

# International course on water and water management in the Philippines

5 January – 1 February 2015



Merlijn van Weerd, Jouel Taggweg, Nina Osterhaus-Simić, Marites Gatan-Balbas and Gerard Persoon (editors)



Hoogheemraadschap van  
**Rijnland**

Universities of Leiden and Oxford

**LOUWES  
FUND** 

*research on water and food*



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Cover: participants of the water course 2015

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## **International course on water and water management in the Philippines**

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**Isabela State University and Leiden University**

**Cabagan, the Philippines and Leiden, the Netherlands**

**2015**



## Message

### Winter Course 2015

In January 2015, 11 Dutch, 1 German and 1 Romanian student went to the Philippines to meet their thirteen Filipino counterpart students, with whom they would participate in the Winter Course of 2015. Although the name Winter Course might confuse one in the Philippine context, something serious is going on with climate change.

The goals of the Winter Course might be described as: 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 this case specifically to the Isabela State University and the Centre for Cagayan Valley Programme on Environment and Development (CCVPED) and the Mabuwaya Foundation.

In this booklet you find the experiences of the group of students participating in the Winter Course 2015. We are proud of the results and the fact that we could contribute to this activity.

We can now speak of a tradition, and I am confident that this fifth Winter Course in a row will not be the last one.

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. The courses were organized under the umbrella of CVPED, the Cagayan Programme for Environment and Development. This collaborative program between Leiden University and Isabela State University started in 1987 and lasted for more than 20 years until December 2009 when it unfortunately came to an end. This also implied the end of a 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 the interest of Rijnland to partly fund a course in the Philippines on water use and water management. The first international winter/water course was organized by the Faculty of Social Sciences of Leiden University, Isabela State University and the Mabuwaya Foundation in January 2011 with 24 students: 12 from the Philippines and 12 from the Netherlands. The course was a huge success, the interest of students in a full time interdisciplinary and intercultural course was as high as during the earlier summer courses. Based on the positive results of the first water course, Rijnland, Isabela State University, the Mabuwaya Foundation and Leiden University decided to continue this collaboration. In January 2012, another international water course was organized, this time with 30 students in total: 15 from the Philippines and 15 from the Netherlands. In January 2013 and 2014, the third and fourth international water courses took place, with 14 Dutch and 14 Philippine students. The present booklet is the outcome of the work done by 11 Dutch, 1 German, 1 Romanian and 13 Philippine students during the fifth international water course that took place in the Philippines from 5 January – 1 February 2015.

The 2015 Course would not have been possible without the funding by Hoogheemraadschap Rijnland, the Louwes Fund for research on Water and Food and the Faculty of Social Sciences of Leiden University.

The course was organized and coordinated by the Faculty of Social Sciences of Leiden University (Gerard Persoon, Nina Osterhaus-Simić and Merlijn van Weerd), Isabela State University (Jouel Taggweg and Mercy Masipiqueña) and the Mabuwaya Foundation (Marites Balbas and Merlijn van Weerd).

Participants from Isabela State University were screened from the different colleges and we thank Dr Oscar Cardenas and colleagues of CFEM, Dr Samuel Simon of PTIA, Dr Jane Cabauatan and colleagues of CDCAS, Dr Ambrose Hans Aggabao and colleagues of CTE, Dr Joel Alcaraz and colleagues of the College of Engineering at Echague and Dr Ricmar Aquino of Cauayan Campus and Dr Clarinda Galiza of ISU Campus San Mariano.

The Centre for Cagayan Valley Program on Environment and Development (CCVPED) of Isabela State University (ISU), headed by Jouel Taggweg with staff members Eso Tarun, Onia Gunayon and Lenlen Morillo provided support while the students stayed in Cabagan.

Accommodation and meals were provided by ISU with the meal service coordinated by Rose Araño, Jun Zipagan and HRM students while Onia Gunayon coordinated accommodation. We thank the Campus Executive Officer Dr Richard Ramirez of ISU Cabagan for all his support during the coordination and the implementation of the course.

We thank Dr. Ricmar Aquino of Cauayan Campus for making available the Cauayan bus driven during this course by expert bus drivers Marcelino Atuan and Guiller Martinez.

Essential support during the preparation and implementation of the course was provided by the Mabuwaya Foundation team: Arnold Macadangdang, Dominic Rodriguez, Edmund Jose, Bernard Tarun, Amante Yogyog, Lilibeth Baldesancho, Joni Acay and Dorina Soler.

A large number of representatives of government, non-government and international organizations warmly welcomed the students in their offices or field sites and provided a unique insight in their work: Rodel Lasco of the World Agroforestry Centre (ICRAF), James Alvarez and colleagues of the Museum of Natural History of UP Los Baños, Ana Maria Reynoso of the International Rice Research Institute (IRRI), Joy Navarro, Rowena Tercero, John Francis Ori and Joseph Rasalan of the Biodiversity Management Bureau (BMB), Alfredo Garcia, Rita Festin and colleagues of the Asian Development Bank (ADB), Dave de Vera of the Philippine Association For Intercultural Development (PAFID), Ann Hazel Javier and colleagues of PUSOD, Protected Area Superintendent Victor Mercado of the Taal Volcano Protected Landscape (TVPL), Dino Tordesillas of the University of Santo Tomas (UST), Nenita Kawit of the Bureau of Fisheries and Aquatic Resources (BFAR) and Sam Balinhawang and colleagues of the Kalahan Educational Foundation (KEF).

Lectures were given at the Environmental Information Centre (EIC) building in Cabagan. Dr Orlando Balderama, Dr Dante Aquino, Prof. Jouel Taggug, Dr Gerard Persoon, For. Tess Balbas, For. Dominic Rodriguez, Merlijn van Weerd, San Mariano Municipal Administrator Florietta Bartolome, SB Secretary May-Ann Gelacio and Legislative Officer Melanie Balayan kindly shared their knowledge and expertise on a wide variety of subjects with the students.







Isabela State University President Dr Aleth Mamauag and Cabagan CEO Dr Richard Ramirez gave inspiring speeches during the opening program.








Mayor Dean Anthony Domalanta and the other Local Government Unit officials and employees of the Municipality of San Mariano allowed and assisted the students to do fieldwork in their beautiful municipality in the foothills of the northern Sierra Madre Mountains.

Last but not least, the students experienced the famous Philippine hospitality while staying in the field sites. The Barangay Captains, officials and tanods, interview respondents, guides and host families in the field sites in Balete, Dunoy, Dadugen, Malaya, Villa Miranda, Dibuluan, San Isidro, Disulap, Diwagden and San Jose are very warmly thanked for their generosity, hospitality and support.

### **The editors**

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## **Introduction**

Water is one of the most critical resources 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 greater risks associated with floods and droughts.

Water supports a great variety of resources, functions and services, and 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 resources management systems, 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 organized an international, interdisciplinary course on water issues and water management in the Cagayan River basin in Northeast Luzon in the Philippines from 5 January – 2 February 2015. Twenty six students participated in this course, 13 through Leiden University and 13 through Isabela State University. The students were enrolled in different studies: Cultural Anthropology, Liberal Arts and Sciences, Administration, Forensic Pedagogy, Graphic Design, Communication Science, Civil Engineering, Secondary Education, Agriculture, Agricultural Engineering, Agricultural Technology, Entrepreneurship, Information Technology, Development Communication, Biology and Forestry.

The general focus of the course was on the utilization and importance of fresh water, water scarcity and super abundance, climate change and water, watershed 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 on water issues and water management in a developing country, students learned practical fieldwork skills, the application of research methods and techniques and the complexities and opportunities of working in multi-disciplinary multi-cultural teams.

At the start of the course, to get to know each other and learn something about the Philippines, the students visited the old city of Intramuros in Manila and the National Museum of the Filipino People.

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 and the Museum of Natural History in Los Baños.

During a one day field visit to Lake Taal and the Pusod foundation the students learned about a poor fishing community living illegally on the brim of the crater of one of the World's most active volcanoes. The Pusod foundation is trying to help this community while at the same time trying to protect Lake Taal and its endemic fish species.

In Manila, the Asian Development Bank (ADB) presented their work in general, their Philippine programs and their system of environmental safeguards to assess the impact of large projects. The Biodiversity Management Bureau (BMB) of the Department of Environment and Natural Resources (DENR) provided a background on biodiversity and conservation in the Philippines, with special attention for wetlands. The Philippine Association for Intercultural Development (PAFID) lectured on the Indigenous Peoples (IP) of the Philippines and their work with IP communities for land rights and conservation.

On the way to northern Luzon, the Kalahan Educational Foundation (KEF) and the Ikalahan Ancestral Domain in Nueva Vizcaya were visited. Here the students learned about the role of Indigenous Peoples in watershed protection.

In Cabagan at Isabela State University, a series of lectures was given by external and academic presenters on water related subjects. During a two day field trial in the small upland village of Puerta, students were introduced to field conditions and to research methods.

The students worked in couples (interdisciplinary, multi-cultural) on the development of a small field study proposal on a water-related issue. The 2015 course focused on water use in a remote rural upland area in the municipality of San Mariano. Field work was conducted by the research teams during five days in various research sites in San Mariano. The field work period was concluded with the release of head-started critically endangered Philippine crocodiles back into the wild in NARRA and Dunoy Lakes. After field work, data were analyzed during three days and presented during a workshop with external participants.




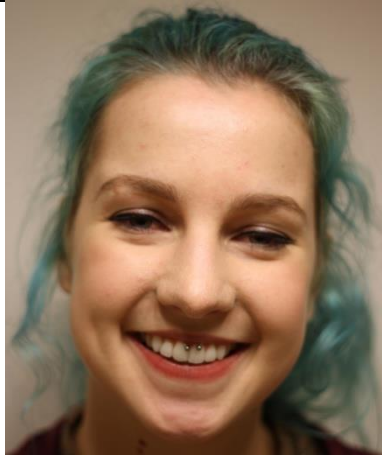





The hard work done, the students visited the rice terraces of Banaue, a world wonder of indigenous engineering and water management. In Batad, a UNESCO World Heritage Site, the students participated in the restoration of some of the 2000 year old rice terraces.




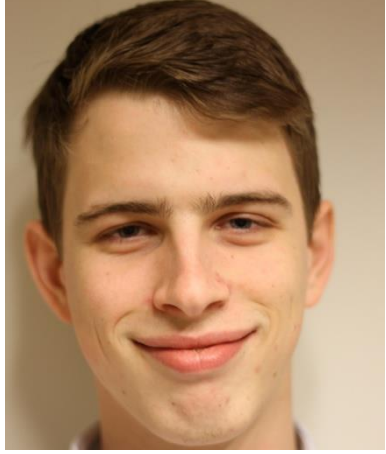
This booklet contains an introduction of the participating students, the course program and a short description of the field studies followed by the full student reports.

The Editors




## Participating Students

### Leiden University students

|   |   |   |
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|  |  |  |
| <p>Nina Osterhaus-Simić<br/>Leiden University</p>                                   | <p>Gerard Persoon<br/>Leiden University</p>   | <p>Mercedes Masipiqueña<br/>Isabela State University</p>                              |

|   |  |   |
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|  |  |  |
| Joni Acay<br>Mabuwaya Foundation  |  | Dorina Soler<br>Mabuwaya Foundation   |

### Program Water Course 2015: 5 January – 2 February 2015

| <i>Day</i> | <i>Date</i> | <i>Locality</i>           | <i>Activity</i>  | <i>Accommodation</i>                                       |
|------------|-------------|---------------------------|--|--|
| Sun        | 4           | Manila                    | Foreign students: Arrival in Manila. ISU students: Travel at night to Manila | Pension Natividad, Malate, Manila                          |
| Mon        | 5           | Manila                    | Welcome, getting to know each other. Visit Intramuros                        | Pension Natividad, Malate, Manila                          |
| Tue        | 6           | Manila-Los Baños          | am: National Museum.<br>pm: Travel to Los Baños                              | Los Baños SEARCA   |
| Wed        | 7           | Los Baños                 | am: Visit botanical gardens<br>pm: Visit IRRI, ICRAF                         | Los Baños SEARCA   |
| Thu        | 8           | Los Baños-Manila          | Visit Lake Taal conservation project   | UP Diliman, University Hotel, Quezon City                  |
| Fri        | 9           | Manila                    | Visit ADB, DENR, PAFID   | UP Diliman, University Hotel, Quezon City                  |
| Sat        | 10          | Travel to Santa Fe/Imugan | am: travel to Imugan<br>pm: Visit KEF.                                       | Dormitory Kalahan Educational Foundation, Imugan, Santa Fe |
| Sun        | 11          | Imugan-Cabagan            | am: Imugan<br>pm: travel to Cabagan  | CCVPED Hostel, Cabagan                                     |
| Mon        | 12          | Cabagan                   | am: welcome<br>pm: lectures  | CCVPED Hostel  |
| Tue        | 13          | Cabagan                   | am: lecture<br>pm: prep proposal   | CCVPED Hostel  |
| Wed        | 14          | Fieldwork trial           | Puerta fieldwork trial   | Field Puerta   |
| Thu        | 15          | Cabagan                   | am: Puerta, travel back to Cabagan<br>pm: prep proposal                      | CCVPED Hostel  |
| Fri        | 16          | Cabagan                   | prep proposal  | CCVPED Hostel  |
| Sat        | 17          | Cabagan                   | am: prep prop.<br>pm: Presentation proposals                                 | CCVPED Hostel  |
| Sun        | 18          | San Mariano               | San Mariano crocodile release  | Field San Mariano  |
| Mon        | 19          | Field                     | San Mariano  | Field San Mariano  |
| Tue        | 20          | Field                     | San Mariano  | Field San Mariano  |
| Wed        | 21          | Field                     | San Mariano  | Field San Mariano  |
| Thu        | 22          | Field                     | San Mariano  | Field San Mariano  |
| Fri        | 23          | Field                     | San Mariano  | Field San Mariano  |
| Sat        | 24          | Field/Cabagan             | Return to Cabagan  | CCVPED Hostel  |
| Sun        | 25          | Cabagan                   | Fiesta Cabagan / free  | CCVPED Hostel  |
| Mon        | 26          | Cabagan                   | reporting  | CCVPED Hostel  |
| Tue        | 27          | Cabagan                   | reporting  | CCVPED Hostel  |
| Wed        | 28          | Cabagan                   | reporting  | CCVPED Hostel  |
| Thu        | 29          | Cabagan                   | Presentation results.  | CCVPED Hostel  |
| Fri        | 30          | Banaue                    | am: travel to Banaue.<br>pm: Banaue  | Banaue Hotel, Banaue                                       |
| Sat        | 31          | Batad                     | Batad  | Hill side Inn, Batad                                       |
| Sun        | 1           | Banaue - Manila/Isabela   | am: travel to Banaue.<br>pm: travel to Manila/Cabagan                        | Foreign students: Pension Natividad Manila                 |
| Mon        | 2           | Manila                    | departure Manila   |  |





Students and staff embarking in outrigger boats to visit Lake Taal Volcano and a village of fishermen (photo by M van Weerd)



Leonalyn Tumaliuan and Corinne van Duivenbode conduct a trial interview with a resident of Balete village in Puerta while the entire group watches and will comment on how the interview went (Photo by M van Weerd)



Edmund Tiu and Lisa van Leeuwen interview Manong Nestor Gumarang in the village of Diwagden with support by Amante Yogyog (Photo by M van Weerd)



Saskia van Otterloo and Shelah Ramirez present the results of their field work (Photo by M van Weerd)

## Student Reports



## SECURING FUTURE DRINKING WATER SUPPLY IN DISULAP, SAN MARIANO

**Melody Gatbonton and Dylan Haanappel**

### INTRODUCTION

As an essential component for life, water is a high priority resource. Efficient allocation of this resource is of key importance in providing for an ever growing population. Although most of our world is covered with oceans, water scarcity has become a reality. Only 3% of the Earth's water resources are considered fresh and just 1% are available for human consumption. Unfortunately, the world-wide allocation of this important resource does not happen equally either. According to the World Bank, the Philippines has the lowest of water available per person in Southeast Asia (Dayrit 2009).

