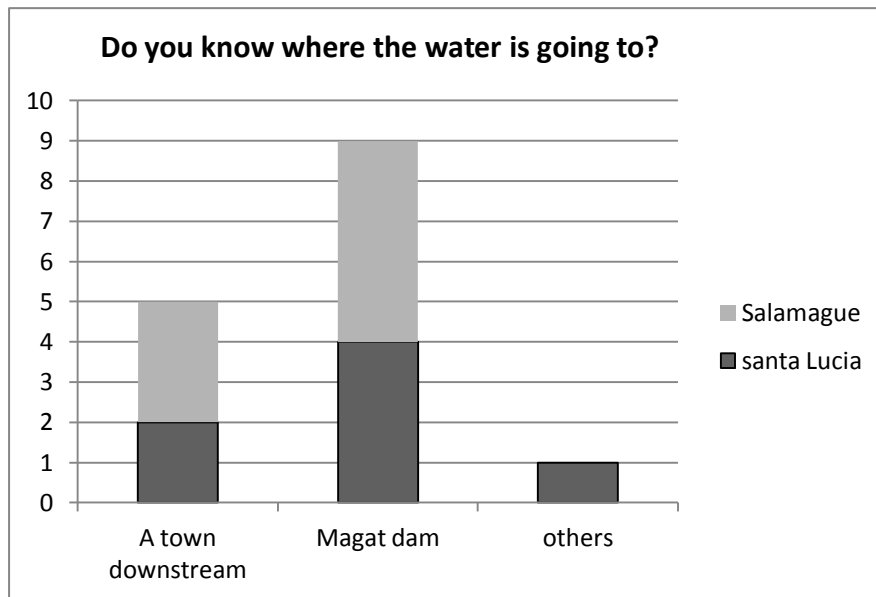


Figure 4: Answers to the question: do you know where the water is going to?

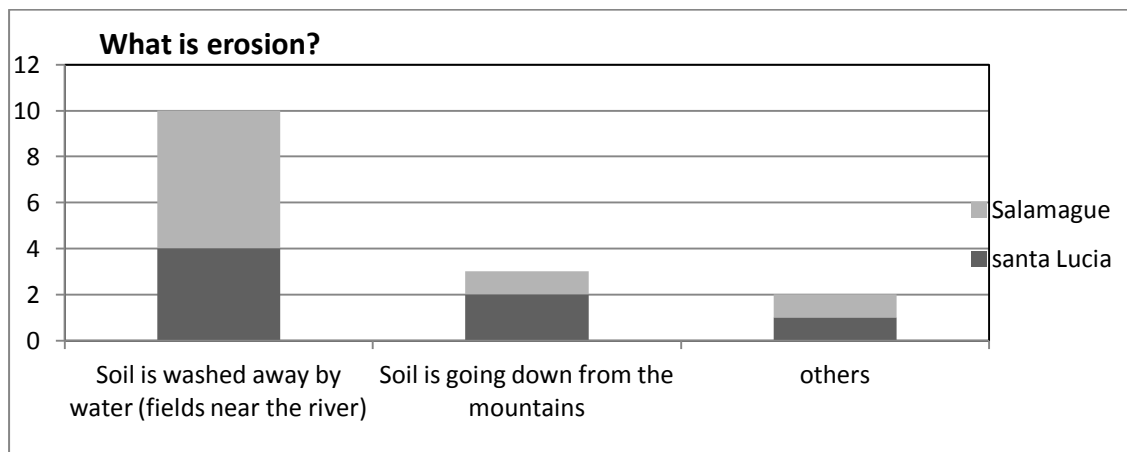


Figure 5: Answers to the question: what is erosion?

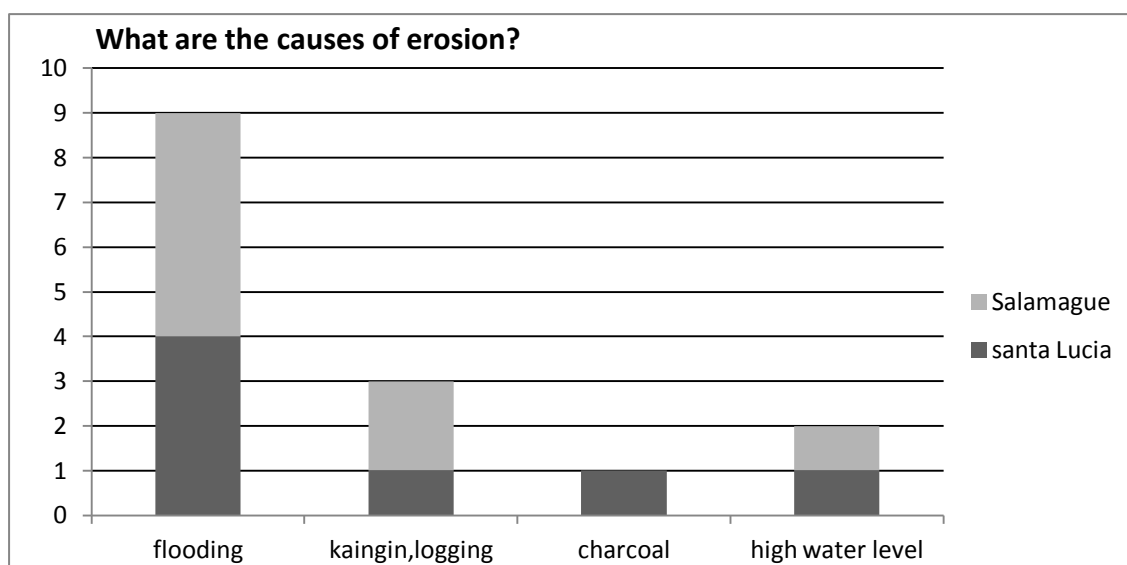


Figure 6: Answers to the question: what are the causes of erosion?

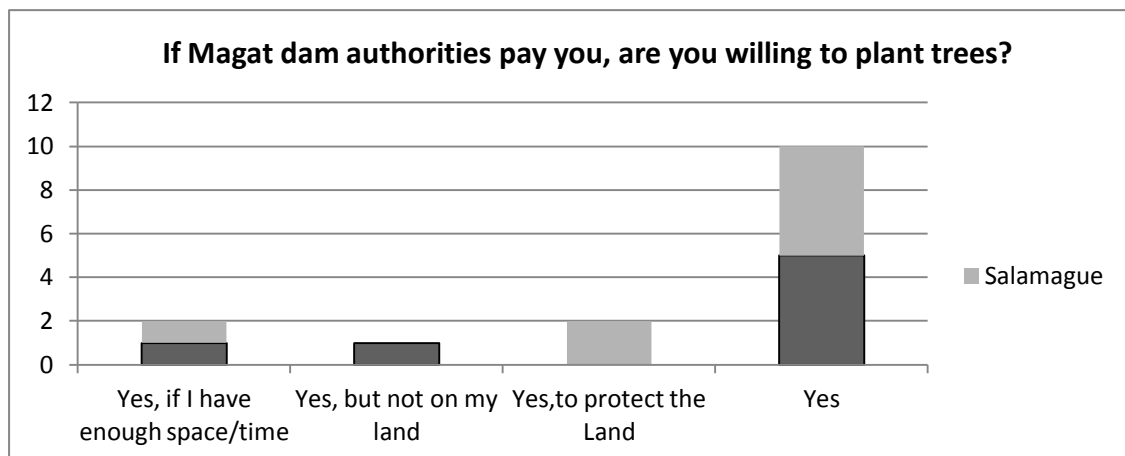


Figure 7: Answers to the question: If the Magat Dam Authority pays you, are you willing to plant trees?

Projects

In the fieldwork period three projects were identified against the erosion that contributes to the siltation of the Magat Dam: 1) the Reforestation Projects, 2) Dike structures and 3) the National Wealth Share program. Each project is shortly described hereunder.

Reforestation projects

In the CENRO office of the DENR in Ifugao province a report of reforestation projects in 2010 was available. In total, the DENR distributed 29,485 seedlings in eighteen different reforestation projects. However, no reforestation projects are located in the barangays of Salamague and Santa Lucia (Narrative report of forest management services cy. 2010, DENR Ifugao).

Dike structures

To prevent flooding and erosion of cornfields, the Municipality of Bagabag has started a flood control Program. This includes a proposed project to construct a dike along Magat River and Lamut River to safeguard the live and properties of the farmers within the area (Municipal development investment program, MPDC Bagabag). The proposal was sent to the DPWH and there it was ranked 15th place of a total of 19 proposed projects (Ranking of road flood control projects, DPWH Bayombong). The DPWH sends the ranking to the central office in Manila and there it is decided which proposals will be funded.

National Wealth Share program

To compensate for the damage caused by flooding, the barangays Santa Lucia and Salamague receive funds from the National Wealth Share (NWS). The NWS is financed by SN Aboitiz, the company that is the owner of the Magat Dam power plant. Their main office is located in Norway. The flow of funds is from SN Aboitiz to an organization named NOVELCO. By NOVELCO funds are divided over the municipalities, for example Bagabag. The municipality finally provides the compensation to the barangay. In this case barangay Santa Lucia receives 1,200,000 Pesos each year and the Barangay Salamague 200,000 Pesos each year (Captain Daniel, Santa Lucia; Captain Jerry, Salamague).

The barangay can decide by it self what it can do with the compensation. In Santa Lucia, half of the town's electric bill is funded by the NWS. Furthermore each household is provided a 5 Pesos lottery ticket if they join the assembly meeting in the barangay hall. This is the meeting of all the households heads to discus the problems in the barangay. With the remaining funds roads are constructed, the barangay hall is constructed and schools are build (Captain Daniel, Santa Lucia).

Observations in the field

To obtain an idea of the causes of erosion pictures were taken in the area of Salamague and Santa Lucia. Under each picture a short explanation with the location is provided.



Picture 1: Burning of grasslands (Santa Lucia).



Picture 2: Erosion of banks of Magat River (Salamague).



Picture 3: Confluence of Magat River and Lamut River(Santa Lucia).



Picture 4: Erosion on a deforested mountain slope (Santa Lucia).



Picture 5: Charcoal making (Santa Lucia).



Picture 6: The riverbed of Magat River (Santa Lucia)



Picture 7: Quarrying (Barretbet)



Picture 8: Firewood collection (Santa Lucia).

DISCUSSION AND CONCLUSION

To test the knowledge of the farmers about the origin and destination of the water in Magat River, the following questions were asked: Where is the water going to? and Where is the water coming from? On the question "where is the water coming from?", the majority of interviewed farmers named a village upstream. The interviewed farmers did not mention the upstream mountain region as the origin of the water (figure 3). On the question "where is the water going to?", the majority of respondents gave as answer a name of a village downstream or the Magat Dam. Not one of the interviewed farmers mentioned the irrigation area downstream (figure 4). This is one of the main functions of the Magat Dam and thousands of households are depending on this water for their livelihood. The cause of erosion according to the majority of interviewed farmers is flooding that washes away the cornfields located near the river. Only a few farmers answered that slash-and-burn (Kaingin) farming and logging contribute to erosion (figure 6). Most interviewed farmers are only aware of the problems in their own barangay. They don't know about the causes of erosion and they have little knowledge about what happens to the water downstream where thousands of households depend on the water for their livelihood.

During this short study, three projects were found that aim to prevent the erosion and sedimentation of Magat River and Lake Magat: reforestation projects, dike structures and the National Wealth Share program. All the projects are good initiatives. However each project has its disadvantages. Of the 18 reforestation projects in the province of Ifugao not one project is located in the surroundings of Barangay Salamague and Santa Lucia. Furthermore, the municipality of Lamut has made a proposal for a dike to protect the cornfields near the river but the proposal is placed on the bottom of the priority list. To conclude, the government is paying attention to the problem of erosion along Magat River and the subsequent siltation of Lake Magat, but this still has a low priority.

ACKNOWLEDGEMENTS

Arnold Macadangdang was very helpful to us the first two days in the field and explained how to work with interviews and how to arrange sleeping places. In addition, special thanks for the hospitality by the barangay captains Daniel and Jerry and their families where we could stay and sleep during the fieldwork. They were also very helpful with arranging interviews and answering the questions we had.

REFERENCES

Sedimentation data, 2010; Magat Dam Authority's
CDP plan, MPDC office, Lamut.
Narrative report of forest management services cy 2010, DENR Ifugao

APPENDIX I: QUESTIONNAIRE

Personal information

Name

Age

Gender

Family size

Educational background

Ethnic group

Migration history

Economic status

Occupation

Land title?

Are you paying tax?

Area (ha) of land

What farming methods do you use?

Crops

Harvest annual

Latest yield

Location of the farm (close to the river and the slope)

Questions

Do you know where the water of the river comes from?

Do you know where the water in the river is going to?

Is there sufficient water for your land?

Do you have an irrigation system?

Did you experience flooding?

Did you experience drought?

How do you manage with floods and droughts?

What are the problems you experience today regarding water?

Do you know what erosion is?

What do think about planting fruit trees on your land?

What do you prefer, planting crops or fruit trees?

If the Magat Dam Authority pays you, are you willing to plant trees?

APPENDIX II: INTERVIEW RESULTS

Inter view	Loca tion	Location of the farm	crop/s	Area(ha)	Annual Harvests	Latest Yield (cavans)
1	1	Near Magat River	planting trees	1		
2	1	Near Magat River	rice	1.2	2	
3	1	Near Magat River	rice		2	
4	1	Far from Lamut River	rice and corn	0.5	3	25, 20
5	1	Near Magat River	corn	0.2	2	21
6	1	Near Magat River	tobacco	0.5	1	8
7	1	fisherman				
8	2	Far from Lamut River	vegetables and rice	0.3, 0.6	2	26
9	2	Near Lamut River	corn and rice	4, 1	2	300,30
10	2	Near Lamut River	corn and rice	2	2	500, 40
11	2	Near Lamut River	rice	0.9	2	40
12	2					
13	2	Near Lamut River	corn and rice	1.2, 0.3	2	160, 30
14	2	Far from Lamut River	corn and rice	0.4, 0.5	2	50, 20
15	2	Far from Lamut River	rice	0.5	2	30

Location: 1: Sta. Lucia Bagabag ,Nueva Vizcaya, 2: Salamague Lamut, Ifugao

Interview results continued

Inter view	Farming Methods	Problems with farming	What is erosion?	What are the causes of erosion?
1			soil is washed away by water	High water level
2	manual	water shortage, plant disease	soil is going down from the mountains	Effectuated by kaingin, cutting trees
3	manual	flooded rice field	soil is going down from the mountains	deforestation, charcoal making
4	machinery , manual	drought, flood	soil is washed away by water	Flooding
5	manual	erosion	soil is washed away by water	Flooding
6	manual	erosion	tobacco field is being eroded	Flooding
7		flood	soil is washed away by water	Flooding
8	manual	unsustainable irrigation	soil is washed away by water	Flooding
9	manual, machinery	erosion, flooding	soil is washed away by water	High water level
10	manual	water shortage,	soil is washed away by water	Flooding
11	manual	water shortage,	soil is washed away by water	Flooding
12			soil is going down from the mountains	Effectuated by kaingin, cutting trees
13	manual	unsustainable irrigation	soil is washed away by water	Flooding
14	manual	floods, destroyed crops	soil is washed away by water	Flooding
15	manual	drought	soil is washed away by water	Effectuated by kaingin, cutting trees

1.3: The effects of flooding and the flood control facilities along Magat River

Koen van Ekdom and Arthur A. Castro

INTRODUCTION

Several years ago the Filipino people started the building of a dam called Magat Dam. The dam was built because there were problems with managing the water of Magat River. For example the dam could be used to improve the irrigation system or to control the water flow downstream Magat Dam. Nowadays Magat Dam is experiencing several problems starting with the sedimentation of Magat Lake. This lake is filling up with sediment coming from upstream the river. Experts calculated that the dam would last for many years but some insiders say the dam will not last for another ten years (!!).

Another problem of Magat River is the flood when it is rainy season. The Dam can hold water when there is a dry season and use the water later (or the other way around of course). Because the Philippines are in an area where there are a lot of tropical typhoons and other natural disasters, the dam discharges sometimes too much and too often water because it has to. Imagine a lake that is at its maximum level and more rain will come. You should lose some water. And this is exactly what is happening. The discharge of water causes floods downstream the dam and that is also happening along Cagayan River. But the question is whether we have to blame Magat Dam for these floods.

Statement of the problem

In our research we focus on the problem of extensive flooding downstream of the Magat Dam. Along Magat River a lot of people live who depend on the dam. For example a farmer, he needs water from the river but when it is dry season and the dam will hold up a large quantity of water the farmer doesn't have enough water for his irrigation system. In the rainy season (or wet season) the dam has to spill water, otherwise the water in the reservoir will overflow the dam. In this situation the farmer will get too much water (because of too many spills) and his crop field will flood.

Magat Dam has an essential role for the downstream area of Magat River. The problem the Dam managers have is that they can't regulate the water so everybody will benefit. Because of the high number of tropical typhoons and monsoon rains in the Philippines the dam has to spill a lot of water. And this is a big problem for the downstream area. In our study we investigated what precisely the effects of the flooding are and if the authorities help local people when there is a flood. The managers of the dam, the National Irrigation Association (NIA), built warning systems along Magat River. So there is some help from the authorities. We wanted to check if this system actually works and if people know enough about it. The main problem we studied is the flooding along Magat River. We compared in three different towns the situations and experiences of local people and local authorities regarding flooding. We started close to the dam in Ramon and went further downstream to Cabatuan and finally to Upi. Upi is in this case very special

because it is next to Cagayan River (the longest river in Luzon). Magat River joins Cagayan River just before it reaches Upi, but still a lot of people in Upi blame Magat River when there is a flood. This is strange because Cagayan River is a lot bigger than Magat River.

RESEARCH QUESTIONS

What are the effects of floods downstream of the Magat dam?

Are the flood-warning systems working properly along the entire Magat River?

Are the flood-warning systems useful for the people that live in flood-prone areas?

Sub-questions:

Do the people know what to do in case of floods?

What are the actions of the authorities with regards to floods?

Expectations

In the places we visited it was expected that a warning system were installed. And the areas are part of the flooded areas being declared by the NIA. Since the area is a flooded area, then the warning system should be working properly for the benefit of the people. The NIA gives enough information to the people, in cooperation with the local government and the barangay officials. In case of flooding there should be emergency plans and support from the government. The management of NIA is good enough and people in the downstream are being considered on their decision-making. People know their role as a citizen in protecting their lives and the lives of others in case of flooding. There are a lot of damages on the livelihood of the citizens, and the agriculture sector is the one greatly affected. The citizens mainly depend on agriculture.

METHODS

How did we do it? Our plan was to compare the situations of three different areas. We picked the villages based on a map with flood-prone areas and the presence of warning systems (fig 1&2). The first village we choose was Ramon. This village lies just below the dam and should be the first village that is affected when waters are released from Magat Dam. The next site was Cabatuan, a village halfway Magat Dam and the confluence with Cagayan River. Cabatuan has a flood warning system. According to the map we received from NIA, Cabatuan is prone to flooding during the rainy season. The third village we picked was Upi. At Upi Magat River has joined Cagayan River. Upi (a barangay of Gamu) also had a flood-warning system.

Table 1: Time schedule (Friday 14 January – Thursday 20 January 2011)

Friday	Travel to Magat Dam and look for maps. Visit the mayor's office for permits and ask for guidance. Look for barangay captain and place to sleep. Visit market.
Saturday	Start interviewing in Ramon/Oscariz.
Sunday	Finish interviewing Ramon/Oscariz.
Monday	Travel to Cabatuan. Mayor & barangay captain & place to sleep & guidance. Go to market. Start interviewing
Tuesday	Finish interviewing Cabatuan. Travel to Upi. Mayor and other things.
Wednesday	Upi: Start interviewing.
Thursday	Finish interviewing Upi. Finish everything and go back to Cabagan.

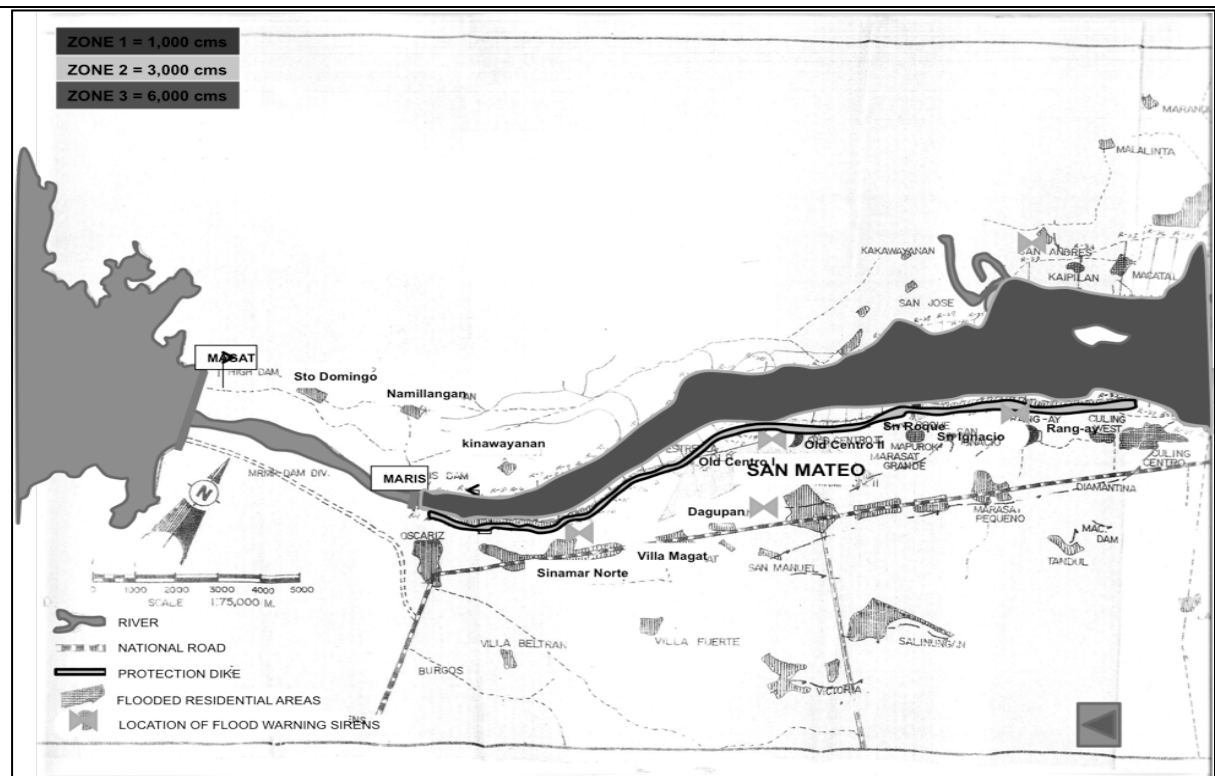


Figure 1: Upper portion of Magat River downstream of Magat Dam. The dark shaded area is prone to flooding. Source: NIA.

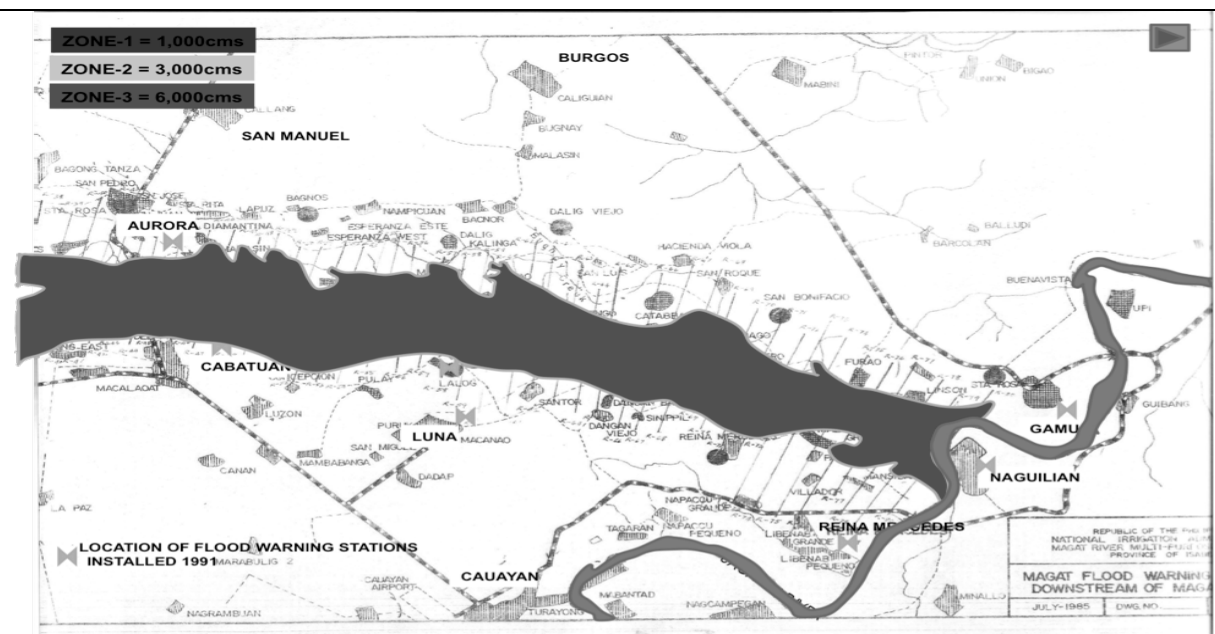


Figure 2: Lower portion of Magat River downstream of Magat Dam till the confluence with Cagayan River. The dark shaded area is prone to flooding. Source: NIA.

How did we gather information? We visited local authorities, like NIA, and interviewed them. With the local people we did also interviews. We made a questionnaire (Appendix 1) with questions that could be rated by respondents from 1 till 5. We used 4 'rating questions' and 6 open questions. Sometimes we asked more open questions but this depended on the person we interviewed. The interviews had to be short otherwise the respondents would lose attention and would not respond very well anymore. We conducted 10 interviews per village so the total number of interviews was 30. The people we interviewed were randomly chosen, from farmer to barangay captain. We considered every type of person in the barangays. We combined the facts we received from authorities (like the municipal office or NIA) with the stories and experiences of local people who live close to the Magat River. If you put them together you can actually see what the real problem is. After we did the interviews we analysed all the data and made graphs showing the gathered information. First we put all the information of each area in a graph and after that we made a graph to compare the three areas.

RESULTS

The categories 1 till 4 are our 'rating questions' where we asked the respondent if he/she could rate the problem from 1 to 5.

Categories:

- 1: Flood effects
- 2: Amount of information received from authorities
- 3: Sense of security
- 4: Happiness

1 What are the effects of floods downstream of the Magat dam?

We asked all the respondents about the effects of floods in their area. Figure 3 is a comparison graph of the three locations where we interviewed respondents. Location 1 is close to the dam and Location 3 is more downstream of Magat. According to our respondents the effects of the flood will increase if you are further from Magat dam. In area 1 the average rating of flood impact was 1.5 on a scale of 1-5. This means the respondents say the impact of floods is not very high. Area 2 is more affected with a rating of about 2.4. In this area there are some effects but also it is still below neutral (the neutral rating is 3). In the last area the rating was 4.9. This means the respondents perceive the impact of floods as really high.

We also saw the effects of the flood in the third area in reality. The farmers who live next to the river are suffering from soil erosion. The water of the river erodes the riverbanks. Some people risk losing their houses in the future as a result of erosion.

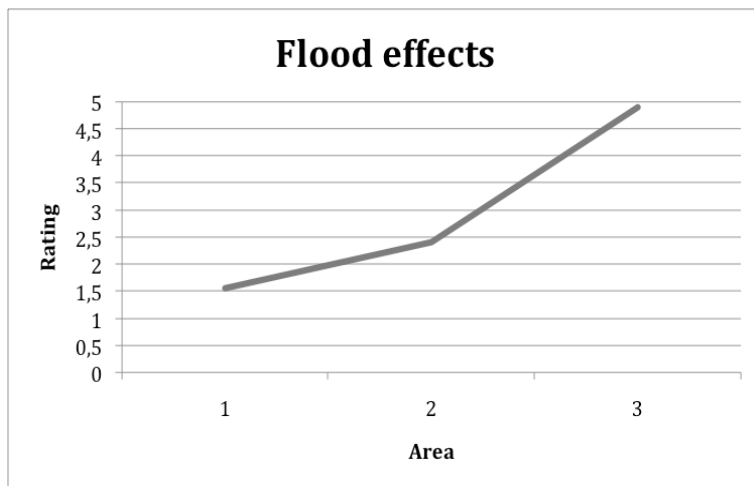


Figure 3: Average rating of flood impact by respondents in Ramon (1), Cabatuan (2) and Upi (3); 1 = no impact, 5 = severe impact.



Figure 4: Soil erosion along river bank in Upi

2 Are the warning systems working properly in the entire Magat River?

There is an existing warning system for floods resulting from releases from dams (Fig 5). The PAGASA, NIA and LGUs are responsible for forecasting, information dissemination and warning people. A protocol is being followed. In case of the Magat Dam, this is the “Protocol on Magat Dam Operation During Floods\Typhoon”. Collection of data and forecasting are done by PAGASA. Warnings regarding the spilling of water from the reservoir are being managed by the NIA and the information dissemination is being done by the LGUs. At the national level, there is a “National Disaster Coordinating Council”. This agency is concerned with the disasters in the country and has its local counterparts: the Provincial Disaster Coordinating Council and the Municipal Disaster Coordinating Council. In the municipality, barangays are mandated to have their own disaster plan. This is to be used or to be followed in case of disaster like floods. The main reason of having this kind of plan is to prepare the people of what may happen, and this may lessen the damage. Records are kept for future use. The authorities also provide evacuation places

where people could stay in case of floods. Relief goods (food like noodles, rice, sardines, coffee, etc.) are distributed to the affected areas after the floods as help for the people. And sometimes subsidies are given to repair the houses of the people affected.

The people in flood prone areas are oriented of what to do in case of floods. Some are trained to do rescue operations and how to avoid damages. They were told where the evacuation areas are. Volunteers in the community are also encouraged and the “bayanihan system” (people helping each other hand in hand) is used. At the barangay level, the barangay captain gives information to the residents.

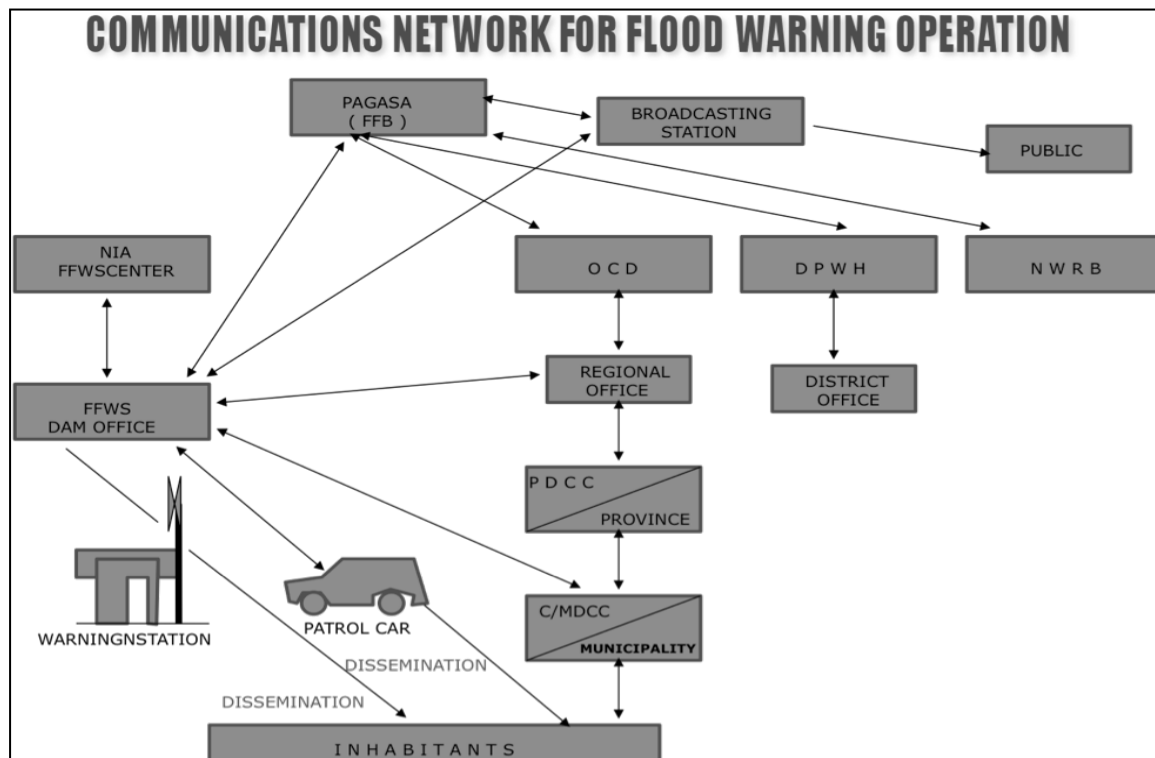


Figure 5: warning system for floods resulting from dam releases

We asked about the information respondents receive from the authorities regarding floods (fig 6).

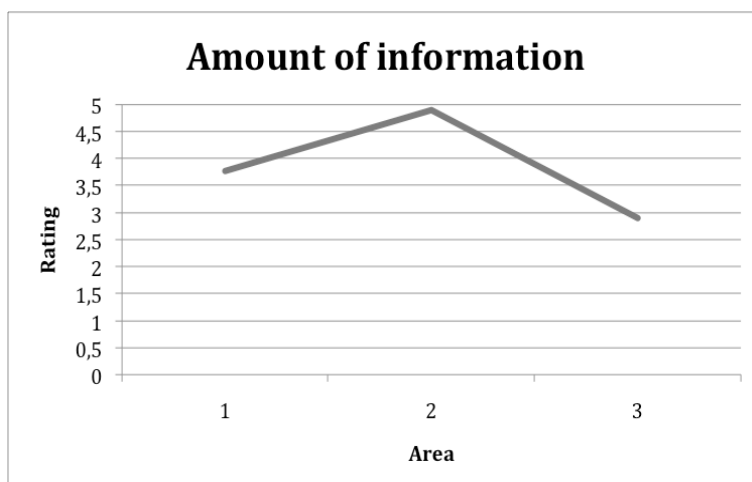


Figure 6: Average rating of information received by respondents in Ramon (1), Cabatuan (2) and Upi (3); 1 = bad, 5 = good.

Ramon received more than average information because they rated it at 3.8. Cabatuan respondents were most content with the information they received as they rated it at almost 5. Barangay Upi respondents only rate the information they receive at 2.9.

We also asked if the people were aware of a flood warning system in their area (Fig 7).

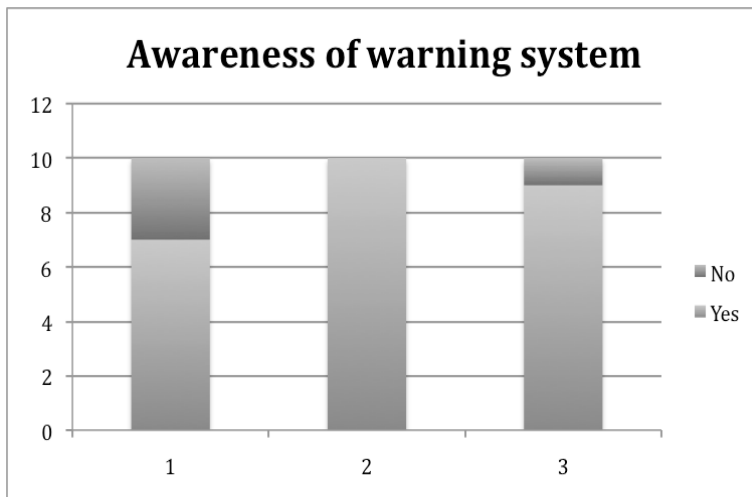


Figure 7: Number of respondents who were aware of a flood warning system (yes) in Ramon (1), Cabatuan (2) and Upi (3)

Most respondents in all three barangays were aware that flood warning systems exist in their area.

Is the warning system useful for the people especially in flood-prone areas?

Figure 8 shows the sense of security of respondents in the three study areas.

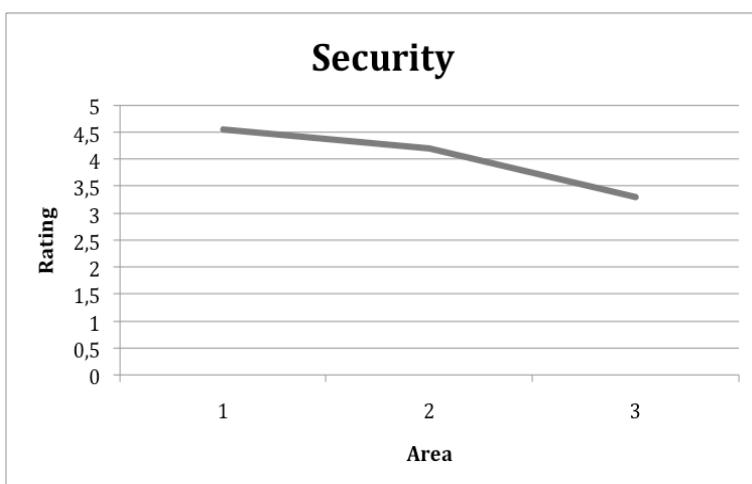


Figure 8: Average rating of sense of security in relation to flooding in Ramon (1), Cabatuan (2) and Upi (3); 1 = bad, 5 = good.

Most respondents feel secure with regards to flooding risk but the sense of security decreases further away from Magat Dam.

Recommendations

Based on the interviews with the residents being affected and the authorities involved, we noticed several common ideas and suggestions. The majority of respondents preferred protection from the river rather than a better warning system (Fig 9).

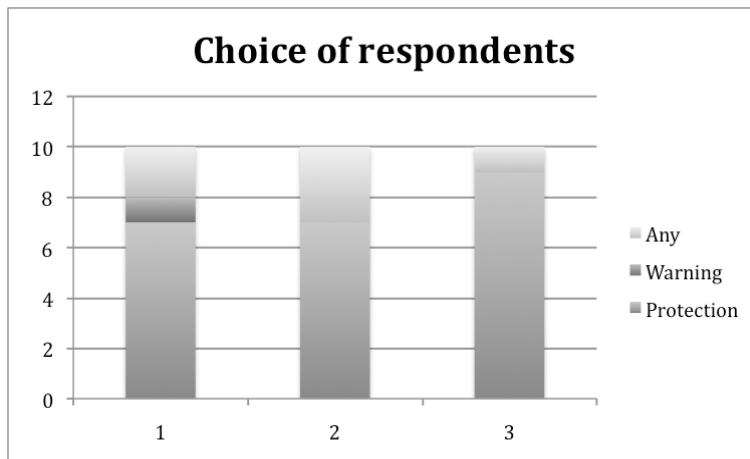


Figure 9: Number of respondents who prefer a better warning system or a better protection from floods or both (any) in Ramon (1), Cabatuan (2) and Upi (3)

People affected by floods are content with the warning system. For them to be more secure it is then recommended to protect people from floods by means of dykes. Dykes would greatly contribute to the welfare and security of the residents involved.

Acknowledgements/ references

We would like to give our sincere gratitude to the following people and organizations: The barangay officials of Brgy. Gen. Aguinaldo, Ramon, and Brgy. Del Pilar Cabatuan, Isabela for their hospitality and for being our host during our stay in their place, and for serving as our guide in our journey in the barangay. The residents of Brgy. Gen. Aguinaldo, Brgy. Del Pilar, and Brgy. Upi for being very cooperative in our interviews. The National Irrigation Association (NIA), for giving us the map, and a lot of very useful information that serves as our bench mark data, without it we could not complete our study and for letting us see some of their equipment used for their operation. The chief tanod of Brgy. Upi for serving as our guide during our interviews in their place. The Municipality of Cabatuan for giving us the profile of Brgy. Del Pilar

Appendix I: Questionnaire

Name: _____ Age: _____ Gender: _____

Address: _____ Occupation: _____

QUESTIONS	Rating (1-5)
1. Do you receive enough information from the authorities regarding floods?	
2. Does the flood affect your crop yield?	
3. Do you feel secure with the presence of the flood-warning system?	
4. Are you happy with your situation with regards to flooding in your area?	

Rating: 1 is not at all, 5 is very much

Open Questions

1. Are you aware of the presence of flood control facilities in your areas?
2. Do you want something to be changed with regards to flood-warning?
3. Does flooding provide you with benefits?
4. What kind of problems do you have with regards to floods?
5. What do you like more: a better warning system or a better protection from the river?

Appendix II: The disaster plan of NIA

I. BEFORE THE ARRIVAL OF A TYPHOON

1. Coordinate with PAGASA

- a. Know the expected date of arrival of the typhoon in the watershed area.
- b. Information on an approaching tropical cyclone and intensity of rainfall.
- c. Any disturbances aside from tropical cyclone.