In the Philippines, 74% of the total available water is used for agriculture, where only 17% is available for domestic use and 9% for industrial purposes. These various activities of water utilization have numerous consequences, not only in quantity but also in the quality of the water (Dayrit 2009). Pesticides used in agriculture and chemicals used in the industry are only two examples of surface water pollution happening now. Besides the unfair distribution and industrialization, growing population and climate change put extreme pressures on this finite resource, causing more extreme weather events, water shortages and large-scale pollution.

Also in Asia, water scarcity and increasingly polluted watersheds are a main threat for sustainable livelihoods; more children die from diarrhea alone than from malaria, measles and AIDS together (Huang 2015). The Greenpeace Research Department explains that babies and infants living around agricultural areas, and if given water from wells, are the most vulnerable to health risks from nitrates in the water (Tirado 2007). The Department of Health stated in 2002 that diarrhea was the second leading cause of morbidity in the Philippines. This was mainly attributed to the use of unprotected or unsafe water, the improper use of water facilities and improper hygiene. Many of these can be attributed to the lack of knowledge within local communities (Dayrit 2009) and therefore shows the importance of community participation in finding solutions for these problems (Balderama 2015).

In our research we have focused on Disulap, a barangay in the municipality of San Mariano, situated near San Mariano town proper (8.2 kilometers). With 534 households, including the sitios, the barangay is among the largest ones in the municipality (Barangay Disulap 2014). It has a great majority of Ilokano-speaking people, and also relatively many Ibanag and Kalinga make up the population (Vermeersch 2014). The terrain is characterized as hilly to mountainous slopes with few flat areas. The main source of their livelihood is agriculture and forest product extraction. The sources of water are mainly closed pump wells and the river, where pump wells are the main source of drinking water. Insufficient supply of water occurs during summer, when droughts are common, and during strong rainfall when the river water turns brown, including some of the pump wells. Workers from the Rural Health Unit (RHU) are available at the Health Center once a week for health related services and are a reliable source of information in regard to local health issues.

In order to secure drinking water resources a change is needed in the way these resources are managed. As described above, the involvement of the community is of key importance to do so. This research will therefore focus on available knowledge of local communities, the availability of clean drinking water, rules and regulations and the involvement of the government in resource management.

## RESEARCH QUESTION

What is needed to secure future drinking water supply in Disulap, San Mariano?

Sub-questions which will help us in answering this question are:

SQ1: What is the current status of water supply in Disulap, San Mariano?

SQ2: What knowledge do local communities have on water quality and supply?

SQ3: What is being done currently to secure (safe) drinking water supply?

SQ4: What is the involvement of the local government on drinking water distribution and conservation?

## METHODS

### Interviews

To gain insights in Disulap's water supply and quality, local available knowledge and future plans, we used interviews as our main research technique. We interviewed 17 randomly chosen household heads, including the barangay captain, a worker from the RHU and a teacher of the local elementary school. Both farmers and non-farmers are included, to gather a reliable sample of the barangay as a whole, although the majority of the population practices agriculture. Males and females are also equally distributed, in relation to the barangay as a whole.

**Table 1:** Population distribution by gender

| Sex    | No. of respondents | No. of barangay residents |
|--------|--------------------|---------------------------|
| Male   | 9                  | 1153                      |
| Female | 8                  | 1145                      |

The interviews are semi-structured, based on a prepared questionnaire (Appendix 1) and complemented by additional questions related to the received answers. For the local authorities and officials, the same questionnaire was used but also additional questions were prepared. (Appendix 2)

### Site investigation

To validate the gathered information, we visited various locations related to the supply of drinking water. These locations include water wells, the river and the RHU. Further sites were determined during the fieldwork, depending on interview-answers. Some interviews have led to further site investigation through which we were able to understand the answers better.

### Water sampling

We did a simple water sampling, to visually examine water quality from various sources. As the river turned brown before we arrived due to heavy rainfall, some of the water sources have visual differences in quality. With the help of a portable water filtration system, we filtered the water and documented the differences. This system also contributed to our lecture in the elementary school about drinking water quality and safety, by visualizing the filtration process from brown river water to clean drinking water.

## Documentation

To secure a solid processing and dissemination of the research, we documented the fieldtrip thoroughly. Visual images and notes were taken for research and presentation purposes.

**Table 2:** Time table and activities

| <b>Day</b> | <b>Date</b> | <b>Activity</b>  | <b>Location</b>   |
|------------|-------------|--|-------------------|
| Monday     | January, 19 | Travel from Cabagan to Disulap; arrived late   | Cabagan – Disulap |
| Tuesday    | January, 20 | <i>AM:</i> Site orientation; water testing<br><i>PM:</i> Interview 7 randomly chosen household   | Disulap           |
| Wednesday  | January, 21 | <i>AM:</i> Visit river; mapping households; interview barangay captain<br><i>PM:</i> Interview 5 randomly chosen household   | Disulap           |
| Thursday   | January, 22 | <i>AM:</i> Visit elementary school; give lecture on drinking water; meet principle & hand out water filters; interview teacher<br><i>PM:</i> Hike along the river; interview 4 randomly chosen households. | Disulap           |
| Friday     | January, 23 | <i>AM:</i> Travel to San Isidro; hike to Dunoy<br><i>PM:</i> Crocodile release   | Disulap – Dunoy   |
| Saturday   | January, 24 | Travel back to Cabagan   | Dunoy – Cabagan   |

## RESULTS

### Water resources and availability

The barangay Disulap has been growing and developing at an impressive rate, which is noticeable in its water resources. One of the barangay counselors, Yolanda Ramirez, explained that while up to 2010 open pump wells were the standard, nowadays almost all households get their water from closed pump wells – only a single household was using a hose to transport spring water to their house as the main source of water. While interviewing the villagers, we found out that most of the pump wells are provided by the government, through the barangay officials, while PLAN International provided an additional two. When pump-wells are broken, the villagers always repair the pump-wells themselves.

**Table 3:** Providers/ownership of pump-wells

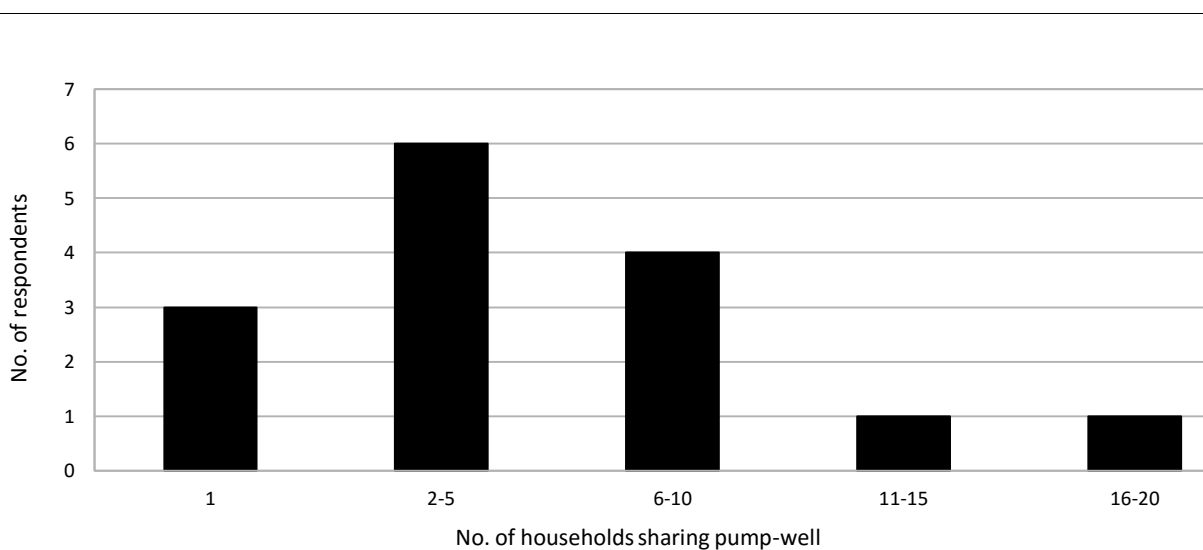
| <b><i>Provider of pump-well</i></b> | <b><i>No. of respondents</i></b> |
|-------------------------------------|----------------------------------|
| Government                          | 13                               |
| PLAN International                  | 2                                |
| Privately bought                    | 2                                |

The locations of these pumps are mainly determined by the location of households sharing the new pump. New pumps are only allocated to a multitude of households or compound houses, while single households either have to get their water from a neighboring well or buy their own pumps.



**Photo 1:** Disulap River (Photo by J. Remmers 2015)

For other water applications, such as washing clothes and sanitary usage, the river (Photo 1) may be used as a source especially during dry periods in the summer when pump-wells could barely supply the needed water. The villagers have different perspectives on the extension of droughts; most of them notice only little differences in summer and do not experience water scarcity. Few of them notice lesser flows and need to use the pump-wells at night to prevent drying out, while others experience complete drought and either get their water from other pump-wells or from the river.



**Figure 1:** The distribution of pump-wells

Our respondents added that the existing number of pump-wells cannot supply the needed amount of water for the entire village/community and the current distribution of water resources is not managed fairly. For instance, in Purok I, as much as 15 households share only one pump-well. With an average of 3-4 persons per household, this will total to 64-65 people sharing only one pump. This scenario exists in the whole barangay proper, but more particularly in the poorer identified areas. One farmer, Ferdinand Bulan Sr., got his pump-well from PLAN International and shares it with no less than 11 households. He explains that “the barangay officials prioritize the area around the barangay hall, not around this household, and so we share our pump-well with more households.”

### **Drinking water quality and safety**

One of the problems in Disulap proper is the access to safe drinking water. For drinking water, the pump wells are the main source. Barangay officials have different opinions about the safety of drinking water. The counselors and the worker of the RHU stated that the water is always safe to drink. They claim that the water looks clear and therefore it is clean, that chlorine is used to clean the water, or that the pump-wells are closed and diseases are kept out that way. The barangay captain, on the other hand, claimed that when it rains the water turns brown and it is not safe to drink, so she gets mineral water for herself.

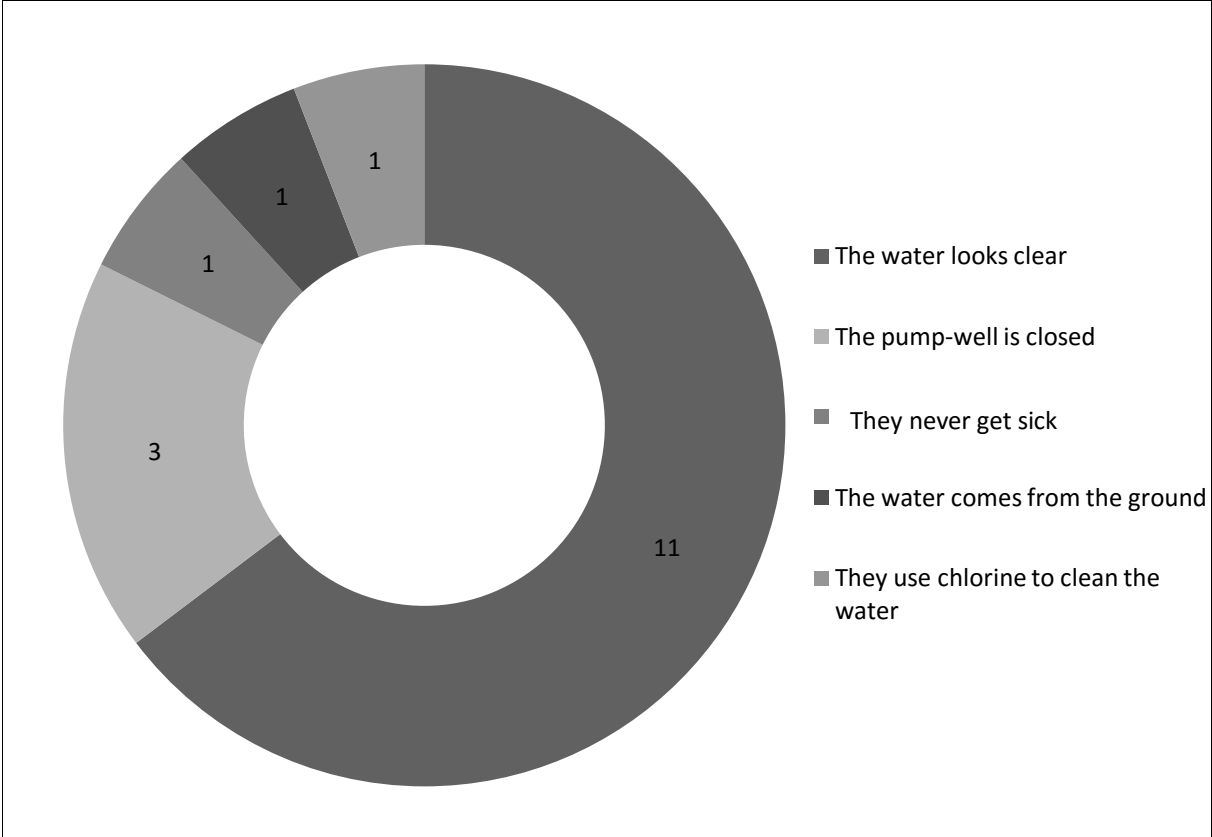


**Photo 2:** Filtration of brown river water into clean drinking water (Photo by E. Jose 2015)

The villagers also have their own perspective on the water quality. All people, except the teacher, think the water from the pump-wells is safe to drink during most of the year, while some realize the water might not be clean during (heavy) rainfall. Those who believe that the



water is always safe to drink, however, have different arguments. From the 17 respondents, 11 state that the water is safe to drink because the water looks clear and never gets brown. Other reasoning include: the water comes from a closed well (3 households), the water comes from under the ground (1 household), they never get sick (1 household) and they put chlorine in the water (1 household).