2. Warning Steps

- a. Manual inspection / check up warning stations and equipment.
 - b. Five (5) to eight (8) hours before pre – release, activate the warning systems.
- #### 3. Pre - Release / Drawdown the Magat Reservoir
- #### 4. Inform concerned Agencies such as OCD, LGUs, PNP and NGOs

II. DURING THE TYPHOON

1. Dam Discharge and Flood Operation

- a. Inflow forecasting
 - Based on the amount of telemetered rainfall observed and recorded
- b. Flood Precaution Period
 - Warning on intensive rainfall issued by PAGASA.
 - Inflow is increasing and exceeds 1,600 cu.m/sec. (Note : 1,600 cu.m/sec inflow is considered start of flood.)
- c. Release of stored water in the reservoir
- d. Issuance and dissemination of the dam discharge warning to the public
 - Thru the warning stations
 - Thru commercial radio stations and local TV network
 - Thru SMS to all agencies concerned.

III. AFTER THE TYPHOON

1. Hydrological observation and study

- a. Regulation of outflow from the Dam so as not to exceed the flood inflow.
- b. Filling the reservoir with the flood inflow by the end of the flood.
- c. Mitigation of flood damage to the target area by means of flow regulation.

II Tumauni



Nearly dry Tumauni River at the Rice irrigation canal inlet with the denuded watershed at the background

2.1: Forest cover and land use in an upland area of Tumauni

Jacinto O. Calingay Jr. and Thomas F. Wissingh

INTRODUCTION

The province of Isabela in north east Luzon is home to the community of Tumauni. This community is located in the basin of the Pinacanauan de Tumaunini River. The Tumauni River originates in the Sierra Madre Mountains and is a major subsidiary river of the Cagayan River. The Tumauni River is a key source of water for irrigation purposes, serving an area of 2,200 hectares of agricultural land. The watershed has a total of 25,834 hectares and covers six barangays. Among them is the Barrio Antagan which was founded in 1939. This barangay was later divided into Antagan first, Antagan second and Namnama (DENR, undated)

Antagan I has a total of 34.841 square kilometers and a total population of 2,580 persons. There are 690 farmers in the area representing at least four ethnic groups (Itneg, Ibanag, Agta, Kalinga). 95 % of the population (2,451 individuals) speaks Ilokano and the rest speaks Tagalog (120 individuals) and Bisaya (9 individuals) (Barangay Secretary Antagan 1, 20 January 2011).

Antagan II has a total area of 7.708 square kilometers and a total population of 1,414 persons accommodated in 348 households. There are 499 farmers in the area of which the majority produces palay (rice) and the minority produces corn and other agricultural crops. 92% of the population (1,132 individuals) speaks Ilokano and the rest speak Kalinga (57 individuals), Kasiguran (2 individuals), Tagalog (19 individuals) and Ibanag (1 individual) (Barangay Antagan II hall, January 2011)

Namnama has a total area of 9.063 square kilometers and a total population of 1,593 persons accommodated in 280 households. In the area are 121 farmers located with a majority producing palay (rice). 98 % of the population (1,563 individuals) speaks Ilokano and the rest speak Ibanag (6 individuals) and Tagalog (24 individuals) (Barangay Namnama hall, January 2011)

All three barangays are included in the Tumauni watershed. Part of the area upstream in the watershed was declared as Tumauni watershed forest reserve covering an area of 17,760 hectares. This area was once dominated by dipterocarp tree species and was once rich in biodiversity. Due to a fast increase in population and logging operations, the forest cover drastically decreased. The Tumauni watershed forest reserve was part of the former Timber License Agreement (TLA) of the Isabela Sierra Lumber Corporation (ISLC) and of the Northern Isabela Lumber Producers Corporation (NILPCOR). In the early 1990s a total logging ban was implemented in an effort to save the watershed from further degradation and timber depletion (Source, DENR). Nowadays, the forest cover is still decreasing, causing a denuded watershed and threatening the irrigation system. Causes of the decrease of forest cover are illegal logging, such as water logging, and slash and burn farming. In slash and burn farming, also known as swidden farming, the forest is transferred into agricultural land by local farmers.

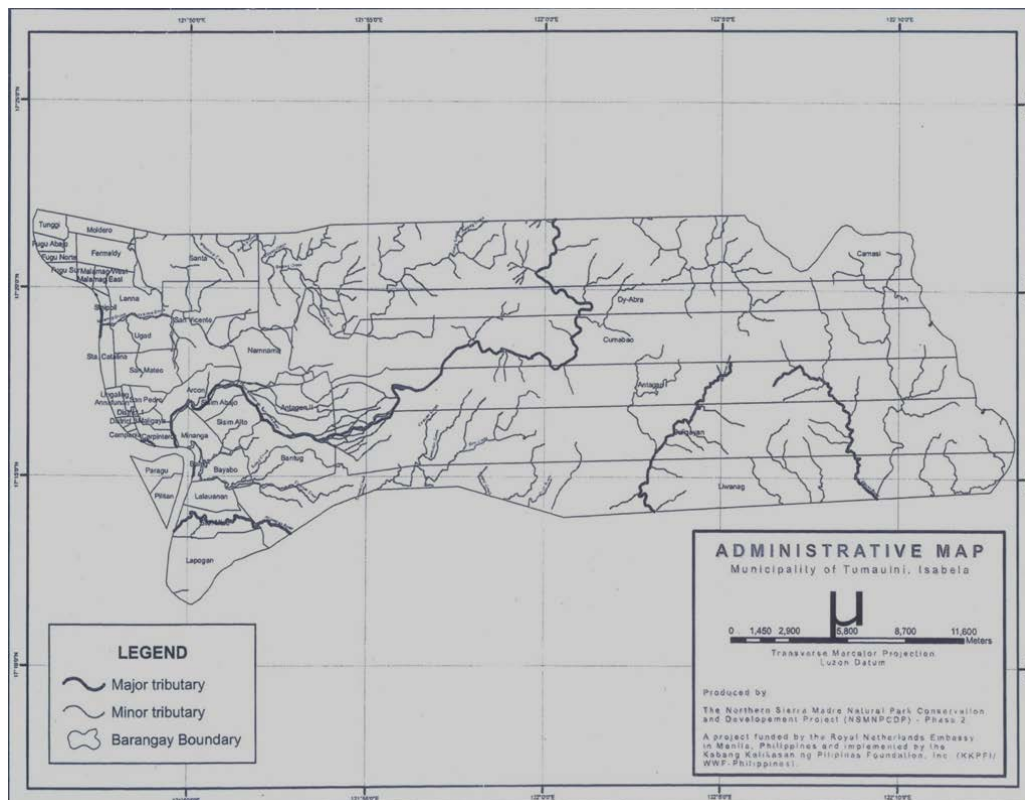


Figure 1: Administrative map of the municipality of Tumauni, Isabela (Municipal office Tumauni January 2011)

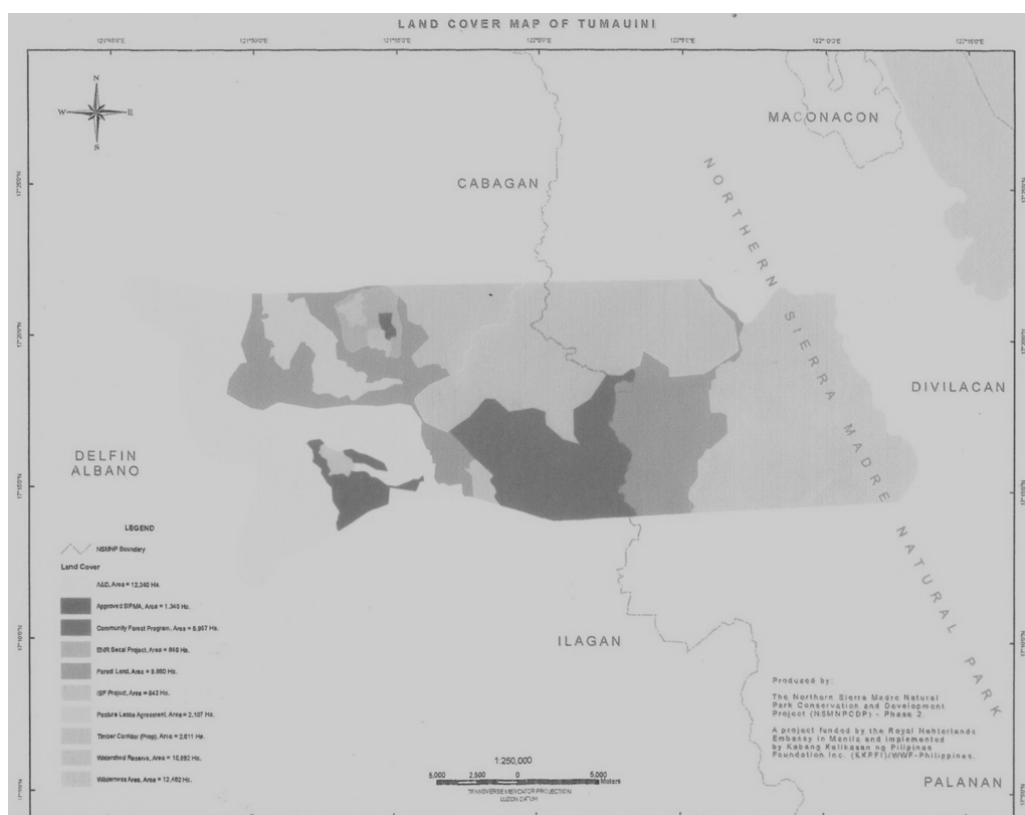


Figure 2: Land cover map of Tumauni (Municipal office Tumauni January 2011)

RESEARCH QUESTION AND HYPOTHESES

We have tried to identify the present forest cover in a coordinated map, trying to locate the farms upstream in the watershed. Our research questions concern the present forest cover and land use of the upstream area in the Tumauni watershed.

Research question:

- What is the present forest cover in the upstream area of the Tumauni watershed?

Sub questions:

1. What is the present land use in the upstream area of the Tumauni watershed?
2. Does slash and burn farming occur, if so why does it occur?
3. Does illegal logging occur, if so why does it occur?
 - a. Are the farmers aware of the impact of illegal logging and slash and burn farming?

Hypotheses: We expect that slash and burn farming and illegal logging occur and that the local farmers are not aware of the consequences of illegal logging and slash and burn farming. We also think that the upland area of the Tumauni watershed is mainly dominated by agricultural land. We think that the occurrence of illegal logging and slash and burn farming are mainly money related.



Figure 3: water logging in the Pinacanauan river

METHODS

We used a GPS device to determine the coordinates of the locations of farms, slash and burn farms and illegal logging sites. We also used GPS to determine the locations of springs and of charcoal making sites. These coordinates were transferred into the GIS program ArcGis 9.0 to produce a map of the area.

Other methods we used were a questionnaire (appendix 2) to interview farmers to see whether they have knowledge of the activities occurring further upstream and their possible impacts downstream. Some sample questions are included in appendix 2. The questions changed along the way, adjusting them to the persons individually.

We interviewed 19 farmers in total coming from Antagan first and some farmers from the upland area. We also gathered information from the municipal office in Tumauni regarding a map of the upland area of the Tumauni watershed. And we gathered information at the DENR in Cabagan regarding information about ongoing programs in the upland area of the Tumauni watershed as well as a map of the upland area regarding to vegetative cover, land classification and an erosion map.

Table 1 Fieldwork schedule

<i>Date</i>	<i>Location</i>	<i>Activities</i>
14 January 2011	Antagan I	Interviewed 5 people
15 January 2011	Antagan I, upland	Interviewed 4 people, went to the cave with brother Jonard
16 January 2011	Antagan I	Interviewed 5 people
17 January 2011	Upland	Went hiking with Uncle Junior, Interviewed 5 people, taken coordinates
18 January 2011	Upland	Went hiking to a cave, Took coordinates
19 January 2011	Dam, river	Took coordinates on opposite of the river
20 January 2011	Antagan I, Cabagan	Returned to ISU Campus
21 January 2011	Cabagan	Worked on report, gone to DENR

RESULTS

Results from the questionnaires concerning the problems that the farmers encountered, upstream and downstream, where as followed:

- All the farmers endured problems during typhoon season, problems like the destruction of their crops due to Typhoon Juan (International code name Megi, October 2010).
- Regarding the influence of El Niño on the water supply, 12 out of 18 (66%) interviewed farmers suffered a lack of water due to drought. This is equally true for the upland farmers as for the lowland farmers, because El Niño influenced also the irrigation system.
- Economical problems, like the price of fertilizer. 3 out of 18 (17%) interviewed farmers were not able to buy enough fertilizer for their crops. The other economical problem is the low prices of corn and rice (4 out of 18 (22%) interviewed farmers) said their profit is not high enough.
- Especially the upland farmers endure problems with rats, birds and insects which destroy their crops. This is particularly the case for corn farmers (10 out of 18 (55%) interviewed farmers)
- 2 out of 18 (11%) interviewed farmers have a problem with the composition of the soil, the soil consist of limestone which is very poor in nutrition. In combination with a high price for fertilizer this results in very poor conditions for the crops.
- 3 out of 18 (17%) interviewed farmers endure problems due to forest fires, which destroys the crops of the farmers.
- 15 out of 18 (83%) interviewed farmers endure problems due to illegal logging that results in landslides, flooding and a lack of water from the irrigation system.

Table 2 Summary of interview results in Antagan I and upland among 18 farmers

<i>Variable</i>		<i>Average</i>	<i>Min</i>	<i>Max</i>	<i>Upland</i>	<i>Lowland</i>
Gender	33 % female, 67% male					
Age	Female: 40, Male: 47	47	20	67		
Hectares		1.667 ha	0.5	4	Average: 1.9	Average: 1.375
Times of cropping		2 times	1	3	Average: 1.9	Average: 2.125
Location of farm	44% lowland, 56% upland					
Profit		Rice: 89 bag p. ha Corn: 59 bags p. ha				

Table 3 Summary of interview results in Antagan I and upland among 18 farmers about their source of water

<i>Variable</i>	<i>Irrigation only</i>	<i>Rain</i>	<i>Spring add.</i>	<i>Creek add.</i>	<i>Pomp add.</i>
Source of water	38%	62%	33%	6%	6%

Add.: additional source of water aside to rain.

Table 4 Summary of interview results in Antagan I and upland among 18 farmers (crops).

<i>Variable</i>	<i>Corn</i>	<i>Corn add.</i>	<i>Rice</i>	<i>Rice add.</i>	<i>Mango</i>
Crops	44%	28%	50%	17%	6%

Add.: additional crops aside to corn or rice.

The complete interview results are included in appendix 1.

Another result gained from the questionnaire is that 80 % of the interviewed upland farmers produced charcoal as a side income. Wood for the charcoal was gathered from living trees as well as from fallen branches. The average profit from one bag of charcoal is around 80 pesos for each bag, depending on the market value.

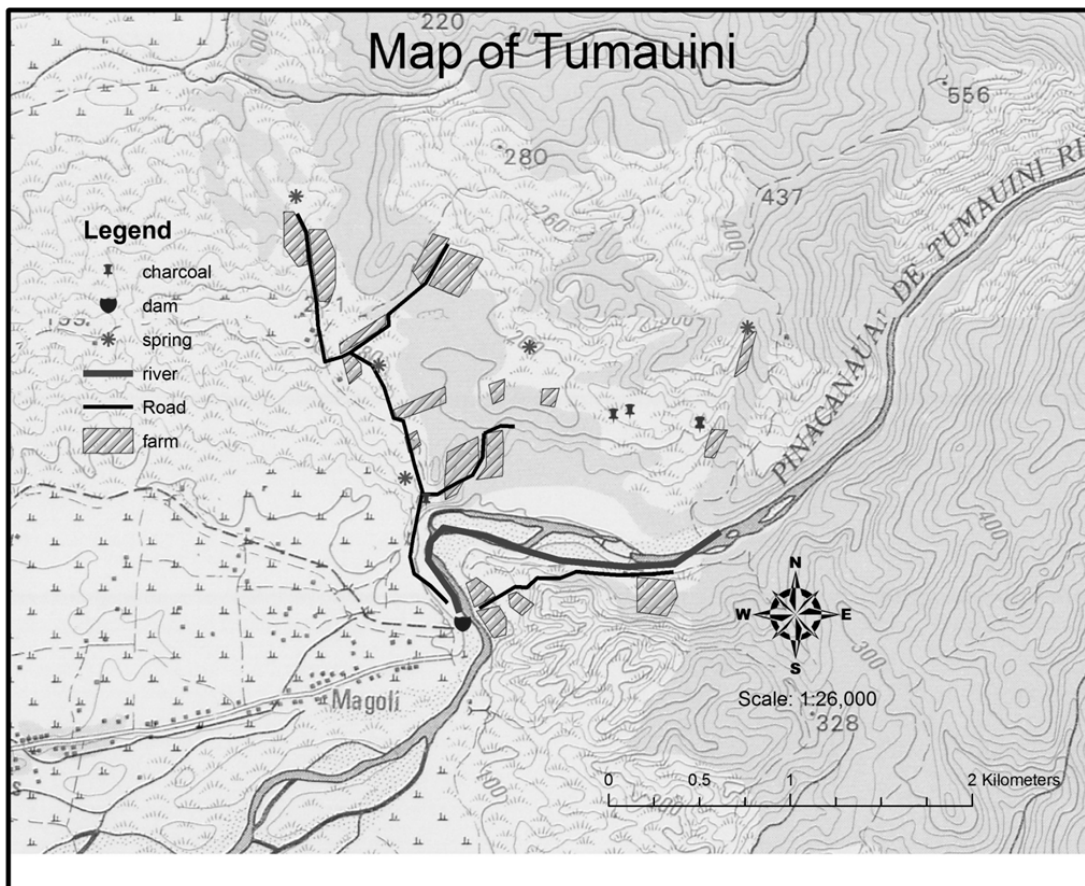


Figure 4: Map of part of the Tumauni watershed based on the coordinates acquired during the trips in the upland area.

DISCUSSION

Based on the findings of the study, we could derive the following conclusions/findings. The present land use of the upstream area of the Tumauni watershed is mainly agricultural, consisting of slash and burn farms as well as normal farms. First we established that illegal logging occurs, the farmers downstream pointed it out as one of the problems they encounter as farmer. We also witnessed water logging during our stay in Antagan I. Other problems farmers up and downstream encounter are problems related to typhoon season and El Niño.

Reasons for illegal logging are often money related, because illegal logging is a profitable profession. The illegal loggers are mainly people who don't own a farm of their own and don't have a standard income. Almost all the people we interviewed were well aware of illegal logging and are even aware of the problems caused by illegal logging. Problems like contamination of the drinking water, due to landslides and erosion, and also the forest which is slowly decreasing. Although the problem is clear to the farmers, there is almost no action taken against illegal logging.

We also saw that slash and burn farming occurs in the upland area, usually because the farmers in the upland area have their farms located on limestone. This is very poor in nutrients and by slash and burn farming the nutrients from the burned plants fertilize the soil.

We found that a majority (80 % of the respondents) of the upland farmers are involved in charcoal making as a side income. This might become another factor influencing the forest cover, because the farmers use not only fallen branches but also living trees.

PROBLEMS ENCOUNTERED

Some problems we have encountered during our field work are first of all that it was not easy to gather all the coordinates in the mountains. Because due to rain the mountains were slippery and the river was higher than usual. This made it harder to reach all the locations. Second we wanted to hike to Makihawe, but due to the weather and the long distance to travel we didn't succeed to go there; we were also told that Makihawe was no longer inhabited. We did though manage to find and interview some indigenous people.

ACKNOWLEDGEMENTS

We like to thank the Barangay Hall of Antagan I, Antagan II and Namnama for their information regarding the population of the three Barangays.

We like to thank the municipal office in Tumauni for their cooperation with our project And the DENR in Cabagan for sharing their information regarding the upland area of the Tumauni watershed.

We like to thank all the interviewed farmers for their cooperation and for sharing their information with us and especially for the smooth cooperation during the interviews.

We like to thank Uncle Junior and Anté Natty for letting us stay at their place all week long, and also special thanks to Uncle Junior for joining us in our wild adventures up in the mountains.

7 References

1. DENR. Undated. Profile of Antagan I.
2. In litt, Barangay Secretary Antagan I, 20 January 2011. Profile of Antagan I.
3. Barangay Hall Antagan II, January 2011. Profile of Antagan II
4. Barangay Hall Namnama, January 2011. Profile of Namnama
5. Municipal Office of Tumauni, Undated. Land cover map of Tumauni
6. Municipal Office of Tumauni, Undated. Administrative Map

Appendix 1: Answers gained from the questionnaire

<i>No</i>	<i>Gender</i>	<i>Age</i>	<i>Ha</i>	<i>Crops</i>	<i>Harvests</i>	<i>Source of water</i>	<i>Upland / lowland</i>	<i>Profit</i>
1	F	20	1 ha	Corn	2	Rain	Upland	Oct 50 p. ha mar 40 p. ha
2	M	67	0.5 ha	Mango, Casava	1	Creek, small spring	Upland	-
3	M	-	3 ha	Corn, Casava	2	Small spring, rain	Upland	Aug 60 p. ha, may 40-60 p. ha
4	M	-	1 ha	Corn, vegetable	2	Small spring, rain	Upland	Apr 3 p. ha Oct 6 p. ha
5	M	53	0.5 ha	Rice	2	Irrigation	Lowland	Apr 65 p. ha Oct 70 p. ha
6	M	46	1 ha	Corn, fruit trees	3	Irrigation	Lowland	Aug 50 p. ha Jan 60 p. ha
7	F	26	1 ha	Rice	2	Rain	Upland	Apr 50 p. ha Nov 30 p. ha
8	F	38	1 ha	Corn	2	Rain	Upland	Apr 20 p. ha Oct 15 p. ha
9	F	-	-	Charcoal	-	-	-	-
10	M	41	2 ha, 1 ha	Corn, rice	2,2	Rain, spring	Upland	Feb 50 p. ha Sept 50 p. ha, Feb 110 p. ha Sept 120 p. ha
11	M	48	3 ha	Corn, vegetable	2	Rain, spring	Upland	Oct 30 p. ha Mar 100 p. ha
12	M	53	1.5 ha	Corn	2	Irrigation, rain	Lowland	Apr 180 p. ha Sept 140 p. ha
13	M	45	0.5 ha	Rice	3	Irrigation	Lowland	Apr 60 p. ha Sept 50 p. ha
14	M	43	1.5 ha	Rice, coconut	2	Irrigation	Lowland	Apr 150 p. ha Sept 130 p. ha
15	F	-	1.5 ha	Corn, Casava	2	Rain	Upland	Jan 100 p. ha
16	M	63	2.5 ha	Rice	2	Irrigation	Lowland	Apr 130 p. ha Sept 100 p. ha
17	F	52	2.5 ha	Rice	2	Irrigation	Lowland	Apr 120 p. ha Sept 90 p. ha
18	M	63	1 ha	Rice	1	Water pump, ground water	Lowland	70-50 p. ha
19	M	45	1 ha, 3 ha	Corn, rice	2	Rain, spring	Upland	-

Appendix 2: The questionnaire

Questionnaire:

1. What is your name?
2. What is your age?
3. What is your main profession?
4. How big is your farm?
5. What are the crops you harvest?
6. What is your source of water?
7. Where is your farm located?
8. How many times you plant your crops?
9. What is the profit you make each harvest?
10. What are problems you encounter?

Additional questions for farmers in the upland:

1. How was the area before you came here?
2. Did you conduct slash and burn farming?

Additional questions were asked where necessary

2.2: The tumauni irrigation sytem: rules and regulations in theory and practice

Imee Oliveros & Pauline Hutten

INTRODUCTION

In this document you'll read about the research of NIA irrigation policy, as described in theory and the way it is used by farmers. We conducted this research in Antagan first, a barangay in Tumauni, Isabela. In this village the lowlands are intensively cultivated. There are a lot of farmers, who plant mostly rice. They depend on the water upstream from the mountains of the Northern Sierra Madre. New farmers migrate to this area, practicing slash and burn farming (kaingin) and logging as their source of livelihood. Together with the absence of rain in the dry season, this is creating problems for the farmers downstream. They have less water to divide among different farms, causing drought spells. This is an interesting research topic, because there are multiple actors involved in the management of the irrigation system.

NIA, the National Irrigation Association, is responsible for the irrigation development in this area. According to their website, it is their mission to provide an adequate level of irrigation service on a sustainable basis in partnership with the farmers. Therefore, NIA supervises the operation and maintains, constructs, improves and repairs the pump irrigation system¹. The farmers on the other hand, are responsible for the partial of full management of the irrigation system. They are united in Irrigation Associations (IA's), organized per Barangay. These associations work according to an Irrigation Management Transfer program (IMT), in which the policies and rules about the management of the system are laid out. To become duly organized, functional and self-reliant, IA's move through different steps in this IMT program. In this research, we tried to find out how the policies of the NIA, as set out in the IMT, are implemented in the Barangay and how the corporation between NIA and the IA's is really working. Therefore we have the following research question:

What are the differences between irrigation policies as proposed by NIA and the actual way the Irrigation Associations are managing the irrigation system?

We introduced a few sub-questions, to find out more about the way the irrigation is managed in Tumauni. These questions are listed below;

How does the irrigation system work in Tumauni?

Who is responsible for the irrigation system in Tumauni?

How do NIA en the IA's cooperate on paper?

How do NIA en the IA's cooperate in practice?

¹ NIA, Irrigation Management Transfer in Tumauni

METHODS

By answering these questions we tried to gather enough information about NIA, about the farmers in different Barangays and about their associations in which they are involved. We gathered this information from fifteen farmers in Antagan first, five farmers in Namnama, a water recourse facilities technician from NIA, an institutional development officer from NIA and the presidents of four Farmers associations; Tumauni Irrigation Pilot Area (TIPA), Samahang Mambubukid ng Tumauni (SMAT), Namnama Irrigators Association and Bantug-Lungot IA. We also talked to Dr. Marino R. Romero of Isabela State University. In this document we reported our findings, and tried to give you a complete and useful overview of our findings. The different questionnaires and the sub-questions are included in this report as appendix A and B. Because of a limited amount of time we were not able to research this subject thoroughly. Therefore, in chapter 4 of this research, we included recommendations for further research towards different difficulties regarding this subject.

Data gathering

We talked to 15 farmers in Antagan first, but two of them did not have an irrigated farm. Therefore, they were not associated by a farmers association and had nothing to do with the NIA policies regarding the irrigation system. That is why we left them out of this report. Most farmers we talked to stated that there were no real problems with water and the policies, other than having too little irrigation water because of the lack of rain. These farmers were living upstream.

To investigate whether or not farmers downstream had more problems and a different view on the policies, we also interviewed the president of the farmers associations of Antagan second, Namnama and Bantug. We only talked to four farmers in Namnama due to lack of time. More research is needed, including more data from different barangays up and downstream. To gather enough data about the policies that NIA set up together with different associations, we talked to two employees. They gave us valuable information about the Irrigation Management Transfer and the most important rules and policies that the IMT includes.

To research the policy implementation we concentrated on the two parts that Filemeno Tagufa (water recourse facilities technician from NIA) and Marilyn T. Salvador (institutional development officer from NIA) thought were the most important parts of the IMT. Therefore, we concentrated most on the water delivery schedule that is used in Tumauni and the rules about the use of the water in the main canal. We also compared the fixed irrigation fees that NIA raises with the fees that the farmers are paying. Not all farmers knew their irrigation fees and couldn't answer this question. As you can see in the result table, we do know that most farmers are paying their fees on time and that they are happy about the paying arrangements.

Set up report

First we will clarify the way NIA and the different irrigation associations are cooperating. We will align the IMT and point out the most important parts according to our respondents. Then, in our results, we will show a table of different respondents just to give an overview. We will show another table with the answers that are given by the farmers, NIA employees, Dr Marino and the presidents of the associations. We will outline these results and conclude with different recommendations in the next chapter.

RESULTS

How does the irrigation system work in Tumauni?

The irrigated farms of Tumauni all get their water from the Tumauni Irrigation System. According to Dr. Martinez (personal communication 2011) this project has a designed service area of 6,100 areas. Its intake is located at Sitio Magoli, Barangay Antagan 1st. It derives its water from the Pinacanauan River, one of the largest tributaries of the Cagayan River. The intake has four gates with dimensions of 1.20 M x 1.70 M. From the intake, the water is flowing into the main canal. This main canal goes from Antagan 1st to Namnama, Arcon, San Pedro, Ugad, Lanna and San Vicente. To irrigate all farms in these barangay, en to reach the barangay that isn't connected to de main canal there are several lateral canals flowing through Tumauni. These five lateral canals connect to the farmer's supplementary ditches.

One of the unique features of the system is the reinforced pressure pipe that connects the main canal to lateral canal C. It is a 1.5 km pipe, crossing the Pinacanauan River. This siphon can irrigate an approximate area of 2,300 hectares on the southern part of Tumauni. To work, it relies on the water level in the canal being at a higher level than the water level in the field that is being irrigated on the other side of the river.

The lateral canals lead to supplementary ditches. These ditches are connected to the different farms by turnouts. These turnouts are managed by the IA's. They have the possibility to close down the turn-outs when there are problems with the water supply. This way, the available water can be equally distributed between the different famers and/or different barangay (per. com. Marilyn T Salvador)

Who is responsible for the irrigation system in Tumauni?

There are multiple actors involved in managing, maintaining, constructing, improving and repairing the irrigation system. At the national level, overall responsibility is vested in the National Irrigation Administration (NIA). They are a government owned and controlled corporation primarily responsible for irrigation development in the Philippines. They are charged with the developing both large and small irrigation systems, and with operating and maintaining the large 'national' systems.² It is their mission to "develop and manage water recourses for irrigation and provision of necessary services on a sustainable basis, consistence with the agricultural development program of the government"³. It is the objective of NIA to do this in

² Bautista, B. Experiences with organizing irrigators associations: a case study from the Philippines

³ NIA, Irrigation Management Transfer in Tumauni

good partnership with the farmers. Therefore they cooperate with the Irrigation Associations (IA) from different barangays. IA's are described as "the basic that shall receive and take-over the NIA's management functions". The cooperation between farmers and NIA started in 1980 with the Participatory Irrigation Management. The approach involved using community organizers who entered and lived in rural communities and helped farmers organized themselves into small irrigation associations (IAs). The IA's are developed to establish and sustain professional management. These associations then entered into contracts with the NIA. A driving incentive for the program was the need to increase cost recovery by the government, and, in particular, NIA's need to fulfill its mandate to be financially self-reliant⁴. The Participatory Irrigation Management later involved into the Irrigation Management Transfer. This program is set up to improve the performance of the national irrigation system (NIS) through the transfer of management functions and operations and maintenance of NIS's from NIA to duly organized IA's. It is edited in different models, in which IA's eventually become completely self-sufficient. Depending upon the transfer model applied, the roles and responsibilities of the IA include a combination of the following;

- Equitable water distribution from the receiving point to the application points of the farms to support the IA cropping and planting pattern.
- Routine and periodic maintenance of the facilities transferred to them.
- Bookkeeping and fund management of Irrigation System Fees collection and other IA financial recourses.
- Mobilizing financing farmers, regulate and monitor use of the NIS.

In Tumauni there are 12 IA's active, one for each barangay. They have not yet completed the transfer model and are therefore only partly responsible for the irrigation system and its usage. The IA's have their own president and multiple board-members who together are responsible for informing the farmers about rules and regulations and who monitor the turn-outs and the overall operations of the sub-lateral canals. In Tumauni, the presidents of the different IA's are joint in the Council of IA's. They are together responsible for the lateral canals. So far, NIA maintains the responsibility for the overall monitoring of the irrigation system, for the infrastructure and repairing of the main canal.

How do NIA and the IA's cooperate on paper?

The corporation between NIA and the IA's is documented in the IMT. In this program there are four models. In the course of implementing the models, it is inevitable that there will be changes in the cooperation between NIA at various stages and depending on the model. According to Marilyn T Salvador (pers. com. 2011) all 12 Barangay are transferred to model 2 as of 2011. The cooperation in this model is constructed as follows;

"The NIA continues to manage the head works (dams, intakes and similar structures) and the main canal, but its role is diminished substantially since the IA will take over the daily operational management of the (sub) lateral canals" (pers. com. Marilyn T Salvador 2011).

⁴ http://www.inpim.org/files/Documents/rab_phil.pdf

According to the president of the IA counsel, the obligations of NIA consist of the preparation jointly with the IA of the cropping calendar, programmed area, water requirements and water delivery schedule (pers. comm. Samuel Lugo 2011). The IA is responsible for the implementation of these operation plans. NIA also assists the IA's in formulating and implementing rules and regulations. They have to distribute the water equitably within the coverage of the IA and safeguard the water rights of all members including those in the expansion and rehabilitation areas⁵. The actual operation-related policies, rules and regulations are established in the contracts with the IA's. The most important rules and regulations in which the cooperation between the NIA and the IA's stand out are (pers. comm. Marino Romero 2011):

- The distribution of the water delivery schedule. This schedule is made by NIA and the Counsel. The IA's make sure that the turn-outs are managed according to the schedule. The schedule says that the three divisions are supposed to get water every six days starting from January, and that there is a shut down for every division. A copy of the schedule is included in the appendix.
- The maintenance of the canals. It is forbidden to wash your animals in the lateral canals, to throw trash into the canals and to make your own turn-outs. This is to prevent damage to the canal from erosion.
- The collection of Irrigation Fees. According to Filemeno Tagufa (pers.comm. 2011) farmers have to pay 1500 pesos per hectares in dry season and 2250 pesos per hectare in wet season. When the crops of the farmers are damaged, due to the weather conditions, the farmers get a discount. When all crops are damaged, farmers are excused from paying the fees. There is a sharing system between IA's and NIA. 60% of the fixed fees go to NIA, and 40% goes to the IA's. With that money, NIA has to repair and maintain the main infrastructure of the irrigation system while the IA's manage the (sub) lateral canals

Both NIA and the IA's have to make sure these rules are followed. Therefore, the institutional development officer and the president of the IA will organize two walk-troughs per season, to monitor illegal turn-outs and other offences. NIA and the IA's constructed disciplinary punishments for farmers that don't follow the rules or don't pay their fees on time.

How do NIA and the IA's cooperate in reality?

In all barangay the IA's are organized according to the IMT contract. Every IA is led by a president and several board of directors. However, according to Dr. Marino R. Romero (pers. com. 2011) there are several differences between the rules and regulations and the actual way policy is implemented. Dr. Romero pointed out that the most important parts about the IMT are about the ISF, the water schedule and the maintenance of the canals.

There are some difficulties with the collection of irrigation fees. Even though almost all famers stated that they paid their fees on time, the IA's often don't get their 40% share. This is because the farmers can get discounts whenever they don't have a 100% output. NIA only uses the sharing system when the overall collection is above 60%.

⁵ NIA, Irrigation Management Transfer in Tumauni

There are major problems with the water delivery schedule. In the IMT is stated that the water should be divided equally between the different divisions. From January 1st until May 15th, there is a water delivery schedule in place, regulating that every 6 days the divisions have water. In reality, according to most of the farmers, the water schedule is only used in dry seasons. All farmers seems to be happy about this distribution, but according to dr. Romero there are a lot of farmers downstream that are having problems. Even in dry seasons, the water schedule isn't followed correctly by the barangays upland, causing drought in the lower areas.

These problems are also caused by illegal turn-outs to farmers. These turnouts are directly linked to the main canal and are not regulated by the IA's. Whenever they shut down the water according to schedule, the farmers are still able to use water coming through the illegal turn-outs (pers. com. Marilyn T. Salvador). According to NIA, all barangays except for Bantug are having trouble with the illegal turn-outs. The president of this Barangay, Fransisco Cacal informed us that this might have something to do with the number of walk-through they organize or with the number of farmers living in the barangay. Looking at the table of the answers from farmers, it might also have something to do with the fact that some farmers are not associated with and IA or don't go to meetings.

The lower areas are also having trouble with erosion of the lateral canals. This is mostly caused by upper farmers who wash their animals in the canals (pers. com. Marino R. Romero 2011). All famers we talked to in Antagan 1st knew about that rule, but we observed twice that there where animals standing in the water. In Namnama 3 out of 4 farmers didn't even know that it was forbidden to wash animals in the canals, and told us they wash their animals one a week in the lateral canal. It is the responsibility of the board of directors from the IA's to implement and monitor the rules. The presidents of TIPA, SMAT and Namnama informed us that there were no penalties given to offenders last cropping season. That might indicate that they aren't strict enough.

DISCUSSION

What are the differences beween irrigation policies as proposed by NIA and the actual way the Irrigation Associations are managing the irrigation system?

The National Irrigation Association and the Irrigators Associations share the responsibilities of the irrigation canal according to the Management Irrigation Transfer programme. NIA is responsible for the infrastructure and the maintenance of the main canal, while the IA's are responsible for the (sub) lateral canals. Rules and regulations are formulated in good partnership with NIA and the IA's, while only the IA is responsible for the implementation.

The most important rules about the irrigation system concern the irrigation fees, the maintenance of the canal and the use of the water delivery schedule. The differences between the policy in theory and the implantation are mostly due to farmers not following the rules and to IA's not using the water schedule. This is causing many

problems in the downstream areas. Farmers in the upstream areas don't seem to be bothered much or aren't impacted by this personally.

A proper solution to these problems might be to monitor the farmers more strictly. Doing more walk-troughs and raising the fines might set an example. Another solution might be to pay more attention to farmers that aren't associated with an IA, and to try to get more farmers to attend the meetings where the rules are explained. According to Marino R. Romero (pers. com. 2011) farmers downstream are having problems with the way water is managed in the upland. Since this is not done correctly by the IA's, NIA might monitor the implementation of the water schedule more strictly.

RECOMMENDATIONS

This research was conducted in only 8 days. We realize that more time is needed to fully investigate the problems about this subject. Therefore we would like to include some recommendations about further research. It might be interesting to:

- Talk to more farmers in downstream areas. to find out what problems they are facing regarding the irrigation system.
- Talk to more farmers in different barangays, to find out if there is a correlation between being associated with IA's /attending meetings and following the rules.
- Observe the implementation of the water schedule more closely, to see how it is actually implemented.
- Take a closer look to the different policies explained in the IMT.

ACKNOWLEDGEMENTS

We would like to express our thanks to those persons who helped us during this research:

To Mr. Dominic Rodriguez and Mr. Jessie Guerrero for assistance during the fieldwork. To the Barangay officials and inhabitants of Antagan for their open welcome and assistance. To Mr. Jovito W. Sutio Barangay Secretary for supplying us the demographic information of the barangay. To Marilyn T. Salvador, Institutional Development officer of NIA for her warm welcome and open answers. To Mr. Filemeno Tagufa water recourse facilities technician from NIA. To Mr. Marino R. Romero for answering all our questions. To Mr. Samuel Lugo, Federation President of the IA of Antagan 1st. To Mr. Roberto Agcouili, Federation President of the IA of Antagan 2st. To Mr. Renato Gamas, Federation President of the IA of Namnama. To Mr. Francisco Carcal, Federation President of the IA of Bantug

REFERENCES

NIA, Irrigation Management Transfer in Tumauni
Bautista, B. Experiences with organizing irrigators associations: a case study from the Philippines (1987)
http://www.inpim.org/files/Documents/rab_phil.pdf

Appendix A: Questionnaires

Questions for Farmer association

1. In which area are you active?
2. How many farmers are there in this area and how many farmers are associated with your association?
3. What does the association do exactly?
4. What are the responsibilities of an association?
5. How does the cooperation work between NIA and the IA?
6. What are the responsibilities of NIA?
7. Is the way the water is distributed officially constituted?
8. Are there other rules and regulation?
9. How is the corporation constituted on paper?
10. Are all farmers in the barangay happy about the irrigation system?
11. What does the irrigation system look like in practice?
12. How do you decide who gets water and who won't get water?
13. How do you cooperate with the farmers?
14. How do you inform farmers about the rules and regulations?
15. Are all farmers following the rules?
16. How do you monitor the implementation of policies?
17. How often do you meet with NIA?
18. What happens when your farmers disagree with NIA/Your association?
19. Are there many conflicts regarding water?
20. What kind of conflicts/most happening/why happening?
21. How do you solve these problems?
22. How do you inform the farmers about the information coming from NIA?
23. Do all the farmers associated with you pay their irrigation fees on time?

Questions for farmers

1. What kind of farm do you own?
2. How many ha do you cultivate?
3. How much water do you need?
4. How does your irrigation system work?
5. Is water equally distributed or do you experience problems? (when&why?)
6. What kind of problems do you experience?
7. How do you solve the problems regarding the distribution of water?
8. Are you associated with a farmers association? Which one?
9. Why? What do they do? Do you go to meetings?
10. Who decides how much water you get?
11. Do you always get water? (when do you get water, when not, why not)
12. Do you know about rules and regulation?
13. If yes, what kind of rules, do you follow them?
14. If no, why not?
15. How is the water distributed, do they use a schedule?
16. Is the water schedule always used? When/why not?
17. Are you happy about the water delivery or do you like to change anything?
18. What does NIA do?
19. What do you think about the cooperation between NIA, the association and farmers?
20. Do you pay for your irrigation water? How much? To who?

Questions for NIA

1. How many farmers are there in Tumauni?
2. Are they all connected to an irrigation system?
3. If people don't receive water, how come?
4. How many IA's are there?
5. Are all farmers associated with one of the farmers associations?
6. How does the corporation with the associations go? (module?)
7. How many times do you meet?
8. Who is responsible for the division of water?
9. What is NIA's part in de distribution of water?
10. What other rules and regulations are used in Tumauni?
11. Do all farmers follow the rules?
12. Who is responsible for monitoring the implementation of the rules and regulations?
13. Is the way the water is distributed officially constituted?
14. Are all farmers in Tumauni happy about the irrigation system?
15. What does the irrigation system looks like in practice?
16. Is the policy implemented like it was supposed to?
17. What kinds of problems do the farmers experience most?
18. Are there conflicts about the irrigation of their field?
19. How does the IMT look like?
20. Can you explain why and how it is implemented?

Appendix B: NIA water delivery schedule



Republika ng Pilipinas

Pambansang Pangasiwaan ng Patubig

NATIONAL IRRIGATION ADMINISTRATION

TUMAUINI IRRIGATION SYSTEM/SAN PABLO-CABAGAN IRRIGATION SYSTEM

Tumauni, Isabela

WATER DELIVERY SCHEDULE

FOR DIVISIONS A, B & C

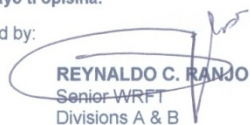
DRY SEASON CROP 2011

Month	Date	Division	Barangay Covered	Remarks	
JANUARY	1-5, 12-16 , 23-27	A & C	Antagan I, Antagan II, Namnama, Arcon, Sisim, Bantug, Bayabo,Liwanag, Minanga, Paoay, Balug	EXTENT OF AREA TO BE IRRIGATED SHALL DEPEND ON WATER AVAILABLE AT SOURCE CONSIDERING THAT THE SYSTEM IS RUN-OFF-THE RIVER TYPE. PLEASE REFER TO THE REMINDERS.	
JANUARY	6-11, 17-22, 28-31	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
FEBRUARY	1-2	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
FEBRUARY	3-7, 14-18, 26-28	A & C	Antagan I, Antagan II, Namnama, Arcon, Sisim, Bantug, Bayabo,Liwanag, Minanga, Paoay, Balug		
MARCH	1-2	A & C	Antagan I, Antagan II, Namnama, Arcon, Sisim, Bantug, Bayabo,Liwanag, Minanga, Paoay, Balug		
FEBRUARY	8-13, 19-24	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
MARCH	3-8	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
MARCH	9-13, 20-24, 31	A & C	Antagan I, Antagan II, Namnama, Arcon, Sisim, Bantug, Bayabo,Liwanag, Minanga, Paoay, Balug		
APRIL	1-4	A & C	Antagan I, Antagan II, Namnama, Arcon, Sisim, Bantug, Bayabo,Liwanag, Minanga, Paoay, Balug		
MARCH	14-19, 25-30	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
APRIL	5-10	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
APRIL	11-15, 22-26	A & C	Antagan I, Antagan II, Namnama, Arcon, Sisim, Bantug, Bayabo,Liwanag, Minanga, Paoay, Balug		
APRIL	16-21, 27-30	B	San Pedro, Ugad, San Mateo, Lanna, San Vicente, Santa, Union		
ANTAGAN 1: SHUTDOWN OF WATER DELIVERY - MARCH 30, 2011 SYSTEM: SHUTDOWN OF WATER DELIVERY - MAY 15, 2011					

MAINAYON NGA PALAGIP:

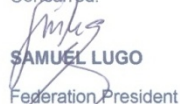
1. Kasapulan ti umno ken naan-anay nga pannaki-kooperasyon ti oficiales ken miembro iti asosasyon tapno sapisap tay amin nga makapadanum.
2. Dagiti "early maturing varieties" (BIIT) ken naresistencia iti sakit nga pagay ti imula.
3. Adda iti mannalon ti namnama ken biag ti irigasyon, tapno mapasayaat ti serbisyo agbayad tay ngarud ti bayad padanum
4. Nu adda problema, iyumanyo a dagus kadagiti O & M personnel, IA Officers dita area yo wenno bumisita kayo ti opisina.

Prepared by:

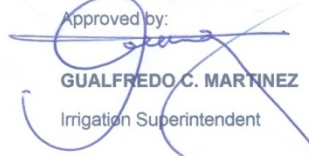

REYNALDO C. RANJO
 Senior WRFT
 Divisions A & B


FILOMENO TAGUFA
 WRFT
 Divisions B

Concurred:


SAMUEL LUGO
 Federation President

Approved by:


GUALFREDO C. MARTINEZ
 Irrigation Superintendent

2.3 Willingness of Farmers to help with the reforestation of the mountains in Antagan

Suzanne E.M. van der Hoeven and Crezel V. Llanillo

INTRODUCTION

A part of the water that comes out of the watershed in Antagan 1 is used for the irrigation of the lands of farmers in different Barangays. The water is held in the ground by the forests on the mountains and flows to the river where also the intake of the National Irrigation Administration (NIA) is build, but in the last decades there is a decrease in forest cover. The cause of this is mostly illegal logging, charcoal making and slash & burn farming. Some of these activities are done by the local people but also by outsiders, like loggers.

One of the results of deforestation is that there is less water available for the irrigation of the farmer's crops. This is also why NIA made a water schedule (appendix F) which shows that there is a complete shutdown of the whole system for a period of time and a division of the water for the rest of the year. But are the local people aware that their activities have such huge consequences? And are they willing to do something about it? Maybe help to reforest the mountains? Reforestation is the restocking of existing forests and woodlands that have been depleted, an effect of deforestation. This can be a solution for the decrease in water, but the seedlings need protection and guarding so that they don't get destroyed like the previous trees that once were there. Could the farmers do that?

The research question will be: Are farmers aware that the lack of water is a result from the deforestation in the uplands and are they willing to pay an extra fee or volunteer for the reforestation of that area?

The objective in this research is to find out if farmers know what the problem is for the decrease of water in the summertime and if they are willing to help protect and maintain their watershed, their main source of income.

Hypothesis: We think that farmers know little about the water problems and that they don't know what the specific problem is or who is responsible for it. We also think that they want to solve the problems but that they don't have the money to pay for the solution or that they don't feel responsible.

METHODS

We interviewed farmers and we conducted several interviews with experts from organizations responsible for the irrigation program in Tumauni and forest protection. We made a questionnaire (appendix A) at the campus before we went into the field. Once we arrived in Antagan 1 we asked permission from the Barangay official to do our research. Some general information about the Barangay was received from the Barangay secretary. On the second day we interviewed 10 farmers of Antagan 1, we started with the first farmer on our left hand and then continued down the road and interviewed farmers that were home. After the first interview-day we realized that

there was not really a water shortage in Antagan 1, therefore we went to Antagan 2 on the second interview-day. There we interviewed 11 farmers using the same method we used before. But the farmers here were quite happy as well. The next day we went to see NIA for some more information (this was not planned so we came up with some questions about what we wanted to know for that particular moment). The NIA told us that Antagan 1 and 2 are 'model' Barangays. So for the last interview-day we went to Namnama, even further downstream, and interviewed four farmers there. After that our time in the field was finished and we went back to the ISU campus.

The questions were kept simple so that the farmers could easily understand them and so that there was space for input from the farmers. In total 25 farmers were interviewed.

Representatives of the Irrigation Association (IA) and the Department of Environmental and Natural Resources (DENR) were also interviewed using other questionnaires (Appendix B) to obtain more (background) information and their opinion about the problems.

Table 1: Time table

Friday 14-01-2011	- Arrival in Antagan 1 - Visit of Barangay <i>secretary</i>
Saturday 15-01-2011	- Interviewing farmers in Antagan 1 - Visit Barangay Hall
Sunday 16-01-2011	- Interviewing farmers in Antagan 2
Monday 17-01-2011	- Interviewing NIA and IA – Antagan
Tuesday 18-01-2011	-Hiking - Analyzing of the interviews
Wednesday 19-01-2011	- Interviewing in Namnama and the IA of Namnama - Visit the Municipal planning and development coordinator office in Tumauni
Thursday 20-01-2011	- Return to the Campus and visit the DENR.

Data gathering: Often farmers didn't know exactly what they are paying to NIA for the irrigation water they use during cropping season. That's why NIA was also interviewed to find out what the farmers had to pay and if NIA is willing to protect the watershed themselves. When we had done 20 interviews already we decided to add another question:

If you have more water available throughout the year how many croppings can you do then?

The answer was always that they could then have 3 croppings instead of 2.

RESULTS

For the complete tables and all the answers to the questionnaires see Appendix C and D

- The average age of the farmers interviewed was 45.7 years
- The average size of the farms was 1.36 Hectares,
- Only 3 of the farmers didn't use the irrigation system for their rice fields.

Summary of farmer interview results:

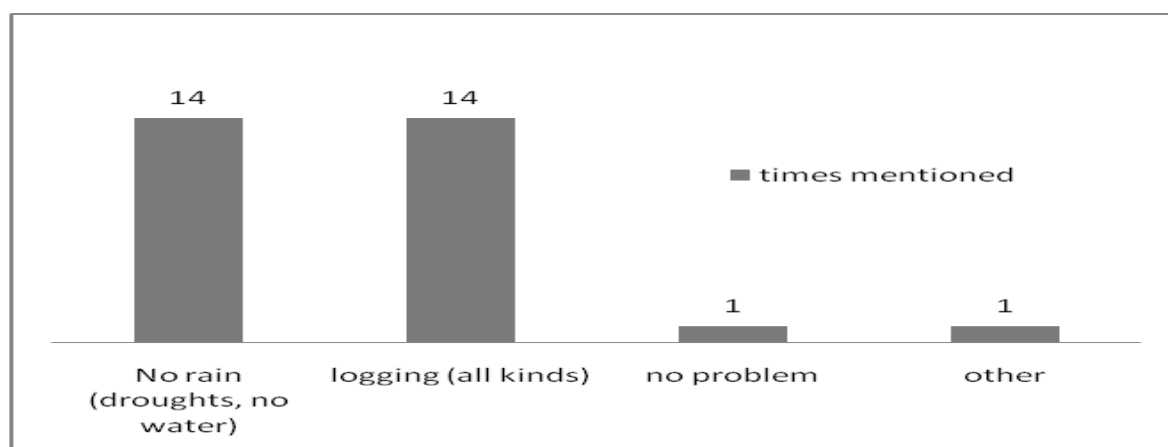


Figure 1: What is the cause of the problem of water shortage in the interviewed barangay? (question 17)

This graph shows that 14 farmers mentioned that the problem of water was that there was no rain, no water or that there was a drought. 14 farmers mentioned that logging was the problem, illegal logging, Carabao logging and water logging are named under logging. One farmer told us that there was no problem at all and that there was just no water because of the summer.

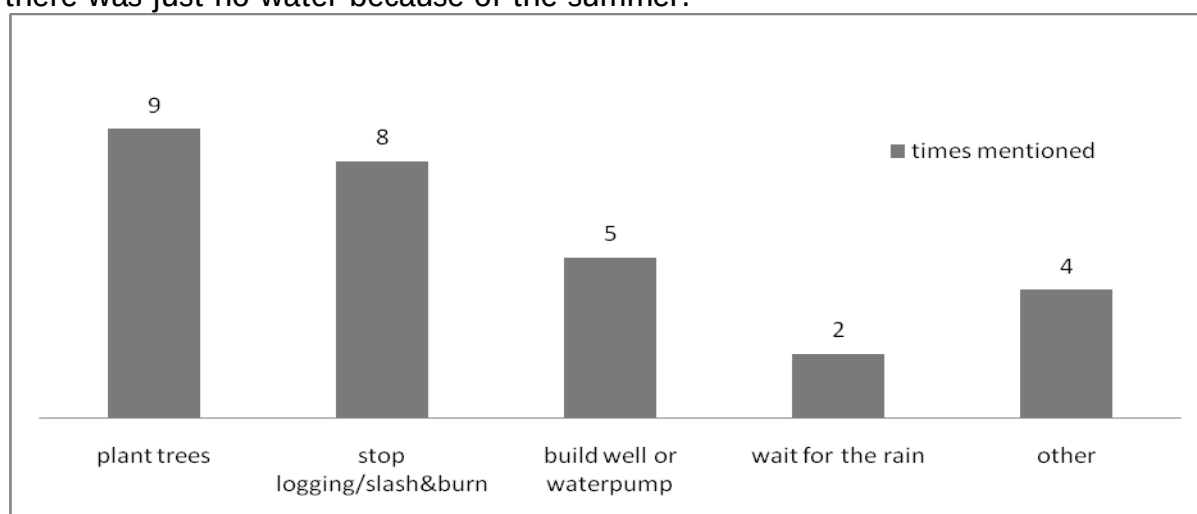


Figure 2: what could be a solution for the water shortage according to farmers? (question 18)

9 farmers mentioned that the planting of trees was the solution for the problem of water. Some of them (8) also said that logging, charcoal making and slash & burn farming should be stopped. Others gave a solution to get more water (well or water pump) but they didn't give a solution to the whole problem for a longer period. Other options that were given are: the rotation schedule (of NIA) or that they had no idea (2). 23 out of the 25 farmers agreed that deforestation was one of the problems for the decrease of water (Q 19)

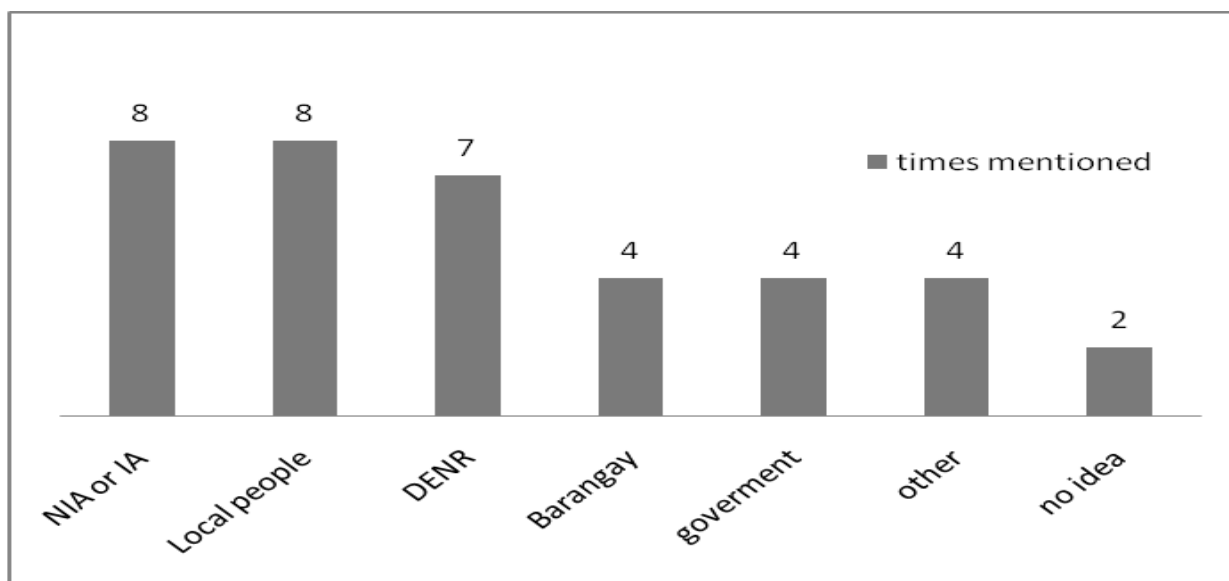


Figure 3: Who is responsible for the protection of the watershed according to the interviewed farmers. (Question 20)

Two of the farmers couldn't tell us who was responsible for the protection of the watershed, others had some ideas. Most mentioned were NIA and the local people themselves. Some also say that the people who plant the trees are also responsible for them. One even said that the slash & burn farmers are the one that are responsible because they destroy the forest.

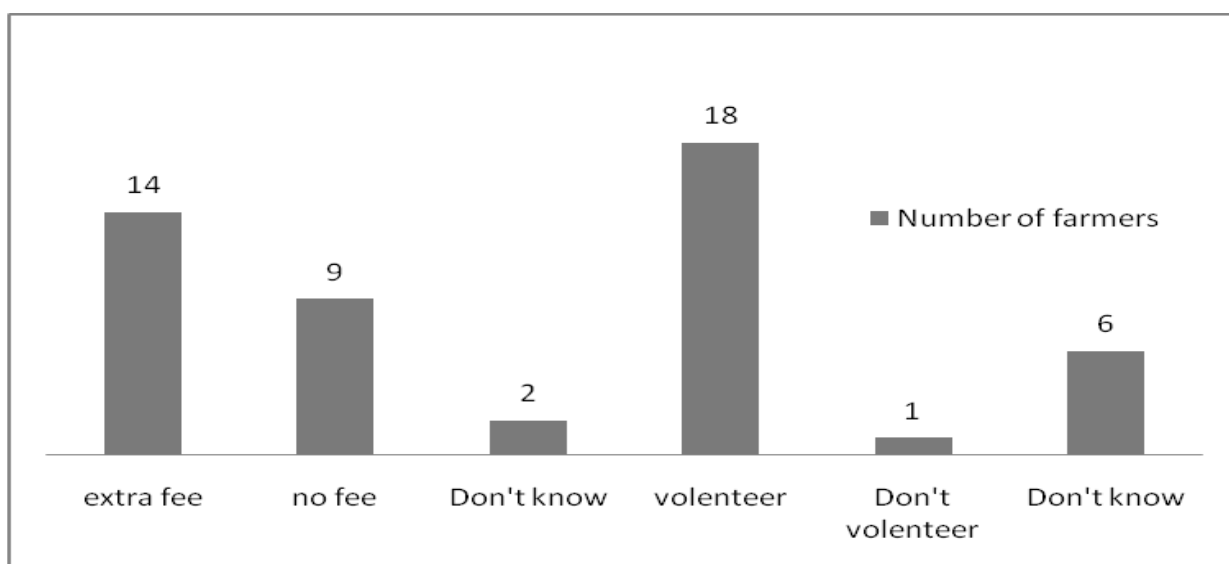


Figure 4: willingness of farmers to help reforest the mountains in Antagan 1 (question 23)

Most of the farmers that we interviewed were willing to help the reforestation of the mountains in Antagan 1. Some were willing to pay money (14) and others were willing to volunteer (18) or both. The average amount of money they are willing to spend is 930 pesos a year, varying between 200 and 2400 pesos a year.

Summary of expert interviews: From the Municipal Planning and Development Coordinator office (MPDC) we received a plan for the reforestation of Antagan 1 and Caligayan starting from March 2009 & onwards (Table 59, Proposed Agriculture Related Programs and Projects for Implementation Tumauni, Isabela). It says that 290 ha should be used for the reforestation project. Another document (the executive-legislative Agenda 2011-2013) that we received stated that there is going to be an establishment of 10 ha of rain forestation in the Tumauni Watershed Forest Reserve (TWFR) with one nursery before 2013 (see appendix E).

The DENR has a program to reforest the mountains and says that they have a team of guards patrolling the area. Unfortunately we didn't receive any information from them what the actual program was about. The program of reforestation finished already but the guards should still be around also because it is a protected area. According to NIA the money that is paid by farmers goes to the maintenance and repair of the canals and for the machineries that are used. A part of the money is also used to pay NIA salaries. They know what the problem is but they don't feel responsible and they also claim to have no funds for the reforestation. They say that the DENR is responsible for the reforestation. We received a water schedule from them which shows that there is a complete water shutdown on the 15th of May 2011. This shutdown will be till the start of the next cropping. The IA said that the money that is collected from the farmers goes to NIA and they are the one who do the planning. The IA also knows what the problems are in the uplands. The IA of Antagan helps the farmers to get water pumps and wants to help planting trees. The IA of Namnama is scared of the illegal loggers so they don't undertake any action whatsoever (see appendix B.)

CONCLUSIONS

Most of the farmers are aware of the problems in the upland causing a shortage of water for the irrigation program and of the farmers who we have interviewed almost everybody was willing to help with the reforestation, if not for more water now then to make sure that the watershed is still there for the next generations.

The program of the DENR for reforestation of the area was a failure according to some farmers; trees have died during droughts, typhoons and a forest fire. After that there were no new trees planted. The DENR is claiming that there is a guarding team that should protect the planted trees, but we never heard of any of the farmers about such a team.

The NIA and the IA know what the problems are but they don't do anything about it, because they don't feel responsible or because they are scared. We find this a bit strange, because NIA could make more money if the farmers can harvest three croppings instead of two (they charge per cropping). So it is also in their advantage if the mountains are reforested.

RECOMMENDATIONS

There is a lot of willingness to reforest the area but nothing is being done. We believe that there should be a general program that involves the DENR, the NIA, the IA, the Barangay councils and off course the farmers. There also should be a real guarding team that will really do something about the illegal loggers. Only when the deforestation will stop there is a chance that reforestation will work.

Farmers should be involved to plant the trees and also protect them; the trees could also contain fruit trees that can be harvested by farmers so they also get some extra income out of it. There will be some loss of income because after a total reforestation it is no longer possible to plant corn in the mountains. But when the water supply is restored the farmers can do an extra cropping of rice and will receive more money out of their harvests.

The loggers will need to find a different way to earn money, maybe buy some land and be farmers again. But the money will be more equally spread among the local farmers. Now there are a few loggers that make millions and maybe 5,000 or more farmers (all of those who use the irrigation system) that only have 2/3 of the income they could have. And of course we should not forget the value of the biodiversity that will come back when the forests are restored.

REFLECTION

What was strange was that at first almost all the farmers said that there was enough water throughout the year. But when we asked them if they could have more croppings if they would have more water the answer was yes. So actually there was not enough water. With the water schedule of NIA they were happy that they could do 2 croppings because if the water schedule would not be there then they maybe *they* could just do one cropping a year. If we could do the interviews again we would like to create a different context for the farmers just to receive all the information that we now only got from a few farmers instead of everybody. We would use more what if- questions (like what if you had more water could you have more croppings a year?) and also ask them if they were ever involved in logging in the past, then we could have a better perspective about the size of the problem. We would also like to go to areas that are not so close to the intake to see how they manage water there.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to the following:

To the Barangay Officials and people of Antagan for their warmest welcome

To Mr. Jovito W. Sutio Barangay Secretary, where we got the barangay Profile

To Marilyn T. Salvador, Institutional Development officer of NIA

To the office of the Municipal Planning and Development Coordinator

To uncle Arcadio Padre and his Family for accommodation during our stay in Antagan

To the respondents for their cooperation during the interview

To Mr. Samuel Lugo, Federation President of the IA of Antagan

To Renato Gamas, Federation President of the IA of Namnama

To the officer of the DENR

REFERENCES

- Table 59, Proposed Agriculture Related Programs and Projects for Implementation Tumauni, Isabela.
- The executive-legislative Agenda 2011-2013 (appendix E)
- Table 49, Existing Major Agricultural Crops by Area, Production and Market, year 2009.
- Water schedule of NIA (appendix F)

APPENDIX A: Questionnaire for the farmers

- 1 What's your name?
- 2 Location?
- 3 gender?
- 4 How old are you?
- 5 What is your ethnic group?
- 6 Are you born here?
- 7 no-> Where do you come from and when?
- 8 What kind of education do you have?
- 9 Are you the owner of this farm or are you a tenure?
- 10 How large is the farm?
- 11 What kind of crops do you have on your farm?
- 12 What is the source of water for your fields? (irrigated or rainfed)
- 13 Irrigated -> Do you pay for that water?
- 14 And to whom? And how much do you pay?
- 15 Do you have enough water all year??
- 16 What do you do when you don't have enough water for your crops?
Plant different crops or other activities?
So do you have other incomes besides farming?
- 17 What do you think that the cause is for the lack of water?
changed to: What do you think that the cause is for the decrease of water in the summer?
- 18 Do you have any idea how we can solve this problem?
- 19 Do you think deforestation upstream causes water shortage?
- 20 Who do you think is responsible for the protection of the water source/
watershed?
- 21 Do you think reforestation of the upland could be a solution to protect water sources?
- 22 (no payment for water then skip) Do you expect that the money that is paid for the water use of the irrigation system should also be used for the protection of the water sources?
- 23 If the money for the water is not spend for the protection of the water source would you be willing to pay an extra fee for reforestation of the forest upland?
no?-> What is the reason that you don't want to pay?
yes?-> How much are you willing to spend?

APPENDIX B: Interviews with NIA and IA's

Questions to National Irrigation Association

1 How much do farmers pay you?

Wet season: 1 HA = 1500p (100KG x 15p)

Dry season: 1 HA = 2250P (150 KG x 15P)

2 For what purpose do you use that money

Repair and maintenance of the channel, salaries and desiltation

3 What do you do when there is not enough water for the entire irrigated area?

Use a Rotation schedule and a total shutdown of the water.

4 Do you know why there is not enough water or less water in the summer

Droughts

5 A lot of farmers say that they want to help planting trees, are you willing to invest some of the money that you receive, for buying trees or seedlings?

No funds for reforestation, it is the responsibility of the DENR

Questions to IA of Antagan

1 Do you know what the cause for water shortage in the summer is?

yes, there is no rain.

2 Could deforestation be a cause?

yes, the cutting of trees

3 What do you think of reforestation?

Yes, trees should be planted

4 Are you willing to help?

yes, to conduct tree planting. They also help upland farmers to get waterpumps.

Conversation to IA of Namnama

DENR told them that they will plant trees, but they never did it.

IA wants to stop the illegal logging but are afraid they will get killed or that the illegal loggers will hurt their families.

They also want to protect the watershed but they don't know how to do that because they are scared.

APPENDIX C: Farmers answers 1

farmer number:	age:	gender	location	zone	ethnic	Born	when	where?	owner?	education	size farm (ha)	Rice?	other	irrigated?	pay	how much? (yearly)
1	62	male	Antagan 1	2	Ilocano	yes			yes	Elementery	0.5	yes		yes	Nia	3750
2	41	male	Antagan 1	2	Ilocano	yes			yes	2nd year co	2	yes		yes	Nia	10,000
3	29	male	Antagan 1	2	Ilocano	yes			yes	collage->At	0.4	yes		yes	Nia	1500
4	54	male	Antagan 1	2	Ilocano	no	1977	x	no	grade 6	1	yes	corn	no	no	x
5	28	male	Antagan 1	6	Ilocano	yes			yes	grade 6	2	yes	Corn	yes	Nia	500
6	61	male	Antagan 1	7	Ibanag	no	1972	Tumauini	yes	3rd year hig	0.5	yes		yes	Nia	x
7	69	male	Antagan 1	7	Ilocano	no	1959	Imogen	no	grade 4	1.7	yes		yes	Nia	2670
8	38	male	Antagan 1	7	Ilocano	no	2005	Ilagan	no	grade 5	0.25	yes		yes	Nia	800
9	51	male	Antagan 1	7	Ilocano	yes			yes	3rd year hig	3	yes	Corn	yes	Nia	wet 3600
10	47	male	Antagan 1	7	Ilocano	yes			yes	x	3	yes	Corn	no	no	x
11	55	male	Antagan 2	2	Ilocano	yes			yes	Elementery	4	yes	corn	yes	Nia	6000
12	39	male	Antagan 2	3	Ilocano	yes			yes	3rd year hig	3.5	yes		1.5 ha	Nia	2500
13	52	male	Antagan 2	2	Ilocano	yes			yes	High school	0.7	yes	vegetable	yes	Nia	1000
14	57	male	Antagan 2	3	Ilocano	yes			yes	Elementery	2.5	yes		yes	Nia	
15	52	male	Antagan 2	3	Ilocano	no	1989	Ipil Achaq	yes	Elementery	0.5	yes		yes	Nia	1500
16	25	male	Antagan 2	3	Ilocano	yes			yes	2nd year hig	0.3	yes		yes	Nia	1200
17	34	male	Antagan 2	3	Ilocano	yes			no	grade 6	0.8	yes		yes	Nia	2400
18	29	male	Antagan 2	4	Ilocano	yes			no	High school	1	yes		no	x	x
19	36	Female	Antagan 2	4	Ilocano	yes			no	Bachelor in	1.5	yes		yes	Nia	4012
20	40	male	Antagan 2	4	Ilocano	yes			no	Elementery	0.8	yes		yes	Nia	x
21	44	male	Antagan 2	4	Ilocano	yes			yes	Industrial T	1.5	yes	vegetable	yes	Nia	4050
22	55	Female	Namnama	2	Ilocano	yes			yes	High school	0.6	yes		yes	Nia	3000
23	45	male	Namnama	3	Ilocano	yes			yes	grade 6	0.5	yes		yes	Nia	1170
24	49	male	Namnama	3	Ilocano	no	1963	Antagan 2	yes	grade 6	0.5	yes		yes	Nia	860
25	50	Female	Namnama	3	Ilocano	yes			yes	grade 6	1	yes		yes	Nia	3000

APPENDIX D: Farmers answers 2

farmer nr	other activities	problem	solve	deforestation	responsible	money/nia	extra fee	how much yearly	volunteer
1	member board of directors Nia	No trees, illegal logging	plant trees	yes	local people	yes	If Barangay says so	depends on barangay	x
2	Barangay council	not pure soil, illegal logging	Stop logging and charcoal making	yes	DENR, NGO, Government, DNP	yes	yes	1000	yes
3	tricycle driver	no rain	water pump	yes	government	no for construction	if they have money	x	x
4	plant vegetables	water logging, no rain	water pump	yes	local people	no	no	none	yes
5	animals and mangotrees	not enough water	rain	yes, maybe logging	doenst know	no for construction	yes	depends on government	yes
6	member of barangay council	illegal logging	plant trees	yes	Nia, Barangay council, DENR	yes	yes	200 x	x
7	no	no rain	rotation of water	yes	NIA	no for construction	no	none	yes
8	no	illegal logging	plant trees	yes	DENR	yes	no	none	yes
9	no	illegal logging	plant trees	yes	Forest guard	yes		1200 x	x
10	no	drought	water pump	yes	local people		no	none	yes
11	no	no problem	no problem	no	NIA			x	
12	no	no rain	stop logging, rotation schedule	no	Ingeneer Martinez	yes	yes	1200	yes
13	carpenter	logging	plant trees	yes	NIA	no for construction	yes	1200	yes
14	no	illegal logging, gods will	water pump	yes	DENR, local people	Depends on NIA	yes	900	
15	no	illegal logging	stop slash/burn farming, plant trees	yes	Barangay Councils, slash/burn farmers		no	none	yes
16	tricycle driver	no rain	plant earlier, stop illegal logging	yes	local people	yes	yes	2400	yes
17	no	no rain, illegal logging, charcoal making	stop illegal logging	yes	NIA, government	yes	yes	600	yes if barangay says so
18	laborer	no rain, illegal logging	stop illegal logging	yes	local people	yes	yes	200	yes
19	no	no rain, illegal logging	no idea	yes	DENR, Barangay officials, Police	no for construction	yes	400	yes
20	animals and mangotrees	farm far from main source	stop illegal logging	yes	IA, DENR	yes	no	none	yes
21	Contractor Electrical services	Illegal logging	plant trees	yes	Local people, Barangay	yes, but thinks NIA doesn't want to	yes	Money will come from the heart	yes
22	carpenter	No rain, no water at	plant trees	yes	Government, Local people	no for construction	no	none	yes
23	laborer	No rain, no water at intake	stop illegal logging, plant trees	yes	no idea	yes	yes	what DENR says	yes
24	store	No rain, Carabao logging	deep well	yes	DENR	no idea	no	none	yes
25	no	no rain	wait for rain	yes	NIA, DENR	yes	no	930	no

APPENDIX E: Form of the CENRO

4. Formulation of the Municipal Forest Land Use Plan and Development Plans of barangays which are located within the forest/ protected zones.
5. Conduct educational campaign to residents on solid waste management such as segregation of waste at source, recycling and composting.
6. Establishment of materials recovery facility in all barangays.
7. Allocation of funds for ESWM and reforestation programs.
8. Provision of material counterpart for the construction of individual family latrines to priority barangays.
9. Intensification of the ESWM and reforestation program through information drives, seminars and mobilization.
10. Prohibition of hunting of wildlife and prosecution of violators.
11. Collaboration with NGO's and concerned government agencies for technical and financial support.
12. Promotion of community-based development enterprise properly managed and sustained by PO's.

Targets:

1. Establishment of a five (5) has. sanitary landfill in San Vicente.
2. Acquisition of two (2) units of garbage trucks and one (1) unit garbage compactor.
3. Construction of barangay MRF/Cluster MRF.
4. Provision of toilet bowls to 265 families without toilets.
5. Establishment of 320 hectares reforestation and 295 hectares agro-forestry projects.
6. Establishment of 10 hectares rainforestation in the Tumauni Watershed Forest Reserve (TWFR) with one (1) nursery.
7. Establishment of three (3) community-based livelihood enterprises sustainably managed by POs/indigenous group.

2.4: Information-supply on new irrigation techniques and rice varieties in Antagan

Eline Holtes and Mylene Gumiran

INTRODUCTION

Antagan is a collection of villages in Tumauni, Isabela. It is subdivided into 3 barangays namely: Antagan I, Antagan II and Namnama. It was first registered into a barrio during the incumbency of the mayor Patricio Taccad and municipal councilor Tomas Taquiqui. During those years, immigrants from neighboring provinces and municipalities took turns to visit the area and finally settled here having acquired homestead and free patent application. In 1964, because of the booming population, barrio Namnama was separated from Antagan and became an independent Barrio. In 1968, Barrio Antagan was divided into two: Antagan I in the eastern part and Antagan II in the western part. With the Local Government Code of 1983 the term barrio was changed into barangay. At present Antagan I, Antagan II and Namnama are three of the 44 barangays in the municipality of Tumauni. Antagan now has a total population of 5587 inhabitants of which 1310 are farmers. (Barangay Hall Antagan I)

There are a few problems in this area. There are large rice fields and there is not enough water to irrigate all the hectares of land. Water is tapped from the river, but the water level of the river is very low. In the upstream area the forest cover is decreasing, causing degradation of the watershed that endangers the irrigation system. Causes of the decrease of forest cover are activities in illegal logging, such as water logging, and slash and burn farming. Because of these factors there isn't always enough water for the farmers to irrigate their crops. Most of the farmers in Antagan are using the irrigation-system which is designed by NIA. Because there was not enough water to supply both the area next to the intake and the area more downstream, NIA created a water schedule. Farmers in Antagan receive 5 days of water and after that a shutdown of 6 days. Then again 5 days of water and 6 days of shutdown. This schedule repeats itself until march 30th when there is a total shutdown for Antagan. With this schedule the farmers are forced to irrigate their lands with a smaller amount of water then before. So they will have to use new technologies to have a similar harvest. With new technologies we mean for example a more efficient use of water, drought-resistant varieties of rice and new ways for farmers to plow their lands.

The International Rice Research Institute (IRRI) is an institute that we would like to mention here. They invent and investigate new rice varieties, for example drought-resistance varieties. They put the information about their results and new varieties in the open but it is up to the government to actually take in this information and give it to the farmers. In our research we also ask the farmers if they are familiar with IRRI and other institutes.

The objectives in this study are:

- Characterizing the information-supply-system of Tumauni
- Find out to what extent the farmers of Tumauni are satisfied with the available information and if they feel empowered through it
- Investigate to what measure the farmers are open to the use of new technologies

Research question

Who are the actors in the information-supply of irrigation-technologies and do they actually reach the farmers?

Hypothesis

We think that the actors of the information supply will have to find better ways to distribute information to the farmers and need to get more feedback from them because the recent information-supply is not satisfying to the farmers.

METHODS

Before we went to the field, we designed a questionnaire for the farmers (see appendix) and a questionnaire for the Department of Agriculture (DA) and the National Irrigation Administration (NIA) (appendix). When we arrived in Antagan I there was already a host family found where we could stay during the 7 days of fieldwork. On the day of arrival we asked permission for our fieldwork from the barangay captain. We received some demographic information about Antagan I from the Barangay Secretary. The next day we started our interviews at the border of Antagan I and II and we interviewed the first farmer on our right hand. We used the snowball-method: after the interview we asked the farmer if he knew another farmer in the area and then we went there. After interviewing this farmer we asked him/her if he knew another farmer nearby and using this method we collected our respondents. Our first 12 interviews were conducted in Antagan I. When we analyzed our results at the evening of the second day we realized that the farmers of Antagan I did not really have a shortage of water and we decided to look if the problem of water shortage in Antagan II was more obvious. We conducted 8 interviews in this Barangay using the snowball method again. But also in this barangay the farmers were quite satisfied with the existing irrigation-system. In the afternoon of day 4 we had an interview with NIA, the president of the Irrigation Association (IA) and with the Department of Agriculture (DA). From these interviews it became clear to us that Antagan I and Antagan II were labeled as 'model-barangays' where all of the governmental programs and subsidies were implanted first. At our last day we decided to try to interview farmers in Namnama because that was a little bit more downstream and not a part of the 'model-barangays' so we thought that might make a difference in the results. We conducted 5 interviews here and after that the time for our fieldwork finished and we had to return to the ISU campus in Cabagan.

Table 1: Timetable of fieldwork

Friday 14 -01-2010	Travel to Antagan I Visit the Barangay captain and the Barangay Secretary
Saturday 15-01-2010	Conduct interviews in Antagan I
Sunday 16-01-2010	Conduct interviews in Antagan II
Monday 17-01-2010	Interview NIA/IA/MAO
Tuesday 18-01-2010	Hiking/swimming/a nalyzing
Wednesday 19-01- 2010	Conduct interviews in Namnama
Thursday 20-01- 2010	Return to Cabagan

RESULTS

We interviewed 25 farmers; 4 females and 21 males.

- The average age of the interviewed farmers was 42 years.
- The average size of the farms was 1.22 hectares
- 17 of the 25 farmers owned the land themselves (68%), 8 farmers were tenants (32%)
- All respondents were Ilocano and none of them were migrants
- 3 of the 25 (12%) farmers did not use the irrigation-system
- 72 % of the farmers have learned to work on the field from their parents. The remaining 28 % says to have learned farming by themselves through the means of practice.

We were curious to find out if the respondents still use the old techniques of their parents and if they know if there are new techniques available (Table 2).

Table 2: Question 14/15: Do you think there are new techniques available for rice cultivation? Have you tried them?

		new techniques available	Tried new techniques
Landowners	yes	64.7 %	47 %
	no	35.3%	53 %
Tenants	yes	0 %	0 %
	no	100 %	100 %

We made a distinction between the farmers who own the land themselves and the tenants who work on the land of someone else. There is a big difference between them with regards to the use of new techniques. 64.7 % of the landowners think that there are new techniques available and 47 % of them tried new techniques. Among the tenants there were no farmers who tried new techniques and they answered that they did not think that there are new techniques available.

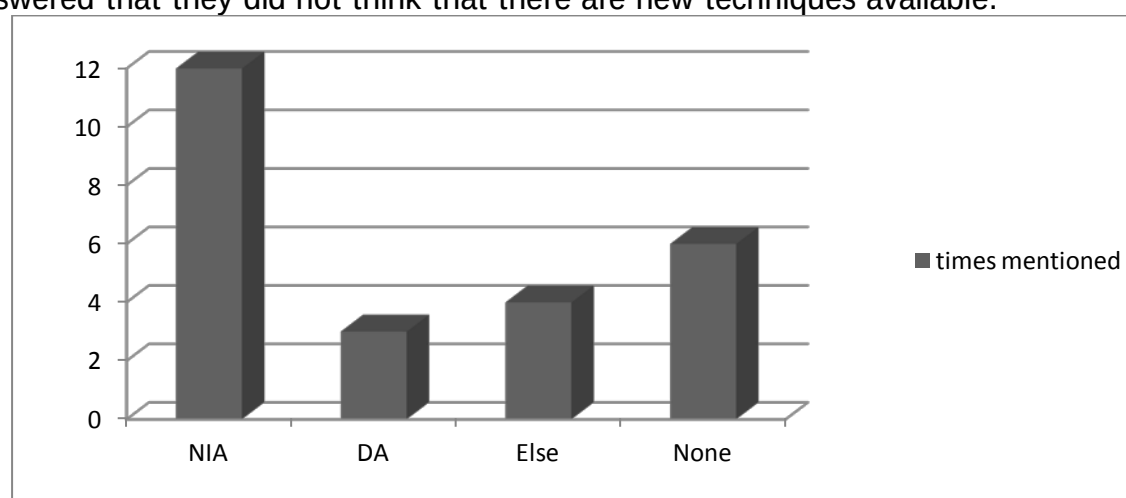


Figure 1 : Where do the farmers think they can get information about irrigation techniques

Twelve farmers know NIA as the information supplier about irrigation techniques (48%). Three farmers would turn to the DA (12%) and 4 farmers (16%) mentioned other persons and institutes. 6 of the respondents had no idea where they could find information about irrigation techniques (Fig 1).

Our next objective was to find out if all farmers are reached by the information supply of the NIA/DA and other institutes. We asked our respondent if they have ever received information about (new) irrigation techniques (question 17). 19 farmers have received information (76 %), 6 farmers have never received information about irrigation techniques(24 %).

Table 3: the suppliers of the received information

Institute	Number of farmers	Percentage of farmers
NIA	11	57.9 %
DA	4	21.05%
Other	4	21.05%

From the 19 farmers who received information, 11 farmers got information from the NIA (57.9%), 4 from the DA (21%) and 4 from another institute or person (21%). Our next question was about the content of the information.