**Figure 2:** How the residents know their water is safe to drink.

During summer, most people adjust their water consumption from the pump-well by getting water straight from the river or from assumed “clean” pump-wells during the rainy season.

**Governmental involvement and future plans**

Once a year the RHU provides the villagers with chlorine to clean the water in the pump-well. However, the pump-wells are closed, which makes direct access to the water impossible. The chlorine will therefore only be added when the pump-well is broken and needs repair. On average this is every 4 to 5 years.

Also, when a pump breaks, households get a small to no sum of money for the repair and they always have to provide the labor to repair the pump themselves. Besides, the local government only assists when the pump is given by them; privately owned pump-wells get no support.

As explained before, the existing number of pump wells cannot supply enough water for the entire community. With this problem the Barangay Officials have programmed to put up new some pump-wells every year. Also, in relation to the contamination of the river water during heavy rainfall, the barangay officials speculate about reforestation programmes in the upland areas. The practicality of these plans however, was not completely clear.

## DISCUSSION

### **Current status of water supply in Disulap, San Mariano**

The majority of the villagers derive most of their water from groundwater using pump-wells. Of all the respondents, 41% (7 out of 17) stated that they always have enough drinking water. However, as expected, during summer the scarcity of ground water causes some pump wells to dry up, prompting some to utilize water from the nearby Disulap River. Some respondents explained that although the pump gets lesser flows of water, they can simply adjust their schedules and get water for the day around 4 AM when the pressure on the source is lower. Also, when the wet season brings too much rain, the villagers notice that the water in the river as well as from some pump-wells, turn brownish. At this time, water becomes scarce, households start using neighboring, clearer pump-wells, because they do not trust the brown water.

Those that can afford to do so, buy mineral water from the town proper, especially when they notice that the water is contaminated. An important note is that only the barangay captain and the teacher seem to have the means to do so.

When identifying the needs of the households in relation to drinking water, the most common response is the desire for more pump-wells. Especially farther away from the barangay hall, we noticed a bigger concern about the available amount of water.

### **Knowledge of local communities on water quality and supply**

This research focused intensively on the communities' knowledge on water quality and supply. To answer the second sub question: *What knowledge do local communities have on water quality and supply?* the research contained multiple questions about safe drinking water and water born diseases. Very early on it became clear that most villagers do not relate diseases with their drinking water, or do not even categories diseases like typhoid and diarrhea as diseases. Questions like *Is your water safe to drink* were therefore mostly answered positively, while follow-up questions about sickness or health issues were mostly answered in a contrasting matter. Diarrhea/Loose Bowel Movement, typhoid and stomach aches were common responses.

Questions about the reasons of the brown color of the river during heavy rainfall were mostly unanswered due to a lack of knowledge. Only the teacher, the barangay officials and two other respondents knew the relation between illegal logging/deforestation and the contamination of the river.

Our respondents also did not seem to know about the benefits of boiling their water. Especially the ones that still drink the water when it is contaminated were asked whether they treat their water during these periods, or even explicitly if they boil their water, but they never do so.

The Rural Health Unit educates the local villagers once a year on water related health risks. According to the barangay captain this is more than enough and the attendance is excellent according to her". The teacher, Anavic P. Cabania, also says she teaches her students about drinking water risks. However, as explained above there's almost a complete lack of knowledge within the community. All together this might be one of the biggest limitations of the community at this moment.

### **Current actions to secure (safe) drinking water supply**

To secure the health of the people the RHU hands out chlorine to prevent water borne diseases.

They give chlorine every year, but this can only be used when the pump breaks and needs to be repaired. Evidently the RHU knows about the health risks of drinking the water from the pump-wells; however they seem not to fully recognize the problem.

On the matter of securing water supply, some households conserve water during summer by getting water from the river to wash and only drink the water from the well. Nonetheless, these measures are only temporary and without notion of the future. As explained before, water scarcity in Asia is already a huge problem, but local communities and governments seem not to realize this.

The strength we saw in Disulap as told by the Barangay Councilor, Yolanda Ramirez, is the future plans of setting up pump-wells as the highest priority project of the barangay. This shows the acknowledgement of the officials about the problem and their willingness to solve it.

### **Involvement of the local government on drinking water distribution and conservation**

There is quite a distinctive discrepancy between the villagers' perspective and the officials' statements about the involvement of the local government. The majority of the respondents explain that the barangay officials are not very active on water management and support this with various arguments, but they do not seem to be very unsatisfied about the local government's role.

Most respondents explain that during pump-well failures they get either a small amount of money or nothing at all, and they always have to provide the labor of repairing the well themselves. When requested by compound households or a multitude of households, new pump-wells will be installed for free, according to the barangay counselor. The future plans of installing more pump-wells also seem to satisfy most residents.

However, on conservation of water there are no regulations or involvement of government whatsoever. There even seems to be almost no concern about future water supply, as “there will always be enough water in the ground for the growing community”, according to the counselor.

Probably our biggest surprise was the complete lack of water quality tests. The only reference to quality tests was a foreign researcher in 2013 that brought his own water testing kit. The water seemed to be of drinkable quality and this is used ever since to show their water is of good quality. The barangay captain however, stated that the testing of their drinking water should happen more often.

On the positive side, the local government seems to realize the problems regarding upland deforestation and plans to work on reforestation programs. However, even though the military showed up last year to warn the local community, illegal logging still seems to be a big problem.

## **Concluding**

With all sub-questions answered we can now answer our main research question: *What is needed to secure future drinking water supply in Disulap, San Mariano?*

As described above, one of the main limitations of Disulap is the lack of knowledge within the local community. With only one RHU meeting/lecture per year and no solid educational program, there is great room for improvement. The officials can ask assistance from concerned governmental agencies to make a study on water quantity and quality in the village and on how to fully implement programs that can improve their practices in water and water management.

Besides, we would like to recommend to the barangay officials to fully implement what they planned for. The unfair distribution of water can be solved by installing extra pump-wells and setting up conservation projects. Also the plans for reforestation programs are of great importance in order to secure future drinking water supply. As this research was strongly focused on the available knowledge of local communities, further research could focus more on government programs regarding water supply and quality.

## **ACKNOWLEDGEMENTS**

We sincerely acknowledge with deep appreciation and gratitude the following people who have extended their knowledge, time, effort, expertise, immeasurable assistance and full support that significantly contributed to the completion of the study. To the Barangay Officials of Disulap San Mariano, particularly Brgy. Capt. Elizabeth Domingo, for their open assistance and for giving us permission to conduct research in the area. To our host family, especially to Nanay Anita Tabije, for their warm welcome, moral support and for providing us a place to stay during the field work. Thank you for treating us as part of your family. To the respondents of this study, for having sincerely participated by expressing their own thoughts, opinions, sentiments and their cooperation during the interviews. Their indulgence to give their time so generously is highly appreciated. To Edmund Jose, for joining us and helping us whenever we had a request or needed guidance, and for making our field work an unforgettable experience. To the Almighty God, for allowing us each day of our research days to do our activities in accordance with what we planned and for giving us the wisdom as a medium. To all of them, this work is humbly and willingly dedicated.

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## APPENDICES

### Appendix 1: Questionnaire

Q1. Name

Q2. Age

Q3. Gender

Q4. Ethnic group

Q5. Language

Q6. Size of household

Q7. Time of residence

Q8. Education

Q9. Occupation

Q10. What is the main source of water?

- a. Is there sufficient for the whole family?
- b. Where do you get your drinking water (separate sources?)
- c. Do you use your drinking water for different purposes as well?

Q11. Is your water safe to drink?

- a. If so, is it always safe to drink? And during summer?
- b. How do you know?

Q12. Do you ever get sick from the drinking water?

- a. If so, what diseases? And do you know why you get sick from the water?
- b. Do you know about others getting sick from the water?

Q13. Do you have enough drinking water?

- a. Do you ever run out of drinking water? If so, during what season?
- b. What do you do when there are droughts/floods? What are the alternatives?
- c. Do you still have enough drinking water then?

Q14. Do you store drinking water?

- a. How do you store your water?
- b. Is it enough to supply your whole family?
- c. If so, for how long?

Q15. Has there been any change/improvement in drinking water supply/water quality?

- a. If so, what exactly?
- b. Is this positive or negative change?
- c. What does the community do to secure water quality / supply?

Q16. What are the problems you experience today regarding water quality / supply?

- a. Are there any regulations within the community regarding water quality / supply?
- b. Does the government assist you with these problems?
- c. Does the government provide information regarding water quality / supply?

Q17. What are your plans for the future, migrating or staying?

a. If staying, do you think you will encounter problems regarding water supply/quality in the future?

- b. If so, what do you think that should be done, by either community or government?
- c. Does the government inform you about their future plans?

## **Appendix 2: Additional questions Barangay Officials**

- Q18. Does the government conduct tests regarding water quality?
  - a. If so, do you ever encounter differences in quality?
  - b. If yes, what is being done to improve the quality?
- Q19. Do you have project concerning water quality / supply (besides the pump wells)?
  - a. If so, what exactly? And are they in collaboration with the communities?
- Q20. Do you educate local communities on health risks concerning drinking water?
- Q21. Do you encounter many water born diseases?
  - a. If so, what do you do to prevent further incidents?
  - b. Do you educate local communities on health risks?

# IMPACT OF CONTAMINATED WATER SOURCES AND SANITATION ON THE PEOPLE OF VILLA MIRANDA, SAN MARIANO

**Aireen Joyce C. Mendoza and Janneke Arinda Smit**

## INTRODUCTION

Water is an essential component of life, but problems regarding water pose the biggest challenge people face nowadays. Safe drinking water is the basis of good health, but failure to provide this is the heart of world's water problem. According to the World Health Organization (WHO), 748 million people lack access to improved drinking-water. It is estimated that 1.8 billion people use a source of drinking-water that is faecally contaminated (WHO 2015).

Waterborne diseases are diseases caused by the ingestion of water contaminated by human or animal feces or urine containing pathogenic bacteria or viruses; include cholera, typhoid, amoebic and bacillary dysentery and other diarrheal diseases (Gleick 2002: 2). These diseases occur when a person drinks contaminated water, particularly water contaminated by pathogens transmitted from human excreta. Diarrhea kills more children than malaria, AIDS, and measles combined (Pers. Comm. Asian Development Bank (ADB) lecturer).

Because of this, complications surrounding sanitation are intertwined with drinking water related issues. More than 2 billion people lack access to improved sanitation (WHO 2015), which is the cause of contaminated water and as a result, waterborne diseases such as diarrhea. This is why most relevant research combines the subjects drinking water, health and sanitation.

Besides the exposure of contaminated drinking water, the awareness of its health risks adds a serious new depth to the problem surrounding drinking water. If people are unaware of the cause and effect of drinking contaminated water, future plans to provide new drinking water sources will have no effect on the safeguarding of this water. Therefore, the key to prevent contamination is, alongside availability, awareness.

Creating awareness is most important for those who don't have the opportunity for education themselves, and of course those who make use of (communal) fresh water sources. People suffering from waterborne diseases are often poor, and live in remote rural areas or urban slums. UNICEF estimates that 1,400 children under five die every day from diarrheal diseases linked to lack of safe water and adequate sanitation and hygiene (unicef.org, 2014).

### **Study area**

Problems regarding drinking water contamination collide in the remote sitio Villa Miranda. Villa Miranda is a small village, a sitio of the Dibuluan of San Mariano, in the province of Isabela. Formerly known as Andarayan, the people of the barangays changed the name of their village in 2004 because of the support from the Miranda family. Even though every resident acknowledges this new name it is still not officially changed.

The area of Villa Miranda is mainly sloped and there is a river running through the sitio. There is one school, one church and kindergarten in the sitio. The sitio consists of 80 to 90 households. Different ethnicities in Villa Miranda are Ilocano, Ibanag, Agta, Kalinga and Ifugao (Fieldschool Water Management Course 2014). Most adults in the main part of the sitio are farmers. People also log, hunt and fish to provide food for themselves. Farmers mostly combine cultivating rice, corn, cassava and/or bananas. Within the area of Villa Miranda are different drinking water sources, used by different social groups.

Health complications derived from unsafe drinking water might always have social impact as well. We were interested in what would happen if someone becomes sick in a small community; can people be aware of the cause of their illness? Do people know that contaminated drinking water can cause illnesses? What kind of impact do such illnesses have on the person who gets sick and the household he or she lives in? Do people try to prevent contaminating their drinking water sources?



**Photo 1:** Our host family in Villa Miranda: Mr. and Mrs. Tagao

## RESEARCH QUESTIONS

**Research question:** What is the impact of contaminated water sources and sanitation on the residents of Villa Miranda?

### Subquestions

- Are the people of Villa Miranda getting sick because of contaminated water sources?  
→ If not: how do the people from Villa Miranda keep their water sources clean?
- Are the people of Villa Miranda aware that they can get sick from contaminated drinking water?
- How often does someone get sick because of contaminated water sources?
- What do people do when someone gets sick because of contaminated water sources?
- In which ways do the people of Villa Miranda prevent getting sick from contaminating water sources?



## METHODS

**Table 1: Time Schedule**

| <b>Day:</b>           | <b>Occupation:</b>   |
|-----------------------|--|
| 19-01-15<br>Monday    | Arrival in Villa Miranda at around 4 pm. We introduced ourselves to Mr. and Mrs. Tagao, our host family. We had an open interview with them which resulted in a closed interview with Mr. Tagao and the neighbour, a barangay policeman.   |
| 20-01-15<br>Tuesday   | We started the day with 8 interviews. We visited a spring near the river and started documenting the different water sources. We started making a map of the sitio with the help of Mr. Tagao. We used participant observation and had an open interview with our host family. Later, we interviewed people from other households.   |
| 21-01-15<br>Wednesday | We started the day with interviews and we mapped other water sources. Later, we had a group-interview with all the teachers from the school. We interviewed a different group of people near the river and the only agta resident in the main area of Villa Miranda. We now have 21 interviews and one group interview with 6 respondents in total. We discussed our progress and the results of the entire research so far with each other. |
| 22-01-15<br>Thursday  | We finished the map of the village, and used participant observation with the households in the neighborhood of our host family. After this, we discussed all our results and started writing the analysis. In the evening, we had a farewell party with the other students in Villa Miranda and the households that we stayed at.   |
| 23-01-15<br>Friday    | In the morning, we prepared to leave and say our goodbyes to our host families. We left Villa Miranda at 9 am.   |

### Research Methods

In order to get the information we needed to answer our research question we used different social research methods. We wanted to document the perception of the local residents on water quality and impact. Afterwards, we validated the data from the information we gathered from our own observation. The methods we executed in order to gain this information include participant observation, open- and structured interviews.