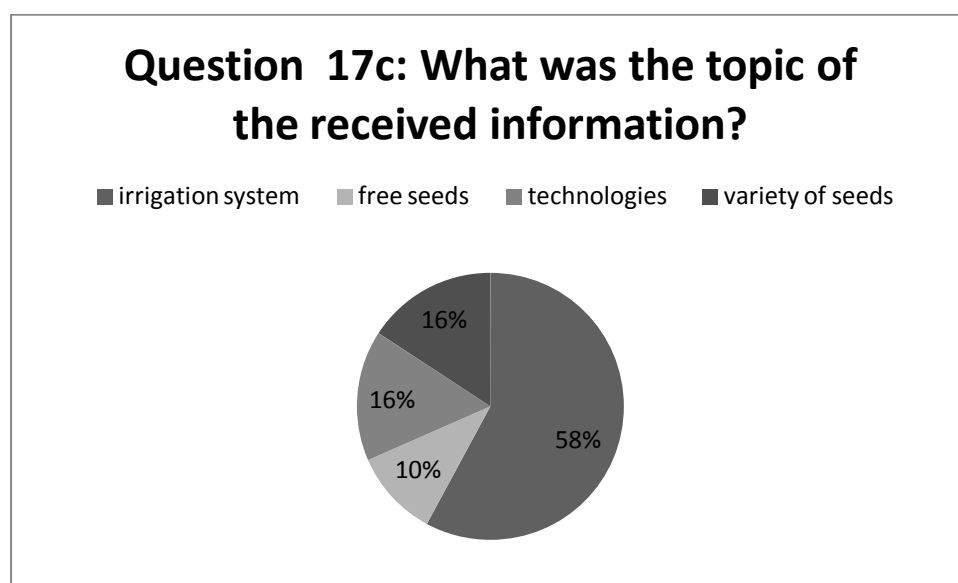


Figure 2: the content of the received information

More than half of the received information was about the irrigation system (Fig 2). The other topics were varieties of seeds, technologies (like applying fertilizer) and the free seeds program⁶.

We wanted to know to what extent the farmers are familiar with different research and information institutes, so we asked our respondent if they have ever heard of PAGASA, IRRI and the DA.

Table 1: familiarity with PAGASA/IRRI/DA and received information

PAGASA				IRRI				DA			
Familiar		Received info		familiar		Received info		Familiar		Received info	
Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
7	18	5	20	1	24	0	25	25	0	22	3

From the 25 respondents, 7 were familiar with PAGASA (28%) and only 5 (20%) had ever received information from them (about the weather forecast). There was only 1 respondent who was familiar with IRRI and none of the farmers had ever received information from them. All the respondents were familiar with the DA and 22 of them have received information from them. See appendix for the content of this information.

20 of the 25 (80%) respondents are familiar with other rice varieties (see appendix, question 22). What is the reason they choose for a particular variety?

⁶ There is a program conducted after the typhoon of last October 2010 through which victims of the storm can get free seeds at the DA. (pers comm. Amante M. Palce Junior – OIC-MAO)

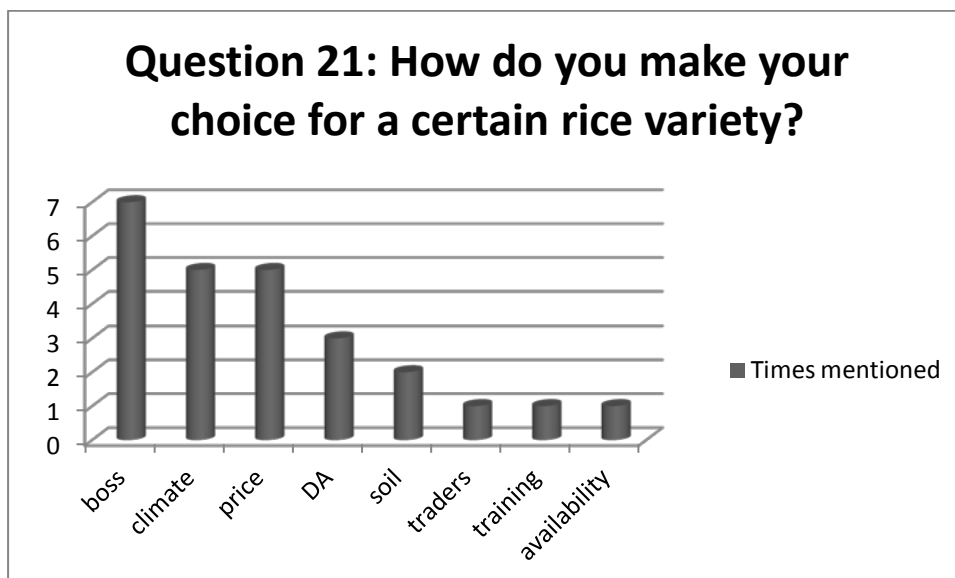


Figure 3: The different reasons for the choice of a particular rice variety

The most important reasons to choose for a certain rice variety are –according to the farmers – the climate, the price and the ‘boss’. All the 7 respondents (28%) who answered ‘boss’ to this question are tenants (see appendix).

We asked the respondents if they would like to receive information about new irrigation technologies and new rice varieties. 24 respondents answered yes (96%). After that we asked them how they would like to be informed and we gave them a list of 8 options (see appendix question 25b).

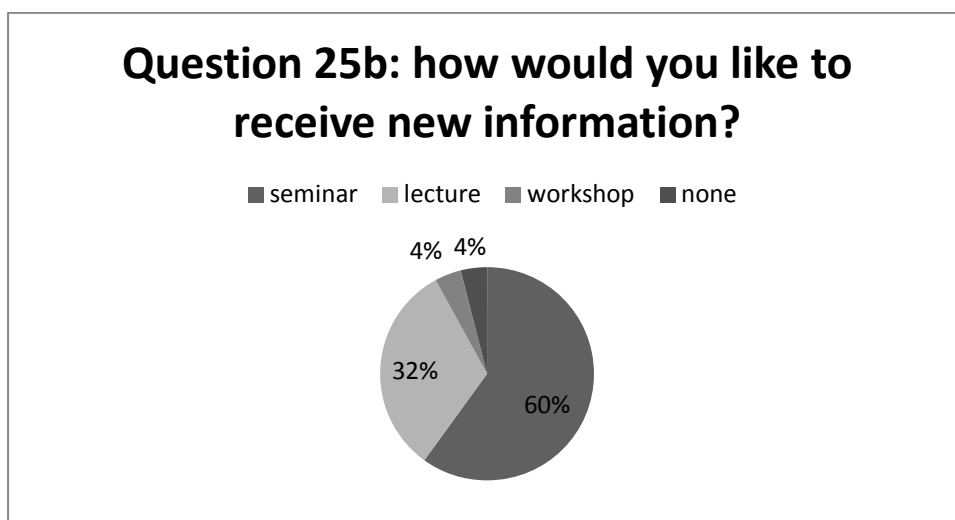


Figure 4: Ways how farmers would like to receive new information

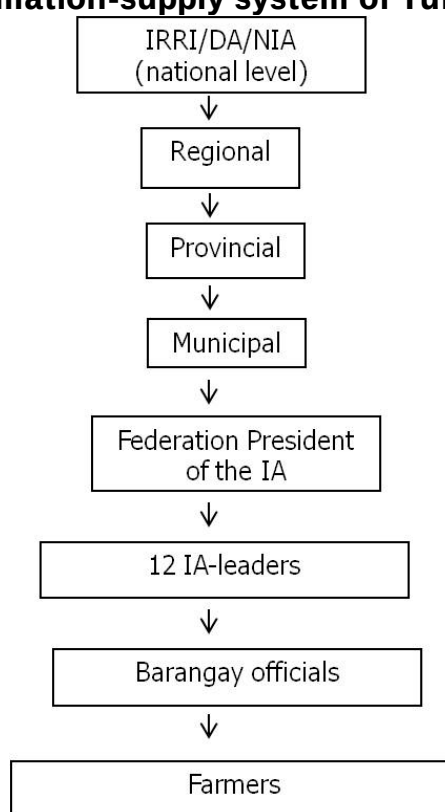
60% of all the respondents would like to be informed about new irrigation techniques and rice varieties through seminars. Lectures are also a preferred way with respectively 32% of the farmers. One of the respondents chose the workshop and one of the farmers does not want to receive any information (Fig 4).

At the end of the interview we asked the respondent if he or she had any problems with the irrigation system and if they would like something to be changed. (see appendix, question 27)

- 19 of the 25 respondents is satisfied and did not want any change (72 %)
- 3 of the 25 respondents want the lining of the main canals and the side canals to be changed (12%)
- 2 of the 25 respondents want to change the irrigation schedule⁷ (8%)
- 1 of the 25 respondents wants the NIA to build a water pump for the upland areas (4%).

We also interviewed the NIA, the MAO and the IA-president. In these interviews we concentrated on the questions: who is responsible for the information-supply? (For the complete interviews, see the appendix). After these interviews we designed a figure which summarizes the answers of the different officials.

Information-supply system of Tumauni



Information on new techniques and rice varieties comes from the IRRI, DA and the NIA on national level. This information will be transferred to the regional office and again transferred to the provincial office before it goes to the municipal office. Then, the municipal level or the Local Government Unit (LGU) will transfer the information they received to the Federation President of the IA. The IA consists of 12 presidents (one for each barangay) and these presidents meet two times a week and then the Federation President shares the received information with the other 11 presidents. Each president spreads the new info to the officials of his own barangay and these barangay officials will finally spread the information on the farmers through the means of posters on the doors or house to house meetings.

⁷ More information about the irrigation schedule in the discussion and in the appendix

DISCUSSION/CONCLUSION

Almost half of the interviewed landowners tried new techniques. They said that these techniques were more effective and resulted into more harvest. None of the tenants tried new techniques. They still use the methods which they learned from their parents. This does not mean that they are not open for new techniques, almost all of them would like to receive information about new techniques and varieties. 19 of all the 25 respondents (76%) received information about farming and farming techniques, but only 16 percent of that information was about new techniques and another 16 percent about new rice varieties. The rest of the information was about the irrigation system and free seeds.

Even though all the respondents had access to radio, tv or both, only a few were familiar with PAGASA and only five had ever received information from them (about the weather forecast). There was only 1 respondent who was familiar with IRRRI (4%) and none of the farmers had ever received information from them. This is not really strange, because IRRRI is not responsible for informing the farmers. They are a research institute and they publish their results. The national government and the NIA are supposed to distribute this information to the different levels (regional, provincial and municipal) and from there on it should be shared with IA-leaders and the barangay-officials before finally reaching the farmers. All respondents were familiar with the DA and 22 of them received information from them (88%). However, most of this information was about free seeds and not about new techniques.

It's striking to see that 24 of the 25 respondents (96%) would like to receive new information about irrigation techniques and rice varieties, while only 8 of them have ever actually received that (32%). Our hypothesis was correct. Not all the information reaches the farmers. Maybe that is due to the plenty different levels through which the information has to flow down. Somewhere in the system is a gap and our guess is that this gap is based in one of the lowest levels of the system. We think that either the IA-presidents do not give the information to the barangay officials or that the barangay officials do not really go to every house. This assumption is based on the fact that only one third of the respondents have ever received information.

RECOMMENDATIONS

The tenants in our research are different from the rest of the farmers with respect to the use of new technologies. None of them have ever tried new techniques and they haven't received any information according to them. 7 of the 8 tenants we have interviewed would like to participate in seminars or lectures when there is new information available. So it would be nice if the barangay officials and the IA-presidents would also invite the tenants to come to the meetings. Furthermore, the information supply is following a one-way-road from the top to the bottom. It would be good to create a possibility for the farmers to give some feedback about new information and new varieties. It became clear to us while conducting the interviews that they don't feel empowered and that they have the feeling that their opinion is of no concern to the bigger authorities.

REFLECTION

During our fieldwork we changed a few questions and also our method of asking. For example, one of our question was: is the water available all year long? Every respondent answered “yes”. After a few interviews we found out that there was a total shut down at 30th of march. When we asked in our next interview about the availability of water they answered us again that the water was available all year long. Then we asked, “what about the shut down?” And then they said “Oh yes, there is a shutdown after harvest”. So we learned to ask more thoroughly because sometimes the farmers tended to give the simplest answers. Maybe it would be better to have the interviews with organizations as DA and NIA before doing the actual fieldwork because in our case we got some vital information only at the end of our research (the fact that Antagan I en II are “model barangays”).

It is also recommendable to practice a few interviews before having a ‘real one’. We found out that some of our questions were a little bit hard to ask because the respondent could feel offended by it (for example the question about children, question 28 appendix).

We learned to take some more time for each interview because some of the respondents liked to talk about personal things and were glad that they could give their opinion. We also experienced some hard moments, like when we did an interview with a family who lost almost everything they owned during the typhoon and the woman of the house was asking me for money during the entire interview. We had nothing with us so we couldn’t really do anything but it was not a nice feeling.

Overall, we had an amazing time together and the cooperation between the two of us was really good.

ACKNOWLEDGEMENTS

We would like to express our thanks to those persons who helped us during this research: To Mr. Dominic Rodriguez and Jessie Guerrero for assistance during the fieldwork. To the Barangay officials and inhabitants of Antagan for their open welcome and assistance. To Mr. Jovito W. Sutio Barangay Secretary for supplying us the demographic information of the barangay. To Marilyn T. Salvador, Institutional Development officer of NIA for her warm welcome and open answers. To Amante M. Palce Junior – OIC of the Municipal Agriculturist Office. To Mr. Samuel Lugo, Federation President of the IA of Antagan. To the Tamang family at Antagan I, for accommodating us and making us feel at home during the fieldwork. To all the respondents who participated in our research.

References

Irrigation-schedule of the NIA (appendix I)
History background poster, Barangay Hall, Antagan I
Pers.com with the Barangay Secretary of Antagan I
Barangay Profile 2005, Antagan II

Appendix I: Questionnaire

Basic questions

What is your name? (anonymous)

What is your education?

How old are you?

What is your ethnic group

Were you born here? If migrant, from where/when?

Do you have children? (how many)

Do you have a farm?

If yes, how many hectares of land do you own?

Do you own the land yourself or are you a tenant?

Specific questions

What kind of crops do you plant?

How many times are you able to harvest per year?

What was the amount of your latest harvest (in cavans)

How much water do you need for your land?

How do you get the water for your land?

Is the water available all year long?

(If there is no water, what do you do?

Do you plant other crops or do you leave the land fallow?)

Do you have other incomes besides farming?

From whom have you learned to work on the field?

Do you think that there are new techniques/information available for rice farming?

Have you looked for them?

Do you know where you can find information on irrigation techniques?

Have you ever received information about the irrigation system?

B. From whom?

C. And what information was it?

D. How do you apply these learning techniques?

E. Do/did you observe that these are more effective?

Do you know PAGASA/ IRRI/ Department of agriculture ?

Have you ever received information from them?

B. If yes, what kind of info did you get?

Do you talk with other farmers about farming techniques?

Do you talk with other people, for example the supply store owner, about farming techniques?

How do you make your choice for a crop or variety?

If you have received information: how do you apply this learning techniques. Do you observe that this is more effective?

Are you familiar with other rice varieties or other crops?

Do you have access to : radio/internet/tv?

Would you like to receive information about new techniques and new rice varieties?

B. How would you like to receive new information:

Workshop

Lectures

Letters

Not at all

Information (flyers) at the supply store

Tarpoline (posters)

Education during one week at a school

Techno-demo

Others, namely:

would you be prepared to pay for it? (the information)

What would you like to change considering the farming/irrigation system?

Would you like your children to become farmer?

Appendix II: Interview results

age	education	gender	location	ethnic group	migrant	owner	ha	crops	variety	harvest	amount	water	availability	incomes	learned from	new info available	tried new	information where
33	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	super 82	2	75	irrigation	all year	x	practice	yes	yes	technicians
46	highschool graduate	female	Antagan I	Ilocano	no	owner	1	rice	503	2	70	irrigation	all year	sari-sari store	father	yes	yes	technicians
30	college	male	Antagan I	Ilocano	no	owner	0.75	rice	x	2	63	irrigation	all year	sari-sari store	practice	yes	yes	x
47	highschool graduate	male	Antagan I	Ilocano	no	tenant	0.50	rice	super 82	2	20	irrigation	all year	x	practice	no	no	NIA
25	3rd year highschool	female	Antagan I	Ilocano	no	owner	1.4	corn	x	2	x	rainfall	x	x	father	no	no	x
56	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	super 82	2	40	irrigation	all year	children abroad	father	yes	no	technicians
51	highschool graduate	female	Antagan I	Ilocano	no	owner	0.5	rice	super 82	2	50	irrigation	all year	x	father	yes	yes	other farmers
49	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	503	2	20	irrigation	all year	x	father	no	no	DA
44	highschool graduate	male	Antagan I	Ilocano	no	tenant	0.4	rice	super 82	2	13	irrigation	all year	x	father	no	no	x
43	highschool graduate	male	Antagan I	Ilocano	no	tenant	1.5	rice	super 82	2	92	irrigation	all year	corn	father	no	no	barangay officials
52	highschool graduate	male	Antagan I	Ilocano	no	owner	0.4	rice	cl8-inbride	2	40	irrigation	all year	corn	practice	no	no	NIA
58	college	male	Antagan I	Ilocano	no	owner	0.8	rice	bigante	1	50	unirrigated	rainfed	government employee	father	yes	yes	DA
48	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	152	2	84	irrigation	all year	corn	father	no	no	NIA
40	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	152	2	20	unirrigated	waterpump	abroad wife	father	yes	no	monsanto
31	highschool graduate	male	Antagan I	Ilocano	no	owner	3	rice	bigante	2	400	irrigation	all year	tricycle	father	yes	no	DA
39	highschool graduate	male	Antagan I	Ilocano	no	tenant	0.5	rice	182	2	42	irrigation	all year	farm labourer	practice	no	no	NIA
40	highschool graduate	male	Antagan I	Ilocano	no	owner	0.7	rice	152	2	70	irrigation	all year	x	practice	yes	yes	NIA
37	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	super 82	2	41	irrigation	all year	tricycle	father	no	no	NIA
44	highschool graduate	male	Antagan I	Ilocano	no	tenant	1.5	rice	inbride	2	100	irrigation	all year	x	father	no	no	NIA
49	highschool graduate	male	Antagan I	Ilocano	no	owner	1	rice	masipag	2	70	irrigation	all year	corn	father	yes	yes	technicians
38	TESDA graduate	male	Namnama	Ilocano	no	owner	0.5	rice	152	2	30	irrigation	all year	sari-sari store	practice	no	no	NIA
32	highschool graduate	male	Namnama	Ilocano	no	tenant	0.25	rice	152	2	4	irrigation	all year	farm labourer	father	no	no	x
22	highschool graduate	male	Namnama	Ilocano	no	tenant	0.25	rice	bigante	2	20	irrigation	all year	sari-sari store	father	no	no	x
41	highschool graduate	male	Namnama	Ilocano	no	tenant	0.25	rice	158	2	30	irrigation	all year	x	father	no	no	x
55	highschool graduate	female	Namnama	Ilocano	no	owner	0.6	rice	152	2	15	irrigation	all year	x	father	yes	yes	IA
42							1.222222											

Interview results continued...

received	from who	what	apply	effective	pagasa	what	irri	what	D.A.	what	talk	variety choice	familiar other var	radio	tv	internet	wanted way of info supply	pay	problems	children
yes	DA	irrigation system	yes	yes	yes	weather	no	x	yes	how to plant	yes	climate	yes	yes	yes	no	seminar	no	no	x
yes	DA	irrigation system	yes	yes	yes	weather	no	x	yes	irrigation system	yes	price	yes	yes	yes	no	lectures	no	no	yes
no	x	x	x	x	yes	x	no	x	yes	x	yes	availability	yes	yes	yes	no	lectures	no	no	yes
yes	DA	free seeds	yes	yes	no	x	no	x	yes	free seeds	no	boss	yes	yes	yes	no	lectures	no	no	yes
yes	unde	variety of seeds	yes	yes	no	x	no	x	yes	irrigation system	yes	traders	yes	yes	yes	no	seminar	no	no	yes
no	x	x	x	x	yes	weather	no	x	yes	agricultural technology	no	climate	yes	yes	yes	no	seminar	no	no	no
yes	farmers	variety of seeds	yes	yes	yes	weather	no	x	yes	x	yes	climate	yes	yes	yes	no	seminar	no	no	yes
yes	mayor	new well	x	x	no	x	no	x	yes	x	yes	price	yes	yes	yes	no	lectures	no	no	yes
yes	NIA	improvement of canals	no	x	no	x	no	x	yes	advise varieties	yes	boss	no	yes	yes	no	seminar	no	no	yes
yes	NIA	shutdown of water	x	x	yes	weather	no	x	yes	free seeds	yes	boss	yes	yes	no	no	seminar	no	no	no
yes	NIA	plant techniques	yes	yes	no	x	no	x	yes	irrigation technologies	yes	trainings	no	yes	yes	no	workshop	no	no	yes
yes	NIA	operations of NIA	yes	yes	yes	weather	yes	x	yes	varieties of seeds	yes	soil dependent	yes	yes	yes	no	seminar	no	no	no
yes	NIA	irrigation system	yes	yes	no	x	no	x	yes	free seeds	yes	price	yes	yes	yes	no	lectures	no	no	yes
yes	morsanto	variety of seeds	yes	yes	no	x	no	x	yes	free pesticides for rats	yes	climate	yes	yes	yes	no	seminar	no	no	no
no	x	x	x	x	no	x	no	x	yes	new varieties	no	climate	yes	yes	yes	no	seminar	no	irrigation-schedule	yes
yes	NIA	irrigation techniques	yes	yes	no	x	no	x	yes	free seeds	yes	price	yes	yes	yes	no	lectures	no	no	yes
yes	NIA	irrigation techniques	yes	yes	no	x	no	x	yes	free seeds	yes	DA	yes	yes	yes	no	seminar	no	change the concrete lining of the mail canal	no
yes	NIA	bill of water	x	x	no	x	no	x	yes	fertilizer/insecticides	yes	price	yes	yes	yes	no	lectures	yes	no	yes
yes	NIA	water flows	yes	yes	no	x	no	x	yes	free seeds	yes	boss	yes	yes	yes	no	seminar	no	repair the water flows and the lining canals	no
yes	NIA	how to supply water	yes	yes	no	x	no	x	yes	new varieties	yes	DA	yes	yes	yes	no	seminar	no	change the concrete lining of the mail canal	yes
yes	NIA	bill of water	x	x	no	x	no	x	yes	free seeds	yes	soil dependent	no	yes	yes	no	seminar	no	irrigation-schedule	yes
no	x	x	x	x	no	x	no	x	yes	free seeds	no	boss	no	yes	yes	no	seminar	no	no	yes
no	x	x	x	x	no	x	no	x	yes	free seeds	no	boss	no	yes	yes	no	lectures	no	no	no
no	x	x	x	x	no	x	no	x	yes	varieties of seeds	yes	boss	no	yes	no	no	none	no	no	no
yes	DA	free seeds	x	x	no	x	no	x	yes	seeds & fertilizers	no	DA	yes	yes	yes	no	seminar	no	building of a new water pump	yes

Appendix III: Interviews with key informants

Interview with the Municipal Agriculturist – Mr Amante M. Palce Junior

From who do you get your information?

DA, IRRI, PHILRICE, AGRICULTURAL TRAINING OFFICE,

Are you responsible for the information supply to farmers?

. Yes We are responsible.

How do you spread the information?

We spread the information through farmers classes, seminars, radios and techno demos.

What is this information?

Free seeds and new variety of rice.

How do you reach the farmers?

We use barangay officials and farmers leaders to spread the message.

Interview with NIA

We also went to the NIA to ask about their system of information-supply. Marilyn T. Salvador, Institutional Development officer of NIA, helped us to understand the supply-system and she drew a picture for us. She also called the Federation President of the IA, Mr. Samuel Lugo, and he immediately came to the NIA to work with us.

Interview with the Federation President – Mr. Samuel Lugo

From who did you get your information?

DA, Irrigation Superintendent (NIA)

Are you responsible for the information supply to farmers?

Yes. we are responsible

How do you spread the information?

I talk with the IA leaders and the IA leaders will do the spread of information

What is this information?

It's about the water bills and about the shutdown and availability of water (irrigation schedule)

How do you reach the farmers?

Put posters on doors and conduct house to house methods

In some of our interviews it became clear that not all the farmers are reached by the information. How do you explain that?

Than you did not speak to real farmers, because everybody is reached.

2.5 Determining Pesticide Usage and Consequences in the Tumauni Community

Vicky Y. Agpoon and Nicolien Pul

INTRODUCTION

Agricultural pesticides

Agricultural pesticides make up the largest percentage of chemical inputs in farms annually to increase crop yield (Oncog undated). As a result, large amounts of pesticides could contaminate the surrounding soil, waterways, air, and other biological systems, including man (Oncog). Pesticides are substances intended for preventing, destroying, repelling or controlling any pest, including unwanted species of plants, insects and molluscs (Oncog).

Whole watersheds become contaminated by the uncontrolled use of agricultural pesticides (Odum 1971). Pesticide pollution has greatly aggravated by unnecessary aerial spraying of entire landscapes. Other unforeseen problems arise because new insecticides are tested at the organisms' level of organization and then used at the ecosystem level without testing. Pesticides were supposed to solve all pest problems forever (Odum, 1971). Besides resistance of pests to pesticides, people suffer from health problems. The use of pesticides is particularly hazardous when applied close to houses. Here, people can easily inhale pesticides. Also, pesticides flow in the ground and can contaminate the water in the deep pump well (pers. comm. Mallillin). Pesticides also cause severe damage to the environment, especially aquatic environments, for example causing mature killings in fish stocks.

There are different kinds of pesticides. Herbicides are applied for forest management and massively in agriculture. Also, it is applied to clear railroads and highways from weeds (Odum 1971). Herbicides have also been applied as forest defoliation agents (Odum 1971). Insecticide is a substance which kills insects. It comes in powder, paste or liquid form (Odum 1971). A third kind of pesticide are the molluscicides to kill molluscs. Molluscicides are especially used to fight the apple snail, a mature nuisance in rice paddies.

Farming in Tumauni

In the Municipality of Tumauni, farmers of the Antagan Barangays grow rice and corn in a total area of 2000 hectares. An irrigation system, that receives its water from the upland rivers, supplies the farmlands with water. The residual water from the irrigated fields flows on towards Tumauni and subsequently enters the Cagayan River. The rice and corn farmers use pesticides but not a lot is known about the actual use and what the consequences are for water quality. Besides, people who live in the irrigated area might suffer from the polluted water.

Research questions

Our research question is: How do farmers use pesticides, what are the consequences and what is the knowledge about pesticide usage?

To be able to answer this question, we focused on the following sub-questions: 1) What pesticides are used by the farmers? 2) How do farmers apply pesticides? 3) Why do farmers use the pesticides? 4) What is the knowledge of farmers on consequences of pesticides on water quality? and 5) What is the water quality at the different locations in the Tumauni Municipality?

To investigate whether community members downstream of the irrigation system are exposed to the pesticides run-off, we looked at how people in Namnama used the water downstream of the irrigation system. This leads to sub-question 6) Do barangay members use irrigation water run-off for domestic purposes, such as washing and drinking?

Here, we report on pesticide use by the farmers of the Antagan barangays and how well they are aware of the consequences of pesticide use. Subsequently, we investigated where people in Namnama get their water for daily uses.

METHODS

From January 14, 2011 to January 20, 2011, field work was conducted in the municipality of Tumauni. Three Barangays in Tumauni, Antagan I, Antagan II and Namnama, were visited for interviewing farmers and collecting water samples. The Barangay Halls of Antagan I and II were visited to get the names of farmers and the maps of the Barangay.

Interviews

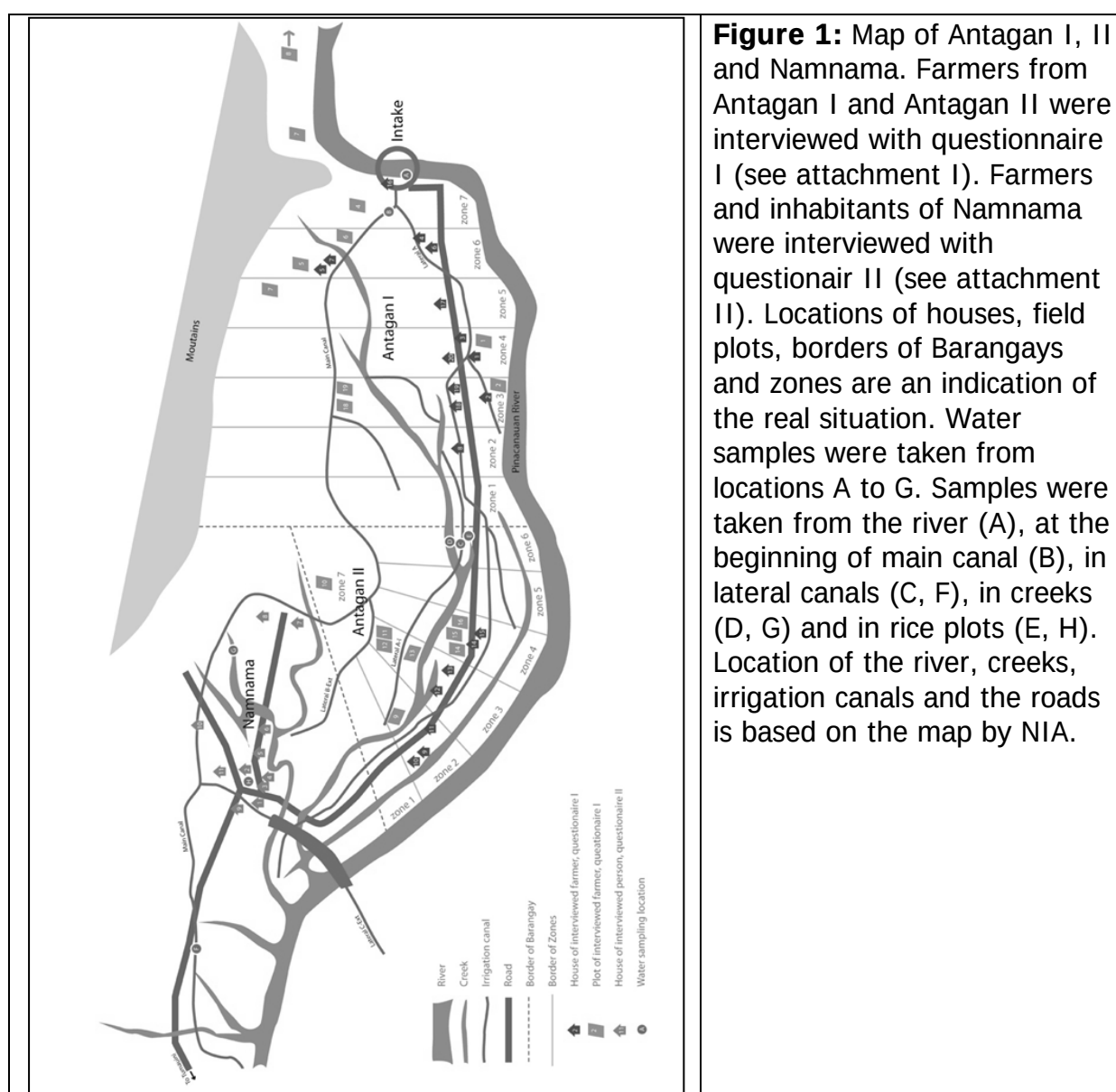
Farmers were selected by walking around the barangays and stopping at different houses. It was tried to select houses in the different zones. For the location of the houses and farm fields of the different farmers interviewed, see figure 1. When arriving at a house, we asked if the farmer or his wife wanted to cooperate with the interview. All farmers that were approached wanted to cooperate. In total, 13 farmers of Antagan I, 7 farmers of Antagan II and 11 inhabitants of Namnama participated in the research.

Two questionnaires were prepared, based on an earlier pesticide study conducted in Cagayan Valley (Baurdoux 2002). Questionnaire 1 (see appendix I) was conducted in Barangay Antagan I and II. This questionnaire asked about what pesticides the farmers use, how they use the pesticides, what safety instructions they follow and what the farmers know about the consequences of pesticide use. During the first four interviews, it was noticed that some of the questions were not correctly stated. Those questions were reformulated. An adjusted questionnaire was developed during the field work because of additional information about the Integrated Pest Management that we were informed about (see appendix I). This basically meant adding question 36 to 38 to questionnaire I. Farmers 4, 6 and 17 were visited again to ask them the additional questions. Farmers 18 to 20 were interviewed with the adapted questionnaire. This was questionnaire 1, but only with questions 1 to 15 and questions 36 to 38. Because of time constraint, the whole interview could not be conducted.

Questionnaire 2 (see appendix II) was used in Barangay Namnama to find out what sources of water inhabitants use for their daily needs, and if they used the creek or the irrigation canal as sources.

Water sampling

On January 20, 2011, water samples were taken at 8 locations in the three Barangays (see figure 1). Four samples were taken along the main canal: At the beginning, in Namnama, from a creek and from a rice field. Three samples were taken along lateral canal A, flowing along the main road through the Barangays: In the canal, from a creek and from a rice field. One sample was taken from the river at the location where the water enters the main canal. This sample functions as the reference for the measurements. The locations were chosen in those locations where pesticide run-off might enter the creeks or flow back in the irrigation canal. These locations are all downstream of farm fields that are treated by the farmers with pesticides.



At each location, two replicate samples were taken in plastic water bottles. Bottles were rinsed three times at the sampling location before filling with the water for sampling. The samples were taken to Cabagan to test for pesticide residues (Backer, 2003), using the Rapid Field Kit for Pesticide Residue Detection (The National Crop Protection Centre, Los Baños). The method of the kit is based on a colour reaction. The kit tests for the presence of four different residues of pesticides, or carbamates. A colour change indicates the presence of a pesticide residue. The protocol was tested on the water sample from the rice field in Antagan and on a water sample to which insect spray (for household use) was added. Unfortunately, no colour reaction occurred, meaning that either the protocol is not working or that no residues of pesticides are present in the samples. A positive control should have been included in the kit. None of the other samples were measured because of the negative results of the test.

Gathering general information

The National Irrigation Administration (NIA) was visited to get a detailed map of the Tumauni municipality. This map shows the location of the road, the two rivers, creeks and the irrigation canals. At NIA, it was inquired if there is a policy about pesticide use that the farmers have to follow. This was also asked at the Barangay hall in Antagan I. The officers at the Barangay hall in Antagan I informed about the Integrated Pest Management (IPM). An appointment was made with the Barangay technician, Miss Norma Corpus, to talk about the IPM.

Pesticides

During the interviews, farmers gave names of several pesticides. Many farmers bought their pesticides at Baquiran's store in Tumauni. This store was visited and photographs were taken from all sides of the bottles and boxes of most of the pesticides that were indicated by the farmers. This information was used at a later time point to collect information about the active ingredients, other ingredients, handling and safety instructions. Hazard codes (see appendix III) were looked up for every active ingredient and some of the solvents (those for which a name was available) at the website of Sigma-Aldrich. In two cases, information was obtained from Wikipedia.

RESULTS

The use of pesticides by farmers in Antagan I and II

Twenty farmers were interviewed in Antagan I and Antagan II about their pesticide use. Demographic information about the interviewed farmers can be found in appendix IV. An overview of the pesticides that farmers mentioned during the interviews is given in table 1. Pesticides were used for three different pests: insects, molluscs and weeds. Some pesticides were only mentioned once by the farmers, while others were used by more farmers. Three active ingredients were found in more than one pesticide brand (see table 1). For example, to treat molluscs, 22 farmers used a pesticide that contains Niclosamide, while 3 farmers used something else (information on Hitz not available).

Hazard codes, when available, are given in table 1. Explanation of the hazard codes can be found in appendix III. All active ingredients carry one to three hazard codes. All ingredients carried at least one of the following hazard codes: cause acute toxicity, pose a threat to human health or are hazardous to the aquatic environment. Especially Cypermethrin, an active compound found in insecticides, is used by 14 farmers. According to the hazard codes, this compound is extremely toxic and poses a threat to human health and the environment. For some pesticides the names of solvents were also available. These solvents are also indicated as being hazardous (see table 2). Especially Xylene is known to be very carcinogenic. From this analysis it can be concluded that the pesticides applied by the farmers are all hazardous in one way or the other.

Table 1: Pesticides used by farmers in Antagan I and II.

<i>Pesticide name</i>	<i>Used by # of farmers</i>	<i>Type</i>	<i>Active Ingredient</i>	<i>Hazard code</i>
Nominee	2	Herbicide	Bispyribac sodium	GHS07
Machete EC	2	Herbicide	Butachlor	GHS07, GHS09
Roundup	2	Herbicide	Isopropylamine salt	Irritant (X), GSH09
Clear Out 41 plus	2		of Glyphosate	
Almix 20 WP	1	Herbicide	Metsulfuron Methyl	GSH09
Sofit 300EC	2	Herbicide	Pretilachlor	GHS06, GHS09
Pyanchor	1	Herbicide	Pyribenzoxim	Not found
Tamarone	3	Herbicide	Not available	Not available
Chix	1	Insecticide	Cypermethrin	GHS06, GHS08, GHS09
Magnum 5EC	4			
Cymbush 5EC	7			
Knockout 5EC	2			
Karate 2.5 EC	3	Insecticide	Lambda-cyhalothrin	GHS02, GHS07
Lannate	3	Insecticide	Methomyl	GHS06, GHS09
Vindex Plus	1	Insecticide	Phenthoate	GHS07, GHS09
Sevin	2	Insecticide	Not available	Not available
Furodan	1	Insecticide	Not available	Not available
Bayonet/Metabit	1	Molluscicide	Methaldehyde	GHS07
Surekill/Besokill	8	Molluscicide	Niclosamide	GSH09
Yuro 250 EC	3			
Bayluscide EC250	9			
Niclos M	2			
Hitz	2	Molluscicide	Not available	Not available

Table 2: Hazardous solvents in pesticides

<i>Solvent</i>	<i>Hazard code</i>	<i>Pesticide name</i>	<i>Type</i>
Chlorimuron Ethyl	GHS07	Almix 20 WP	Herbicide
Xylene	GSH02, GSH07	Machete EC	Herbicide
		Magnum 5EC	Insecticide
		Knockout 5EC	Insecticide
		Vindex Plus	Insecticide
Methyl isobutyl ketone	GHS02, GHS07	Bayluscide EC250	Molluscicide

Hazard codes: GHS02 flammable, GHS06 acute toxicity category 1-3, GHS07 acute toxicity category 4, GHS08 health hazard, GHS09 environmental hazard. For more information, see appendix III.

It was inquired what safety instructions were followed by the farmers. Some farmers (3) only wear a gas mask, while others (4) only wear long sleeve sweater. These farmers said that they don't wear a gas mask because it makes breathing difficult. Most farmers (10) did use gas mask and another form of protection, such as long sleeve sweater, pants, gloves and/or a cap. All farmers (15) that were asked what they do after spraying, said that they wash their hands. Nine farmers took a bath as well. There is no correlation between the amount of protection worn by the farmers during spraying and their washing behavior afterwards. These results implicate that approximately one third of the farmers protect themselves badly. The other farmers did better, but still don't wear full protection during spraying. Only one farmer takes full protection measures when spraying.

Farmers are aware of the hazards to human health. Symptoms were mentioned like headache, weakening, dizziness, itchiness, pain and difficulty breathing. One farmer said that people living close to the rice paddies might experience problems from breathing in pesticides, especially those persons who suffer from asthma. Some say that people might be affected when eating rice grains that contain pesticides. Farmers are aware of the negative effects on health. They often mention that pesticides are very bad for health, but that they have to apply to get a good crop. Still, even though their awareness of the effects on health, farmers spray pesticides while not wearing full protection.

The farmers were asked what the effects, or negative effects, of pesticides are on the environment. Farmers did not know (3), said that there was no effect (7) or that pesticides only have an effect on humans (6). One respondent mentioned that an herbicide called Power causes landslides. He pointed to the mountains and said that the barren areas were a consequence of this herbicide. Farmers do say that pesticides, after spraying, might evaporate, drain in the soil or flow off in the water. But all farmers but one are apparently not aware of the negative effects that pesticides can have on the environment.

We were interested where farmers get instructions on the use of pesticides. Thirteen (of 17) farmers got some kind of training. Trainings were provided by the Department of Agriculture (6), the Barangay technician (2), a pesticide trader (6) or by the land owner (2, if farmer was a tenant). The trainings by the pesticide trader had an extra function in that the traders try to sell their products to the farmers. Farmers always said that they got the information on how much pesticide they have to apply from the bottle. They mentioned that they use a certain number of tablespoons or cups, based on the instructions on the bottle. But doing a quick analysis from the pesticide bottles and boxes revealed that instruction tables on the amount of pesticides to be used are quite complicated. Besides, all information on the bottles/boxes is in English. Every pesticide package contained only a small part on some safety instructions in Tagalog. But all main instructions on handling, safety, what to do in case of casualties or on possible effects on health was in English. Since

many farmers in the Barangays we visited spoke no or very little English, this must be a problem for the farmers to be able to follow the instructions correctly and use the pesticide in a safe way.

Integrated Pest Management

At the 5th day of the field work, we found out that an Integrated Pest Management (IPM) system is applied in Antagan I. The official, Jovita W. Sutiose, who told us about IPM, said in the first place that no pesticides are sprayed by the farmers in the Barangay because of the IPM strategy.

IPM is an integrated approach to solve problems in agriculture that are caused by the use of hazardous chemical pesticides (Dreistadt et al. 1994). The main goal is to significantly reduce or eliminate the use of pesticides while at the same time managing pest populations at an acceptable level. IPM was introduced by the Department of Agriculture to the Philippines in 1993 (pers.comm. Corpus). Lectures about IPM started in Antagan I in 1998.

Barangay Technicians inform farmers about IPM strategies during lectures in the Barangay Hall. During the whole cropping season, there would be one lecture per week. Lectures would regard issues that would be of relevance to the farmers at that time point in the cropping season. Farmers have to attend all lectures during the whole cropping season to be able to learn thoroughly how to treat pests with alternative strategies (pers. comm. Corpus).

Barangay technicians encourage every farmer who attends the meeting to not use pesticide. Instead, the technicians suggest strategies that farmers can follow to avoid or treat pests. Advantages of these alternative strategies are that those strategies do not involve toxic chemicals that pose threats on human health and the environment. In addition, farmers don't have to spend money on expensive pesticides (pers. comm. Corpus).

The IPM strategies discussed are:

- Wild Gabi: Slice root crops and throw in rice paddy to get rid off molluscs.
- Picking of molluscs. Teach the farmers how they can cook the molluscs so that the molluscs become "adobo" (edible).
- Mix soap and chilli pepper in water. Cut in smaller pieces (siling labuyo). Use for spraying the paddy against insects.
- The use of ducks to eat the molluscs.
- Teach on correct use of fertilizer. Applying too much fertilizer endorses pests and diseases.
- Teach on correct use of watering. Most pests don't like water.
- Inform farmers about rice varieties that are more resistant to insect pests and diseases.
- The use of decomposed bullfrog in a plastic bag to serve as an insect trap.

- Banana and papaya leaves to attract molluscs. Leaves with molluscs can subsequently be removed.
- The use of grids positioned in the drainage outlet of the paddy. Molluscs will be collected here and can easily be removed.
- Crush eggs of molluscs by hand.

Five farmers were interviewed after the IPM and the strategies. Unfortunately, due to time constraints, not more farmers could be approached. None of the farmers know about the IPM, but four of the five farmers use/used alternative strategies. Three farmers attended the lectures by the Barangay technician. Two of these farmers found the lectures useful. These two farmers also apply some of the strategies, such as picking molluscs for consumption, use gabi roots and papaya leaves. But they still have to apply pesticides because the alternative strategies are not effective enough by themselves. One farmer had applied alternative methods in the past, but he found the strategies not effective, difficult to apply and labor intensive. This farmer had attended lectures but does not go anymore because the strategies don't work and he therefore finds it a waste of his time.

Pesticide policies

Both NIA (pers. comm. NIA) and a Barangay technician (pers. comm. Mallillin) told that there are no policies on pesticide use. But certain pesticides are now forbidden to use, such as Breston, a very toxic molluscicide (pers. comm. Mallillin).

Use of water sources in Namnama

Interviews were conducted in Namnama to find out what water sources the inhabitants of Namnama use in their daily lives. The questionnaire can be found in appendix II. Namnama was selected for the questionnaire because this Barangay is located in an area where drainage from the upstream farm fields could flow in the creeks or back in the irrigation canal. Demographics of the respondents are listed in appendix IV. Results are given in table 3. None of the respondents used water for drinking and cooking from either the creek or the irrigation canal. Four from the six respondents that live close to the irrigation canal or creek used the water from the creek or the irrigation canal for washing or bathing. None of the respondents that live further away from the creek or the irrigation canal use water from these two sources for washing or bathing. Two of these respondents said that it was simply too far. These results implicate that people who live close to the creek or the irrigation canal tend to use the water for bathing or washing clothes. Ten of the 11 respondents did say that their children use the creeks and irrigation canals for recreational use and some of the adults did so too.

Table 3: The use of water in Namnama (number of respondents using source for activity)

<i>Activity</i>	<i>Aquastation</i>	<i>Pumpwell</i>	<i>Creek</i>	<i>Irrigation canal</i>
Washing clothes	0	7	3	1
Bathing	0	9	1	1
Cooking	1	10	0	0
Drinking	1	10	0	0

Water sampling

At 8 different locations in the municipality of Tumauni water samples were taken to test for pesticide residues (see figure 1). Water samples were taken after a night of heavy rain. The water samples taken from the river and from beginning of the main canal (see figure 1, locations A and B) looked clear. The water samples from the other locations looked light brownish, meaning that maybe more silt was present in the water. This could be a result from the heavy rains during the nights.

Unfortunately, the samples could not be measured for pesticide residues, either because the protocol was not working (a positive control was lacking) or because no carbamates were present. Therefore, nothing can be said about the quality of the water regarding to pesticide loads.

DISCUSSION AND CONCLUSION

During our research project we focused on questions related to pesticide use in the Barangays of Antagan I and II. Here we wanted to know what pesticides farmers use and what their knowledge is regarding the effects of pesticides on human health and the environment. Adding to that, we wanted know what the quality of the water is in the creeks and irrigation canal downstream of rice fields and if farmers use this water for in their daily practice.

From our results we can conclude that the pesticides that are used by the farmers are very hazardous to both the people and the environment. While farmers are aware of the effects that pesticides have on humans, they or not aware of the effects on the environment. This is probably caused by a lack in education from responsible organisations/ associations, suchs as the DA and the agricultural technician from the Barangay. Despite the fact that farmers are aware of the hazardous effects of pesticides on human health, most farmers don't fully protect themselves during spraying. This might also be the result from lack in education.

The Integrated Pest Management strategies are introduced during lectures to the farmers, but the strategies are not well implemented. Partly is caused because not all farmers attend all lectures, because lectures are not on a regularly enough basis, and because some farmers don't believe in the strategies. Also, the IPM strategies are not effective enough against pest and farmers still need to apply chemical pesticides to be able to keep pests at an acceptable level. Main problems that the few respondents put forward are that strategies are not effective, they are difficult to apply and they are labor intensive.

People who live close to creek or irrigation canal use it for washing and bathing. It can be questioned what the effect would be on the health of the people that use this water for washing, bathing or recreational use. Especially children are exposed to the risks of pesticides residues in the polluted water. Although we can not make any actual statements about the water quality because the measuring of the water samples failed, we do think that the water in the creeks and the irrigation canals downstream of the rice paddies contain residues of toxic, hazardous pesticides.

RECOMMENDATIONS

The truth is, pesticides are useful especially in farm fields to control massive building of pests. But how about the persons suffering the consequences of spraying pesticides? The Department of Agriculture has a program, the Integrated Pest Management. The IPM informs the agricultural/ Barangay technician about the strategies to teach to every farmer, but most of the farmers had not heard about IPM. Although farmers use some alternative strategies, a lot more could be improved to reduce the use of pesticides with alternative methods. The DA must focus on this situation and put more effort in encouraging farmers in adopting the strategies to eliminate the use of chemical pesticides. Also, farmers should be better informed about the hazardous effects of pesticides on humans and environment, how to properly apply pesticides and what the effect of pesticides is on water quality.

Here, we see a big task for the Barangay/ agricultural technician. What should also be focused on is to increase the willingness and cooperation of the farmers in reducing pesticide use. For a better education of the farmers, more money should become available. At the moment, the technicians are paid by the local government who simply don't have enough money. Only with more money, the technicians can put more effort in educating the people.

REFLECTION

Our week of field work in the municipality of Tumauni was experienced by both of us as very nice. The corporation between us went well and therefore we could conduct good interviews. We were able to gather useful information, both during and after field work. Some things could have been better. We only found out the day before we would leave to go back to Cabagan about the IPM strategies. Because we were not aware, we did not ask the farmers about it. We only asked some farmers on the last day. To get a better picture about the actual health issues that farmers, or other Barangay members, experience, it would have been good if we had interviewed the health workers in the Barangays. We wanted to visit the Department of Agriculture to inquire about pesticide policies and to get more information about IPM, but we had no time. Next time, we would like to ask students from Isabela State University about their knowledge of pesticides. Also due to time constraint, we were not able to do a thorough literature search. It was a pity that, despite all our time and efforts, we could not get the rapid kit for testing pesticide residues to work.

ACKNOWLEDGEMENTS

We would like to thank the officials at NIA, the Barangay halls and secretaries and the Barangay captains for their great help whenever we had a question or request. Our research would not have been possible without the participation of the farmers that we interviewed. Besides getting useful information, we also very much enjoyed the small encounters with the farmers. Last, but not least, we would like to show our great thanks to Anti Natti and Uncle Junior for their hospitality. We very much enjoyed staying at their place and are grateful that we could. They made our stay pleasant and very delicious, thanks to the great food of Anti Natti.

REFERENCES

Backer, Marc-Jan. 2003. Integrated Pest Management and Pesticide Use in the Cagayan Valley, Philippines: Potentials and Limitations. Field report, CVPED, Leiden University and Fontys University of Higher Education.

Baurdoux, Manon. 2002. Spraying of Chemical Pesticides in the Cagayan Valley, Philippines. Student report, CVPED and Leiden University.

Corpus, Norma. Barangay technician for IPM implementation. Personal communication. January 20th, 2011.

Dreistadt, Steve H., Mary Louise Flint, et al. 1994. Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide. ANR Publications, University of California, Oakland, California.

Mallillin, Cenon. Trainer of Barangay technicians. Department of Agriculture. Personal communication. January 20th, 2011.

Odum, Eugene P. 1971. Fundamentals of Ecology, 3rd edition.

Oncog, Rosa Theresa A. Detection and Movement of Commonly Applied Pesticides in Critical Upland Rice Environment. Soil, Water and Plant Tissue Laboratory, ISU-Cabagan, Isabela.

APPENDIX I: Questionnaire on pesticide usage.

House: zone #

Field: zone #

Observations (own)

House:

General

What is your name?

What is your gender?

How many children do you have?

What is your ethnic background?

Did you migrate here? If yes, where from?

What is the latest education that you had?

What is your main source of livelihood?

Do you have a radio or TV?

Farming situation

a. What is the size of your plot?

b. Who is the owner?

What crops do you plant?

Yearly income:

How many harvests do you have per year?

How many cavans per harvest?

What is the price per kilo that you get for your harvest? Do you sell it dry or wet?

In case of tenant, what percentage of your harvest goes to the owner?

Pesticide usage

Do you use pesticides?

If not, why not?

Cannot afford – don't think useful – don't have spraying machine – other:

What pesticides do you use?

Are these herbicides, molluscicides or insecticides?

Why do you use pesticides?

Increase harvest – facilitate work – told by owner – told by trader – against insects/herbs in my fields – against insects in neighboring fields – see neighboring spraying - other:

When do you apply pesticides?

Do you consider weather conditions before spraying?

If yes, how/why?

Which instructions do you follow on the use of pesticides?

What concentration do you use?

What safety instructions do you follow?

Do you mix different pesticides?

If yes, which ones and why?

Where do you buy your pesticides?

Knowledge and perception of pesticides

Did you even get training or a lecture about the use of pesticides?

If yes, from whom?

DA – pesticide producer – pesticide trader – other:

And what did you learn?

Do you think you will get less harvest when not using pesticides?

Do you think that using less pesticide is better or that using more is better?

Pesticides increase your crop production. Do pesticides also have negative effects on the environment?

If yes, in what way does it affect the environment?

Do you think pesticides affect humans?

If yes, in what way?

Where do the pesticides go after you sprayed them?

Additional questions about Integrated Pest Management

Instead of using pesticides, do you use an alternative way to get rid of insects, weeds or mollusks?

Did you hear about the IPM, the Integrated Pest Management?

If yes, could you explain what this program is about?

APPENDIX II: Questionnaire on domestic water use

House: zone #

Field: zone #

General

What is your name?

What is your gender?

How many children do you have?

What is your ethnic background?

Did you migrate here? If yes, where from?

What is the latest education that you had?

What is your main source of livelihood?

Water use

Where do you get the water that you use for bathing?

Where do you get the water that you use for washing?

Where do you get the water that you use for drinking?

Where do you get the water that you use for cooking?

Do you think the water that you use is safe?

If yes, why?

If no, why not?

Do you do anything to clean the water that you use?

Appendix III: Hazard codes

Irritant
Xi

Flame
GHS02



Flammable gases, category 1
Flammable aerosols, categories 1,2
Flammable liquids, categories 1,2,3
Flammable solids, categories 1,2
Self-reactive substances and mixtures, Types B,C,D,E,F
Pyrophoric liquids, category 1
Pyrophoric solids, category 1
Self-heating substances and mixtures, categories 1,2
Substances and mixtures, which in contact with water, emit flammable gases, categories 1,2,3
Organic peroxides, Types B,C,D,E,F

Skull and Crossbones
GHS06



Acute toxicity (oral, dermal, inhalation), categories 1,2,3

Exclamation Mark
GHS07



Acute toxicity (oral, dermal, inhalation), category 4
Skin irritation, category 2
Eye irritation, category 2
Skin sensitisation, category 1
Specific Target Organ Toxicity – Single exposure, category 3

Health Hazard
GHS08



Respiratory sensitization, category 1
Germ cell mutagenicity, categories 1A,1B,2
Carcinogenicity, categories 1A,1B,2
Reproductive toxicity, categories 1A,1B,2
Specific Target Organ Toxicity – Single exposure, categories 1,2
Specific Target Organ Toxicity – Repeated exposure, categories 1,2
Aspiration Hazard, category 1

Environment
GHS09



Hazardous to the aquatic environment
- Acute hazard, category 1
- Chronic hazard, categories 1,2

Overview of hazard codes that are related to the pesticides used by the farmers. Hazard codes are based on EU classification of hazards and International classification of hazards (altered from Sigma-Aldrich).

Appendix IV: Demographic information of interviewed farmers

Demographics of interviewed farmers questionnaire I

Total number of respondents:	20
Respondents in Antagan I:	13
Respondents in Antagan II:	7
Gender:	15 males, 5 females
Number of children:	4.1 ± 2.1
Migration status:	10 farmers migrated
Ethnic background:	Ilocano: 19 Bicolano: 1
Educational attainment:	Elementary graduate: 13 High school undergraduate: 2 High school graduate: 2 College: 3
Other sources of income:	Piggery: 2 Job for the Barangay: 3 Little store: 2 Technician at electrical corporation: 1
Farmers with radio:	15
Farmers with tv:	18
Average plot size:	1.6 ± 2.4 ha.
Farmers that own land:	13
Farmers that are tenants:	7
Planted crops:	Rice: 18 Corn: 7 Vegetables: 4 Coconut: 1
Yearly farming income:	3475 ± 5653 php (range: 220 to 26400 php)

Demographics of interviewed farmers questionnaire II

Number of respondents:	11
Barangay of respondents:	Namnama
Gender:	3 males, 8 females
Number of children:	4.9 ± 3.6
Migration status:	6 farmers migrated
Ethnic background:	Ilocano: 10 Ybanag: 1
Educational attainment	No education/ elementary undergraduate: 2 Elementary graduate: 5 High school graduate: 1 College: 3
Sources of income:	Farming: 9 Little store: 2 Tricycle driver: 1 Security guard: 1

III Peñablanca



3.1 The functioning of the Protected Area Management Board in the Peñablanca Protected Landscape and Seascape and its future priorities in the area

Josie C. Robles & Jessie Post

INTRODUCTION

In 1992 the Senate and Congress enacted the National Integrated Protected Areas System (NIPAS) Act, which established the Protected Areas (PAs) in the Philippines. The Act also describes several involved organizations, which are governing and managing the area. Every PA is managed by a Protected Area Management Board (PAMB), which ideally consists of a cross-cut of the inhabitants of the Protected Area. The Peñablanca Protected Landscape and Seascape (PPLS) is a beautiful, diverse Protected Area in Northern Luzon. Sadly, there are several problems in the area, such as illegal logging, climate change, slash and burn farming and many others. Since the proclamation of the PPLS in 2003 the area consists of 18 barangays, with a total population of 27,612 people. Less than one hundred are indigenous Agta and 42,8 % are farmers. The PPLS covers 118,781.58 hectare (PASU, 2011, pers.comm.) We spent one week in the area to carry out a short field study on the management of the PPLS, the current situation and the future of the protected area. In this report we hope to answer the following research question:

How does the PAMB function in the PPLS and what should be its priorities in the near future?

In order to get an impression of the organization of the PAMB, we interviewed eight members of it, including barangay captains, the Metropolitan Tuguegarao Water District and the Provincial Planning and Development Office. We also spoke to the Protected Area Superintendent Unit (PASU), who is in charge of the implementation of the policies of the PAMB. To get a clear view of the current state of the PPLS we also talked to people in five different barangays, ranging from teachers to pastors. The first part of our report will describe the government structure in the environment and natural resources sector and the NIPAS Act, which established the PAs and PAMB. In our results section we will document our findings concerning the actual working of PAMB. Then we will describe the current situation (and problems) in the PPLS, followed by an overview of issues which should receive priority in the policy making of PAMB, according to our respondents. We will round up our report with some conclusions and recommendations for the (near) future. We hope you enjoy reading our report; we definitely enjoyed conducting the research!

Management of Protected Areas on paper

The Government structure

Before looking into the act which established the Protected Areas in the Philippines (the NIPAS Act), it is important to make an overview of all the different government agencies which are involved in law-making, policy making and implementation in the field of environment and natural resources. Below you will find an overview with all the different levels of government and the attached organizations (Fig 1).

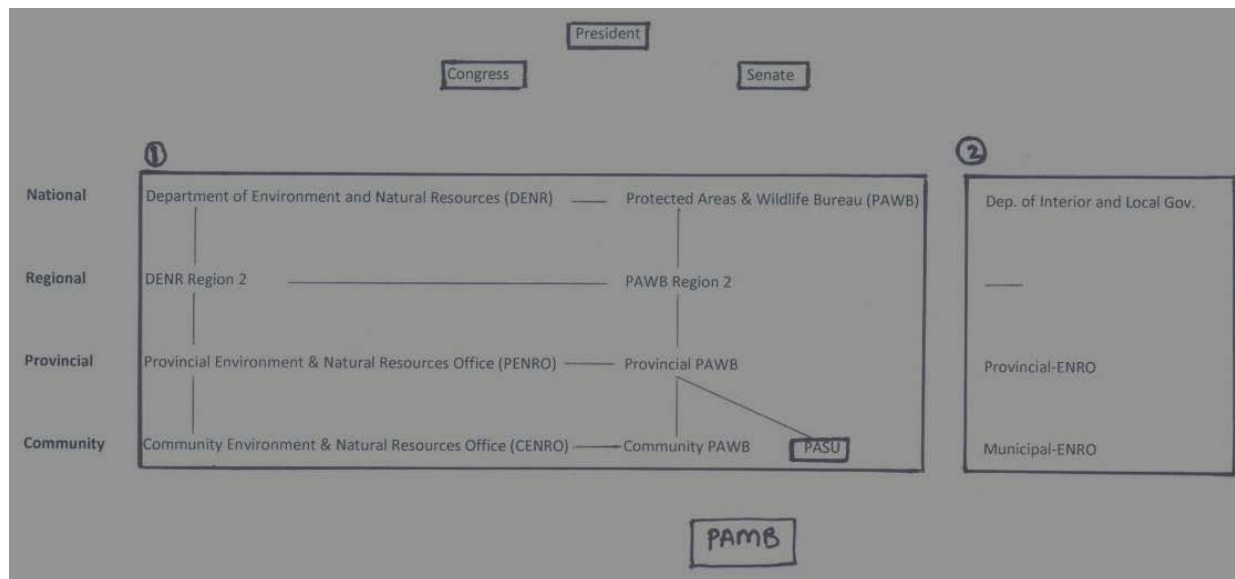


Figure 1: overview of government organizations involved in protected area management.

The highest level of the government of the Philippines is occupied by the President, the Congress and the Senate. Next, there are 19 different executive Departments. For our study, the Department of Environment and Natural Resources (DENR) and the Department of Interior and Local Government (DILG) are of great importance. When it comes to the management of the protected areas, two government systems operate side by side.

On one side there is the DENR, which consists of six offices. One of those is the Protected Areas & Wildlife Bureau (PAWB). The DENR has representatives of all the offices at three different levels: there is a regional office (in this case: DENR Region 2), a provincial office (PENRO Cagayan) and an office at community level (CENRO Peñablanca). This means that there is a PAWB representative in the regional, provincial and community office of the DENR. At the community level there is one more organization: the Protected Area Superintendant Unit (with a Protected Area Superintendant Unit Officer). This office/person is amongst many other things occupied with the implementation of laws and policies which PAMB makes.

Next to this structure runs yet another hierarchy under the DILG. This organization consists of a provincial government (Provincial-ENRO) and a municipal government (Municipal-ENRO). The difference between this hierarchy and the one previously described is that in the first structure, all the offices and representatives carry out the national policies made by the DENR. The tasks and responsibilities are devolved, as is the case in a typical top-down organization. In the second structure the different government levels have much more autonomy (both the P-ENRO and the M-ENRO have (some) elected members). They have to obey to national laws as well, but they are allowed to create their own policies within this framework.

This complicated structure finds its roots in the ruling of former dictators such as Ferdinand Marcos (1978-1986), who centralized all the power at the top level. After he was dismissed, the public opinion was that power had to be decentralized. For

that reason we see this quite extreme devolution of tasks and responsibilities. In theory, the system is quite good and very honest. It is super democratic and it even acts as a model for other countries. However, the system fails on the ground. It is often very unclear who is in charge of what, who has to account to whom. Also, several tasks overlap (e.g. PENRO and P-ENRO).

NIPAS Act & PAMB

The NIPAS Act, adopted in 1992, is an act providing for the establishment and management of national integrated protected areas system, defining its scope and coverage and for other purposes (NIPAS Act, p.1). This act was created by the Senate and the Congress and aims to create one guiding system for all Protected Areas. In the act, a protected area is defined as 'identified portions of land and water set aside by the reason of their unique physical and biological significance, managed to enhance biological diversity and protected against destructive human exploitation'. The PPLS is not only a protected area, but also a 'protected landscape/seascape'. The definition of the previous is as follows: an area of national significance which is characterized by the harmonious interaction of man and land while providing opportunities for public enjoyment through recreation and tourism within the normal lifestyle and economic activity of these areas'.

In section 9 it is stated that there shall be a general management planning strategy to serve as a guide in formulating individual plans for each protected area. The NIPAS is officially placed under the control and administration of the DENR. It also mentions the earlier mentioned PAWB. In chapter five (section 18) the duties, functions and composition of PAMB are mentioned. We will look at this more closely in paragraph 3, where we describe the functioning of the PAMB in the PPLS. The issue of funding will be covered in paragraph 5.

In conclusion we can say that the NIPAS Act is all-encompassing. It describes all the goals, tasks and stakeholders. However, the question remains whether all these plans and policies are carried out in reality.

Some Protected Areas have their own act. This is the last step in really becoming a Protected Area. This has not happened in the PPLS, so the NIPAS Act is the law which governs this PA.

The next paragraphs will focus on the information we gathered during our field study. We will look at the working of PAMB in the PPLS and the current condition and future priorities of the area. Before we get into the results, we will first describe our methodology and give an overview of our respondents.

METHODS

In order for us to gather information, we interviewed the people of five neighboring barangays within the protected area, namely Sisim, San Roque, Nannarian, Malibabag and Aguggaddan. We also interviewed 8 of the 23 permanent PAMB members, including one of the board directors of the Metropolitan Tuguegarao Water District, the Provincial Planning and Development Office, the Municipal Environment and Natural Resources Office and four Barangay Captains. After that we talked to the

PASU, the 'manager' of the Protected Area. He gave us a lot of background information about the park, in addition to our regular questions. We used questionnaires for the interviews, with open questions.

The local people that we talked to can be divided into the following categories; within brackets you will find the number of respondents in these categories. All of the following respondents were selected randomly.

- Education (5)
- Church (2)
- Farming (5)
- Transport/driving (1)
- Government (5)
- Toyota project (2)
- Healthcare (1)
- Gambling (1)
- Housekeeping (1)
- Owner of shop (1)
- Students (2)
- Retired (2)

Every interview was conducted in 30 to 50 minutes. In every barangay we interviewed a minimum of five people including the Barangay Captain (usually also a member of PAMB). In total we conducted 37 interviews, including 28 interviews with people in local communities.

We chose to interview both PAMB members and local people with lots of different occupations, to get a more complete image of the current situation of the PPLS and different ideas for the future plans of it as well. In our interviews we asked questions about five key issues to find out about the present and future state of the park. Those issues were tourism, climate change, water quality and water use, forest management/timber poaching and agriculture. We were happily surprised about the willingness of all the interviewees to share their opinions and personal stories with us. In our results we will divide our answers into three categories: PAMB-members, PASU & local respondents.

The research we conducted was part of a small field study. We realize that for a more encompassing research you would need a lot more respondents. Aside from the interviews we used the NIPAS Act (1992) and the Peñablanca Forest Land Use Plan 2010-2015 as a theoretical framework.

RESULTS

PAMB – how it works

How PAMB works according to the NIPAS Act

Chapter 5 of the NIPAS Act focuses entirely on the Protected Area Management Board. It states that each PA should be administered by a PAMB. Among many other

duties and responsibilities, the board decides on matters relating to planning, resource protection and general administration of the area and it approves proposals, work plans, action plans, guidelines, for management of the PA in accordance with the approved Management Plan (NIPAS Act, p.25).

The composition of PAMB should be as follows:

- a) Chairman: DENR Regional Executive Director (RED)
- b) One representative of the Autonomous Regional Government where this is applicable
- c) The Provincial Development Officer from each province with territory within the protected area
- d) One representative from each Municipal Government with territory within the protected area
- e) One representative from each Barangay with territory within the protected area
- f) One representative from each tribal community residing within the protected area, if applicable
- g) At least three representatives from local NGOs and community organizations, including people's organizations, church and civic organizations. These representatives shall be based in or near the PA
- h) One representative, if necessary, from other national government departments that may be involved in protected area management.

Other important rules include:

- Board members shall serve for a term of five years without compensation
- The PAMB shall meet monthly. The chairman may call special meetings as deemed necessary
- The protected area staff shall serve as the Secretariat to the PAMB under the direction of the Protected Area Superintendent

How PAMB works in the PPLS

An important part of our interviews were the questions about the working of PAMB in the PPLS. From the answers of the PAMB members we interviewed, we learned that the PAMB of PPLS has 23 permanent members: the chairman (Regional Executive Director DENR), the mayor of Peñablanca, the barangay captains of the 18 barangays in the area, a representative of the Provincial Planning & Development Office, the Metropolitan Tuguegarao Water District and Conservation International (a NGO). Sometimes other stakeholders are also invited, but they cannot vote during the meetings, like the regular members. The PAMB meets quarterly at different locations (amongst others: LGU building Peñablanca and DENR building in Tuguegarao). At the meetings, different opinions and interests are present. Agreement is reached through voting (usually majority voting). In the case of difficult or sensitive issues, the PASU sometimes talks to the members who do not agree beforehand, in order to make agreement at the meeting possible. The meetings usually last one day.

When asked about the tasks and responsibilities, the PAMB members replied that their main duty is to protect the environment and the natural resources in the area. In practice this often comes down to controlling illegal logging and charcoal making: some of the main problems in the area, according to the respondents.

The last meeting of the PAMB of PPLS before our interviews was in December 2010 and covered topics such as the evaluation and assessment of the area and the appointing of new officers. The next meeting after our interviews is scheduled for end of February/March 2011. The members will receive an invitation letter in the upcoming weeks and the chance to suggest topics for the agenda, which is formed by the secretary of PAMB (the PASU). Board members serve for a period of five years. This sometimes causes problems, since Barangay Captains serve for three years and then have to stay in PAMB for another two years, while the new Barangay Captain doesn't have a say yet. Lastly, we asked the PAMB members whether the inhabitants of the barangays know about PAMB and its tasks. The Barangay Captains all claimed that most people know about PAMB and that they inform the people in their barangay at, for example, the general assembly meetings. This did not correspond with the answers of the inhabitants: 17 of the 28 respondents had not heard of PAMB before.

If you compare the actual composition of the PPLS PAMB with the criteria set in the NIPAS Act, some things are not in accordance with the law. Firstly, there seems to be only one member from an NGO, Conservation International. Some PAMB members we talked to mentioned that (sometimes) there were more, but no one could tell us any other names or more information. Secondly, the IP's which live in the PPLS, the Agta, are not represented in PAMB. The PASU told us that they had appointed an elder of the Agta but that he passed away before he was an actual member. For the moment, there are no other candidates available. The PASU also mentioned that communication with the Agta is difficult. However, it remains a priority of the PASU and PAMB to appoint an IP member in the near future. Further, the NIPAS Act states that the PAMB should meet monthly. The PAMB in the PPLS meets quarterly.

Current situation of the PPLS

In order to get an idea of the current situation of the PPLS (and the working of PAMB) we asked all of our respondents questions about the following topics: climate change, water quality and use, tourism, forest management/illegal logging and agriculture. After these specific questions we asked them what has changed in the past 10 years, what the current state is like and what should be improved (more on this last topic in the next paragraph). Below you will find the different categories and the answers of the local people, the PAMB members and the PASU.

PAMB

Tourism

Seven of the eight PAMB members said that ecotourism is taking place in the protected area, especially in the Callao cave, where an entrance fee is charged. Some PAMB members said that the collected money is used for the management of

the cave, others said that it is used for the meetings of PAMB. Two members stated that the money goes to the fund of the provincial government.

Water use & quality

All of the PAMB members said that the water is potable in the whole protected area. Most of the Barangay captains said that the water of the barangay comes from a pumpwell/deepwell and that they are not connected to the Water District. Some said that barangay officials manage the water themselves. The Metropolitan Tuguegarao Water District just manages the three springs in San Roque. This water travels on to Tuguegarao where it is used for consumption.

Climate change

The majority of the PAMB members said that there is clearly a change in climate. The weather has become abnormal and unpredictable. As a result of this (and due to illegal logging etc.), the quality of the water is also affected.

Agriculture

Most PAMB members mentioned that there is slash & burn farming in the protected area. Another thing they mentioned within this topic is that climate change makes farming difficult, leading to less production. The Barangay Captain of San Roque said that some farmers are not affected because of the free flowing irrigation of National Irrigation Administration (NIA).

Forest management

All members agreed that forest management (including illegal logging) is the biggest problem in the area. Timber poaching is prohibited in the PPLS, but it is still happening because it is a source of livelihood for many people living within the area. Some of the PAMB members mentioned that you are allowed to cut trees if you have a permit from the DENR & PAMB.

PASU

Tourism

According to the PASU, ecotourism is increasing in the area. The money which the area receives from that is allocated to the national treasury (Department of Budget & Management) and also to the PAMB.

Water quality & use

The PASU confirmed that there is clean and potable water in the area. He also mentioned that only the three springs in San Roque are being managed by the Metropolitan Tuguegarao Water District.

Climate Change

The PASU believes that there is not much change in the climate in the protected area.

Agriculture

He mentioned that farming techniques such as slash & burn farming are having a destructive impact on the area. Sometimes this farming technique causes forest fires.

Forest Management

Just like the PAMB members stated, the PASU thinks that forest management is a big problem in the PPLS, especially the timber poaching. Cutting down trees is only allowed if you have a permit.

Local people

The local people we talked to in the different barangays all know that the area is a protected area. Since the establishment of the Protected Area, there have been good and bad changes. Out of 28 respondents, 13 of them said that the area is not really protected; there are still illegal activities taking place in the area, such as timber poaching, slash & burn farming and charcoal making. Fifteen of the respondents said that there the establishment of the PA has been a good change and that the area is in fact really protected and sustained, by activities such as tree planting. The Toyota/Conservation International Project has brought a lot of good things to the area, according to those respondents, including employment.

Tourism

Local people also said that there is ecotourism in the area, especially in Callao cave, which provides money for the improvement of the area.

Water quality & use

Just like the PAMB and the PASU, the respondents said that the area has clean and potable water. Their source of water is not connected to the Metropolitan Tuguegarao Water District. There is also a shortage of water due to the cutting of trees.

Climate Change & Agriculture

The respondents said that due to climate change, farming has become difficult. There is less production. Slash & burn farming is also occurring in the PPLS, because it is a source of livelihood of the people in the area.

Forest management

Concerning forest management, all respondents said that illegal logging cannot be stopped in the area, even though it is already prohibited. According to the respondents there are a couple of reasons why this is the case:

- It is their only source of livelihood
- No forest guards in the area
- Weak implementation of the law
- There are big politicians involved in illegal logging
- People are afraid to speak up and say who is doing illegal logging; afraid for the consequences

Conclusion current state of PPLS

The interviews gave us quite a clear image of the current state of the PPLS and what has changed in the past 10 years. The PAMB members are quite divided about the current state of the area. Four out of eight members say that the park is being neglected and that it is not really protected. Others say that the situation really has improved and that issues such as illegal logging have been minimized. The PASU agrees with this last opinion: the PA has changed a lot, in a good way. The local people are divided on the issue as well: 15 respondents say that the current state is good, 12 say its negative and 1 person is neutral.

If we compare the area now to the area of 10 years ago, the PAMB members mention both negative and positive changes. Some of the good changes include more awareness of the people, the fact that there is some kind of organization now, more tree planting and the minimizing of illegal activities. One of the mentioned negative comments was that the area is only protected on paper. Also, the fact that there are not enough employees to monitor the area came up.

The local people are divided about whether it has changed in a good way. 15 of 28 respondents say that it has changed in a negative way (or not at all), saying that the illegal activities still take place, that there are floods now etc. The other 13 respondents are positive. They state that there is more tree planting now, that illegal activities are decreasing and that both the natural environment and the infrastructure have improved. The PASU is very positive about the changes. He agrees that there are still some issues which need to be tackled, such as carabao logging and charcoal making, but all in all he believes that they are heading in the right direction. All in all, we can conclude that the opinions about the area are very diverse. Most people agree on the fact that illegal logging is still happening and needs to be banned completely. Tree planting was often mentioned as a way of combating climate change, deforestation and other issues. For that reason, the respondents think that the reforestation project of Toyota and Conservation International should be continued by the national/local government after 2013, when the partnership ends. Almost all respondents agree that there is climate change and that the area needs to adapt to that.

People seem to be aware of the remaining/current problems already, so the focus should lie on the actual implementation of ideas and laws and how this can be improved.

Underlying & connected problems

In the interviews many respondents mentioned underlying and connected issues and problems. Below you will find a short description of the six problems which were mentioned most. We divide them into the following categories: administrative problems, problems in the area and problems concerning the local communities

Administrative problems

Implementation

Some respondents from PAMB and some of the local people mentioned that the national government (and other government agencies) has made lots of good and thorough laws and policies concerning PAs, but that those are not implemented on the ground. The amount of paperwork at the national level is immense and it just does not reach the Barangay Captains and the local people. This has to do with bad information dissemination on the one hand, but we should also mention the fact that those who should be implementing the laws, do not always do so correctly. Some 'lower' government agencies even make policies which are infringing the laws which are made higher up. Sometimes this happens because they do not know (enough) about the law. Other times it happens on purpose because it, for example, serves the interest of the people involved.

When talking about the functioning of PAMB, many Barangay Captains were not even sure about the essential basics (who was in PAMB, how often they meet etc.), let alone about the exact content of the NIPAS Act. This does not only have to do with lack of information but also with lack of will to commit to this project.

Devolution of tasks and responsibilities

As we explained before, the government structure in the field of environment and natural resources is rather complicated. Tasks and responsibilities are spread over many different actors and agencies. The goal of this is to make the system more democratic and 'from the people'. In reality, it has become very unclear who does what and many tasks overlap. The devolution of tasks and responsibilities also leads to a situation where no one can really be held accountable if things go wrong. Everyone is pointing at each other and nobody takes the final responsibility. In Dutch we call this phenomenon 'the problem of many hands'.

Funding

The problem which was mentioned most, is funding. The NIPAS Act established the Integrated Protected Areas Fund (IPAF). This fund receives revenues generated within the protected area, donor support and other funds as provided by law (NIPAS Act, p.35). This basically means that the PA needs to provide its own income, from tourism, giving out permits etc. It is the task of the PASU to collect this money. All the PA's do this individually and are then supposed to deposit the money on one national account. In theory, this money is then equally distributed among all the PA's.

In practice, not a lot of money is being generated. Also, the PA's which do generate a lot of money, do not feel like sharing with the ones which do not. For that reason

they sometimes do not transfer the money to the fund at all. DENR does not provide any money to the fund. The only thing paid by them is the salary of the PASU Staff. This funding system is very weak and ineffective. In the PPLS we found out that there is barely any money available, leading to not enough forest guards, not enough campaigning and many more other problems.

Problems in the PA

Monitoring/forest guards

The majority of our respondents mentioned that several illegal activities (slash & burn farming, (carabao) logging and others) are still taking place in the protected area. Some even said that this has increased since the area became protected. Due to a lack of funding, only two forest guards have been appointed by the PASU, to assist him in the monitoring of these issues and the protection of the park. In an area of 118,781.58 hectares, this is not very constructive. Currently, there is no money to employ more forest guards. Also, there is not much interest in the job of forest guard, since a couple of forest guards were shot in the past years. People have become afraid and prefer to close their eyes if they see illegal activities.

Problems local communities

Bad socio-economic conditions

Many of the illegal activities seem to take place because people do not have any other sources of income. One of our respondents, a housekeeper, said: "It is better to cut trees than to steal". Without much employment possibilities, people are left to cutting trees and slash & burn farming, even if they know it is not moral or allowed. The fact that nobody is really checking them, makes the step even easier.

Mindset

We talked to several elementary school teachers and principals and they all pointed out that environmental education is integrated in many subjects, starting in grade 3. All children learn about waste disposal, tree planting and that illegal activities should not be taking place, because the effects of those activities will eventually bounce back at them. The principal of the school in Aggugadan mentioned that they also teach parents. However, much of the taught stuff does not seem to really enter the child's mind. Much of the information the children learn in school gets disproved when they get home and see that their parents cut down trees. The illegal activities are part of the regular life and without clear punishments, people do not see why they should stop doing it. Also, the leaders do not always give the right example. A whole different mindset needs to be applied, at all levels of society, which is an enormous task.

Many of the mentioned problems are connected to each other. For some, a 'domino effect' accounts: one problem causes another problem and that second problem then causes yet another problem. We hope to have sketched a clear picture of some of the present problems, which will hopefully stimulate further thinking and research about the future (management) of the park. The next paragraph will focus on this and on what the priorities of PAMB should be.

Future of the Peñablanca Protected Landscape & Seascape

Priorities of PAMB

After asking the respondents about the working of PAMB and the current state of PPLS we also asked them what should be the priority of PAMB in the next years. They got to choose between the topics we covered in the interviews: climate change, (eco)tourism, farming, forest management, illegal logging and (drinking) water/water quality. The respondents were also allowed to add topics and to choose more than one priority.

From the eight PAMB members, two answered that all of these issues were essential. Forest management & illegal logging were chosen four times, climate change was chosen once. Three members said that the increase of funding needs to be the absolute priority of PAMB. One member mentioned that implementation needs to be improved, just like law enforcement.

The PASU chose forest management and also mentioned funding. He warned that the Philippines should not completely depend on foreign donors. The majority of the local people we interviewed think that forest management and banning illegal logging should be the biggest priorities of PAMB in the next years. These issues were mentioned 21 times. Water quality was mentioned 5 times. Other named priorities were climate change (1), better implementation (2), improving socio-economic situation of people (1), funding (1) and flood control (1). Two respondents replied that all the issues are equally important.

Recommendations as to how to address the problems at the ground level

Most of the respondents mentioned issues and problems which are taking place on the ground, such as illegal logging, charcoal making and slash & burn farming. We believe that these problems are (partly) caused by other, underlying problems, which are often connected to the government administration. In order to solve the issues on the ground, the following suggestions for improvement, at both government and ground level, could be taken into account.

Administrative suggestions

Clear division of responsibility & tasks

As mentioned before, the government structure in the environment and natural resources sector is very complicated and involves a lot of different agencies at different levels. Several respondents told us that it is often unclear who is in charge of what and who can be held accountable for which issues. Overlap of tasks needs to be prevented and tasks and responsibilities should be clearly divided. Furthermore, it is important that government officials know what officials in other agencies are doing and why.

Better control mechanisms & punishments

For the moment, people who are infringing the law (eg. Illegal loggers) seldom get punished. The Barangay Captain can only give a warning if he/she catches someone. The DENR is the only body which can actually file a case. This system should be changed, expanded and implemented, in order to increase the chances of actually

punishing criminals. A real penal system might also scare people who are thinking of getting involved in illegal activities.

A different funding system

The current system of funding, where the PA provides its own source of income, is not working effectively. It is not realistic that the PA's can generate enough money to solve all the issues mentioned earlier. A new system of funding should be aimed for. The DENR could play an important role in that. It seems logical that the government provides at least part of the budget for the PA's.