### **Open interviews**

We used this method in conversation about general topics. Our host family and the neighboring households were our main source of information. By using open interviews we were able to gain information about the daily lives of the residents. We asked questions about their ideas on the current situation regarding drinking water and possible improvement in the future. Residents often gave their own suggestions. We used this information directly in our analysis. Furthermore, we were able to gain information about the working schedules of the residents and the places and dates they would be available for interviewing. We used this method to improve research from the other social research methods as well.

### **Structured interviews**

We conducted a total of 21 interviews and one group interview with the 7 teachers of the primary school. We decided to interview one person per household, since the answers to the question should represent the household. By only interviewing one person per household we tried to keep the validity of our research intact. We used a set questionnaire (see appendix B) in order to gain more objective results from the residents. Our questionnaire is parted in different subjects; we asked about the quality of drinking water, experiences of illnesses and the use of sanitation. Before this, we asked more general questions about the resident. The list of respondents is found in Appendix A.

### **Participant Observation**

In order to make our respondents feel at ease in our presence we helped them with everyday tasks. We prepared dishes with our host family and assisted them with work around the house. Since our respondents were generally shy- especially towards the Dutch students, this method of working together helped us in research. Participating also resulted in conversation and later the mapping of households and drinking water sources. We gained a clear image of the number and places of the drinking water sources, and visited them with the help of directions of our host family.

In our project proposal we mentioned photo elicitation as a possible research method in this study. The interviews however showed us that this method did not seem relevant in our research. Our primal idea was to show pictures of drinking water sources and water (in different colors, from different places), and ask the residents about the possible quality of the water. Residents could explain this well enough during the interviews, so we decided not to use the method of photo elicitation.

## **RESULTS**

After three full days of research we collected 28 interviews and had a sound map of the sitio (Figure 1). We noted the different sources of drinking water.

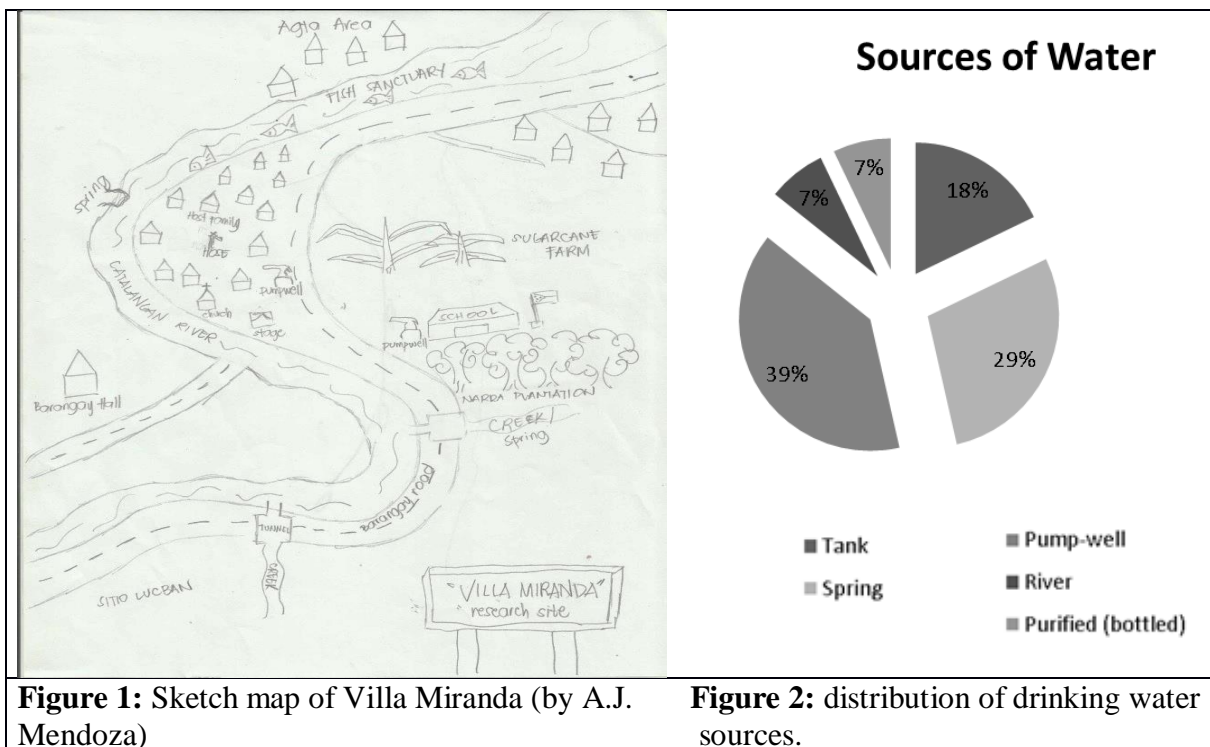
*Water out of a tank with water which originates from the mountains.* People can become part of a co-operative to get a hose from the tank nearby their house. This membership costs 1000 pesos and provides the member with water during a set schedule. People can also make use of these hoses as a non-member; this will cost them 50 pesos.

*Residents can also get their drinking water from a spring or creek near the river.* This is quite far away from most households. Water from the spring might be scarce during the summer or on days with heavy rain.

There are two pump-wells in Villa Miranda. The one in the school ground is used by children and teachers during school time. The other pump-well is situated in the center of the village. People note water from this source sometimes tastes rusty. Most people use the spring or pump-well (Figure 2 1)

Some residents use the water from the river that surrounds the village. Residents who use this source all live near the river, somewhat separate from the other households.

Some residents drink, often temporarily, purified water. They do this after illness and because of advice from the doctor.



**Are the people of Villa Miranda getting sick because of contaminated water sources?**

To answer this question we first asked the residents if they think their water is safe to drink. None of the residents think the drinking water is unsafe, and 75% answer that the drinking water is safe to drink. All of the 25% of people who answered 'I don't know' to the question are not residents of Villa Miranda; they are the teachers who temporarily rent rooms in the sitio. All of the residents of Villa Miranda believe their drinking water is safe to drink.

When we asked if the water people use for consumption is always safe to drink only 39% of the respondents answered yes. 43% is not sure if the water is always safe or does not know. Only 18% percent of the respondents told us the water is not always safe to drink. Of course we have to consider the different sources of water people used.

We also documented whether residents experienced Loose Bowel Movement (LBM) and/or stomach ache. We compared the results with the drinking water source (Table 1). We excluded the temporary residents, the teachers, to get an image of the people who have and will keep on using the drinking water sources.

**Table 2: Answers to questions about the source of drinking water, perception of water safety and occurrence of illnesses.**

| <b>Number of resident</b> | <b>Q1. What is the source of your drinking water?</b> | <b>Q3. Is your water always safe to drink?</b> | <b>Q5b. Do you ever experience Lose Bowel Movement (LBM) and/or stomach ache?</b> |
|---------------------------|---|--|---|
| 1                         | Tank  | Yes  | No  |
| 2                         | Tank  | Yes  | No  |
| 9                         | Tank (and other)                                      | Not always                                     | Yes   |
| 10                        | Tank (and other)                                      | Not always                                     | Yes   |
| 22                        | Tank  | Yes  | No  |
| 4                         | Spring  | No   | No  |
| 5                         | Spring  | Yes  | Yes   |
| 6                         | Spring  | Not always                                     | Yes   |
| 7                         | Spring  | Not sure                                       | No  |
| 11                        | Spring  | Not always                                     | No  |
| 14                        | Spring  | Not always                                     | Yes   |
| 16                        | Spring  | Yes  | Yes   |
| 3                         | Pump-well   | No   | No  |
| 8                         | Pump-well   | Yes  | No  |
| 12                        | Pump-well   | Yes  | No  |
| 13                        | Pump-well   | Yes  | Yes   |
| 15                        | Pump-well   | Yes  | Yes   |
| 19                        | Pump-well   | Not always                                     | Yes   |
| 20                        | Pump-well   | Not always                                     | Yes   |
| 17                        | River   | No   | Yes   |
| 18                        | River   | No   | Yes   |

Out of the people we interviewed five used the tank to get drinking water from. Two residents (nr. 9 and 10) were not members of the co-operative and also use other drinking water sources. If we only look at the people who are part of the co-operative and use the tank, we see that all the residents believe the water from the source is clean and none of them experience LBM and/or stomach ache.

Answers about the quality of the water from the residents who use the spring are mixed. 29% of the respondents believe the source is always clean, 71% either don't know, don't think the source is always clean or believe it's not always clean. 43% never experiences stomach ache and/or LBM. Most respondents get their drinking water from the pump-well, 57% of the respondents we interviewed think that the pump-well always provides them with clean drinking water. More than half, also 57%, do experience stomach ache and/or LBM.

None of the respondents who lived near the river and got their drinking water from the river as well believed that the drinking water was always clean, and indeed; they both also told us they regularly experience LBM and/or stomach ache.

Of course, we cannot state that there is a correlation between the quality of drinking water and LBM and/or stomach ache. From our interviews we could conclude water from the river has a higher chance of being contaminated; the water is from an open source, and some respondents told us they defecate near the river. People also wash themselves in the river, animals cross it, and only the size alone gives it a higher chance of contamination.

The water from the tank, on the other hand, comes from ground water and is placed in a closed tank before distributed. According to a barangay official and our host family this water is also regularly tested and cleaned if necessary. Water from the pump-well provides the users with groundwater. Respondents who use this source do, however, collect an amount of water that is used over one or more days; this might influence the chance of contamination. This also applies for the water from the spring. Respondents who consume water from the spring or pump-well did note that this water does not look clear when it's raining or in a particularly hot summer. We assume therefore that the water from the river has the highest chance of being contaminated, water consumed from the pump-well or spring has a moderate chance of being contaminated and the water from the tank would be the cleanest of all the drinking water sources located in Villa Miranda.

We should also take into account the people who boil their water before consumption. Answers from the interviews showed us however that only a small number of people boil their water. Most people who do only do this after they get LBM and/or stomach ache.

Residents who consume water from contaminated drinking water sources are assumed to experience LBM and/or stomach ache more often. This seems to be in line with the results from our interview. Residents told us that when they visit a doctor because they are experiencing LBM they often get the advice to drink purified water or to boil their water before consumption. This, together with the results shown above leads us to conclude that the people in Villa Miranda do regularly get sick from the drinking water.

Furthermore, we noticed that the people who are part of the co-operative seem relatively wealthier than other residents; they pay 1,000 Php to be part of the co-operative (which other residents could not afford) and live in relatively bigger and more luxurious houses. Residents who consume water from the river seem to be poor compared to the other residents; they could not afford medicine against LBM and lived in fairly simple and small houses. We suggest there is a correlation between the wealthiest of the residents in Villa Miranda and the chance they have to consume clean drinking water.



**Photo 2:** Different sources of drinking water. Clockwise: spring, hose from tank, river and pump-well.

**How do the people from Villa Miranda keep their water sources clean?**

This question was not always applicable on the residents of Villa Miranda; often people were not involved at all in cleaning their drinking water sources or keeping their drinking water clean.

Only one respondent told us her sons clean her water resource sometimes. The tank that is used by people who are part of the co-op or paid for the usage made use of a water source that is regularly cleaned. The tank is checked on its quality, and chlorine tablets are used to clean the water if necessary.

People use their own toilet or use the toilet from someone else’s household, but we cannot verify that this is because they want to prevent waste from polluting drinking water sources.

**Are the people of Villa Miranda aware that they can get sick from contaminated drinking water?**

We noticed that respondents often make remarks about the clearness and taste of water when describing whether they thought water was clean or not. They assumed that if water looks clear and tastes ‘clean’, the quality would be good enough to use as drinking water. After interviewing we state that most residents do not know that water can be contaminated even if it looks clean.

Keeping our focus on waterborne diseases from contaminated water sources, we asked our respondents if they believed that (human/animal) feces can pollute drinking water resources. The answer to that -in contrast with the previous statement- is mostly yes (see table 1)

### **How often does someone get sick because of contaminated water sources?**

Out of the 28 respondents that we interviewed, 9 stated they may have been getting sick from the water they drink. The others, 19 respondents, claimed they never get sick from the water they drink. Our hypothesis included the understanding that not every resident would understand they could get LBM and/or stomach ache from contaminated drinking water. This is why we also asked about if, and how often, respondents would experience LBM and/or stomach ache. It came out that out of all the respondents 15 would experience these diseases sometimes or often, and hence, surmised that those diseases might be waterborne, thus derived from the consumption of contaminated water sources.

Out of the 15 people who said they did experience LBM and/or stomach ache we noticed a remarkable difference in frequency of LBM. People who used the river as drinking water resource told us they experienced LBM up to three times a month. All the people who experienced LBM and used the spring or pump-well as drinking water source told us they experienced LBM from once a year up to once month. The two respondents who used the tank and the spring as drinking water source told us they only experienced LBM once a while; mainly when they changed their source of drinking water.

### **What do people do when someone gets sick because of contaminated water sources?**

Since we assume that people might also unknowingly experience waterborne diseases, we decided to ask all residents about what they would do when they or someone else in their household would experience LBM and/or stomach ache. Some respondents could therefore also answer even if they never experienced LBM themselves.

Almost every respondent who answered this question (see appendix 2: 'Q10. What happens when you get sick from drinking water?') said that they would go to the hospital in San Mariano, carry the sick person to the hospital in San Mariano or use medicine they keep in their own house. People seem to prioritize the sick; the Barangay policeman told us he would carry the sick and helpless victims of LBM and/or stomach ache to the hospital in San Mariano; a respondent who had experienced this verified this too.

### **In which ways do the people of Villa Miranda prevent getting sick from contaminated water sources?**

To answer this question we must yet again examine the boundaries of the respondents who did or did not believe that they could themselves contaminate drinking water sources. We compared these answers with the answers about waste disposal and in how far people would understand and follow advice from the doctor or midwife about the importance of consuming clean water.

Even though respondents would all follow doctors' advice for some time (they would temporarily only consume purified or boiled water) this would not have impact on the long run. Respondents would go back to their usual source of drinking water. This would be either because they did not think it would be necessary to follow doctors' advice anymore or they could not anymore afford to use purified water. Only one respondent told us that she would often boil her drinking water because the midwife had told her to.