Strong leadership

Our respondents gave us the impression that many leaders (at all different governing levels) are not always giving a good example when it comes to the illegal activities. Some keep their eyes closed and ignore the problem. One of the people we interviewed said: "If they would really want to ban illegal logging, it would happen". The area needs some capable and ethical people who are willing to make a real point of this, even if it means they might risk not getting chosen again at the next elections.

Provide basic information about the area to everyone (make it available)

One of the problems we encountered while conducting our research, was that many respondents (even government officials) were not able to tell us basic facts about the PPLS and PAMB. For the sake of transparency it would be good if this basic information was openly available, both in hard copy and on the internet. Also, the inhabitants of the area should receive this information.

Continue the reforestation project of Toyota & Conservation International

A lot of people were positive about the reforestation project of Toyota & Conservation International, which has been present in the area since 2007. Not only is there frequent tree planting taking place; the project also provides livelihood to the community and a source of income to some. However, the project only lasts until 2013. It is still insecure whether it will be continued after 2013 and who will take care of this. Some respondents said that the local government and the national government will do this, but it has not been formally arranged yet. It is of great importance to the local people and the area that this happens.

Suggestions for changes on the ground level

Focus on education & social responsibility

In our interviews with the teachers and principals of elementary schools in the barangays, it became clear that environment education is already part of the curriculum. It is important that this remains the case. Also, the parents and other relatives should be involved in this, so that the word spreads and a different mindset can be achieved eventually. An important component of the education is to involve the people in the practical part: make them do tree planting, show them how to separate waste etc. Furthermore, the people should be made aware of the consequences of illegal activities so that they come to see that it will bounce back to them eventually.

Improve livelihood of people/socio-economic conditions

Many respondents said that there is illegal logging and slash & burn farming because people do not have any other sources of income. It is important that new employment opportunities are created and that people are stimulated to develop themselves further so that the people cannot hide behind this excuse anymore. Without these opportunities and a lacking punishment system, the step towards illegal activities is easily set.

More forest guards/better monitoring of the park

One of the most important issues that we heard is the lack of monitoring in the park. The park is almost 120,000 hectares, but there are only two forest guards, aside from the PASU (PASU, 2011, pers.comm.). In an area where illegal activities prevail, this is clearly not enough. Without funding however, it is not possible to employ more people.

CONCLUSION

Based on our findings we will now answer the main research question which was stated in the introduction of this report: *How does PAMB work in the PPLS and what should be its priorities in the near future?*

We found out that the PAMB of PPLS consists of 23 members (mayor, 18 barangay captains, Provincial Planning & Development Office, the Water District, Conservation International and someone representing a cooperative from the barangays). They meet quarterly at different locations (usually Tuguegarao or LGU Peñablanca). Cooperation is good and agreement is achieved through voting. The members are appointed for a period of 5 years and they do not receive salary. Their main task is to protect the environment and the natural resources in the area. This can often be narrowed down to controlling illegal logging and charcoal making, the main issues in the area.

As stated earlier, the composition of PAMB of PPLS does not completely comply with the NIPAS Act. There are not enough permanent members from NGOs situated in the area and there is no representative of the Agta who live in the PPLS. Aside from that, the board does not meet often enough.

The respondents were quite clear about what should be the priority of PAMB in the protected area in the near future. Almost everyone thought forest management and banning illegal logging are the most important. Although this is possibly the case, we also gave an overview to some of the underlying problems, which are mostly administrative. One of our recommendations is to make a clear division of responsibilities and tasks in the complicated government structure. Furthermore, better control mechanisms and punishments for illegal activities need to be implemented and a new system of funding is highly necessary. Good leadership and strong political will is needed as well and a new plan for the Toyota project needs to be achieved. At the ground-level more forest guards need to be employed and basic information about the area should be distributed, for the sake of transparency. Focus

on education and social responsibility should remain a priority in the barangays. It is of great importance that the changes at government level are taken only after intensive study of the history, culture and other characteristics of the concerned area, so that real solutions can be found.

The short field study gave us a valuable insight in the issues and organization of the PPLS. The area is very diverse and beautiful and deserves to be managed and maintained in a proper way. This is not always the case at the moment. We hope that our report will trigger other researchers to investigate this more thoroughly.

ACKNOWLEDGEMENTS

We would like to express our profound thanks and sincere appreciation to all those who contributed to the accomplishment of our research: The 7 PAMB members (4 Barangay Captains, Provincial Planning & Development Office, Metropolitan Tuguegarao Water District, and the PAMB-member of Aggugadan) who gave us a lot of useful information. The respondents from the different barangays who gave us honest answers and information. The Pagalilauan Family of San Roque where we stayed during our fieldwork, for being hospitable and kind. The Winter Course Group for sharing their knowledge and for the unforgettable moments. Above all, thanks to our Heavenly Father who gave us strength, knowledge and wisdom to accomplish this research.

REFERENCES

- NIPAS Act (1992), *Department of Environment and Natural Resources*
- LGU Peñablanca (2009), *Peñablanca Forest Land Use Plan 2010-2015*
- Interviews with PAMB members, the PASU & local people

Appendix A: Interview PAMB-members/PASU

Respondents:

Barangay captain San Roque

Barangay captain Sisim

Barangay captain Nannarian

Barangay captain Malibabag

PAMB-member Agugatdan

PAMB-member Water District

PAMB-member Provincial Planning & Development Office

MENRO/Mayor

Questionnaire

Name

Barangay

Questions about being barangay captain (if applicable)

1. Since when are you the barangay captain?
2. What are your tasks as a barangay captain?

Questions about being a member of PAMB

3. Since when are you a member of PAMB?
4. What does PAMB do exactly?
Who is in PAMB? How many members?
Are there IPs in PAMB?
When and where do you meet?

Questions about cooperation between PAMB members and internal and external communication

5. Do you work together with other barangay captains in PAMB?
6. Is the cooperation with the other PAMB members good?
7. Do you sometimes have different interests?
8. How do you reach agreement?
9. What were the topics of the last meeting? What are the topics of the next meeting?
10. Do the people in this barangay know about PAMB?

Questions about Peñablanca Protected Landscape and Seascape

11. Can you tell us something more about the PPLS?
What is it like?
How many people live in the protected area? Who lives in the park?
Are there many farmers? IPs?

Tourism

12. Does the area get a lot of visitors/foreigners?
13. Do they pay to visit the park?
14. Is there ecotourism?

Water use/quality

15. Is there clean water in this barangay? Is it potable?
16. Is there clean water in the rest of the protected area?
17. Who manages the water in the protected area?
18. Is it allowed to cut wood for your houses?

Climate change

19. How Is the climate over here?
20. Has it changed in the past 10 years?
21. Can you measure climate change? How?
22. Does it affect vegetation and farming?
23. How can the barangay/the inhabitants adapt to climate change?

General questions

24. Has the area changed since the protected area was established? In what way?
25. What can be improved in the area?
26. What should be the priority of PAMB in the next years?
 - Climate change
 - (eco)tourism
 - Farming
 - Forest management
 - Illegal logging
 - (drinking) water/water quality
 - Something else
27. Can you influence this? Can you make suggestions for the agenda?
28. Do the people in your barangay also contribute to the protection of the PA?

Appendix B: Interview for local people

28 respondents

Questionnaire

Name

Barangay

General information

1. What do you do for a living?
2. How long have you lived here?

Questions about the protected area (PPLS)

3. Do you know that your barangay is belong to the protected area?
4. Did anything change since the barangay became part of the PPLS? (protected area)

Questions about the current state of the area

Climate change

5. How is the weather over the area? Has it changed in the past years?
6. Does this affect farming & vegetation?

Water quality and use

7. Do you have clean water? Can you drink it?

Forest management

8. Is it allowed to cut trees/get wood? Do you do that sometimes?

Tourism

9. Do you see many visitors/foreigners?
10. Do you know if there is an ecotourism?

General questions about the PPLS

11. What do you think of the current state of PPLS? Any problems?
12. If you compare it to 10 years ago, what has changed?
13. Can you tell us something about the park? Is it nice? Who lives in the park?
Are there farmers? Indigenous people?
14. What can be improved in the area?

Questions about PAMB and their future priorities?

15. Do you know about PAMB?
16. What should be the focus of PAMB in the next years?
 - Climate change
 - Tourism
 - Farming
 - Forest management
 - Illegal logging
 - Water/water quality
 - Something else

Appendix C: Interview for Protected Area Superintendent Unit (PASU)

Questionnaire

Name

General questions

1. Where do you live? (which barangay?)

Questions about being the PASU/PAMB

2. Since when are you the PASU of PPLS?

3. What are the tasks and responsibilities of the PASU?

4. What is the difference with PAMB?

5. Who is in PAMB?

6. How many members does PAMB have?

7. What are their tasks?

8. Are there IP's in PAMB?

9. Do you work closely together with PAMB? Do you attend the meetings?

10. What are the meetings like? Are there lots of discussions?

11. Do the members have different interests and ideas?

12. Are you allowed to vote?

13. Is the cooperation between PAMB members good? How about between you and PAMB members?

14. How is agreement reached?

15. Do the people in the Protected Area know about PA and PAMB?

16. What are the topics of the next meeting (when?) Last meeting?

Questions about the current state of the PPLS

17. Can you tell us something about the PPLS?

- How big is it?
- How many residents?
- Are there also IP's?
- Farmers?
- Many visitors/tourists?(do they pay an entrance fee/)
- Is there ecotourism?
- What do you know about the Toyota/CI project?
- What are the main problems?

Water use/ quality

18. Is there clean water in the barangays/PA? Can you drink it?

19. Does the water district provide all the water? Who manages the water?

Forest management

20. Is it allowed to cut trees for building of houses?

Climate Change

21. How is the climate over here?

22. Has this changed in the past 10 years?

23. Can you measure climate change?

24. Does it affect vegetation and farming?

25. How can the people of the barangay react/adapt to climate change?

General questions about the PPLS

26. Has the area changed since PA was established? In what way?
27. What can be improved in the area?
28. What should be the priority of PAMB in the next years?
 - Climate change
 - Tourism
 - Farming
 - Forest management
 - Illegal logging
 - Water quality
 - Something else
29. Can you effect this?
30. Are the people in the barangay/barangay officials also contributing for the protection of PA?
31. Different respondents have shared their concerns and issues with us.What do you think of the following issues?
 - Implementation of laws
 - Lack of funds
 - Illegal logging
 - More forest guards (monitoring)

3.2: The information gap. Research about farmers and their knowledge and techniques.

Grace Bayang and Sara Van Damme

INTRODUCTION

Farming is very important all around the world. The globally increasing population is one of the reasons that we are now experiencing scarcity of water. Therefore it is important to know the proper management of water from the field and even from the house. The crops need some amount of water to grow. You also have to maintain the good production and good quality of the yield as well as the human/animal beings that depend on the water. We believe that the use of better farming techniques lead to a better water use. There is a lot of new information and techniques on rice cultivation available at several institutes. But does it reach the farmers? And how is it regulated in the area of Penablanca?

Facts and figures.

Malibabag has a total of 1,296 inhabitants. 77.6% of the total land area is used for farming. It consists of 6 puroks.

Table 1: Population of Malibabag per Purok.

PUROK 2008	Population	No. HHs	No. of Families
Ampalaya (Bitter Gourd)	314	70	86
Talong (Eggplant)	180	40	52
Okra	259	58	76
Kamatis (Tomato)	149	32	38
Kalabasa (Squash)	155	138	49
Sili (Green Pepper)	239	50	64
TOTAL	1,296	388	365

Out of the total of 388 households the majority receives a yearly income of 100,000 pesos and above. 13 households have an income below 10,000 pesos a year, which is insufficient to sustain basic needs. 10,000 pesos is considered as minimum wage. The town of Malibabag has no water pipe system yet, so all the households use a piped well. (in litt. Barangay official)

Irrigation

Malibabag receives their water for rice production from the National Irrigation Association (NIA). In 1975 the NIA started with the construction of the irrigation system in the Penablanca area. In 1980 their building work was finished. 1405 farmers have benefited from it in 2009 (NIA 2011) and in 2007 they irrigated 577 hectares.

The NIA works together with the Irrigation Associations (IA). This is a group of farmers who have a contract with the irrigation management. In 2007, 1962 farmers were a member of an IA. According to the NIA there are monthly meetings with the water master and the IA, during which they can discuss the problems and concerns regarding the water resource facilities.

The NIA of Penablanca has a development program with the World Bank in which there are 4 possible contracts with the IA. The goal of the program is for IAs to end in module 4, which is full turn over of management of the irrigation system from the NIA to the IA. Currently the IA of Malibabag has a contract in module 1 which means they have to do canal cleaning and campaign for the Irrigation Contribution Fee (ICF). When they have a contract in module 2, there is joint system management between the NIA and the IA. The IA is also collecting some parts of ICF. In the third module there is a partial turn over.

The farmers pay the NIA for their services. They are not allowed to pay in crops. In dry season they pay the equivalent of 150 kilo of rice per ha and in wet season 100 per ha. According to NIA they provide water all year round and make a cropping calendar for the farmers. This calendar shows when they will release water and stop releasing it.

Department of Agriculture

In the Philippines there are two important levels of decision making. The national level and the local level. The department of agriculture (DA) is situated at the national level and is engaged in everything that has to do with agriculture. They receive information from several institutes regarding new techniques. This information is mostly given in forms of articles and publications for example by the International Rice Research Institute (IRRI), Phil rice, agricultural training centre and scientists. The DA then decides what information is important and how it should be passed on to farmers. The counterpart of the department of agriculture at the local level is the municipal agriculturist office. They receive information and assignments from the DA and have to pass it further on.

Research question.

We were wondering what techniques the rice farmers were using and how these techniques were updated. In short how did they learn techniques?

We came up with the following question: *'What techniques do the farmers use and what actions are being/ should be taken to improve their techniques. By either themselves or by the government or other institutes.'*

We suspected that transmission of information, from the institutes to the farmers did not go as smoothly as it could.

METHODS

We have conducted 6 days of research in the barangay of Malibabag, one of the 24 barangays of Peñablanca. We conducted several interviews and made observations. We interviewed the municipal agriculturist and also the NIA. The farmers could not be missing of course, so we interviewed 23 of them in Malibabag. 4 in each Purok, women and men.

We were guided by a barangay official who introduced us to the farmers and guided us to the correct houses. The interviewing didn't always go as smooth as it could be because of translation problems. After receiving all the information from the several

institutes and the farmers we started to analyse the data. We used a colouring scheme to scan our interviews. Everything concerning a certain topic received a certain colour.

RESULTS

After analysing the data we came up with some interesting results. The farmers of Malibabag seem to be well informed of new techniques and often apply them. We will present the most important points now, to conclude with a schedule of information flows.

Basic demographics

First of all we would like to give you the basic demographics of the people we have interviewed. We have asked everybody's age and education and the amount of hectares of rice they had.

Table 2: Basic demographics of respondents.

		Female	Male
Age	30-40	1	3
	40-50		3
	50-60	3	6
	60-80	2	5
education	Elementary	3	9
	Higher education	3	8
hectares	0-1	4	7
	1- 1.5		4
	1.5 – 3	2	6

We also want to give you an impression of the yield per hectare. We have divided in dry and wet season, because during dry season the yield is normally higher. The yield is expressed in number of cavans (50 kilos) they can fill with rice.

Table 3: Yield per Hectare

respondent	Dry season	wet season
1	80	80
2	160	100
3	125	100
4	109	79
5	36	36
6	110	100
7	70	70
8	90	60
9	140	120
10	200	100
11	120	100
12	100	100

respondent	Dry season	wet season
13	80	80
14	120	100
15	100	100
16	80	80
17	100	85
18	50	50
19	80	70
20	22	25
21	80	50
22	48	48
23	50	40

Farming Techniques

We started by asking the farmers questions about which techniques they used. We asked them about Carabao's, but also about fertilizers and which kinds of seeds they used.

Carabao / Rotor

Table 4: Use of rotor and Carabao.

	Rotor	Carabao + Rotor
Farmers	6	17

We asked the 23 respondents what they used in cultivating the land. Most of the farmers answered that they used the carabao and rotor (Machine). 6 farmers use only a rotor. When we asked them what the reason was to use the two they gave two reasons. They use carabao for plowing the edges of the rice field, which the rotor cannot do. Another reason they gave was that a carabao is less expensive in gasoline.

Organic fertilizer

Table 5: use of fertilizer.

Fertilizer	Inorganic	5	9
	In+organic	1	6

There are two types of fertilizer that the farmers commonly use, the inorganic fertilizer which is the commercialized one and the organic fertilizer which is derived from agricultural waste. Based from the data collected most of them used/apply inorganic fertilizer in the rice field and there are some farmers that use a combination of both. We also discovered that 2 farmers don't burn the rice straws in their field but let them decompose which can serve as an organic fertilizer.

Kind of seeds

Table 6: kind of seeds farmers use.

	Ordinary	Hybrid
Certified	13	7
Not certified	3	

There are two classifications of seeds that farmers use: certified and not certified. The second one is ordinary versus the hybrid variety of rice. 13 respondents used certified seed. The main reason farmers gave for buying this one is because it's not the most expensive one. Seven farmers used hybrid seeds. According to our interviews, they think that using hybrid seeds gives them a higher yield per cropping. There are also 3 farmers that prefer the not certified seeds. The reason they gave us is the lack of money to buy the certified one.

We also asked the farmers how they selected their seeds. They paid attention to several things. First of all it depends on the season, what seeds are best for certain weather type, for example fast maturing types, types that can resist drought a bit better. Another thing they pay attention to is the yield, the seed that gives them the best production is the seed they choose. The price also plays an important role, some just choose according to what they can afford. The fifth reason we received was that interchange of variety is good for the yield and that they choose a different seed every time.

Amount of water per stage of the growth of the rice.

Table 7: amount of water in centimetres during stages of growth.

Amount in cm	all the time	tiller stage	Vegetative stage
2	1		
2 - 3	2		
3 - 4	3	5	2
4 - 5	6	2	5
5 - 6	1		

Rice doesn't need the same amount of water during every stage of its growth. We found it very important to find out if farmers know this, because there could be a lot of water saved at this point. We received a brochure of the municipality of agriculture in which they explain how many centimetres of water you should use during the different stages of the rice growth. You have to use between the 2-3 centimetres when vegetative and tilling. 5 centimetres during flowering and when the rice is fully grown you should use 2 cm again (Grains production enhancement program GPEP). We only asked the farmers about the vegetative and the tilling stage. According to the brochure they should have answered 2-3 centimetres but there were only 2 farmers who gave this answer. But those farmers used the 2 cm during all the stages, which according to the brochure can't be done either.

The other farmers who gave a constant figure of centimetres for every stage are not doing it the way the DA thinks is best. The other farmers that gave a centimetres during tilling and vegetative stage gave a much higher number than the brochure suggests.

We take into account that some farmers might have misunderstood what we meant with tilling and vegetative stage and that we should have asked about the other stages as well. Some farmers were also mixing centimetres with inches.

Municipal agriculturist

The municipal agriculturist (MA) (local level) receives information from the DA (national level) and sometimes also from the NIA. They receive this information in the form of lectures, workshops, seminars and trainings. Afterwards it is their job to give this information to the farmers through the same type of seminars or trainings. This is the job of the technicians. Currently each technician is responsible for 4 barangays. They notify the barangay captain about a coming lecture. The captain then passes it on to his barangay officials and they notify the farmers.

Techno demos on crop production, seminars or workshops given in Malibabag are mostly held at the public market. The municipality has also organised a farmers class, this consisted of 16 Tuesdays on which the farmers were being lectured about the basics of farmers. (in litt: Barangay official).

Attendance information seminars and application

Table 8: attendance of information meetings and application of information

	Always attend	not always attend
DA meetings	17	3
	Always apply	not always apply
apply techniques	15	5

The technicians undertake different actions to make sure that the farmers understand the information or come to these meetings. The brochures that they hand out are written in local languages and the meetings are also conducted in these. To make sure that the farmers come they have implemented a rule that if you don't come, you don't receive the free samples that they sometimes provide. The most important reason for farmers not to attend is according to the MA because they cannot afford it. There are also farmers who are just stubborn.

We have asked all the farmers whether they attended every meeting of the DA. Only 3 of them answered that they don't always go. The reasons they gave were that they had other things to do, like working in the household or were too busy farming.

We also asked them if they applied everything the DA taught them, of course only when it's applicable for them. If they for example only plant ordinary rice and they get a lecture on hybrid rice they off course do not apply it. Five farmers answered that they did not always apply it. When we asked why we got two types of answers. Sometimes the new techniques are too expensive for the farmers and then they do not apply it. Another type of answer was the 'we usually use our own techniques'.

We also asked them what ways they like to receive the information. Most of the farmers wanted lectures and workshops. Few opted for receiving brochures.

N/A.

Table 9: attendance NIA meetings

NIA Meetings	always	not always
Attendance	19	2

Table 10: problems with the NIA

Problems	
canal cleaning	5
El Nino, not enough water	2
too much water	2
No problems	12
Missing	2

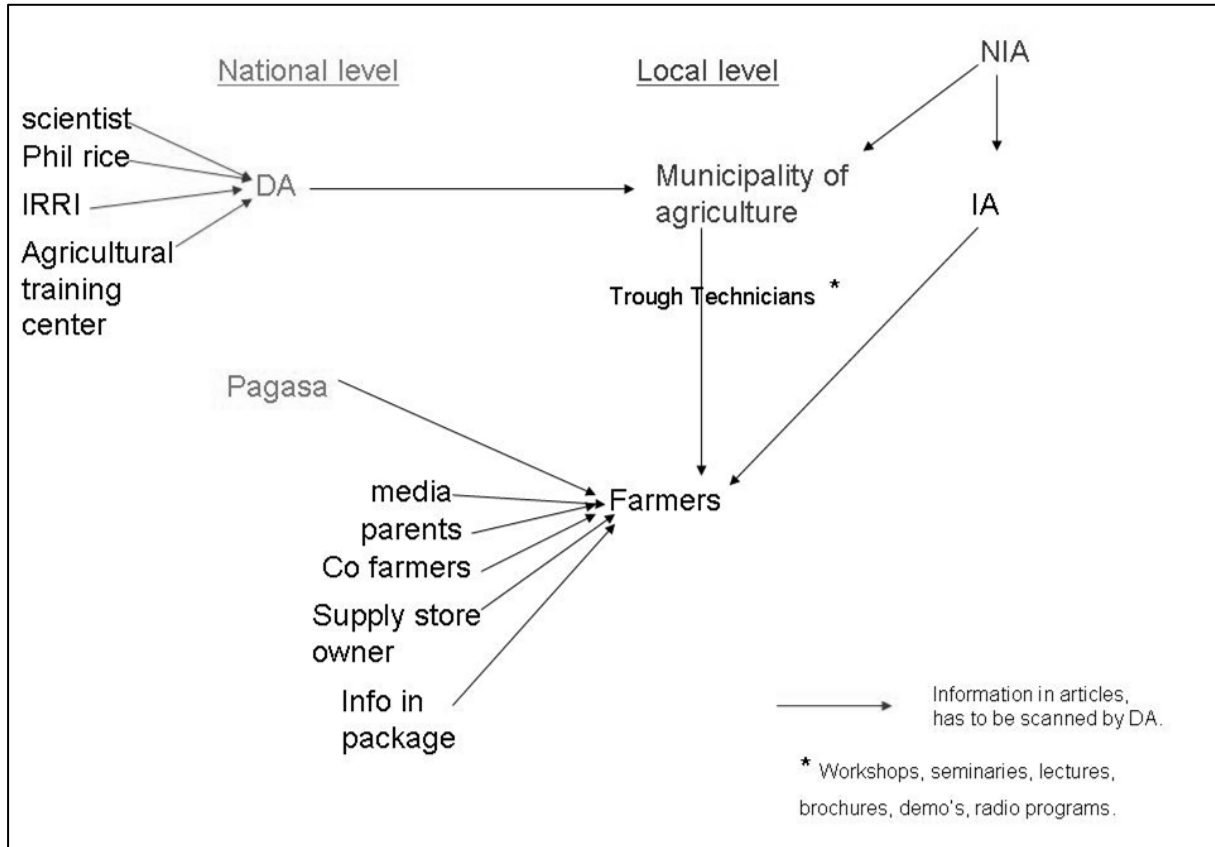
In our introduction we already gave you an overall view of the working of the NIA. According to the NIA there were no real problems with the IA and the irrigation system. They told us that they sometimes receive information of the MA and pass it on to the farmers during the quarterly IA meetings. We asked all the farmers if they attended all IA meetings and what problems they encountered. 19 farmers said that they always attended the meetings and 12 stated that there were no problems. The problems that were given were related to their contract. Module one states that the farmers have to clean the canals. The farmers make a schedule for it, to make sure that every farmer helps. They try to make sure that they pick a time when every farmer has harvested. With a lot of farmers it's not easy to find a date when everybody has harvested, therefore some people complained that there is no water during canal cleaning. They also don't like cleaning the canal because it is a hard job that takes a lot of their time.

During very hot summers 2 respondents complained of a lack of water. 2 respondents complained of too much water during wet season. They live at the edge of the system and when there is too much water it floods their place.

Others

We asked the farmers from where they received information besides the DA. We received a list of several people and institutes. Pagasa, supply store owner, media, farming friends, parents, grandparents and the information that was on the product itself. It is important to keep these flows of information in mind.

Schedule of information flows.



We have made a schedule of the information that flows to the farmers in Malibabag. The arrows are the information flows. Because the DA decides what part of this information will flow through not all information might totally reach the farmers.

CONCLUSION/RECOMMENDATIONS/REFLECTION.

Conclusion.

We wanted to know what techniques the rice farmers used and how they received their knowledge. First of all we will discuss the several conclusions that we have reached about what techniques farmers use. The farmers use both carabao and rotor, because the rotor is not able to plough the edges. Most of the farmers use certified, ordinary seeds and inorganic fertilizer.

The second part of our research question is about receiving or looking for information. We had some very positive findings about this part. We found out that the farmers in Malibabag receive information via different canals. These canals are the DA, NIA, Pagasa, tv, radio, parents, other farmers, supply store owner and product packages. The farmers of Malibabag are interested in the information concerning farming techniques. The majority of them attends every meeting with the NIA and the DA and almost all of them apply the new techniques. Only a few claimed that they were sometimes too expensive and some preferred their own techniques. The farmers have also a good contact with the NIA. There are monthly meetings between the IA and the NIA and they seem to be going very well. The only thing the farmers really complained about is the cleaning of the canal, which is in their contract.

The technician of the DA, the supply store owner, parents, other farmers and the packages is what the farmers turn to if they have specific questions. The large institutes like for example IRRI are not really known by the farmers.

All in all, Malibabag is doing a really good job in spreading and receiving new information. The farmers listen to it and most of them decide to apply it. If the farmers have specific questions they also know who to turn to. The barangay officials do their best in spreading the word from the MA. If the officials would not spread it, then the farmers would not be aware of the meetings.

Recommendations

We really hope that the DA keeps on conducting meetings in the barrangay of Malibabag. Also the follow ups by the technicians are really important.

We discovered that the farmers did not know IRRI and actually don't know where the information is exactly coming from. Maybe the DA should look into that and investigate whether it is important to let the farmers know where they receive their information from.

If somebody wants to do further research than we would advise that person to look deeper into the informal flows of information. For example what other farmers tell them or what information they receive from their parents.

Reflection

In 6 days you cannot collect all the data you want, after 3 days you finally figure out whether your questionnaire works or not. We should have given more attention to techniques that really use water. The one technical question about water, namely how many centimetres they used during each stage, didn't work out. We should have looked it up more carefully to make sure that we talked about all the different stages, which we didn't. Also as a team you have to grow, which doesn't always work in 6 days. Doing interviews together and translating is not easy. But we tried real hard and we are proud of our result.

ACKNOWLEDGEMENTS

We would like to thank everybody that has helped us with our research. The barangay captain, Emerson Tuppil was of great help, he was the one who introduced us to the barangay officials who also helped us very well. Special thanks to Vicky, Levie and Maritess who accompanied us to the farmers. We also like to thank all the farmers, Emerson, Ricardo, Aurelio, Nixon, Elisabeth, Leandra, Ben , Wilma, Marlon, Rosalinda, Boy, Paquito, Martin, Menita, Santiago, Resti, Joey, Leon, Severino, Jacinto, Quirino, Raquel and Primo.

REFERENCES

History of Malibabag, Author unknown, 2008.
Gingdong ania, grains production enhancement program, year unknown.
Historical data, Nia 2008
General information, Nia 2009
Pris inventory of system, Nia 2010

Appendix A: Questionnaire.

Farmers:

A. Basic questions:

- Age
- Education
- Hectares of farm
- Yield per season (How many times do you plant)

B. Specific questions.

B.1. Techniques:

we will go to the field with the farmers and observe what they are doing and ask additional questions.

There are a few things we will pay attention to:

Carabao or machines

Variety of rice: early maturing variety or not?

Use of fertilizers

Amount of water ->

Some question:

- how much water do you use per stage?
- Have you come up with your own techniques?

B.2. Knowledge.

- From who have you learned to work on the field?
- Do you think that there are new techniques/information available?
- Have you looked for them?
- Do you know where you can find information on farming techniques?
- Have you ever received information about the irrigation system? From who?
And what information was it?
- Do you know PAGASA/ IRRI/ Department of agriculture ?
- Have you ever received information of them?
- Do you talk with other farmers about farming techniques?
- Do you talk with other people, for example the supply store owner, about farming techniques?
- Why do you choose for a certain seed?
- If you have received information: how do you apply this learning techniques.
Do you observe that this is more effective.

B.3. Receive knowledge.

- Do you have access to : radio/internet cafe/supply store?
- Do you know how to work with radio/internet?
- How would you like to receive new information:
 - o Workshop
 - o Lectures
 - o Letters
 - o Not at all
 - o Information (flyers) at the supply store
 - o Tarpoline (posters)

- o Education during one week at a school
- o Others, namely:
 - would you be prepared to pay for it?
 - Would you like your children to become farmer? If there would be a school education for it, would you send your children to it?

Irrigation management:

A. how does the system work?

- How many farmers are using it/involved in it.
- How many hectares
- How does It work (draw little map?)
- Is there enough water to supply every farmer, all year round?
- Who has to pay?
- Is the water released all the time, or do you make arrangements with the farmers about when they get their water.
- How old is the system?
- Have you come up with some problems during the years, witch ones?
- Do the farmers actively participate for this irrigation system for the maintenance of having enough supply water. And what do those activities involve.

B. spread of information?

- How did the project start?
- How did you inform the farmers about your plans?
- What were their reactions?
- Was it difficult
- How did you convince them to cooperate.
- what do you think is the best way of making the farmers interested.

Department of agriculture:

Spread knowledge:

- From which institutes do you receive knowledge (ig: pagasa, irri,..)
- How do you spread it to the farmers?
- Have you tried different methods? What do you think is the best way of reaching them?
- How do the farmers react to the information, is it interesting.
- Can we look at a message that you have spread?
- Is it difficult to reach the farmers?

3.3: No sickness, clean water . Perceptions about water, water management and water quality in San Roque and Tuguegarao

Israel Bryan Estrabo jr and Tom Alkemade

INTRODUCTION

The fieldwork period of the winter course in the Philippines 2011 was divided in three subjects. One of these subjects was the drinking water in Tuguegarao City. This city is situated in northern part of Luzon in the Philippines in the province of Cagayan. Most (98%) of the population (c. 160,000 people) in Tuguegarao City have a water pipe connection, that the Metropolitan Tuguegarao Water District (MTWD) supplies. The sources for this pipe water are ground water (85%) and water from springs in the uphill area in the Barangay San Roque (15%). The water from the springs goes directly (under San Roque) by pipeline to Tuguegarao City. Most of the people (five of the seven zones) of San Roque do not have a pipe connection to the springs, instead they have pump wells or deep wells as source of their water.⁸



Figure 1: Field study area

In this research we have focused on the perceptions of people that receive the water from the springs in Tuguegarao City and the people in San Roque that have and do not have water from the pipe. Next to that we have focused on the water quality of the springs, other water sources than pipe water (pump wells) and the water that the people in Tuguegarao receive.

We have focused on the next research questions:

- Is the water quality of pump wells in San Roque of inferior quality compared with the pipe water in Tuguegarao city?
- What are the perceptions of the drinking water users on water and water management in both areas?

With these questions we have tried to identify the main problems on water use and management in San Roque and Tuguegarao city.

The research is a combination of the disciplines anthropology and biology; we have combined questionnaires with water sampling. Before we will focus on our research, methods, results and conclusions we will give a short background of the research areas Tuguegarao City, San Roque and the institute that helped us with our research, the MTWD.

Background information Tuguegarao City

The population of Tuguegarao City is estimated at 160,000 people. At daytime this number is much bigger, but unknown because the city attracts lots of people with socio-economic reasons. The number of households in the city is about 27,300. In

⁸ Personal communication Ninia P. Lumauan, Acting General Manager, Metropolitan Water District, Tuguegarao City

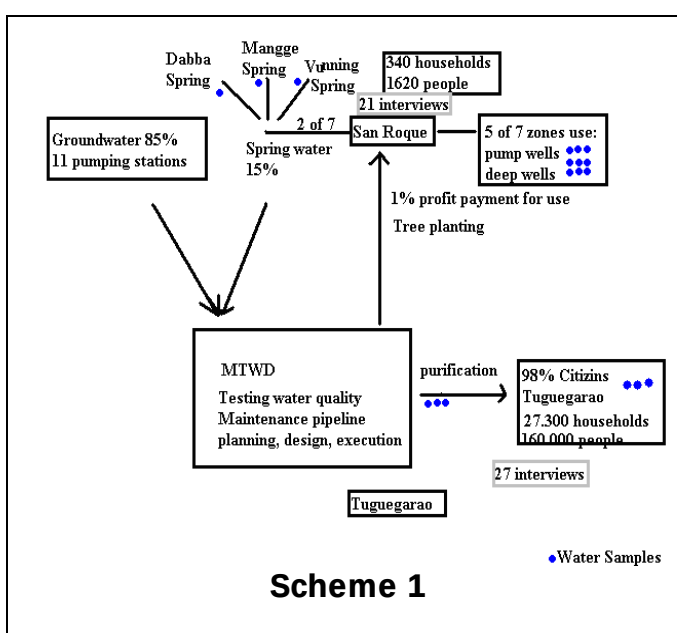
2010, 98% of the people were connected to the pipe water supplied by the MTWD. The other 2% got their water from pump wells and deep wells. The amount that the people have to pay for the first 10 m³ of their water is 120 pesos. This amount is the cheapest of the whole of the Philippines for pipe water. There is no sewage system or waste water treatment in Tuguegarao City, the water goes after use via drainage to the nearby rivers.⁹

Background information San Roque

San Roque is a Barangay in the municipality of Penablanca, east of Tuguegarao. The Barangay is situated in the transition zone between lowland and upland. The east part lies in the mountains and the west part is flat. The population of San Roque consists of 1620 people divided over 340 households. San Roque is divided in seven zones. In all the zones farming is the main source of livelihood. The sources of water of the people in zone one till five are pump wells and deep wells, the people living in zone six and seven have a direct connection to the springs in the uphill area of the Barangay and pay 20 pesos per month, this water is not purified. This pipeline is a different line than the pipe (origin 1924) that goes directly from the three main springs to Tuguegarao City. The plan to connect all the zones to the water from the springs uphill is interrupted because of a lack of funds (1 million pesos). The Barangay captain wants to finish the project in 2014, but this depends on the availability of sufficient funds.¹⁰

Background Metropolitan Tuguegarao Water District

The Metropolitan Tuguegarao Water District (MTWD) is one of the 800 Water Districts in the Philippines. It is placed 65 on the list in size and was founded in 1978. The water district supplies pipe water to more than 27,000 households in Tuguegarao City. This water is coming from springs and groundwater. Before the Water District divides the water under the citizens of Tuguegarao City it undergoes purification to remove the bacteria in it by adding an amount of chloride. The average daily use of water of the households in Tuguegarao is estimated to be 24 liters. In the scheme next to this you can see a schematic image of the sources of the MTWD and the source of our samples. The MTWD have analyzed the samples in their laboratory where they conducted water quality test.



⁹ Personal communication Ninia P. Lumauan, Acting General Manager, Metropolitan Water District, Tuguegarao City

¹⁰ Personal communication Isioro B. Pagalilauan, Barangay Captain, San Roque

Our fieldwork for this research was conducted from 14 - 19 January 2011 (Table 1).

Table 1: itinerary of field work activities

Day		Location	Activity	Time
Fri	01-14-11	Penablanca Tuguegarao City	Interview MENRO Interview AGM MTWD	10:30 am – 12:00 am 13:00 pm – 17:00 pm
Sat	01-15-11	Tuguegarao City	27 Questionnaires Tuguegarao	08:30 am – 14:30 pm
Sun	01-16-11	ISU Cabagan	- Making questionnaires San Roque - Planning	10:00 am – 15:00 pm
Mon	01-17-11	San Roque	Gathering 10 water samples, 3 springs, 7 San Roque wells	08:00 am – 14:30 pm
		Tuguegarao	testing water samples laboratory MTWD	15:00 pm – 17:00 pm
Tue	01-18-11	San Roque Tuguegarao	Gathering 8 water samples Laboratory MTWD	09:00 am – 14:00 am 14:00 pm – 16:00 pm
Wed	01-19-11	San Roque	Interview Barangay Captain 21 Questionnaires San Roque	09:00 am – 15:00 pm

Research Questions

We wanted to answer the following two questions:

1) Is the water quality of pump wells in San Roque of inferior quality compared with the pipe water in Tuguegarao city?

The main reason for this question is that most of the people of San Roque do not have a connection to the springs uphill. These springs provide water for the people in Tuguegarao city. If the quality of the water in the deep wells and pump wells in San Roque is of 'inferior' quality (dangerous for human health) compared with the water from the springs there should be a change in the source of the water for the people in San Roque. The plan to connect all the zones of San Roque should then be implemented in a shorter time schedule.

2) What are the perceptions of the drinking water users on water and water management in both areas?

This question we asked, because we want to identify the main problems of water and water use in both areas. We have focused on water sources, clean water, drought and rain, waste water, payment for environmental services and the perception of the Water District.

For the first question we have gathered 18 water samples (nine in San Roque and nine in Tuguegarao City). These samples were tested in the laboratory in the MTWD in Tuguegarao City.

The second question was answered by analyzing the interviews we conducted in San Roque (21) and Tuguegarao City (27)

Hypothesis

- 1) The water quality of the drinking water in San Roque is of inferior quality compared with that of the drinking water in Tuguegarao.
- 2) The respondents in Tuguegarao have a positive perception of the water they receive and the water management.
- 3) The respondents in San Roque want to be connected to the springs.

METHODS

In this research we have combined two academic disciplines: anthropology and biology. For the anthropological part we have used two questionnaires for San Roque and Tuguegarao City. For the biological part we have focused on a microbiological analysis of the water samples.

Questionnaires and analysis

Before we conducted the interviews in both areas we spoke to three persons who gave us some background information of the area and the people. We talked to the Acting General Manager (AGM) of the MTWD, the Municipal Environmental National Resources Officers (MENRO) in Penablanca and the Barangay captain of San Roque. After these interviews we formulated our questions and conducted the interviews.

In our questionnaire we have first focused on background information of the person who is being interviewed. For the questionnaire for the people in Tuguegarao we have made questions that focused on the following subjects: Sources of water, climate, waste water, payment for environmental services and the water district. For the questionnaire for the people in San Roque we have added another topic namely assurance for clean water, because they do not have all a pipe water connection to the springs. In total we have interviewed 21 people in San Roque spread equal to the seven zones. In Tuguegarao City we have interviewed 27 people spread around the City. We have gathered the interviews by random asking people if they are willing to answers our questions. And we have analyzed the questionnaires by comparing the answers on the same question for every area.

3.2 Microbiological analysis

One aim of this study is to gather eighteen water samples and subject it to analysis to identify whether the water from Tuguegarao and San Roque is potable. We have taken three samples from the springs that represent 15% of the intake of the MTWD water for Tuguegarao. We have taken three samples after purification of the water and in three samples in households in Tuguegarao. Next to this we have taken nine samples of pump wells in San Roque. After the gathering of the samples we brought the samples to the MTWD. MTWD uses microbiological analysis



One of the three springs (photo by B. Estrabo)

to determine whether the sample possessed bacteria by means of two test: PRESUMPTIVE and CONFIRMATORY TEST (Multiple tube fermentation technique). If the samples contain more than the limit for coliform organism (bacteria) they are not meeting the Bacteriological Standards for Drinking Water. This means that it is not advisable to drink the water for human health. We will discuss if samples contain coliform organism and are not advisable to drink.



One of the nine waterpumps (photo by B. Estrabo)

RESULTS

Tuguegarao

In Tuguegarao City we have interviewed twenty-seven people of 27,300 households. This is an overall percentage of 0.1% in Tuguegarao City. We have asked those people questions about the sources of water, the influence of drought and rain on their water source, waste water, a payment for environmental services and the water district. This questionnaire can be found in the appendix.