Making use of a toilet instead of defecating in the open could limit the chance of contaminating drinking water sources. Of the 28 respondents, 10 did have their own toilet, and 11 used a toilet of other households. This could influence the prevention of contaminating drinking water resources, but we cannot verify that people are aware of this.

## DISCUSSION

### **Social setting**

People from different ethnicities live together in Villa Miranda, seemingly without trouble. Only the Agta live apart from the other households, across the river. They don't often contact the other households but do sometimes cross the river to buy supplies from other households.

Most farmers own a piece of land and one or two carabaos to plow the field with and carry the crops. Claims of land ownership often lead to serious issues in Villa Miranda. According to a resident there had been killings over land claims and the Barangay Captain doesn't visit the sitio anymore out of fear.

Problems regarding contaminating drinking water are similar to those we described in our introduction; availability and, in addition to, awareness. All of the residents who experienced LBM and/or stomach ache had experienced this often. All their perceptions were based on the fact that they weren't aware of the reason behind their illnesses ('It's just the way it is'), or the fact that they did not have any other choice of drinking water sources. Water from the tank, as used by members of the co-op, seems to be relatively clean. However, most residents of Villa Miranda are unable to pay for the membership. Even the people who are members of the co-op experience limited water supply due to the fact that the tank is not big enough to contain all the water for the members of the co-op and users of the tank. In the event that residents are aware of the chance to contaminating drinking water and willingness to keep the drinking water sources clean there still seem to be issues.

### **Recommendations**

In solving the problem of waterborne diseases due to contaminated water resources we focus on two main points: availability and awareness.

First of all, we concluded that not all residents seemed to have access to safe drinking water. The co-op provided limited supply and the spring and well do not always provide all users with year-round safe drinking water. Often residents would note that they would like a new pump-well in the village; either to provide more safe drinking water or to limit the distance residents have to walk to get drinking water. According to us, a new pump-well could indeed decrease the chances of LBM and/or stomach aches among the majority of residents.

We recommend a regular check-up alongside this plan; chlorine tablets could increase the quality of the water tremendously.

We acknowledge the importance of awareness in the context of Villa Miranda too; often residents seem to be unaware of the different aspects of water contamination. When we asked the teachers about their policy on (contaminated) water education, they mentioned that they tried to teach the children from classes 4-7 about the importance of clean water. They however also noted that most parents did not seem to change their ways by advice from their children. We therefore recommend the start of a free course to all parents; they could learn about the importance of clean drinking water and contamination in some classes. Because this hasn't been



done before and adults did seem interested in the possibility to decrease LBM, we cautiously assume this might have a positive effect on the perceptions on, for instance, boiling drinking water.

### **Improvement of research**

Since we had limited time in the field and only a small group of respondents, we understand that our research results might not be representative for the whole of Villa Miranda. We excluded the agta residents since we could not reach them; this also resulted in a skewed analysis of the social groups in the sitio.

We were able to do a group interview with all of the teachers, so we do feel like we were able to make a good comparison between the temporary residents and the rest of the people in the village.

We were however able to draw a sound map of the village and document all the different drinking water resources, which gave us a valid basis of the choices the residents have. We were also lucky to be given a host family that doubled as proper key informants; they seemed very open about their ideas and provided us with other useful contacts in the village.

### **ACKNOWLEDGEMENTS**

We are very thankful to all the people who were always on our side to support, help and cooperate during the conduct of our research study. Without them, it would have been impossible for us to fulfill this activity. A million thanks to Mr. and Mrs. Eduardo Tagao for letting us stay in their house and for their hospitality and kindness, Arnold Macadangdang for always helping us and giving pieces of advice in conducting our interviews, and Villa Miranda residents for being friendly and cooperative.

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APPENDICES

**Appendix A - List of respondents**

| <b>Number:</b> | <b>Name:</b>          | <b>Sex:</b> | <b>Age:</b> | <b>Ethnicity:</b> |
|----------------|-----------------------|-------------|-------------|-------------------|
| 1              | Eduardo Tagao         | Male        | 51          | Ilocano/Kalinga   |
| 2              | Mario Jose            | Male        | 42          | Ibanag            |
| 3              | Tong Tagao            | Male        | 60          | Kalinga           |
| 4              | Evelyn Pacleba        | Female      | 42          | Ilocano/Kalinga   |
| 5              | Jimmy Martinez        | Male        | 51          | Kalinga           |
| 6              | Regie Malvar          | Male        | 30          | Ilocano           |
| 7              | Janet Tagao           | Female      | 36          | Ilocano           |
| 8              | Marcelina<br>Martinez | Female      | 58          | Kalinga/Palanan   |
| 9              | Amelia Ramirez        | Female      | 28          | Kalinga           |
| 10             | Divina Montanez       | Female      | 25          | Kalinga           |
| 11             | Remigio Tagao         | Male        | 57          | Kalinga           |
| 12             | Robin Grutas          | Male        | 24          | Ilocano/Bicol     |
| 13             | Novie Sampang         | Female      | 25          | Ilocano           |
| 14             | Angelita Cacay        | Female      | 52          | Ilocano           |
| 15             | Laring Martinez       | Female      | 62          | Ibanag/Kalinga    |
| 16             | Myrna Maramag         | Female      | 42          | Kalinga           |
| 17             | Levi Ramos            | Female      | 26          | Ilocano/Kalinga   |
| 18             | Mercy Flores          | Female      | 25          | Ilocano           |
| 19             | -                     | Male        | 33          | Ibanag            |
| 20             | Marciano Butac        | Male        | 65          | Ilocano           |
| 21             | Michael<br>Aguinaldo  | Male        | 16          | Agta              |
| 22             | Ricafort Arsenio      | Male        | 29          | Ilocano           |
| 23             | Junah Valdez          | Female      | 33          | Ilocano           |
| 24             | Mylene Luyao          | Female      | 29          | Ibanag            |
| 25             | Mary Grace<br>Umacam  | Female      | 23          | Ibanag            |
| 26             | Rex Ramos             | Male        | 27          | Ilocano           |
| 27             | Jhonalyn Sagayo       | Female      | 32          | Ilocano           |
| 28             | Zeny Grace<br>Bayaona | Female      | 23          | Ifugao            |

## **Appendix B – Questionnaire residents Villa Miranda**

1. Name:
2. Age:
3. Gender:
4. Ethnicity:
5. Education:
6. Occupation:
7. Time of residence:

- Q1. What is the source of your drinking water?
- Q2. Is your water safe to drink?
- Q3. Is your water always safe to drink?
- Q4. How do you know?
- Q5. Do you ever get sick from the drinking water?
- Q5b. Do you ever experience Lose Bowel Movement (LBM) and/or stomach ache?
- Q6. What is the distance to the source of your drinking water?
- Q7. With how many households do you share the source?
- Q8. Do you always have enough drinking water?
- Q9. Where do you get your water from if you experience scarcity?
- Q10. What happens when you get sick from drinking water?
- Q11. Do you think (human/animal) feces can pollute drinking water?
- Q12. Do you own or use a toilet?
- Q13. If not: where do you deposit your waste?
- Q14. Do you want the source/distance of your drinking water to improve?
- Q14b. If yes: in what way?
- Q15. Do you want the quality of your drinking water to improve?

# PERCEPTIONS OF THE SAN ISIDRO PEOPLE ON WATER SOURCES, DRINKING WATER AND WATER MANAGEMENT

**Leonalyn Tumaliuan & Corinne van Duijvenbode**

## INTRODUCTION

Water is the most important basic need for human life. We cannot imagine a world without it. Water scarcity and water pollution are however a big problem, especially in developing countries in Asia. By 2015, it is predicted that 1.8 billion people would be living in countries that lack their own resources of water (Philippine Star 2012a).

One of the most important uses of water is for drinking. Clean drinking water is therefore a priority for every person. Unfortunately, drinking water in developing countries in Asia is often contaminated. Water can, for example, be corrosive, saline or contain high concentrations of iron. Also due to landslides, the water can get contaminated. Another problem is the variation in availability of drinking water. Due to stream flow and dry- and rain season, the quantity of drinking water differs (Kneese and Bower 1968).

One of the countries dealing with water scarcity and pollution is the Philippines. This is partly due to population growth. The Philippine population grew between 2000 and 2007 from 76.50 million to 88.57 million people (Dayrit 2009). The fact that the Philippine population continues to grow will put more pressure on water resources in the future (The Philippine Star 2012b). Because of population growth, the Philippines deal with a water shortage. The Philippines also encounter many typhoons which influence the availability and quality of water. Due to the typhoons, with much rainfall and wind, landslides occur. This in combination with slash-and-burn contributes to soil erosion. This has a negative influence on the quality of the groundwater, which people may use as their main water source (Israel and Briones 2012).

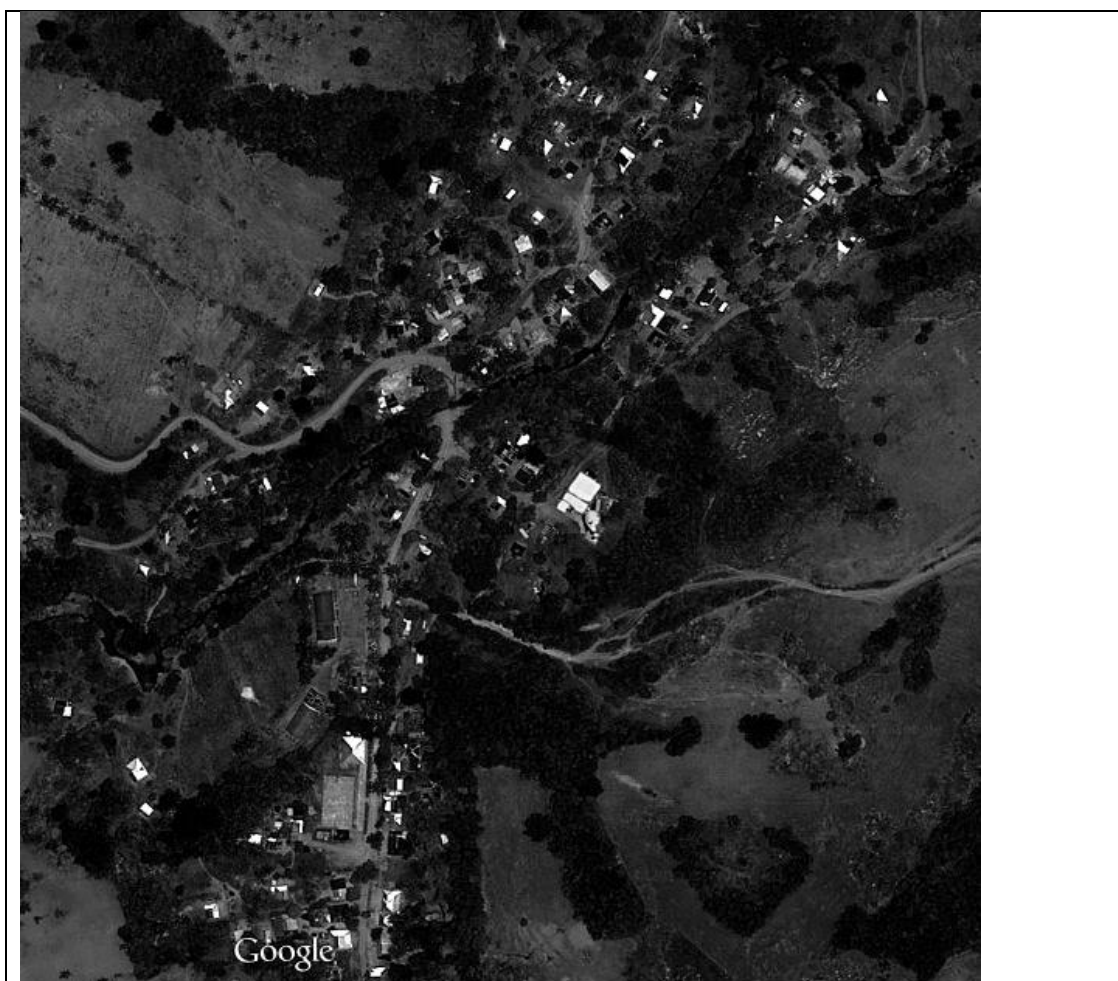
The inhabitants of the Philippines use different sources for their water supply. These are: rainfall, surface water resources (creeks, rivers and lakes) and groundwater resources (Greenpeace 2007). From these main water sources, the water can be distributed to the various households via free flow hoses or hand pump wells. Only 44% of the population in rural areas have direct connections of water in the house. Most of them make use of the communal free flow hoses, pump wells and springs (Greenpeace 2007). In 2005, the water from 88 wells in depressed areas in the country were monitored. The project found that 21 pump wells contained safe drinking water, while 27 pump wells were found to be unsafe. The remaining 40 pump wells required further testing to confirm the safety of the water. The sampling pump wells which contained unsafe drinking water were among others in region II - Cagayan Valley, where also our research was conducted (Greenpeace 2007).

It is apparent that there are problems concerning drinking water in the Philippines. To solve these problems good water management is necessary. To do so, all parties should be informed and involved in the water management (Asian Development Bank [ADB] 2001). The water management in the past focused mainly on the uses of the water, but they lacked focus on the water resources themselves. It is for example necessary to focus on the conservation of the water resources, to make sure that in the future there will be enough drinking water. Therefore, ADB proposes to manage the water sources in an integrated manner. For this, the focus must be on planning, conservation, development and management of the water resources. An example of this kind of management is boiling water on a collective basis instead of boiling water per individual household (ADB 2001).

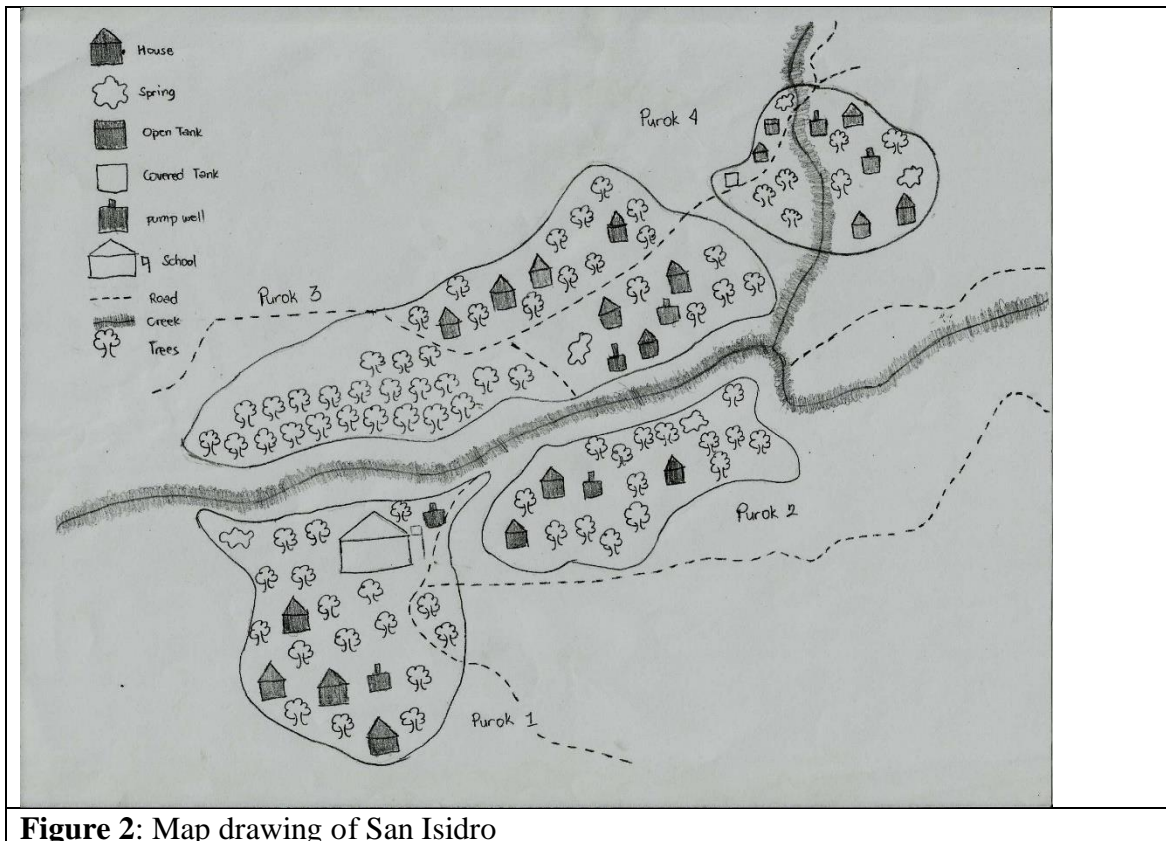
To improve the quality of drinking water and the water management in the Philippines, more research is necessary. Isabela State University (Philippines) and Leiden University (The Netherlands) have set up a collaboration in which students from both universities work together on a research concerning water management in the Isabela province. This report focuses on perceptions of the inhabitants of San Mariano, Isabela on the management of drinking water. Within this research project, we investigated whether the people of San Isidro (sitio within San Mariano) encounter problems concerning drinking water and the management of it. It is important to know this, so that the municipality of San Mariano can improve its policies concerning water sources and drinking water when necessary.

### **San Isidro: The location of our research**

Sitio San Isidro, in the Barangay Disulap, is part of the municipality of San Mariano, which is located in the province of Isabela. San Isidro is located 20 km from San Mariano proper. It is close to the Northern Sierra Madre Natural Park (NSMNP). San Isidro has 159 households (Barangay Profile San Isidro 2015). Within San Isidro there are four puroks (neighborhoods) and the main sources of livelihood in San Isidro are agriculture and forest products extraction (Barangay Profile San Isidro 1998).



**Figure 1:** Satellite image of San Isidro



**Figure 2:** Map drawing of San Isidro

## RESEARCH QUESTION

What are the perceptions of the inhabitants of San Isidro on the quality of water sources, drinking water and water management?

1. What are the sources of drinking water and how accessible are they in San Isidro?
2. How do people view the quality of the drinking water in San Isidro?
3. How do the people of San Isidro manage the drinking water? Do they have barangay schemes?

## METHODS

### Time schedule

| <i>Date</i>           | <i>Activity</i>  |
|-----------------------|--|
| Monday, January 19    | Travel and arrival in San Isidro   |
| Tuesday, January 20   | Interviewed 10 respondents<br>- five respondents from purok 1<br>- five respondents from purok 2 |
| Wednesday, January 21 | Interviewed 10 respondents<br>- five respondents from purok 3<br>- five respondents from purok 4 |
| Thursday, January 22  | Interviewed 4 respondents<br>- one respondent from each purok                                    |
| Friday, January 23    | Departure from San Isidro  |

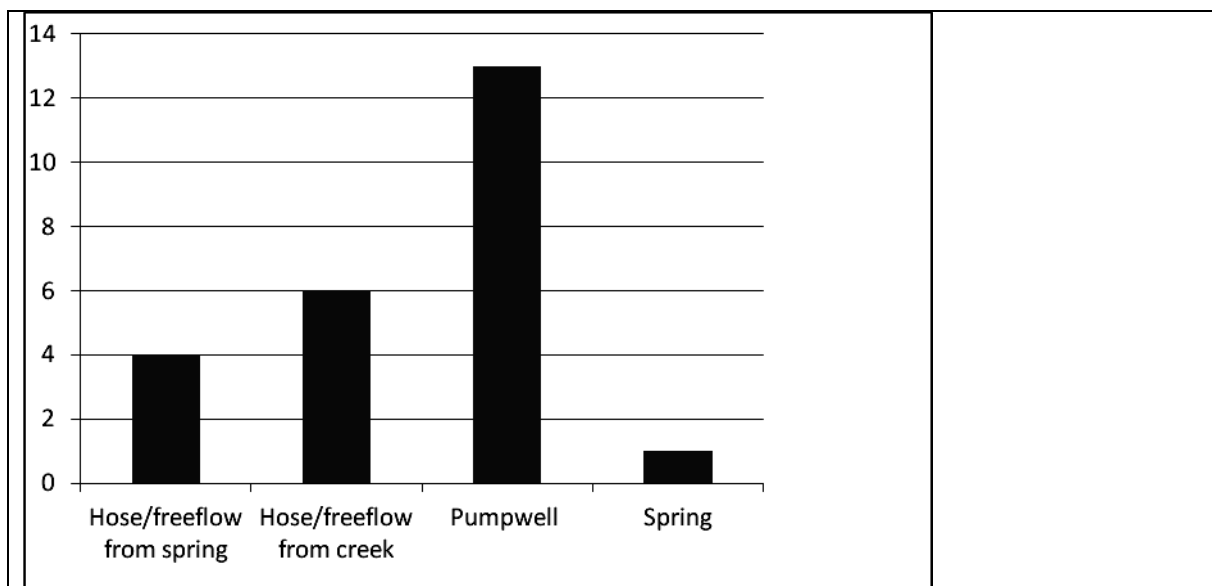
## METHODS

The research population consisted of 24 participants. The average age of our respondents was 37.4 years. For our research, we interviewed different people: farmers, housewives, one student, one elderly and one teacher. Most of our respondents however were farmers. The majority of the respondents (80%) had attended only elementary school.

We selected our respondents randomly by walking through the village and asking people whether they were willing to participate in our research. There are four main puroks in San Isidro, and we interviewed 6 respondents from each purok. We collected our data by interviewing our respondents, by way of semi-structured interviews. (The full interviews can be found in the appendix.) Before the interview, the respondents gave their informed consent. We also mapped the area of San Isidro to show where the different water sources were located. After we collected our data we analyzed them by tallying all the answers. Below we described all our results.

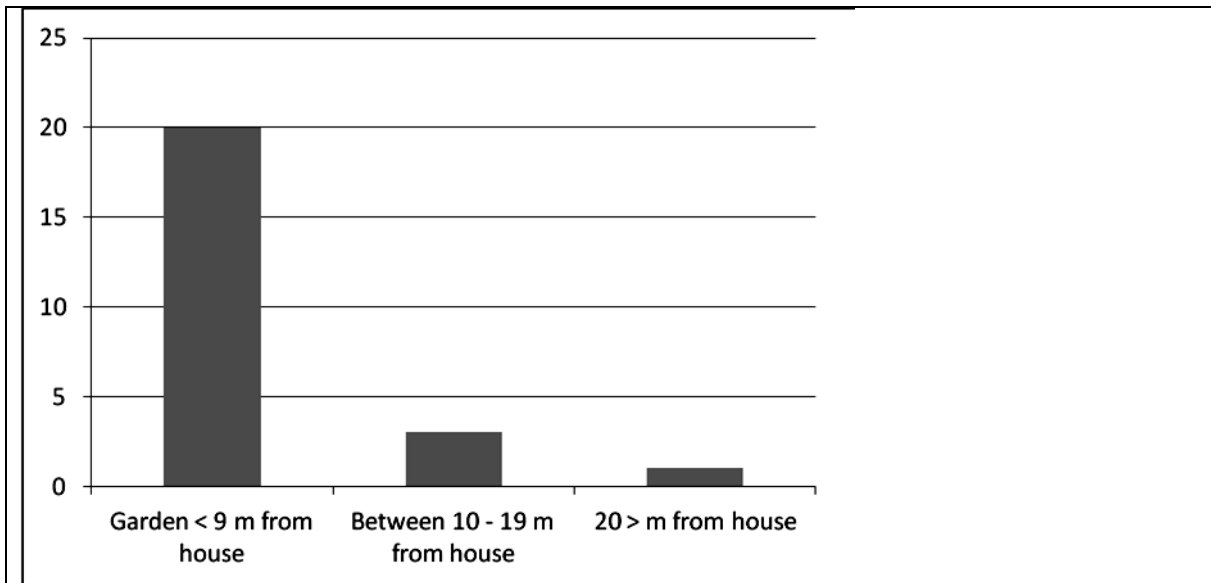
## RESULTS

### 1. What are the sources of drinking water and how accessible are they in San Isidro?



**Figure 1:** Different water sources in San Isidro and their use in the number of households

Pump well is the most common source of drinking water in San Isidro (Figure 1). Majority of the pump wells were requested by the respondents and granted by the barangay, but some of the pump wells were given by the non-governmental organization (NGO) Plan International. After the pump wells, the hose or free flow from the creek is most used, followed by the hose or free flow from the spring which also mostly was provided by the barangay. Finally, there was one household that got their water directly from the *bubun* or spring. It has to be mentioned that the households connected to the hose from the spring are all from Purok 4; they are connected to one and the same spring.



**Figure 2:** Accessibility of water sources.

The majority of the respondents in San Isidro have their water sources located in their backyards or in less than 9 meters from their house (Figure 2). However the distance from the core source of water (creek or spring) is quite far from their houses, which is why they connect hoses to have a convenient connection to water. Three households have access to their water source with 10 meters and more, and one respondent had his water source more than 20 meters away from his house.

When we asked the respondents if they wanted to improve the access to their drinking water, 21 answered yes and 3 replied no. The improvement suggested by most informants was building another hose or pump-well, so that there would be more water available and less households using the same water source, since the water sources were shared with an average of 9.75 households per water source. Another often mentioned improvement was building a water tank to preserve and clean the water. Two respondents wanted to cement the surroundings of their water pumps and one respondent wanted to dig the pump well deeper to increase the amount of the water.

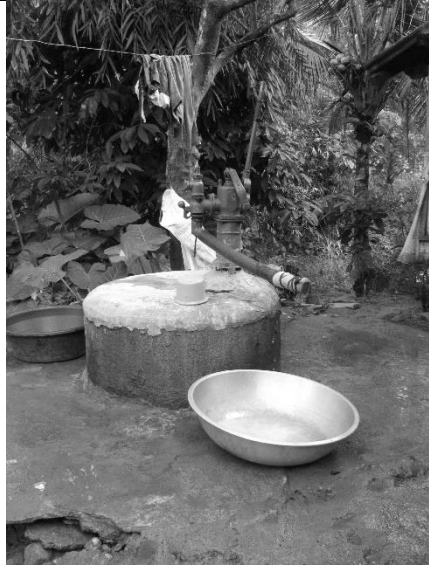


**Photo 1:** Spring: "bubun" (Photo by L. Tumaliuan 2015)



**Photo 2:** Free flow hose (Photo by L. Tumaliuan 2015)





**Picture 3:** Closed pump well (Photo by C van Duijvenbode 2015)

## 2. How do people view the quality of the drinking water in San Isidro?

Almost all the respondents thought that the water from their resources was safe to drink. Only one respondent (teacher) thought it was not safe to drink the water, so he boiled the water before drinking it. The other respondents had different explanations for why the water was safe to drink (Table 1). Most of the arguments were concerning natural resources: the water was safe to drink, because it came from the ground or it was a natural source. Less mentioned answers were that the pump wells were closed and that no one ever got sick from the water.

**Table 1:** Perceptions on why drinking water is safe.

| <i>Perception on safety water</i>                                     | <i>Frequency</i> | <i>Percentage</i> |
|---|------------------|-------------------|
| Pump well is clean, it's groundwater                                  | 8                | 33.3              |
| Natural source is clean water   | 7                | 29.2              |
| Pump well is closed   | 4                | 16.7              |
| No one ever got sick/diarrhea   | 3                | 12.5              |
| Use a sock pulled over the mouth of the pump well to filter the water | 1                | 4.2               |
| Immune to the bacteria in water                                       | 1                | 4.2               |
| Water is checked by LGU 1-2 years                                     | 1                | 4.2               |

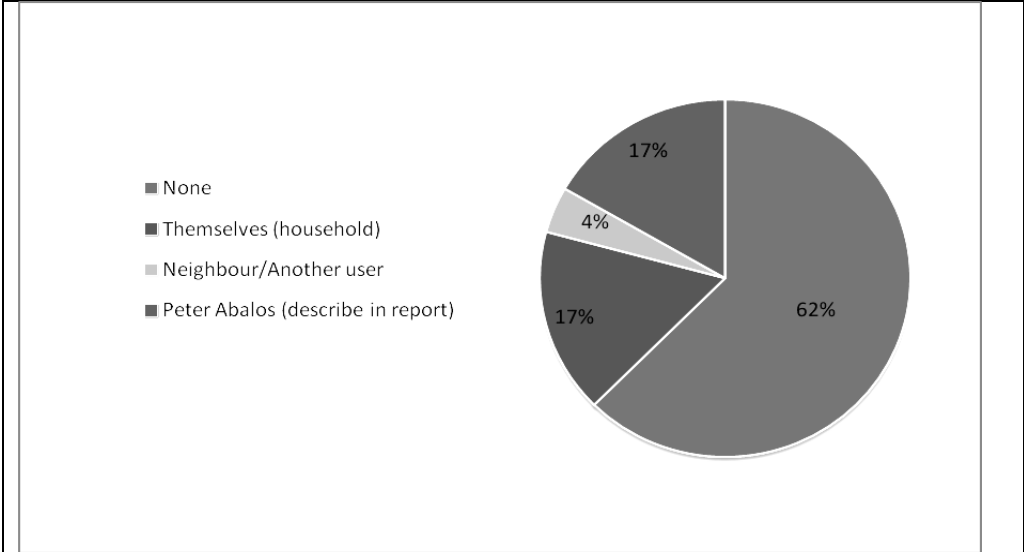
\* Multiple answers n = 24

When we asked if the water quality had changed during the last ten years, 16 respondents answered yes. Seven respondents thought that the quality of the water went down, because of population growth that leads to an increase in the number of houses around the creeks and other water sources that may pollute the sources of water. Other explanations for why the water quality worsened were: pesticides from the farmlands influenced the water, improper use of garbage, and rainfall. Two respondents did not know why the quality of the water went bad. Five respondents said that the quality of the water was better now than 10 years ago, because the pump wells were closed now which prevents it to be polluted unlike before when they got their water from open water sources which is prone to contamination. Another reason why the water was better now than 10 years ago was because they changed from free flow to pump well. We also asked if the quality of the water could be improved, for example by boiling it or by using chlorine compounds. The majority of the respondents (17) did not find this necessary,

they were content with the quality as it is. Eight respondents wanted to improve the quality of the water, by using a water tank which would purify the water. Almost all the respondents (21) said that they did not get sick or diarrhea from the water.