Table 2: Overview respondents Tuguegarao

Interviews	27
Sex	19 female, 8 male
Average age	39.6 years
Ethnic group	10 Ilocana 10 Tagolog 4 Ibanag 3 Itawis
Highest followed education	3 elementary, 7 high school, 15 university 2 Master Grade
Work	12 No work 15 work (6 business, 3 gov. employee, 2 policeman, 1 engineer, 1 guard, 1 maid, 1 teacher)
Average size of household	4.4 person per household
Pipe water / wells	6 pipe water, 15

Source and demand

Most of our respondents have a connection to pipe water (26/27), see figure 2. In reality 98% of the people have a connection to the pipe water in Tuguegarao City. They all said that the MTWD make sure that there is enough water even in the summer.

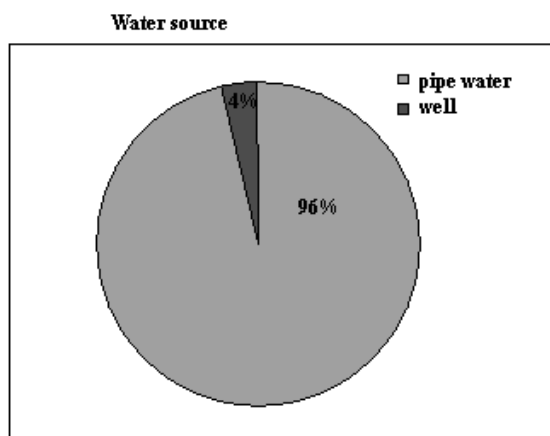


Figure 2: water source of respondents in Tuguegarao

Problems

Most people who live near to the water pump said that they almost never have problems with the water supply. They have all 24 hours/day pipe water and the water pressure is high. The people who live on a greater distance from this pump said that they have 21 hours/day have pipe water and they are dealing a couple of times a year with yellow smelly water. According to people further away from the pumping station the pressure in the morning is low, mainly because those are the peak hours. The people we interviewed said that the influence of the drought and rain season is very low on the quality and the amount of pipe water.

Water storage and waste water

All of the people we spoke to store their water. None of the people use a septic tank for their used water. Their used water goes by drainage in the ground and ultimately in the nearby rivers.

Payment environmental service

Most of the people want to pay for environmental service especially in San Roque at the springs (Fig 3). The majority of the people that want to pay a fixed amount per year. They want to pay only small fee, around 50 pesos per year. A smaller group wants to pay a percentage every month (Fig 4).

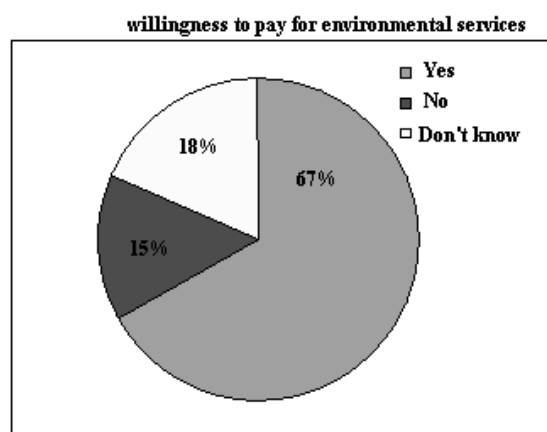


Figure 3: Willingness to pay for protection of the watershed of San Roque by Tuguegarao water users

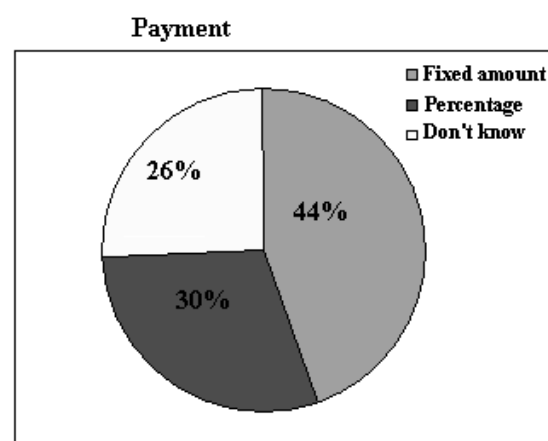


Figure 4: Preferred mode of payment for ecosystem services by Tuguegarao water users

Perception Water District

All the respondents gave good comments on the way the Water District managed their pipe water. Many people said they are happy, contented, satisfied on the way the Water District supplies the water.

Preferred changes Water District

Most of the people prefer no change (40%) in the way the Water District manages their water supplies. One third of the people think that the Water District should give more attention to maintenance and installation of new pipelines. The reason for this is that they want 24 hours/day pipe water, higher pressure and PVC pipes instead of metal pipes. Other suggestions are a emphasize on public communication, treatment of water and way of payment (Fig 5).

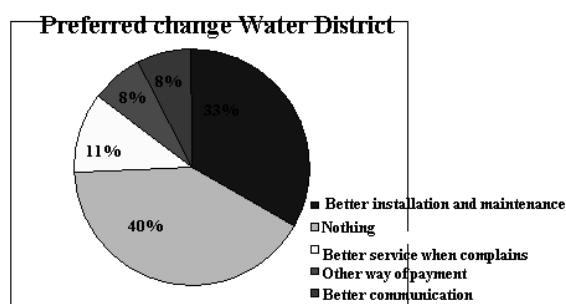


Figure 5: Preferred changes of Water District services by Tuguegarao water users

San Roque

Of the 340 households in San Roque we have interviewed 21. This is an overall percentage of 6.1 %. We have interviewed three persons per zone (7). The questionnaire can be found in the appendix.

Table 3: Overview respondents Tuguegarao

Interviews	21
Sex	17 female, 4 male
Average age	45.0 years
Ethnic group	14 Itawis, 4 Ibanag, 3 Ilocana
Highest followed education	8 elementary, 8 high school, 5 university
Work	12 No work 9 work (7 farmer, 2 store)
Average size of household	4.4 person per household
Pipe water / wells	6 pipe water, 15

Source and demand

We found out that zone one till five make use of pump wells and deep wells, and the people in zone six and seven have a connection to the springs uphill (Fig 6). They use pipe water, but also water from their pump and deep wells. All twenty-one respondents said that there is enough water to supply there demand.

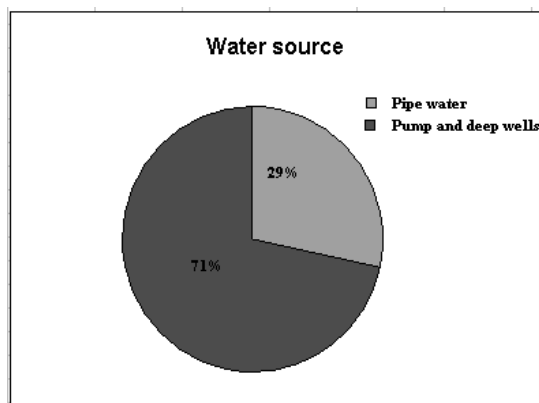


Figure 6: water source of respondents in San Rogue

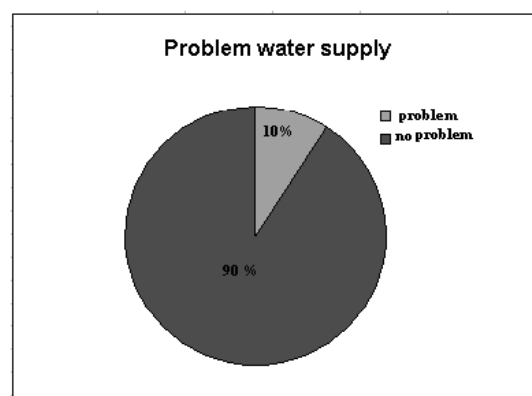


Figure 7: Proportion of respondents mentioning problems with water supply in San Rogue

Problems

Most of the people (19) said that there are no problems with their water management (Fig 7). When they deal with droughts and the raining season, they said that their deep and pump wells are deep and almost never dry up. Almost all people we have interviewed drink water from their pump well and they said that is clean water and they are adjusted to the water. When the pump and deep wells dry up people use other wells to gather their water. Two people said they have sometimes not enough water, this is especially occurring in the summer.

Water Quality

The majority of the people (14/21) think that the water they drink from the deep well and pipe line is clean water (Fig 8). They base their opinion upon different observations and perception of the source (Fig 9). The other seven persons are not sure that their water is clean. Three of them boil it before consumption; two filter it and add chlorine and the others do not drink it. Of the total of twenty-one only three persons said to us that they become sick because of the water. There are no clear connections between the people who have pipe water and who have water from wells.

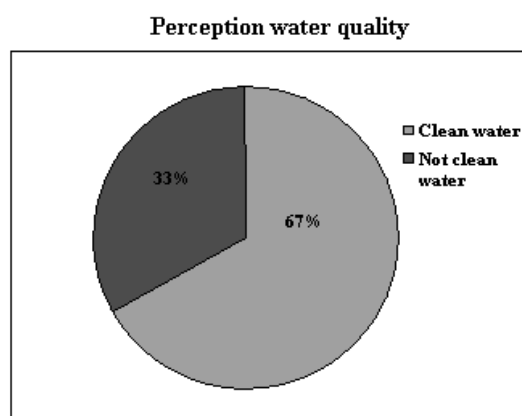


Figure 8: Perception of water quality by respondents in San Rogue

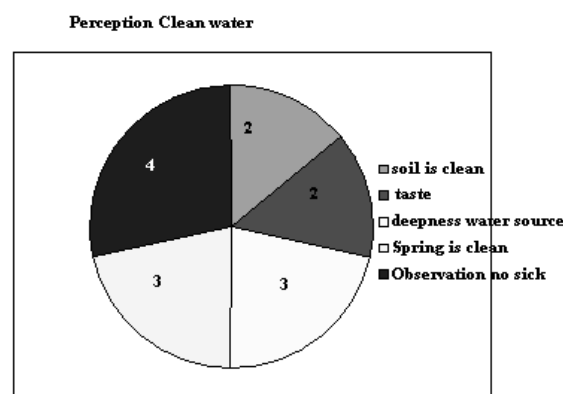


Figure 9: Perception of reasons for water quality by respondents in San Rogue

Water storage and waste water

Most people (Sixteen of the twenty-one) said that they store there water in bottles, jars, buckets, etc (Fig 10). In most of the cases these were amount that they could use for two days. The other (five) people get their water directly from the source without storage. After use, the water goes by drainage in the ground. There a different canals that are use for drainage.

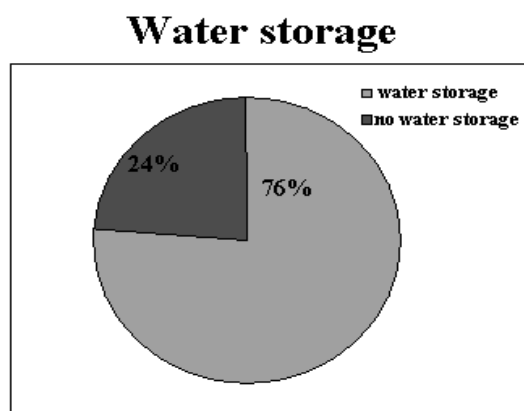


Figure 10: Proportion of respondents in San Roque storing water

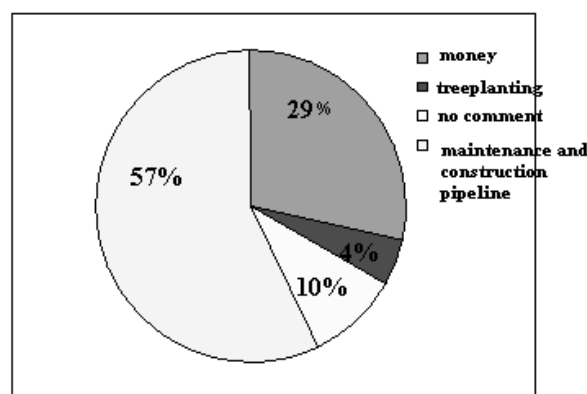


Figure 11: Preferred payment for water use by the MTWD to San Roque

Payment for environmental service

There is no direct payment to the villagers in San Roque by the MTWD for the use of water source uphill. The amount they pay goes to the barangay captain and a fund to maintain the wells and to connect a villagers of San Roque to the springs. We have asked the villagers what kind of payment they prefer from the water district. Most of the people prefer a direct payment for the maintenance and construction of water pipeline (Fig 11).

Perception Water District

Most of the respondents think that the Water District manages the water sources in the area properly. Sixteen of the twenty-one respondents said that it is managed 'O.K.', four people could not give an answers and one person said that the Water District should give more priority to the implementation of the plan to connect all the zones in San Roque to pipe water (Fig 12). Five of the twenty-one people knew that the Water District conduct test of the water quality.

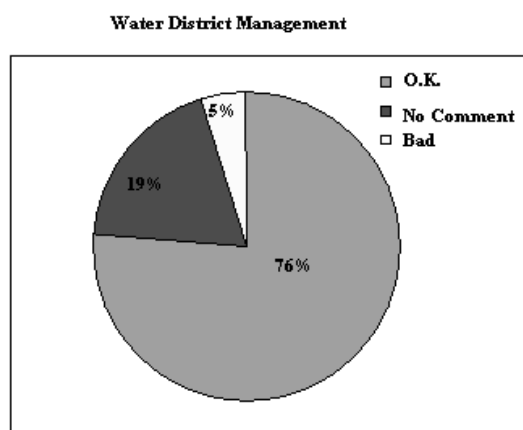


Figure 12: Perception of the Tuguegarao Water District by respondents in San Roque

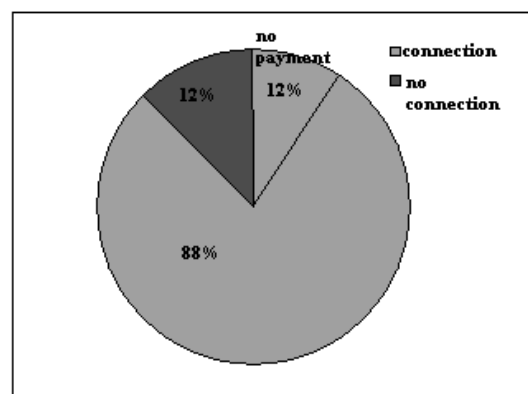


Figure 13: Preferred connection to pipe water by respondents in San Roque

Connection pipeline

Of the sixteen people that are not yet connected to the springs fourteen want to be connected to the pipeline. Of the fourteen people twelve people want to pay for the water (Fig 13). They want to pay only a small fee and mainly for the maintenance of pipelines.

Preferred changes Water District

One third (7) of the people want that the Water District better facilitate the construction of a water pipeline to more zones in San Roque. The problem is that there is lack of money. To accomplish the project, the Barangay should get more financial input; the people think that the Water District can contribute to this. One third have no comment on the Water District and one fifth think that the Water District should more focus on the protection of the forest surrounding the water springs (Fig 14).

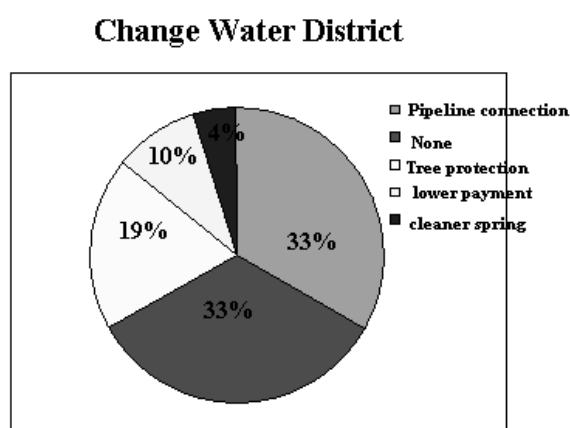


Figure 14: Preferred actions by the Tuguegarao Water District by respondents in San Roque

Microbiological Analyses Water Samples

San Roque

We have taken nine samples from different pump wells in San Roque. We will discuss in this part the result of the bacteriological examination of water samples. Five out of the eight samples from San Roque contained a lot of Coliform organisms and fecal organisms. They do not meet the Bacteriological Standards for Drinking Water. This means that 62.5 % of the research samples do not meet the Philippine National Standard for Drinking Water (PNSDW). One of the nine samples should be retested due to improper handling.

Table 4: Results of Bacteriological Examination of Water Samples from San Roque

Sample number	A) multiple Tube Fermentation Technique (MTFT)		B) Heterotrophic Plate Count (HPC)	Remarks
	Total Coliform Organisms	Fecal Coliform Organisms		
1	>23 mpn/ 100 ml	>23 mpn/ 100 ml	44 cfu/ ml	Positive
2	<1.1mpn/ 100 ml	<1.1mpn/ 100 ml	57 cfu/ ml	Negative
3	>23 mpn/ 100 ml	>23 mpn/ 100 ml	80 cfu/ ml	Positive
4	<1.1mpn/ 100 ml	<1.1mpn/ 100 ml	34 cfu/ ml	Negative
5	>23 mpn/ 100 ml	>23 mpn/ 100 ml	320cfu/ ml	Positive
6	<1.1mpn/ 100 ml	<1.1mpn/ 100 ml	190cfu/ ml	Negative
7	>23 mpn/ 100 ml	>23 mpn/ 100 ml	93 cfu/ ml	Positive
8	>23 mpn/ 100 ml	>23 mpn/ 100 ml	228cfu/ ml	Positive
9	X	X	X	X
PNSDW Limit	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	< 500 cfu/ mL	

Tuguegarao

Now we will discuss the results of the water samples taken in Tuguegarao. These were taking at three springs, three after purification and three at the household level. Two of the three samples of the springs should be retested due to improper handling of the water samples. All the samples tested negative, they meet the Bacteriological Standards for Drinking Water.

Table 5: Results of Bacteriological Examination of Water Samples from San Roque

Sample number	A) multiple Tube Fermentation Technique (MTFT)		B) Heterotrophic Plate Count (HPC)	Remarks
	Total Coliform Organisms	Fecal Coliform Organisms		
1 Spring Vunning	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	45 cfu/ ml	Negative
2 Spring Dabba	X	X	X	X
3 Spring Mangge	X	X	X	X
4 Tap Water BP	<1.1 mpn/ 100 ml	<1.1mpn/ 100 ml	<1 cfu/ ml	Negative
5 Tap Water BP	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	<1 cfu/ ml	Negative
6 Tap Water BP	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	<1 cfu/ ml	Negative
7 Tap Water HH	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	4 cfu/ ml	Negative
8 Tap Water HH	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	<1 cfu/ ml	Negative
9 Tap Water HH	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	23 cfu/ ml	Negative
PNSDW Limit	<1.1 mpn/ 100 ml	<1.1 mpn/ 100 ml	< 500 cfu/ mL	

CONCLUSION

Question one: Is the water quality of pump wells in San Roque of inferior quality compared with the pipe water in Tuguegarao city?

Our hypothesis was that the water quality of the drinking water in San Roque is of inferior quality compared with that of the drinking water in Tuguegarao.

The water from the deep wells is indeed of inferior quality compared with the water from the pipe in Tuguegarao City. The water quality of five of the eight samples we have taken from pump wells in San Roque was not meeting the bacteriological Standard for Drinking Water. This means that it is advised not to drink this water. In our test 62.5% of the drinking water from pump wells is not 'clean'.

Question two: What are the perceptions of the drinking water users on water and water management in both areas?

Our hypotheses were that the respondents in Tuguegarao have a positive perception of the water they receive and the water management of the MTWD and that the respondents in San Roque want to be connected to the springs.

Most of the respondents in Tuguegarao, who are connected to the pipe lines, drink the tap water. They are sure that the water is clean, because it undergoes treatments and purifications. The result of the samples we have taken of the water quality in Tuguegarao shows indeed that the water is clean. All the respondents in Tuguegarao gave good comments about the water management in the area. And most (40%) of the respondent prefer no change in the management.

One third of the people in San Roque we have interviewed think that their water is not clean, the other two third of the people think that their well water is clean. Most of the people of San Roque base their perception of the cleanliness of the water on the fact that they become sick of it or not. They base their opinion further upon different observations and perception of the source. The big majority (88%) of the people who are not yet connected to pipe water want to be connected, they only want to pay a small fee every month and mainly for the maintenance of pipes and source.

RECOMMENDATIOS

To the Metropolitan Tuguegarao Water District

- The respondents think that the Water District should give more attention to maintenance and installation of new pipelines. Other suggestions are more emphasize on public communication, treatment of water and ways of payment.
- The MTWD must have good collaboration with the government officials and other Water Districts to secure the health of the people of San Roque. All parties should have public communication regarding the quality of the water. They should conduct water test, because it is one of their responsibilities as users of the springs of San Roque.

- The formal responsibility of the Penablanca Water District over San Roque should be given to the MTWD, because then the MTWD can give funds to complete the project to connect all the zones to pipe water.
- The Pipe water to zone six and seven in San Roque should be tested and purified before use.
- The MTWD and other Water Districts should focus on wastewater treatment.

To pump well users of San Roque

- The people of San Roque must consider the area where they will build their deep well. They must consider the surroundings of the area, such as the comfort room, eating area and washing area. The people must subject their wells to tests to ensure the quality of the water.

To the Barangay captain of San Roque

- The plan to connect all zones to the pipe water should be implemented as fast as possible if the water quality of the wells in the area are comparable with results of our research. Most of the water from the wells is not meeting the Microbiological Standard for Drinking Water.

REFLECTION

During this research many things went easier than we expected. The help of the MTWD was really useful. Some things that did not go well were:

- * During our stay in San Roque we were both a little bit sick after drinking the water from the pump well of our house. After seeing the results of the samples we have taken from this place we know what the reason for this was. The MTWD Bacteriological Water Test showed that water was positive and not advisable to drink. We learned personally that people should be careful with drinking water from wells.
- * We wanted to make a map of interview places, but we were not able to make a good map of the places of interviews in Tuguegarao, because we did not note all the locations during the interviews.
- * If we knew earlier that zone six and seven in San Roque are connected to pipe water we had also take samples from that source.
- * Some people don't want to be interviewed because they thought that they will not benefit from this study.

ACKNOWLEDGEMENTS

Metropolitan Tuguegarao Water District: Acting General Manager *Ninia P. Lumauan*. Engineers *Vincent Soriano, Ma. Evangeline P. Rey, Janice R. Cardenas*. Laboratory researcher *Baron C. Moralit*

Municipality Penablanca: MENRO *Alex M. Sibbaluco*

San Roque: Barangay Captain *Isioro B. Pagalilauan*. The 21 respondents in zone 1 till 7

Tuguegarao: 27 respondents

REFERENCES

- * Personal communication Ninia P. Lumauan, Acting General Manager, Metropolitan Water District, Tuguegarao City
- * Personal communication Isioro B. Pagalilauan, Bangaray Captain, San Roque

Appendix I: Questionnaires

Questionnaire Tuguegarao	Questionnaire San Roque
Name: <i>Pangalan?</i>	Name: <i>Pangalan?</i>
Male/female: <i>Kasarian?</i>	Male/female: <i>Kasarian?</i>
Age: <i>Edad?</i>	Age: <i>Edad?</i>
Ethnic Group: <i>Tribo kung saan nabibilang?</i>	Ethnic Group: <i>Tribo kung saan nabibilang?</i>
Education: <i>Edukasyon/ Natapos?</i>	Education: <i>Edukasyon/ Natapos?</i>
Work: <i>Trabaho?</i>	Work: <i>Trabaho?</i>
Size of household: <i>Bilang ng tao sa inyong tirahan?</i>	Size of household: <i>Bilang ng tao sa inyong tirahan?</i>
Sources of their water	
<i>What is the main source of your water?</i> Saan kayo kumukuha ng inyong tubig?	<i>What is the main source of your water?</i> Saan kayo kumukuha ng inyong tubig?
<i>How many water do use for drinking and other activities?</i> Gaano karaming tubig ang inyong gigamit?	<i>How many water do use for drinking and other activities?</i> Gaano karaming tubig ang inyong gigamit?
Influence droughts – rain season	Assurance clean water
<i>How do you handle water when there are droughts?</i> Kapag my elninyo, paano nyo ito nasusulasyonan?	<i>How do you know that your water is clean?</i> Paano nyo nalalaman kung malinis ang tubig na ginagamit nyo?
<i>How and where do you store your water supply?</i> Paano at saan kayo nag-iipon ng tubig?	<i>Does the Water District conduct test of the water quality?</i> Sinusuri ba ng Water District ang unyong tubig sa inyong kaligtasan?
Waste water Do you know where your water after use goes? Sa inyong palagay, saan pumunta ung mga maduming tubig na ginamit nyo?	<i>Do you know somebody who became sick because of the drinking water here?</i> May naitala nab a o may kilala ba kayong tao na nagkasakit dahil sa pag-inom ng tubig ditto sa lugar nyo?
Payment for environmental services <i>Are you willing to pay a small fee for the management of the source of your drinking water in the mountains?</i> Pumapayag ba kayo sa maliit na halaga para sa pagpapanatili at pag-aayos ng inyong iniinum na tubig na nagmumula sa kabundukan?(San Roque)	Influence droughts – rain season <i>How do you handle water when there are droughts?</i> Kapag my elninyo, paano nyo ito nasusulasyonan?
<i>Do you want to pay for forest protection, reforestation and compensation for the residents of the water source in San Roque?</i> Sumasang-ayon na kayosa pagbibigay ng maliit na danyos, para sa pangangalaga ng kagubatan, patatanim ng puno at tulong sa residente ng San Roque	<i>How and where do you store your water supply?</i> Paano at saan kayo nag-iipon ng tubig?
<i>If fixed amount per year how many pesos:</i> 50 P, 50-100 P, 100-500 P, 500-1000 P, >1000P Kung pagkakasunduan ang halaga ng pagbabayad, alin at magkano; 50 P, 50-100 P, 100-500 P, 500-1000 P, >1000P	Waste water Do you know where your water after use goes? Sa inyong palagay, saan pumunta ung mga maduming tubig na ginamit nyo?
<i>If percentage how much percentage?</i> Kung porsyentohan, ilang porsyento?	Payment for environmental services
Water district <i>What do you think about water</i>	<i>Does the Water District pay you for the use of</i>

<i>management of the Tuguegarao water district?</i> Sa inyong palagay, maayos ba ang serbisyong binibigay ng MTWD?	<i>the water source?</i> Binabayaran ba kayo ng Water District ng Tuguegarao sa paggamit nila ng inyong pinagkukunan ng tubig?
<i>What should they change?</i> Anu ang dapat baguhin ng MTWD, sa pamamalakad ng daloy ng tubig?	<i>Do you want to be connected to the pipeline from the water springs?</i> Gusto nyo po bang magpakabit ng inyong sariling linya ng tubig?
	<i>If yes, are you willing to pay for the service?</i> Kung oo, gusto nyo po bang magbayad sa serbisyong kanilang ibibigay?
	<i>What should the Water District change through their management?</i> Anu ang Dapat baguhin ng MTWD, sa pamamalakad ng daloy ng tubig?

3.4: The impact of ecotourism at the Callao Caves on the environment and the livelihood of the Agta community in Aggugadan

Dorina R. Soler and Lotte C.W. Krijnen

INTRODUCTION

In the mountains next to the *barangay* Aggugadan in Peñablanca, in the province of Cagayan, there are hundreds of caves. The enormous Callao Caves are the most well known. It is also the main tourist destination of Northeast Luzon. Located within a Protected Area (PA), the Callao Caves area so-called ecotourism spot. Ecotourism is meant to influence an area's environment in a positive way. Since deforestation and water pollution have seriously damaged the area, the surroundings of the Callao Caves urgently need protection and some ecological restoration.

A lot of the inhabitants of Aggugadan make a livelihood out of the ecotourism. Some work near the Callao Caves, , others have shops downstream that are visited by the tourists. A special group of the inhabitants of *barangay* Aggugadan is the Agta community. They live downstream from the Callao Caves. Some of them used to be involved in ecotourism activities as well. They were well appreciated by the tourists for being their guides, from 2009 on. However, last year they quit their job. Now the only Agta involvement at the Callao Caves is in selling of baskets and orchids to the tourists.

In our research we took a close look at two different aspects of the ecotourism at the Callao Caves. First, we explored the impact of the ecotourism on the environment. And second, we investigated the involvement of the Agta community living in Aggugadan in the ecotourism project, now and in the past. Moreover, we were interested in possible future improvements for both topics. In comparing the answers of the different parties that we interviewed, we also hoped to be able to formulate some recommendations that will affect the environment as well as the life of the Agta community in a positive way.

Before we start presenting the results, we will give some background information that we gathered on ecotourism at the Callao Caves and the settlement of the Agta community in Aggugadan. Because this is a case study, everytime we mention the Agta, we mean the Agta community living in Aggugadan. And from this point on, 'ecotourism' refers to the ecotourism at the Callao Caves. Unless we point it out differently of course.

Background Ecotourism at the Callao Caves

The Callao Caves have been inhabited in the past. In fact, the oldest fossil of Southeast Asia, about 67,000 years old, was found over here. The uphill caves were rediscovered during World War II, when military people went up the mountains to hide for the Japanese.

From 1972 onwards, the provincial government, then leaded by governor Teresa Dupaya, started to prepare the site for tourists. Stairways were constructed and a number of cottages was built. After a change in government, the focus on tourism

declined however. In the meantime, a small group of Agta moved to Aggugadan. So when the tourists finally started to come in substantial numbers to the caves, the Agta were living near the caves.

The community was not asked to participate in the tourism plans at that time (CAVAPPED 2011, pers. comm.). The management of the site would like the Agta to keep their surroundings clean and follow the rules of the *barangay*. Moreover, the management says that they were very happy with the involvement of some Agta as tourist guides, and the manager regrets the fact that they recently quit that job (PTO, 2011, pers. comm.).



Figure 1: inside Callao Cave

The ecotourism at the Callao Caves is managed by the Provincial Tourism Office (PTO). The PTO was there before any other governmental organization, like the DENR and the Municipal Tourism Office, started trying to get involved. None of them have any funds for investments (DENR, MT, 2011, pers. comm.), so for the PTO co-management would not be very profitable. Since the ecotourism site is located within the boundaries of the previously established Protected Area (PA), the management has to obey to the National Protected Area System (NIPAS) law. The Protected Area Management Board (PAMB) usually manages the PA's. However, since the ecotourism was already going on, the PAMB is not in charge over there. A new, specific law for the zone, to authorise the PAMB as fund manager, is written but not yet approved (PASu, 2011, pers. comm.).

According to the PTO, the Callao tourism spot 'used to be the best', before it started to be degraded and polluted. Now, with a new governor willing to invest in tourism, the office has big plans for regaining the grandeur. The site is declared a 'multi purpose zone', allowing a lot of adaptations in the environment in order to attract tourists or other visitors since the caves are also a good spot for marriages and conventions. The caves have several chambers that can easily be used for ceremonial purposes. In fact one of the chambers is designed as a chapel.

At the present time, the management is collecting 20 pesos entry fee per head at the entrance. This entrance can be reached by boat and after climbing the first couple of stairs. After paying the 20 pesos, a large number of f stairs can be climbed, finally leading to the caves. Over there, the tourists can freely wander around in the seven chambers. The PTO is planning to increase the entrance fee for the benefits of tourist guides and improvements of facilities and tourist attractions as well. The monthly average number of tourists from April to December, as counted last year, is 3200 from the Philippines and about 50 foreigners. Especially in April and May the caves generally receive a lot of visitors (PTO, 2011, pers. comm.)

Background Aggugadan Agta

The Agta that live in Aggugadan are not the original inhabitants of this area. We spoke to the community's elders Marita Mondejar (72) and her brother Hendry Salbino (60). They told us the story behind their settlement.

Almost 30 years ago, a rebelling group of the NPA (New People's Army) came to their original habitat in Gattaran to hide for the government. The group brought trouble to their lives. To regain peace, Salbino went to the Provincial Capitol. He talked to Rodolfo Aguinaldo who was the leader of the governmental military at that time. He helped them to move from Gattaran to the mountainside of Buyun, Lagum. Mondejar stressed that they moved voluntarily, because they wanted to give their children good education and in Gattaran the school was too far removed from their settlement.

Lagum, however, was only a temporary solution. The American Christian missionary Roy Mayfield intervened and bought them the 30 ha in Aggugadan. 40 families moved over there in 1983. Some of them moved on to other, more mountainous locations. At the mountain sides of Lagum, which is at about 3 to 4 days hiking from Aggugadan, 15 families still reside with whom the Aggugadan community is still in good contact (ALS coordinator, 2011, pers. comm.). At this moment, 28 families still live in Aggugadan (Marita Mondejar, 2011, pers. comm.).



Figure 2: An Agta woman

In Aggugadan, a Danish grant indeed gave them access to education. Although the grant has ended, the Agta still see education as the main reason why they stay at their small lowland settlement. At the moment, there are no Agta enrolled in formal education. They do follow an Alternative Learning System (ALS) within their own community. The program is meant to encourage and prepare them for further education. Upon passing the final ALS test and the required enrolment test of their preferred school, they automatically receive a scholarship.

At first instance, they built their houses with coconut leaves and other locally available materials like they used to do in the forest. When they want to move on, they just left their simple huts. At a later stage they started to use more solid wood and other construction materials. When we visited the community ourselves, they were still busy building their new, more permanent houses.

The Agta at Aggugadan still mainly get their resources from the forests in the mountains. Their only involvement with ecotourism at the Callao Caves, was said to be the selling of orchids to the tourists. Three Agta girls have been tourist guides before. They could earn 50 – 500 pesos per day, depending on the tips given to them by the tourists. They did not receive a salary. In order to get the job, they attended a five days' seminar in April 2009. The PTO, which organized the seminar, informed us that the Agta girls were really good compared to the local people who also joined the seminar. Unfortunately, they quitted last year, mainly due to the teasing of other, local tourist guides. The Agta girls said that they liked the job and they would like to be tourist guides again since the work is less tough than collecting food and other materials from the forest. The captain of the community also said that it would be nice for them to be involved in ecotourism and in that way experience having a more or less steady salary.

METHODS

We conducted a qualitative research, making up an inventory of the ways various parties involved think about the effects of the ecotourism at the Callao Caves on the Agta community of Aggugadan and on the environment of the area.

Our main research question was: **In what way is the ecotourism at the Callaos Cave affecting the environment and the livelihood of the Agta community in that area?**

In order to answer this research question we spoke with several key informants, like the Office in Charge of the Provincial Tourism Office, the DENR Protected Area Superintendent (PASu) and the Municipal Tourism Officer, as well as the CEO of Cagayan Valley People's Protection and Development (CAVAPPED) and the *bBarangay* officials of Aggugadan. Moreover, we interviewed inhabitants of Aggugadan, people working at the Callao Caves, tourists visiting the caves and teachers and coordinators at the local school (also involved in the ALS). Of course, we also talked with different people from the Agta community in Aggugadan, among which their captain and some of the former tourist guides.

These answers allowed us to get an overview of the possibilities for future improvement as well. We used the following subquestions, which formed our main focus during the interviews:

- What is the impact of the ecotourism at the Callao Caves on the environment of the area? We specifically asked for both positive and negative sides.
- What could be improved about the ecotourism to be more environmentally friendly?
- What is the involvement of the Agta in the ecotourism at the Callao Caves?
- In what way could the Agta be involved in the ecotourism at the Callao Caves?

RESULTS

In ordering our results, we put together all the answers our informants gave us, divided into two sections. First, we give the impact of the ecotourism on the environment as we have been told. We also list the gathered ideas about possible future improvements for tourism at the Callao Caves regarding the environment.

In the second part, we organise our findings regarding the involvement of the Agta in tourism now and in the past. We will also discuss the problems that these ways of making money create for the Agta. Just like in the first section, we will mention some ideas about future possibilities as well.

We will not present many numbers since these will not be representative. Because of the qualitative design of the research and the limited time available we did not interview a large number of people.

Table 1: Impact of ecotourism at the Callao Caves on the environment in the area

<i>PROBLEMS</i>	<i>PROPOSED SOLUTION</i>
• No proper waste disposal at the cave	• Mandatory tourist guides • Educate tourists not to litter • Environmental maintainers • Truck for removing garbage
• Plans for more tourists = more waste	• More money for environment • Environmental rules by government • More promotion for more money
• Deforestation already took place	• Reforestation (planting more trees)
• Vandalism is destroying the caves	• Briefing section prior to entry • Guards to keep an eye on the tourists • Limitation people in the cave at once
• No good facilities (no clean CR)	• Have a clean CR



Figure 3: ECO tourism?

In addition to this table, we would like to mention that most of the governmental organizations only worked out plans for attracting more tourists (putting up zip lines, improving the bridges, stairways and roads leading to the area, investing in cottages etc.). They even give these options as an answer to how to improve the impact on the environment. They gave us no concrete plans on how the consequent increased impact on the environment should be handled or decreased.

Table 2: Impact of ecotourism at the Callao Caves on the livelihood of the Agta in Aggugadan

<i>INVOLVEMENT in ECOTOURISM</i>	<i>PROBLEMS</i>	<i>PROPOSED SOLUTIONS</i>
• Making and selling original products to tourist, for which they gather materials in the forest.	• No replanting which affects the environment in a negative way.	• Ask for commercial permit. • Own harvesting of food and used materials. • Giving them a job as environmental caretakers.
• Free food and clothes given by tourists and other organizations.	• Making them lazy and dependent.	• Set restrictions before giving the food and clothes to avoid taking things for granted.
• Tourist guides (not anymore)	• Jealousy of local people, no security about whether they will be hired and Agta being "shy type person"	• Enhancement of education, for locals as well as Agta.
• Picture taking and cultural dances (not anymore)	• -	• Perform original habits. • Start mini museum.

CONCLUSION AND RECOMMENDATIONS

If we look at the results about the impact of the ecotourism on the environment, we see that even though we specifically asked for positive consequences as well, not many were mentioned. Only the tree planting was said to have a positive influence, but still this was not substantial. The main negative impacts on the environment that were mentioned, were the waste, the vandalism and the insufficient sanitary facilities.

The main problems with the involvement of Agta in the ecotourism at the Callao Caves, was the fact that for the products they sell to tourists, the Agta take materials from the forest without replanting. Also problematic is the cooperation with the local people. This last problem is partly due to jealousy of the local tourist guides and partly to the character of the Agta. They are known to be shy, some people specifically mention them to be unclean and they have a different way of living and they lack a general sense of discipline. They live from one day to the other and do not plan future activities. They often simply do not show up at agreed appointments. Finally, also the free food and clothes they receive seems to change their attitude in a negative way. It makes them dependent and lazy.

RECOMMENDATIONS

Although this small research can hardly be seen as more than an inventory, or a set up for more thorough research, we would like to put forwards the different results together with a set of recommendations. These recommendations have positive consequences for the environment as well as for the livelihood of the Agta.

The Agta say they want to stay in Aggugadan, to have good access to education. They also indicate that they would like to have jobs at the ecotourism sector again, in order to 'experience having a steady salary'. Furthermore, they are among the respondents that mentioned to experience pollution of the river by the waste tourists throw out. All these statements fit very well into the job openings for future improvements for the environment, as stated by our respondents. This is what we would recommend, taking into account all the data we gathered:

A raise of the entry fee of the Callao Caves gives the management of the spot more money. They could spend this on:

- Better sanitary facilities and more garbage bins.
- Arranging a truck to realise proper waste distribution. The PTO could also work together with other governmental institutions in order to realize proper waste distribution.
- A fixed salary for tourist guides, guards and environmental maintainers. The jobs could be done by trained Agta as well, since they were successful in the past. The payment of the tourist guides could already be included in the entry fee, which makes an equal payment system easier. This might solve the problem of not receiving any money when you are not lucky enough to be the chosen tour guide. Moreover, knowing that you receive a salary anyway, might prevent jealousy.
- To make sure the Agta people will integrate better than last time, and that the local people will behave in a better way towards their Agta colleagues, part of the money should be spend on education of the ecotourism workers of both cultures. Not only prior to their job appointment, but repeatedly.

The management of the Callao Caves could also take care of:

- Limiting the number of people that can be in the cave at the same time. This could make it possible to appoint tourist guides according to a prefixed schedule. This avoids long waiting and jealousy.
- Dividing the tips tourist give. The guards and maintainers should also receive a share. This makes it a communal effort to please tourists. From a practical point of view, it could help to make tourists aware of such a system and ask them to give the tips at a central point. A see-through collection case makes it possible for everybody to more or less see how much is in there, in order to prevent the feeling of corruption.
- If tourists will be educated about the environmental problems and the consequences of their actions in a better way, as recommended above, they might be willing to invest a little extra in the area by planting a tree. These could be for sale at the tourism spot.

The Agta community could:

- Set up tourist activities within their own area, like producing and selling souvenirs. They could also perform their original habits or start a mini museum on their own land. In that way, they do not have to work together with local people if they do not want to do so.
- Ask for a permit for commercial use of forest products. This permit they could easily get according to the Protected Area Wildlife Division (PAWD, part of the DENR) (2011, pers. comm.).

The DENR / PASu should consequently:

- Investigate the way in which the Agta make use of the forest products, and make sure that no protected species are being harvested. Replanting or managing these resources in a sustainable manner could also be stimulated.

For the *barangay* officials:

- The organizations that provide the Agta community with free food and clothes should be better informed about the consequences of their well-intended deeds. As we heard, it might not always help the Agta. The *barangay* officials could intervene, by informing these parties and propose some restrictions on how the organizations could prevent the Agta from becoming too lazy or dependent.