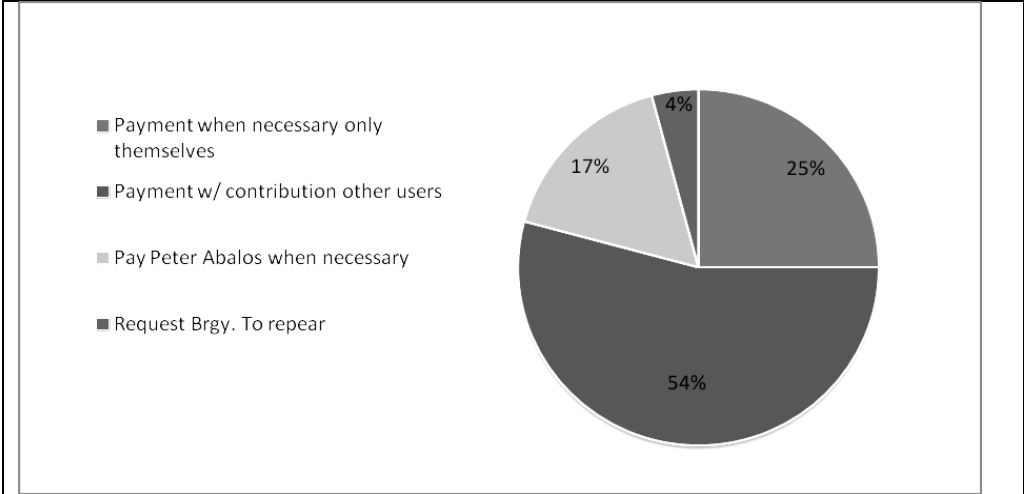
When we asked if they always had enough drinking water, for example in summer, all the respondents replied yes. There was never a water shortage. In summer the pump well would give less water, but still enough to drink. Most of the respondents would then use the water sources only for drinking and they would use the creeks for washing, etcetera.

**3. How do the people of San Isidro manage the drinking water? Do they have barangay schemes?**



**Figure 3:** Who manages water source

Most of the water sources (15) did not have any management scheme (Figure 3). Four respondents mentioned that they manage the water source themselves. One respondent said that his neighbor took care of the water source. Four respondents from purok 4 which were all connected to one spring said that the spring was managed by the owner Peter Abalos.



**Figure 4:** Management without schemes

When we asked if there were any arrangements made for when the water source (e.g. pump well) breaks down (= schemes), all the respondents answered no. If for example the pump well would break down, 13 households would fix it themselves with contribution from the other users (Figure 4). Six households would pay for the repair themselves without contribution from other users. The four households from Purok 4 would pay Peter Abalos (manager of the spring to which the households of Purok 4 are connected) when necessary and one respondent would call the barangay to repair the pump well.

When we asked the respondents if they wanted to improve the management, 20 of them answered no, because they were content with having an open management in which the households themselves would be responsible. The respondents from Purok 4 were content with the management of Peter Abalos. The four respondents who did want improvement mentioned that they wanted schemes or that the barangay would manage it.

## DISCUSSION

### **Answering research questions**

In this research we assessed the perceptions of the inhabitants of San Isidro (n = 24) on the quality of water sources, drinking water and water management. The first task was to determine the sources of drinking water and its accessibility in San Isidro. The results show that the majority of the population use pump wells as their main source of water. Free flow hoses from springs and creeks are second most used and only one respondent derived his water directly from the spring. This is in accordance with the results from Greenpeace (2007), which show that most of the population in rural areas make use of communal free flow hoses, pump wells and springs.

We found out that the accessibility of the water sources could be improved. Most of the water resources were located in the yard of the respondent. A few respondents had their water source farther away from their houses. The respondents however would like to have more water resources, so that less people would have to make use of one source.

Our second challenge was to determine how people view the quality of the drinking water in San Isidro. The results show that the large majority of the respondents, thought that the water was safe to drink. Their perception on the quality of the drinking water is therefore positive. However, according to the Greenpeace report (2007), unsafe drinking water was found in region II - Cagayan Valley (where San Isidro is located). This means that there is a discrepancy between the perceptions of the inhabitants of San Isidro and the Greenpeace (2007) data. The explanation for this could be that the pump well which was tested by Greenpeace in region II was probably not located in San Isidro. As the respondents from San Isidro say it is safe, the water apparently is safe to drink. Besides, one pump well in San Isidro was actually tested and the water quality was good.

There was only one respondent (a teacher) who did not think that the water was safe and who boiled it before drinking. This shows that there may be a correlation between the knowledge about water safety and educational attainment although our data is insufficient to prove this.

From our data we can also conclude that there is no water shortage in San Isidro, not even in the summer, although this contradicts the information from Dayrit (2009) stating that there is a general water shortage in the Philippines. Cagayan Valley however has one of the highest

potential source of groundwater (Greenpeace 2007) which can explain why there are no water shortages in San Isidro. The groundwater in San Isidro area is self-sustaining.

The third sub question was: "How do the people of San Isidro manage the drinking water? Do they have barangay schemes?". The results show that most of the water sources are not managed. They have an open management in which the people themselves usually repair the pump well or hose when necessary. So there are also no barangay schemes arranged. The inhabitants of San Isidro were mostly content with the management as it is now. The ADB (2001) proposes to manage water in an integrated manner with a focus on conservation. The inhabitants of San Isidro probably do not know about this advice. As most of the inhabitants are content with the management, they do not want a change in the management.

### **Limitations and recommendations**

During our research we found out that the respondents can give very contradicting answers, which is probably due to misunderstanding. After a few trial and error interviews we learned to ask further and to ask more questions than the questionnaire contained to gather additional data that were relevant to our study. Our recommendation would be to always check the answers we got from respondents and ask for explanation when necessary.

Another limitation is that our research sample was quite small. We interviewed 24 respondents, but the village consists of 159 households. Therefore, for future studies we recommend to interview more respondents, in order to make the information representative for the whole village. Also, we were only able to interview the respondents for three days. Next studies could take more time to interview the inhabitants and this will also increase the number of respondents.

At present the respondents in San Isidro do not face problems regarding the water and its management. The people of San Isidro probably do not know about the suggested management policy of the ADB. It is tough to introduce such water management or schemes to villages that are contented with an open management. We suggest to introduce and discuss the ADB policy among barangay officials who can decide themselves if they would implement this in the future. They would have to inform the inhabitants first and then ask their opinions about it.

Lastly, we would recommend the barangay officials to look at opportunities to improve the accessibility of the water resources. This study made clear that the inhabitants of San Isidro would like to have more water resources. We would like to advise the barangay officials to take a look at the possibilities for better distribution of water hoses or pump wells.

### **ACKNOWLEDGEMENTS**

First of all, we would like to thank the respondents from San Isidro from whom we got all our information. Thank you for sharing your opinions and your spare time. We would also like to thank the barangay health worker for giving us the information on the barangay profile. Besides, we want to thank our site director Dorina Ferrer for her assistance in the field. Lastly, we would like to thank Manong Lito and Ate Marilyn for letting us stay in their home for one week and cooking us delicious meals.

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## APPENDIX 1

### Questionnaire

1. Name
2. Age
3. Gender
4. Ethnicity
5. Dialect
6. Livelihood
7. Educational attainment
8. Income
9. How many people live in the house
10. What is the source of drinking water? And who provided the water source?
11. How accessible is the water source, in other words: what is the distance to the water source? With how many households do you share the water source?
12. Could the water accessibility be improved? If yes, in what way can this be improved?
13. Is your water safe to drink?
14. Is it always safe to drink?
15. How do you know?
16. Do you ever get sick of the water? Do you ever get diarrhea/LBM from the water?
17. Did the quality of the drinking water change during the last 10 years? If yes, in what way? (good or bad).
18. Do you always have enough drinking water?
19. Do you think that the quality of the drinking water can be improved? If yes, how?
20. Who manages the water source?
21. Are there arrangements in using the water source (= scheme)? If yes, what are those?
22. Do you think that the water management can be improved? If yes, how?

# INDIGENOUS PEOPLES' PERCEPTIONS ON WATER AND WATERBORNE DISEASE SITIO DIWAGDEN, BARANGAY SAN JOSE, SAN MARIANO, ISABELA

**Grace Joy Martínez and Alexandra Mandroiu**

## INTRODUCTION

Given the all-encompassing and wide understanding of the term indigenous, it has often been difficult to define “indigenous peoples”. Among the criteria used to identify indigenous peoples one can find: self-identification as indigenous or distinct community group, with a shared culture, religion or system of beliefs and traditional practices, a link or claim to a particular territory or land which could be traced or dated back to pre-colonial times (Monday 2010). The fact that these indigenous peoples are for most of the times minority non-dominant groups within a broader population brings certain confusion among the separation between the latter and ethnic minorities. While indigenous people have distinct ethnic identities not every ethnicity could bring forward indigeneity claims. Also ethnical differentiation becomes obscure in countries in which the majority of the population is “indigenous” such is the case of Bolivia in which the Aymara represent above 70% of the country’s population and thus could not be viewed as an ethnic or group minority. However, the latter is an exception to the general rule in which indigeneity is associated with ethnical differentiation. Nonetheless their ancestral domain, historical continuity and their linkages to natural resources mark the indigenous distinct from other ethnic sub-groups. Indigenous peoples have been ensuring the preservation of their cultural and historical ties to land and natural resources by continuously reproducing ancestral beliefs and practices.

The commonly used definition of “indigenous peoples” is the one utilized by Martínez Cobo (Monday 2010):

“Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system”.

Although it has been clearly established that indigenous peoples have developed strong linkages to particular territories and lands, which they have been sustainably working and harvesting for many centuries nation states and the international community as a whole has failed to recognize the importance of these traditional communities’ practices in ensuring the effective and long term preservation of land and resources (UNESCO 2006).

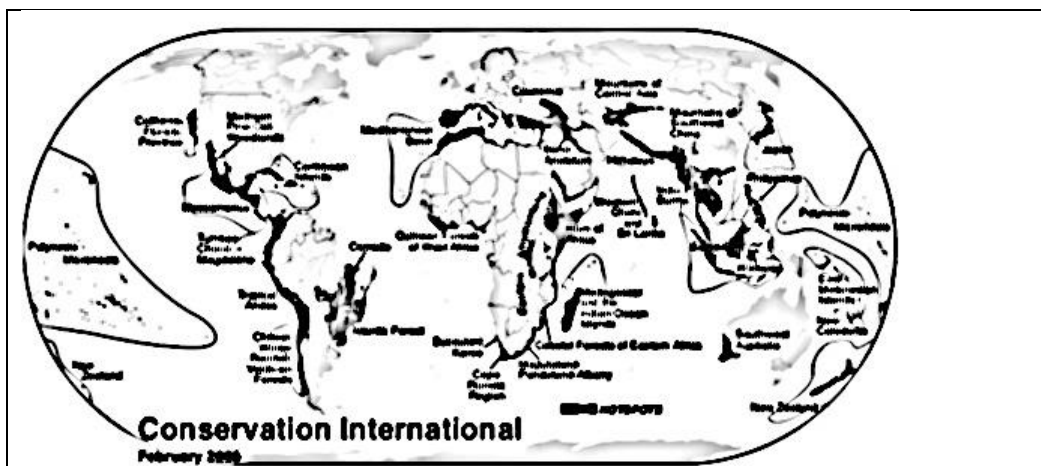
### **General Problem description**

As Evo Morales specified during the opening of the Third World Water Forum there are one billion people in the world affected by water scarcity having very limited access to water resources, mainly for drinking and home based consumption (UNESCO 2006). A high percentage of this billion people is indigenous, coinciding with the fact that indigenous peoples still occupy some of the most inhospitable but also biodiverse areas of our planet. It is mainly due to this occupation of tropical regions, forest areas and remote locations that these

communities have managed to live and grow in perfect isolation from the mainstream development. Therefore it is of no surprise that some of the KA's (Key Biodiversity Areas) and main Biodiversity Hotspots in our planet coincide with specific indigenous occupation. If we agree that this is the case, is this a mere coincidence or shall we question the ways in which indigenous occupation and land exploitation has ensured its conservation and resource richness?

The ICCA's or Indigenous Peoples and Local Community Conserved Territories and Areas have gained important recognition in the international conservation agenda (Brief 2011). The role of indigenous peoples in conservation strategies could be seen through the Strategic Plan of Biodiversity for 2011-20 framed by the CBD (Convention on Biodiversity) in conjunction with other international bodies concerned with nature conservation such as International Union for the Conservation of Nature (IUCN). Following the Aichi Targets the plan is primarily concerned with biodiversity conservation by minimizing biodiversity loss and ensuring the effective ecosystem safety through sustainable environmental usage (CBD 2015). In the aforementioned Plan, ICCA's are identified as key elements of biodiversity promotion and conservation combining indigenous local knowledge with conservation strategies and efforts. According to the Plan, it is of common value and use to understand and further expand on the ways in which the indigenous have managed their lands in order to incorporate these practices into the mainstream biodiversity conservation strategies. It is an opportunity for the international community to learn and reproduce indigenous traditional local practices which have for so long sustained the protection of high resource rich lands.

The Philippines is one of the best examples of such scenario being one of the countries with the highest density of endemism or endemic species in the world, comparable to the Galapagos or Madagascar.