ACKNOWLEDGEMENTS

The Barangay Captain of Aggugadan, Penablanca, Cagayan for letting us stay in their house during the conduct of our data gathering. The Maramag Family for their support and treating us as part of their family. Our colleagues in this course who gives us inspiration. Furthermore, in the name of Dorina R. Soler: Thanks to my Teachers, Friends, and Family for their unending love. Above all is our Almighty God who gave me strength to do my daily duties and guidance.

Appendix I: Key Informants

1. Jenifer Baquiran (OIC Tourism Division), Provincial Capitol, Cagayan
2. Perla Vissoro (CEO CAVAPPED), Cagayan
3. Catherine Santos (Municipal Tourism Officer), Peñablanca Cagayan
4. Resty Antolina (DENR – PAWD), Cagayan
5. Marita Mondejar, Agta community Aggugadan, Peñablanca, Cagayan
6. Hendry Salbino, Agta community Aggugadan, Peñablanca, Cagayan
7. *Barangay* officials from Aggugadan, Peñablanca, Cagayan

Appendix II: QUESTIONNAIRES

These served as guidelines during the interviews.

Barangay Officials and People

1. Do you know about the Ecotourism at the Callao Caves?
2. How does the ecotourism influence your life?
3. How does the ecotourism influence the environment?
4. What would be a possible improvement in environment?
5. Do you know about the involvement of Agta in Ecotourism at the Callao Caves?
6. In what way do you think it affects their livelihood?
7. What would be a possible improvement of ecotourism?

Tourists

1. What do you think is the impact of ecotourism at the environment?
2. What could be a possible improvement for the environment?
3. In what way do you see Agta people are involved?
4. In what way do you think the ecotourism effects the livelihood of Agta people?

Workers in ecotourism

1. Background of the ecotourism
2. Impact of ecotourism in environment?
3. Ideas about the involvement of Agta in ecotourism?
4. Impact of ecotourism in the livelihood of Agta?
5. What could be a possible involvement of the Agta in the ecotourism?
6. What could be possible improvement of ecotourism for the environment?

Agtas in Aggugadan

1. Background (relocation)
2. What is their involvement in ecotourism at Callao?
3. What is the impact of ecotourism on their livelihood?
4. What is the impact on their environment (positive and negative)?
5. What could be their possible involvement in ecotourism and environment for the future?
6. Do they have contact with others Agta? In what way?

BLOGS

The following daily blogs were posted by the students on the water course website:
<http://cabaganwintercourse.wordpress.com/>

The Alpha

Posted on January 4, 2011 by [cabaganwintercourse](#)

How *Ben Elizer* experienced *Tuesday the 4th of January*

At around 5 am, we arrived in Manila and we proceeded to Malate where the Natividad Pension House was situated. After checking in we took our breakfast and to much of our own chagrin, some of our fellow students opted to explore the downtown façade of daytime Malate that even the stress of the long travel did not deter them. Maybe this is due to the excitement on the impending arrival of our Dutch counterparts as well as the excitement of seeing and being in Metropolis in flesh and blood. I took some much needed sleep, after that night I swore to never seat with Dorina who is like an AM radio HAHHAHA (I like her though). At around 2 pm, we visited the historic Fort Santiago as well as the venerable San Agustin Church which to our surprise the patron saint of the Augustinian Missionaries is St. Paul! (how ironic!). We were toured on the very ground where our national hero Dr. Jose Rizal suffered his inhumane incarceration in the hands of the Spaniards. Sightseeing was not only the order of the day, we learned a lot and I appreciated being a Filipino and realized how I am proud to be one!



Thus a perfect head start..... and the adventure continues.....

After the tiresome explorations, starving and thirsty, the Mabuwaya staff took us for sumptuous dinner with the Manila Bay as the backdrop at the Harbor View restaurant. We were treated to a sumptuous feast which “cured” our hungry bellies. Thus begun a fellowship and an adventure that I believe will be etched in my life for as long as I live. We got back to the pension house at around 8pm and the venerable Merlijn hold us for short meeting with regards to our itinerary(adventure) for the next day. The Dutch students stayed up late updating their paperworks which to our amazement, did not heed to their stressful flight and jetlags. A toast's to the Dutch students! Merlijn and the Mabuwaya staff also stayed late that night, I

began to appreciate the project itself and the people who made this monumental project become a reality, to the Mabuwaya Foundation, MABUHAY KAYO!!!

From freezing to burning

Posted on [January 4, 2011](#) by [cabaganwintercourse](#)

How **Eline Holtes** experienced ***Tuesday the 4th of January.***



View from the plane

Well....honestly....our beds! We were all so very tired and jetlagged! But we went on to a restaurant in the harbor of Manila and had a great welcome-dinner. Fish, soup, rice, vegetables, fruit drinks... everything was there... it was also a chance to get to know some of the other students a little better. Around nine 'o clock we went back to the hostel to get some sleep and to process all the new impressions, people and cultures in our dreams!

On Monday morning the 3th, Lotte, Sara, Suzanne, Tom, Thomas and I said goodbye to the rainy cold lowlands of Holland. After 12,5 hours of flying we arrived in Manila. What a difference! We immediately regretted that we had no slippers and short clothes on, but when we saw the other half of the Dutch students (who landed 2 hours earlier and had been waiting for us since) we saw they had the same problem.

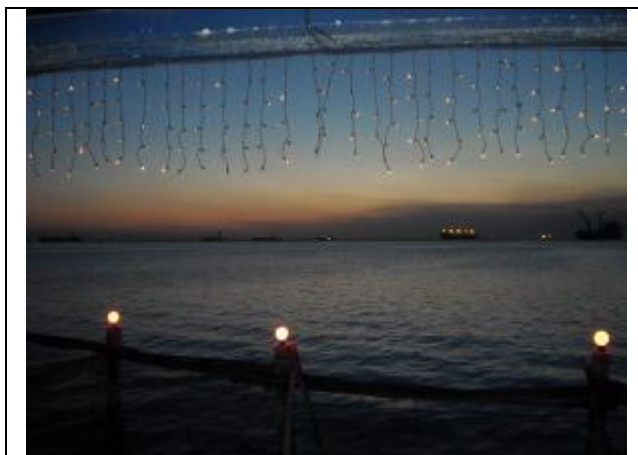
Merlijn, Arnold, Tess and Wilda picked us up from the airport and brought us to our hostel. The Philippine students arrived early in the morning and were already in the rooms. We could take a quick shower and a change of clothes and then we went to the old part of Manila. We visited the Jose Rizal park, a church and a museum. It was very beautiful, the guide was funny and the sun was shining! What more could we wish for?



Tour the Intramuros



Welcome dinner



Beautiful sunset at Harbor Bay

Contrasts

Posted on [January 5, 2011](#) by [cabaganwintercourse](#)

How *Jessie Post* experienced **Wednesday the 5th of January**

The first couple of days in the Philippines have past and one thing has already become very clear to me: this country consists of many contrasts. Also, the contrasts between the Netherlands and the Philippines are huge. Just to name a few:

Freezing cold vs. very hot

Western buses vs. Jeepneys

Directness vs. Politeness

Potatoes vs. Rice

Cabs vs. tricycles

Brick houses for everyone vs. some people living in slums/on the street

Tall vs. short 😊

However, I really enjoy opening my Western mind to all these new impressions and people. It is great and important to witness and experience different cultures, habits and customs and to see that the world is so much bigger than the Netherlands, for example.

The excursions of today taught me that huge differences of opinion and lifestyle exist within the country as well. I saw enormous five star hotels and people sleeping on the street; I have seen crazy traffic and people who clearly care about the environment. The indigenous people seem to have completely different goals and also different plans and solutions for existing problems than the government and some NGOs. Aside from that, the country is linguistically divided and inhabits people from various ethnic backgrounds. Talking with the Philippine students of our group gives all of this a clearer image. I am already starting to realize that this course will teach me much more about the Philippines and their culture than a normal holiday would.

A day in the life of a Dutch student

Posted on [January 5, 2011](#) by [participantwintercourse](#)

How *Koen van Ekdor* experienced **friday the 5th of January**

After we moved from Manila to Los Banos we got moving again, in the opposite direction. But first we had to pay a visit to a couple of very important local institutions. Leaving Los Banos with the bus we went first to an eco-tourism park, which was, according to the speaker "The Tubing capital of the Philippines", because it's the longest river where you can tube down in a rubber band.



Laguna Lake

The next stop we made was at a solid waste management project. The man who was doing the presentation was a very inspiring speaker because of the way he spoke about the problems in his area and how he solved them. It was good to actually see a local person do some work and succeed in solving the problem. He should be the governor!

After this nice visit the plan was to go to La Mesa dam, but the schedule was really tight and because the presentations earlier were a little bit too long we could not go anymore. Too bad, but later on we were also going to pay a visit to Magat dam.

We continued sitting in the bus until we were back in Manila. So today we drove around Laguna Lake with some nice views (see picture). In the evening we had the option to go to the mall and eat something over there. All the Dutch students went directly to the Pizza Hut! The pizza was okay, a little bit different than the pizzas at home. But at least something different than rice!! No i'm kidding, i like the rice 😊 Yours sincerely, Koen van Ekdor

Moving again

Posted on [January 6, 2011](#) by [cabaganwintercourse](#)

How **Sara van Damme** experienced *Thursday the 6th of January*

Today we finally left Manila! I couldn't wait to see all the nature. And it was even better than I expected, even the sideways of the 'highway' are beautiful. We went to Los Baños and visited the botanical garden, a big contrast with the city. Instead of from the smog, we now felt sticky from the sweat.

We again visited some very interesting institutes but the climax of the day was definitely the soccer match. After days of sitting in the bus or listening to interesting talks, we could finally move! We all took our special water course T-shirt and got on the bus, we felt like a very important team that went to this important match. We also brought our very well trained supporters with us, who kept shouting at the sideline during the entire match!

The team of the ICRAF, our opponent, was very strong and we had to fight. Although we had a Nobel Prize winner in our team and some good soccer players we lost, 4-2 was the final score. It was already dark and the bats were diving on the field, which was very confusing because each time I thought it was the bal. Maybe that's the reason we lost, but I do know one thing, I've never been so happy to be moving again, in my entire life!

Kisses, Sara

The Los Banos Laguna

Posted on [January 6, 2011](#) by [participantwintercourse](#)

How **Ryan Dela Cruz** experienced *Thursday the 6th day of January*

It was really a wonderful day, we started with a breakfast in the morning before going to UPLB (University of the Philippines Los Banos). It's my first time to go and visit UPLB. I guess the majority of the group were also first timer. We travelled almost two hours from the Natividad Pension House going to UPLB. Upon arriving in UPLB we went directly to the College of Forestry in which the Makiling Botanical Garden as well as the Museum of Natural History is situated.

The Botanical garden is an amazing place. It is where you can find sentinel trees like the White Lauan and the Big Leaf Mahogany.



Makiling Botanical Garden

You can also find a collection of exotic and endemic plants in the Philippines. Inside the garden, there are two buildings with designs that were inspired by a plant named *KAPA-KAPA*. It is endemic to the Philippines. It's really amazing!!.... There were other kinds of amazing species of plants inside the garden like Mickey Mouse which got its name from a famous cartoon character. This was due to the similarity of the flower to the face of Mickey Mouse.. Can you believe that?! Just amazing isn't it?!...

After we visited the botanical garden we proceeded immediately to the Museum of Natural History, they showed us the collections of some species of plants, animals, and even

insects which are fascinating. They also showed us the bones of the biggest mammals in the world, the Sperm Whale. Awesome! These mammals actually ate plankton for them to survive.

Ohh.. I forgot it's time to eat!... hehehe.. We took our lunch at ICRAF where they cook really delicious...yummy....



In front of the Museum of Natural History UPLB

After the feast, we proceeded right away to IRRI (the *International Rice Research Institute*) where they showed us a film about IRRI. They discuss the function of the institute. We learned that they are making solutions ascertaining the problems in farming. They introduced some technique in farming and developed some technology in order to improve farming system.

After the film viewing they guided us to the Museum of Rice where they display different kinds of rice variety. They also showed us some implements in farming and even the products that are made from rice.

After that we went to the office of the ICRAF where they gave us lectures on mitigation and

adaptation with regards to climate change. The lecturer gave us an idea about Carbon Trading and some information about Kyoto Protocol.

After the lecture, they invited us to play soccer. This excites us much! Of course it's really nice to play soccer. It's was my first time to play soccer thus, exhausting me especially in running after the ball! Hahaha! We did our best but sometimes in a game there is always a winner and a loser... Sad to say we lost the game with a score of 2/4... But that's okay at least we did our best and everyone put enormous effort for us to win but maybe time is not on our side. Maybe we need more practice, and skills in playing the game. Whew! That's all for today.....till next time.....!!!!

Saturday 08 jan

Posted on January 8, 2011 by participantwintercourse

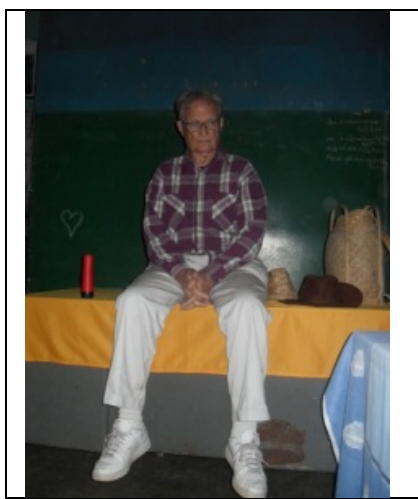
How **Tom Alkemade** experienced **Saturday 8 januari 2011**

We departed with our bus from our hotel around eight o'clock. After a ride of 5,5 hours we arrived at the foot of the Mountains in Imogen. We went on the mountain on the top of a jeepney (large jeep). It was a bumpy and dangerous road. We arrived after one hour at the Kalahan Ecological Foundation (KEF). At that moment it was late in the afternoon. A 83 year old American (one of the Wiseman of the area) told us about the initiative to protect the forest and water supply in the area. After the meeting we had dinner and went to sleep.

A day with the Christian Pastor

Posted on January 8, 2011 by cabaganwintercourse

How **Arthur Castro Jr.** experienced **Saturday the 8th of January.**



very inspiring pastor

It was a fabulous morning that welcomed us to start our day. We started packing up our things as early as 6:30 am. We leaved UP Diliman at 7:00 am. We ate our breakfast at Jollibee. Just after breakfast, we departed and we travelled north going to Imugan, Sta. Fe, Nueva Vizcaya. It was a tiresome and a very long travel, taking for consideration of vast traffic we encountered in Metro Manila and also in Bulacan. Almost everybody was asleep on the trip. We took our lunch at Marquez restaurant at San Jose City Nueva Ecija.

As usual we ate a lot. We continued our travel as we sing and laughed to avoid boredom. And finally, after a painstaking travel we arrived at Imugan City. It took us almost 6 hours travelling. All I thought we're already there, but we needed to travel another 20 minutes for our final destination. Our travel to Kalahan was an all out fun. We rode in an owner type jeep commonly known as jeepney. We actually stayed on top of the jeepney, which make things more exciting and trilling.

We had a lecture with the former manager of the Kalahan Foundation. He inspired us with a lot of things. In fact, he is not even a Filipino, only a naturalized Filipino (a German actually). What makes him more interesting is, he is a pastor. He lives a life of a typical Christian, more patriotic than a Filipino politician. He is no other than Pstr. Delbert Rice, an engineer, anthropologist, pastor, ecologist. He shared a lot of his inspiring and very relevant words of wisdom, in which anyone may ponder. And I believe it's something worth it. Here are some of his words,

"If we have a lot of land in the low land then, why do the lowlanders go to upland?"

"I didn't come here to change but to accomplish sustainable development."

"You have to establish community for the justice to work."

"Do not manage the forest, let the forest manage you."

"How can you protect the forest, watershed, wildlife if you need to eat it?"

"Be more holistic."

He even shared us a parable,

"Put ten birds in certain part of the forest (niche), and come back after ten years. You will see flocks of birds and the forest remains virgin. Put ten deers in a certain part of the forest, and come back after ten years. Believe me, you'll see a lot of deers in the forest. Try also to put some wild pigs in the forest, and come back after ten years. And you'll find those pigs more on the forest and the forest remains unchanged. This time try to put ten people in the forest, and come back after ten years. You will find the forest destroyed and wasted by the people. Who is more intelligent then?"

He finished his lecture with a simple phrase "Resources of this earth are by nature, designed and sustainable but we have to be a steward of the nature"

After the lecture we ate our dinner together. And spend the rest of our time playing cards and enjoying our stay in the place. It was a great and memorable day for everyone! And one more thing, it was really cold!

Exploring the own country

Posted on [January 8, 2011](#) by [cabaganwintercourse](#)

How *Dorina Soler* experienced *Friday the 7th of January*.

Here comes again, another journey, full of fabulous experience. Our day started with early packaging of our things because we need to leave SEARCA Hotel and moved again to our next destination. That was at Panguil Laguna to visit Laguna Lake Development Authority, one of the Eco-Tourism park and considered as a virgin forest.

There it is, the Ambon-Ambon Falls, located 1 km from the Panguil River and this falls were developed last 2009. It was visited by many Filipinos because of its natural beauty and the cool, fresh, and clean water. This area is free from illegal logging and any other illegal activities because the community is protecting it.

Illegal work is being prohibited because the community is improving the lake. Mr. Rey Diaz, the manager and also the supervisor of Laguna Lake presented to us a very good video presentation about what we can see in the Eco-park.

Valuable waste

After almost 2 hours of travel, we arrived at Teresa, Rizal. Unfortunately, we needed to satisfy our stomach, so we first took our lunch, then moved to Teresa Rizal's Solid Waste Management. Here, we heard more substantial information from Marlon Pielago. Everybody got inspired when he shared the story on how they manage the waste of 9 Barangays in Teresa, Rizal. They processed this waste into usable materials such as hollow blocks, bricks, paper charcoal, and lastly the organic fertilizer. These materials are made out of waste. It means we can make money out of the waste scattered everywhere, if we really know how to manage it properly through segregating it into biodegradable and non-biodegradable.

It has been quoted that "waste is a resource in the wrong place at the wrong time. Once it finds its right place, it gets beneficial."

Our way back to Manila, I observed a lot of us were really tired and preferred to sleep during the trip, but some were still alive. They kept on having fun, especially I who kept on learning the Dutch language and tell it to them immediately. I saw how happy they were because some of us were really interested. It was a great and challenging Day!!

Travelling the Jeepney

Posted on [January 8, 2011](#) by [cabaganwintercourse](#)

How **Mylene Gumiran** experienced *Saturday the 8th of January*.

Hello! Welcome to the official website of the International course on water management of the joint partnership of Isabela State University, Cabagan Campus and Leiden University, the Netherlands. After 9 hours of travelling from Manila, we totally reached the province of Nueva Viscaya to visit the "watershed protection project" at Imugen, Santa Fe.

We travelled using jeepneys (in the Philippines we use these colorful large jeeps for public transport) to reach the project. We stayed at the roof of the jeepney and we enjoyed the trip a lot. According to the Dutch students, it was their first time to ride using this vehicle, that's why we kept on yelling and laughing at the top of the jeepney.

After 30 minutes, we reached the watershed protection project at Imugen and we took our snacks at the guesthouse. Pastor Delbert Rice conducted a simple presentation about what the project is all about. He also gave us some pieces of advice on the importance of water. According to him *"Resources on earth are by nature designed to be sustainable, and we should all be stewards of sustainable systems"*.

Pain in our bottom

Posted on [January 9, 2011](#) by [participantwintercourse](#)

How **Bart van Velzen** experienced *Sunday the the 9th of January*

Good morning!

After a peaceful night in the mountains with only the sounds of the woods and the river we wake up. All the cell phones are silent because there is no signal. For the students that want to participate, Merlijn organizes a bird watching tour through the woods of the Kalahan Community that starts at 6 o'clock. Eventually we left with six students the building.

Because of the weather we didn't see a lot of birds, however the Pilipino students were able to tell and show a lot of interesting things. For example they dug out a spider hiding in the rocks. After a walk we reached a beautiful waterfall. The Filipino students wanted to take a dive and I didn't hesitate to join them. Very refreshing in the morning!

After a fast breakfast we jumped on the roofs of two jeepneys to drive further in the Cordillera mountains. The views were spectacular. On the way down the jeepney got engine problems, loss of power. The driver was able to repair it and we continued our journey to the main road with pain in our bottom from sitting on the roof. Arrived by the main road we changed vehicles, the ISU bus had not left without us, and took our place in the bus for the 2 hours drive to the Magat dam. A lot of talking and singing in the bus ('gezellig').

After the visit to the Magat dam, it is after all the International course on water and water managment, we drove further to our final destination Cabagan. After unpacking the backpack and install the mosquito net it was time to sleep, unfortunately.

Goodnight! Bart van Velzen

How Thomas Wissingh experienced Monday the 10th of January

Posted on [January 10, 2011](#) by [participantwintercourse](#)

Welcome, Good day/Magandang araw! Today it's Monday the 10th of January, I'm Thomas and this is how I experienced this day. It's our first official day at ISU Cabagan. At the beginning of the day the president of the ISU Cabagan welcomed us to the ISU Cabagan Campus and wished us a pleasant stay at the campus.

The whole morning we had guest speakers of different organizations and in the afternoon we went to Cabagan palengke, the center of the City Cabagan. We travelled with a kalesa, which is a carriage with a little horse. There are not particularly fast, indeed we went over the high way with a total of 5 carriages. Riding really slow and all the people and student from the campus and along the road stared at us. But it was a nice ride, I sat in the carriage with Koen, Josie, Bryan, Tess and of course the carriage driver. They learned me a Filipino joke, that if you might fall. You grab your ears so you won't lose them, at first I didn't get the clue. But the reason you need to grab your ears, is because you will fly and don't hit the ground. It was a very funny joke for our Filipino students!



Then finally we arrived in Cabagan palengke where we went to the market, I was told that the market was the cheapest place to buy everything. It was a pretty large market, and we bought a basketball for all the students. And for ourselves of course, because we can use the exercise after sitting and listening to the presentations all day! When we were at the market I noticed again that we were a good attraction for the people, because again they all stared at us. Although I must say, I 'am getting used to the attention. This is my experience of Monday the 10th of January,

Yours sincerely/Paalam, Thomas F. Wissingh

Another day in the Philippines

Posted on January 11, 2011 by participantwintercourse

How *Suzanne vd Hoeven* experienced *Tuesday the 11th of January*



Today we started the day with a lot of interesting lectures!!

But because we got tired of sitting all day we were glad that we could go out and take a ride in a jeepney again!!

Unfortunately we had to listen to another lecture before we went to the irrigation inlet we were planning to visit!! At the irrigation inlet the boys even took a swim in the river!!
BRRRR!!

It was already dark when we came back at the campus (it was an hour drive) but after a good dinner (again rice 🍛) it was time for a movie and later PARTY-TIME!! A lot of people were

dancing on the music and having a lot of fun. That was actually the best thing about the whole day!! Around eleven we sat down on the grass and Jacinto played songs on the guitar and even sang for us together with Josie and Bryan. A great day but even a better evening!!

Another day in the classroom

Posted on January 12, 2011 by participantwintercourse

How *Jolien Rip* experienced *Wednesday the 12th of January*



After a little party yesterday night (one of today's speakers even heard our music at his house!), everybody was relieved that the lectures today began an hour later than usual. We've had lectures for the past days, only with a few breaks, so most of us are a little mentally indigested and had a hard time paying attention...

Everyone has a Filipino/Dutch counterpart now, and the research proposals are beginning to develop. I'm the only girl who is teamed up with a boy because none of the Filipino girls are studying engineering. So my counterpart is Ben! We are going to do research at the Magat Dam, I think it's going to be a memorable

experience. At the end of the day, we had a role playing game to practice interviewing people in the field. Samuel played a stubborn Ifugao farmer and Bart & Ryan had a hard time interviewing him! Unfortunately, Eline was sick today. I hope she gets better soon! (..and that her disease is not contagious!)

Wishlist

Posted on [January 13, 2011](#) by [cabaganwintercourse](#)

How **Pauline Hutten** experienced **Thursday the 13th of January**.

Dear Parents of all Dutch students,

We are having a great time here in the Philippines. Lovely weather, nice people, beautiful landscapes and interesting lectures are all making it a fantastic adventure. We are starting to feel at home here, and the thought of coming back to the Netherlands still seems so far away. However, dear parents, just to make our return a little bit more easy on us, could you please make sure you gather the following things:

A hot, clean shower,

A whole wheat bread with lots of cheese,

Fresh milk,

Fruit – anything other than bananas,

Typical Dutch dinner,

All boyfriends/girlfriends of the students?

A fast internet connection,

Lots of aftersun,

A laundry machine – and someone to do our laundry for us

Mosquito- free bedrooms

Cockroache-free bathrooms

And lots of love 😊

With kind regards,

All your loving sons/daughters

Mona Lisa

Posted on [January 14, 2011](#) by [cabaganwintercourse](#)

How **Nicolien Pul** experienced the **Friday 14th of January**.



Aunti Natti

Imagine, 8 students, of which four are Dutch and tall, with their luggage and groceries for a week (rice, vegetables, fruits, snacks, toilet paper, water, snacks, etc.). Now picture two tricycles and its drivers. Next, imagine the students and all their stuff crammed in the two tricycles. That's how we travelled to Barangay Antagan I in Tumauni to do our field work!

Today, most students left to go do their fieldwork. We (Jacintho, Thomas, Eline, Mylene, Suzanne, Crezel, Vicky and I) will stay in the municipality of Tumauni. Tomorrow, Pauline and Imee will join us. Vicky and I are staying at the house of Uncle Junior and Aunti Natti. The house is build of concrete blocks with iron roofs and a sandy floor. It feels a bit like camping and I love that. Aunti cooks great food with lots of vegetables, finally!



Vicky and me at the river

The first task today for our fieldwork was to visit the Barangay secretary. We reached his house after a walk of almost an hour, but that was mainly because we took an unintended site-seeing detour. Upon our arrival we asked the secretary for the names of the farmers that are living in the Barangay. These names we will use to locate farmers for the interviews we want to conduct tomorrow for our research project. Our hike to the barangay secretary made us very sweaty. Luckily, the river is only 200 meter away from the house where we are staying. Dressed in my new 'bathing suit' (a cycling shorts and a T-shirt), the refreshing water of the river felt great!



Rice fields in Antagan I

Tonight, many neighbours visited the house of Uncle Junior and Aunti Natti. Again, I felt like the Mona Lisa. All eyes staring at the tall, white women. Two neighbour girls, who speak a little English, came shyly sit with me. After a while, not knowing what to ask anymore, I asked what they normally do in the evening. Watching TV was the answer. Well, tonight they were watching me.

Koen: videoke king

Posted on January 14, 2011 by [cabaganwintercourse](#)

How **Arthur A. Castro Jr.** experienced **Friday the 14th of January.**

It was the start of the fieldwork. I was with KOEN (a great engineer from the Netherlands). We



the videoke king

started with a great enthusiasm. We left Cabagan EIC early in the morning. We travelled to Santiago for 3 hours. It was a sleepy trip for me, since we arrived at Ramon Isabela around 11 am. People were really amazed with KOEN, maybe because he is white, tall, and of course both of us are handsome (hehehehe). We went to the municipality of Ramon and got a little information, useful information. On the road we decided where we should go. And the place was Gen. Aguinaldo Ramon Isabela. We actually went to a place where we didn't know anyone.

It's a total adventure for the both of us. That was something! And there began our little adventure. We rented a tricycle for the trip. It took us a long time to find the barangay Captain's house. And whew we are busted the barangay captain went somewhere! It's time to shift to our plan B! We looked for the other officials, and there we find one! They were really hospitable. They gave us a warm welcome and



the videoke machine

actually arranged a place for us to stay. At night we had a little party with barangay officials. We sung in the VIDEOKE. And Koen really sung! He is like a typical Filipino. He is really nice because he easily adapted himself to our culture. A thumbs up for Koen, welcome to the Philippines tol (tol is a Filipino word for a brother).

Shy lad

Posted on January 15, 2011 by [cabaganwintercourse](#)

How *Imee Oliveros* experienced ***Saturday the 15th of January.***

Good evening world!!!

I'm just a simple and shy student of ISU Cabagan Campus, given a chance to be a part (student) of CABAGAN WINTER COURSE for almost 1 month at the EIC Cabagan campus.

As my adviser told me: "this is a good opportunity for you IMEE, take it. Because I want you to learn more and socialize to different people". Thanks for you my loving adviser- Dr. Bella T. Reyes.

As of now, Pauline Hutten (my partner on research) and I are at Antagan Tumauini Isabela and laying on our bed. Hoping that we will finish the data gathering for seven days so that we can present it on the presentation day. Lord give us strength, wisdom and good health for finishing the course. I miss my parents, friends, classmates, boardmates and my someone. I miss being with them. Laughing, eating with my family, doing many assignments and more ...Oh no! there's tears on my eyes. But no, I must be strong!! For all, don't stop on dreaming because we don't know, it will happen for the future. Goodnight, I love u all!!!!

Tarzan(s) and the Dutch girls

Posted on January 16, 2011 by [participantwintercourse](#)

How *Eline Holtes* experienced ***Sunday the 16th of January***

On Sunday we decided to take a break from our fieldwork and have a moment of relaxation by going into the Sierra Madre Mountains for a hike. Thomas and Jacinto already did that earlier this week and this time Pauline, Suzanne, Crezel, Jennalyn and me joined them. Uncle Junior was our guide. I borrowed hiking shoes from Dominic, but after 15 minutes I already had such big blisters that I decided to put on my slippers (not very smart either..).

We hiked for 2 hours before we arrived at a cave. We went inside with our flashlight and saw all creepy animals. We really had to watch our step because there were holes and bumps inside and it was so dark! (But exiting!) We found a way up at the end of the cave where we could crawl to the exit hole and from there on there was no accessible path. Uncle Junior formed the frontline with his big machete and he cut the plants and tried to create a passage for us.

We all felt like Jane in the jungle even though we were not that charming stumbling down and holding on to the roots of trees. Jacinto and Thomas played the role of heroes (or Tarzans) because they caught us when we (almost) fell and tried to ease us when we were afraid to go down from some very steep hills.

At the end we were very tired but when we were back at the foot of the mountain after 5 hours we also were a little bit proud of ourselves: we came down alive! We jumped into the river to cool down and after that we ended the day with a nice big shot of G.S.M !

Fieldworking!

Posted on January 19, 2011 by participantwintercourse

How *Koen van Ekdorn* experienced the week of **January the 14th to 19th**.



Videoke

Finally, we were going to do something instead of listening to all these lectures! Thursday the adventure started. Me and my counterpart (Arthur) started our trip by taking the bus to the Magat area. We were lucky to have this bus otherwise you had to go by van and it's not really comfortable when you're travelling three hours. We are doing our research about the effects of flood at the downstream area of Magat rivier. We wanted to visit three barangays (little villages) to get the right amount of information. I shall tell you our highlights of the journey: Karaoke with barangay officials, we met very hospitable and friendly people along our road, in the 2nd town they guarded us with 10 army men, drinking

and having a lot of fun with local people. I can continue telling our story until the end of time because we had a lot of fun during our week of fieldwork!

We also did 30 interviews with locals, farmers, barangay captains and other people. And actually they responded very well! First we thought they didn't want to talk to a foreigner because they were too shy. But after all, the respondents did fine. Now we have to make an report of everything we did and make an presentation. But I think we'll do just fine! Greetings, Koen van Ekdorn. Here are also a couple pictures I took during the week:



Our respondants



Our guards



The view

Dorina: the explorer

Posted on January 19, 2011 by [cabaganwintercourse](#)

How **Dorina Soler** experienced ***Wednesday the 19th of January.***

Wednesday! Wow! I didn't expect it. Days and time seems very fast or I just enjoyed only my stay here in Aggugadan with the families who have really generous heart. Well, I and my beautiful partner Lotte have been so very busy this past few days in conducting our interviews.

Speaking of interview, I can't imagine how many interviewees we had already with my partner and of course a lot of different ideas and informations regarding our questions. The worst is that the history of the Agtas relocation where we are interested more. This informations gave curiosity for me to learn more from this native people. Unfortunately, one of the great things that happened today is that we went to the office of PASu in Carig, Tuguegarao to conduct interview regarding the NIPAS law.

There we met this very intelligent alumni of ISUC Mrs. Resty Antolina who shared to us a brilliant informations towards the right of indigenous people in protected areas. After the exchanging of ideas and opinions, we proceeded to their foodcourt and ate our lunch. Then, it's time for shopping! Yes, we went shopped in Tuguegarao together with Angelo the son of Capt. Maramag where we stayed at Brgy. Aggugadan.

After that simple shopping, we planned to go to cornfield and ride for a carabao (Lotte's wish) together with Sarah and Grace but sad to say, the weather did not favored our plan that afternoon. It was raining! Huhuhuhu! In addition to that, from Tuguegarao we went directly to the house where Sarah and Grace stayed, hoping to join us in our farewell party. Unfortunately, they were toured by their host family in Callao Cave.

In our way home, expect that we are wet because of the rain. Angelo's auntie offered us a snack, we did not refuse it. There, we made plan for our dinner. Happy to know, that she is willing to join and help us.

So, what we did is that we bought light liquors, vodka and soft drinks. We drink it after we ate our dinner together with our host family. Proud to say that they appreciated the food that I cooked. Then its time for drinking and bidding goodbye to our host family. They treated us as a family member. They were so good to us! Especially their lovely kids who taught Lotte in singing the Philippine National Anthem both English and Filipino version. (let Lotte sing and let her beat). Once again, it was another wintercourse page and adventure in life.

Going home

Posted on January 20, 2011 by [participantwintercourse](#)

How **Sara Van Damme** experienced ***Thursday the 20th of January.***

Mali Babag was taking a shower all night long. So by the morning, there was no bridge left, only troubled water, because how should we get 'home' now? Luckily there was another bridge. It took us (only a small) detour of approximately one hour and several prayers to make sure the tricycle could reach the top. We transferred to the bus to Cabagan and the sun joined us again.

It was nice seeing everybody again, hearing all the story's and looking at some pictures.

Unfortunately there was no running water, so everybody, dirty from the trip, was bound to smell for another day.

Merlijn didn't want our environment to suffer like that so we could all take a shower in his house.

Everybody enjoined it, after weeks of pouring water over your head with a bucket, we could now just let the shower do the work for us. The shampoo actually went out of my hair for once. A day of mixed emotions, glad to see everybody again, sad that the fieldwork part had ended.

Wonderful Philippines

Posted on January 22, 2011 by [participantwintercourse](#)

How **Thomas F. Wissingh** experienced ***Saturday the 22th of January.***

Today we went with the whole group to Penablanca, we started the day with planting trees. Each student planted a tree of its own together with the local mayor and his companions.



Tree planting



The Jeepney

After the tree planting, we went with jeepney in the direction of the Callao Cave. But the first jeepney that we drove in was not capable for the ride, so before we could proceed we had to switch to another jeepney that where just like a jeepney, little bit bigger and with a very nice engine. They could even drive straight through the river.

The last part of our journey to Callao Cave was by boat. We went down a very nice river with beautiful forest on both sides. It was actually still rainforest, something that I hadn't seen before. The river ended into a lake, where we took a nice dive. The water was actually even a little bit cold. When we tried to cross the lake swimming, we had to save Bryan from his sudden dead, because the distance was a little bit too long for him. But I can say that he is still alive and made a the way to the other side and back.



Banca near Calao Caves



Bowling with Suzanne!

After swimming we went to Callao Cave, which was a very nice cave. Although it was nothing from the cave I have witnessed during my week of fieldwork in Tumauni. We finished the day with a nice game of bowling, and a very nice dinner at a luxe hotel.

It was a very successful day, and I really enjoyed it. I even got a little sun burn, but hopefully that will turn into a nice tan later.
By Thomas

A very nice sunday

Posted on January 24, 2011 by participantwintercourse

How *Suzanne van der Hoeven* experienced **Sunday the 23th of January.**

Today we had nothing planned on the schedule!! So after a good night of sleep we went with tricycles to the centre of Cabagan, where the Fiesta was already started. With war dances, a market and lots of people and foods, I think you can compare it a little with Queens day in the Netherlands. Everybody was having fun and watching the dances.



With people from the war dance

After we saw a few of the dances we started to walk around, so much to see and even more to buy!!

We really enjoyed ourselves, watching all the market stalls and all the dressed-up people from the war dances.

At around one o'clock Jolien and I walked to the supermarket and stopped on the way for some Pizza, that tasted amazing even though it was just a ham and cheese one. After the market we went back to the campus and just do nothing for the rest of the afternoon, just reading and sleeping like we do on a normal Sunday 😊.

Around seven we went back to Cagaban with almost all of the students and had dinner. A very good pansit with some meat, vegetables and shrimps! After the meal some students went back to the fiesta and others (like me) went back to the campus. Today was one of the days that we didn't eat rice 3 or 4 times a day (and secretly I loved it;))!!

A boring day with a surprising end

Posted on January 24, 2011 by participantwintercourse

How **Jolien Rip** experienced **Monday the 24th of January.**

While the rest of the group is really sweating to finish their reports on time, Ben and I actually had quite relaxing day! Our report is almost finished; all we have to do is prepare a presentation for the workshop on Wednesday.

So I spend my day reading a book, skyping with my friends back home and because the internet was fast today I could finally check my email. The highlight of the day was supposed to be a trip to the fiesta to see a band that's world-famous in the Philippines. But... I didn't go because Koen and Thomas forgot me.



Scary!!

Before I went to bed I went to pick up my laundry in the bathroom. There were a few small bugs on my clothes, so I shook them a little to scare them off. But then I got a little bit scared myself because suddenly my clothes started to make hissing sounds!!

When I turned them around a giant rhino bug was clamping on the back of my t-shirt, apparently he was really attracted to the colour purple because he didn't want to let go! After 5 minutes and with help from Pauline we finally managed to get him off! I hope he's not planning revenge right now...

The Presentation of Studies

Posted on January 26, 2011 by [cabaganwintercourse](#)

How *Ben Elizer* experienced *Wednesday the 26th of January*.

The Moment of Truth!!!!

Finally the moment has come to show it off.... after so much work, sleepless night, stressful trekking and numerous discussion..... THIS IS IT!!!

I barely slept last night, Jolien and I revised our reports and revised it again after critical suggestion by Merlijn and Dr. Persoon with regards to the coherence of our report. Its tiresome and unnerving but me and my "daughter" made it through!!! Viola!!!! Our master piece!!!!

I slept at exactly 3:00 in the morning and woke up 6:45. After finishing my morning rituals (shower and sitting on my beloved THRONE), I go over my report right away. I do not want to lose any precious moment in preparing for my part on our presentation, sifting through piles of paper writing on my laptop important points to support our presentations. Jolien, the ever intelligent and focused partner, came up and we rehearsed and took points and commentaries to make our presentation seamless.

Since our study was on the Magat Dam Reservoir and its strategic economic importance, we where the first one out! The report was exhilarating! I felt nervous and anxious at the beginning but as the presentation takes to a higher gear, I felt relaxed. The reporting was smooth and I felt that I was in unity with my report!!!! Sanamagan!!!! Make My day!!!

So much for our presentation which by the way, Jolien performed splendidly had it not been by the time limit set in the presentations of study, we would have offered more to the satisfaction of our esteemed guest and audience. But the 12 minutes of our presentation arguably made us shine!.... so much for my modesty huh?! After the presentation we were given our certificates which are the products of our untiring effort and sacrifices!! Whew!! So much for our study back at school! As I am writing this, we are having a party! The band is waiting for presence to rock the ISUC-EIC.... let's go!!!! Until then, wait for my next update on how the party goes... I wish my mother was here to see this... I dedicated this and my studies to her... I love you ma.... and to all our Dutch friends, especially Jolien, Thomas, Koen and Tom.... DANKE JE WEL..... Salamat PO!!!!!! Till next time..... MEN!!!!!!!

Flying Dutch(wo)man

Posted on January 26, 2011 by [cabaganwintercourse](#)

How *Nicolien Pul* experienced *Wednesday the 26th of January*.

The last changes on the research reports were made and the final presentations practiced one more time. And then it was 11 o'clock: presentation time! All student teams presented the results of their field work for the other students and the staff of the Mabuwaya foundation. But also for quite a big number of special guests that were present to listen to all our findings, such as the Ambassador of The Netherlands.

Both Vicky, my counterpart, and I were a bit nervous when we had to present our results. But, I think we both did well. Especially Vicky did a really good job! Thumbs up for my counterpart! It was nice to see the presentations of the other students and also to get an impression of how they experienced their week in the field. But the day was long and I think we were all happy when it was six o'clock! Because at that time it was party time! The band started playing and the cocktail bar opened. In the garden of the EIC building, the place where we stayed the last weeks, we had a nice dinner. Students from the Isabela State University gave a truly nice show in traditional dances of Indigenous peoples. After their show was finished, we were invited to try to dance the indigenous dance. I raised my hand and before I knew I was dancing on top of a bench and flying through the air! Jolien, Lotte, Sara and Jessie also gave it a try. Sara then thought us a Belgium folk dance. We all had a lot of fun dancing and it was good amusement for those who didn't want to lift their feet from the ground.