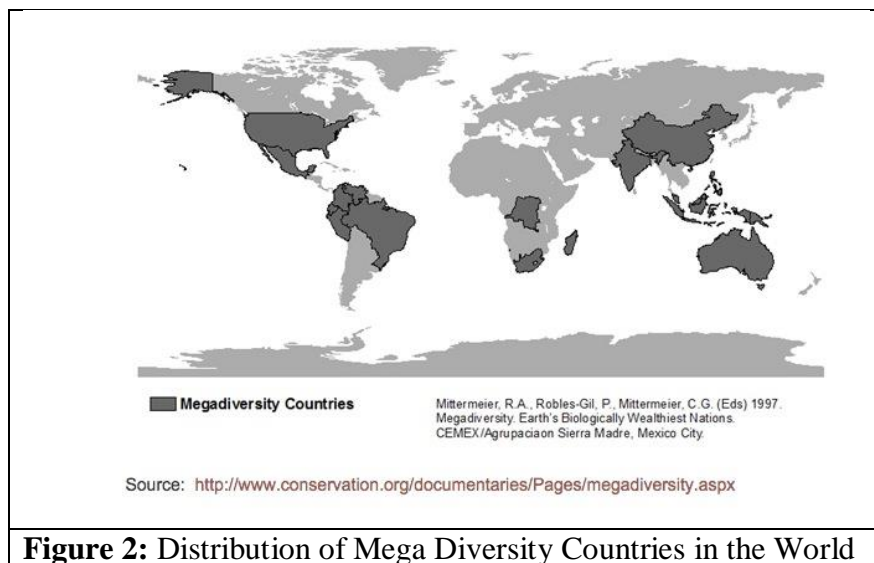


**Figure 1:**Biodiversity Hotspots Conservation International (February 2006)  
[http://www.gondwanalink.org/images/Hotspots\\_map.jpg](http://www.gondwanalink.org/images/Hotspots_map.jpg)

As one could see from the above map (Figure 1) the Philippines as a whole country has been catalogued by Conservation International (CI) as one of the 34 biodiversity hotspots in the world accounting for more than 90% of the species in the world, 50% of the world marine species and 42% of the terrestrial vertebrate species.



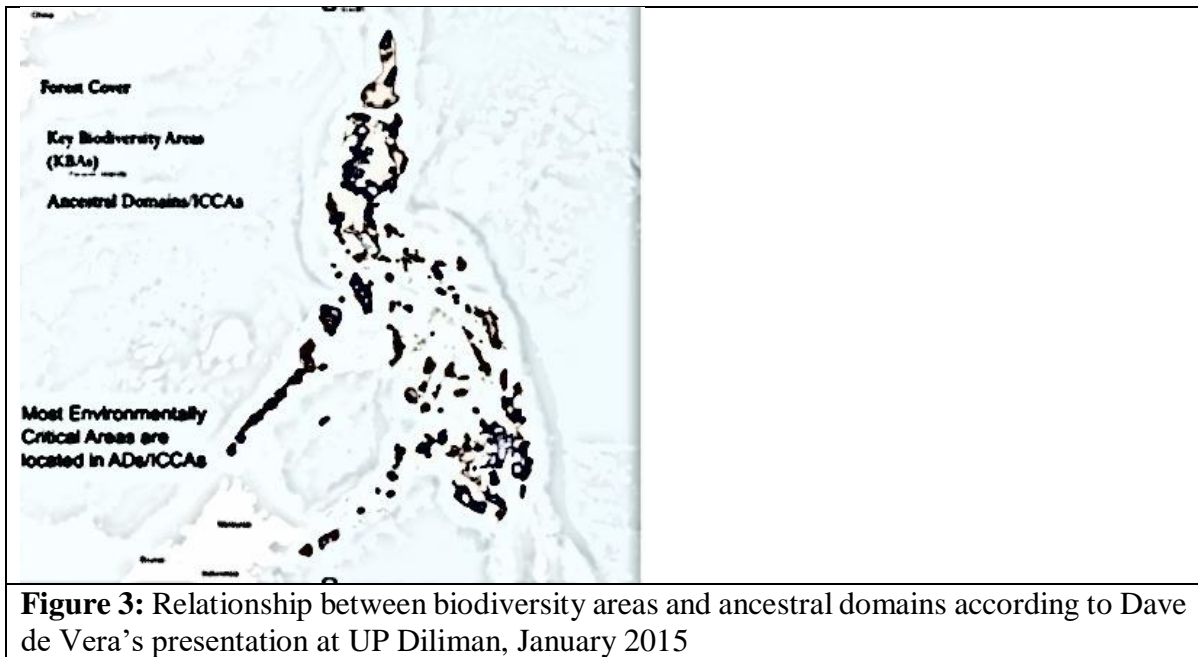
Furthermore, the Philippines has also been identified as one of the mega diversity countries. Meaning, that it is one of the 17 countries containing 70% of the world's species biodiversity (Gondwanalink 2015).



**Figure 2:** Distribution of Mega Diversity Countries in the World

The Philippines is home not only to numerous and diverse flora and fauna but also to numerous groups of indigenous peoples spread around its territories, who have been long struggling to conserve their lands and culture. As identified by Dave de Vera (2015) there are more than 110 different ethno-linguistic groups in the Philippines representing 10-12 million people accounting for more than 10 % of the population. These indigenous populations can be divided into: Negrito Peoples, Cordillera Peoples, Island Groups and the Islamic minorities of Mindanao. Each category includes various indigenous groups and each group can be identified by different names according to their geographical emplacement and the local dialect. This is also the case with the Agta who are known as Mamanua in Surigao, Ata Manobo in Davao, Ati in Panay, Ayta and Ita in Northern Luzón and Agta or Aggay along the Sierra Madre Mountain Range (Galang 2006).

Given the association of high biodiversity and the historical presence of indigenous peoples through the Philippine nation it is important to understand the overlap between existing natural resources and the contribution of indigenous knowledge and practices in their conservation. Following Dave de Vera's presentation (2015) we can see how the Key Biodiversity Areas overlap with the Ancestral Domains of Indigenous Communities in the Philippines. As one could also see, this overlap is even greater in the island of Luzón between the Cordillera Mountains, Caraballo Mountains and Sierra Madre.



For that reason, we focused our research on the indigenous communities of the Northern Sierra Madre region. More specifically, we focused on the municipality of San Mariano, part of Isabela province in region II. We worked in Sitio Diwagden located on the border of the Protected Area (PA) of Sierra Madre. Sitio Diwagden is located in the buffer zone before the Northern Sierra Madre Natural Park (NSMNP).

According to Minter (2010), the Agta living in the NSMNP are in high disadvantage when compared to those living in the lowland areas of the valley given their restricted access to health units and medical treatment. Health policies do not target the Agta given their characteristic nomadism (Minter 2010, 242). However, it has been observed that over the years Agta have settled following kinship-based residential settlements in specific regions along river valleys or the coastal region of the Sierra Madre (Minter 2010, 83). Although they might have changed residential sites, distances among camps are not very extensive and thus nomadism can no longer be an excuse for excluding the Agta from local health policies, especially in terms of vaccination and disease awareness programs. Furthermore, mortality among the Agta has remained alarmingly high to this day, mainly child and infant mortality. Agta children have as much as seven times higher chance of dying before reaching their fifth birthday when compared to the average Filipino child (Minter 2010, 242). Child morbidity and mortality could easily be prevented and tackled by including the Agta into the local and municipal vaccination programs, through the provision of better maternal health care and through emergency medical attendance provision. As Minter further points out, a way of addressing and improving Agta’s health and thus reducing the incidence of disease would imply ensuring the community’s access to safe drinking water. Although health aid has been provided by the non-governmental organization, PLAN International, in the form of toilet bowls and water pumps, the beneficial effect of such program was identified as temporary. Therefore it is of high importance and priority to understand the ways in which these indigenous communities make a livelihood around water sources in order to recognize how disease prevention could be carried out, especially in cases when solutions involve simple actions as providing or ensuring the community’s access to safe drinking water.

### **Case specific background**

Based on the Community Participation in the Management of Crocodile Sanctuary in the Municipality of San Mariano (Guingab 2003) Sitio Diwagden is part of Barangay San Jose which is also part of the crocodile sanctuary as declared by Ordinance No. 01-17 (LGU San Mariano 2001.) There is an estimated number of 24 households within the sitio with an approximate population of 120 individuals. Within the sitio itself there are several territorial subdivisions such as Talbag, with 5 households, Nagsabarn with 5 households, Dalayap with 7 and five more grouped as the upper part of Diwagden.

The main source of livelihood is agriculture with plantations of banana, rice, corn and other local varieties of fruits and vegetables. Apart from agriculture, the residents of Diwagden engage in fishing, hunting and rattan gathering mainly used for furniture while the shoots are used as food.

The area around Diwagden and the crocodile sanctuary is located at 500-2000 meters above sea level, with a land slope ranging between 19-85%. The region is dry from March to January and the rainy season occurs mainly from June to December.

The area is catalogued as forestland according to Department of Environment and Natural Resources (DENR) classification which means that land property is only allowed under governmental issue of land tenure agreement for a maximum of 25 years and a maximum of 1 ha. The land occupier agrees to work on 10% of the land while ensuring the effective preservation of the remaining 90%. However, as seen in Sitio Balete, this is rarely the case. Most of the indigenous and migrant indigenous communities occupy these lands without any legal title, thus become “squatters” or illegal settlers with no right to claim the lands they are harvesting. (Agta Recognition of Ancestral Domains)

### **RESEARCH QUESTION**

What is the perception of indigenous peoples regarding the relation between use of water and waterborne disease?

- What are the main indigenous groups in Sitio Diwagden?
- What are the main water sources in Sitio Diwagden?
- Is water seen as a source of disease?
- What are the main water related diseases or symptoms as identified by the respondents?

### **METHODS**

The methodology behind this short field study was based on personal interviews built on a framed questionnaire of 25 questions. The questionnaire included a combination of both quantitative and qualitative questions. These were first designed in English but for the actual interviews a translation was provided by one of the researchers both in Tagalog and Ilocano depending on the interviewees' ethnical background.

During the four-day research, 19 interviews were carried out. Among these, 17 were held with the general population, 1 with the barangay captain of San Jose and the last one was conducted in conjunction with the host family, our field assistant and two of the course coordinators providing a historical account of the emergence and contextual development of Diwagden.

The research was accompanied by photographic and geographic documentation of the respondents, the locations and their respective water sources.

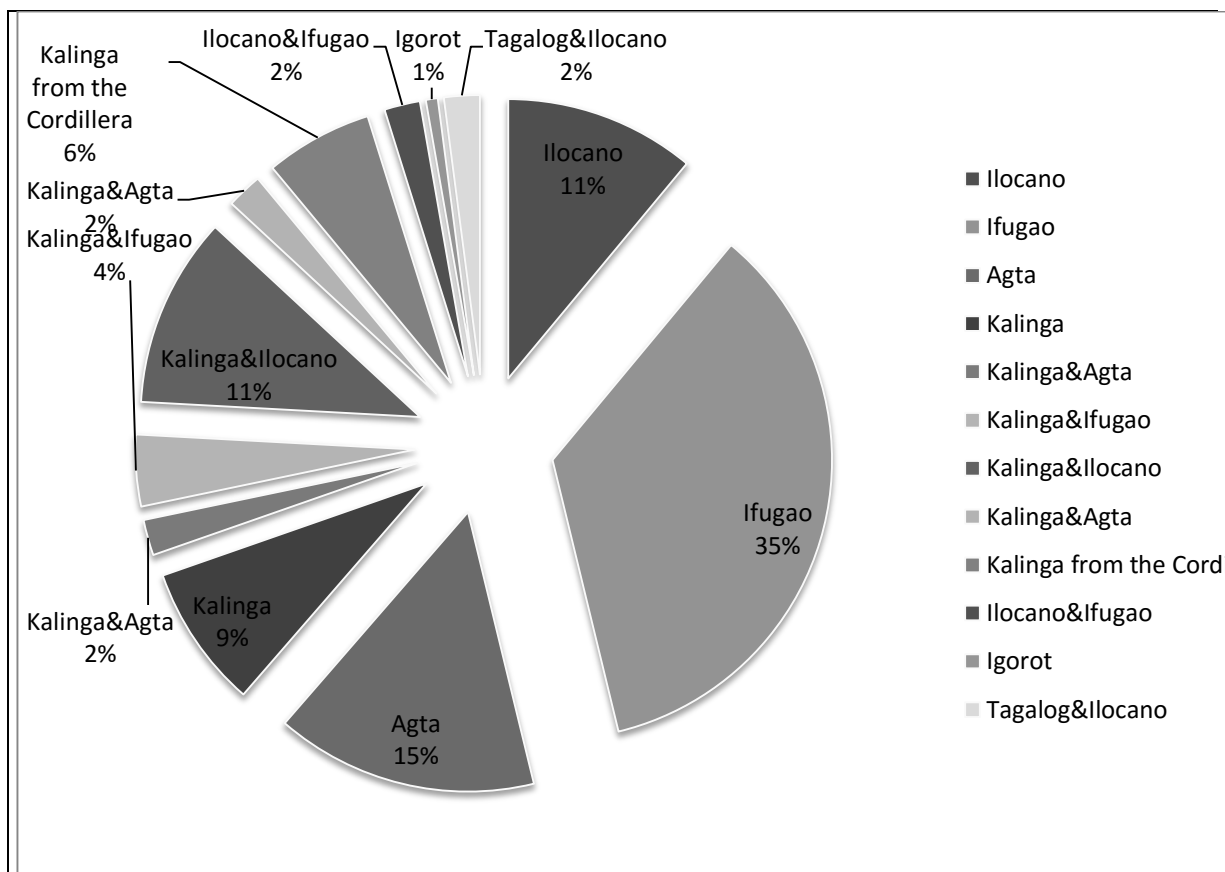
In order to complete this report, field data will be analyzed using Microsoft Excel and Word, for both graphical and narrative description. Data will be further supported by secondary sources. Furthermore, a comparison will be made contrasting the results from Diwagden with three other sights regarding water safe drinking practices, management and disease.

Time schedule:

| <i>Day/Date</i> | <i>Activities</i>   | <i>Place/Location</i>          |
|-----------------|---|--------------------------------|
| 19/01/2015      | Travelled from CCVPED in Cabagan to San Mariano, Mabuwaya Rearing Station and from there to San Jose. Slept in the Health Unit in San Jose.   | Cabagan-San Mariano- San Jose. |
| 20/01/2015      | Interviewed Barangay Captain of San Jose. Hiked to Diwagden. Arrived in Diwagden in the afternoon. Familiarized with the Sitio and interviewed 3 Agta respondents.  | San Jose- Diwagden.            |
| 21/01/2015      | In the morning, we interviewed 2 more Agta, 1 Ifugao, 1 Kalinga and 2 Kalinga -Ilocano.   | Diwagden                       |
| 22/01/2015      | Historical background provided by Teresita Yog-yog, Merlijn and Tess. Information meeting at the church/school; interviewed 1 Agta from Kamarasitan, 3 Agta from Upper Diwagden and 4 more Ifugao. Drew a sketch map of Diwagden with the 2 groups and sight coordinator. | Diwagden                       |
| 23/01/2015      | In the early morning, hiked from Diwagden to San Isidro and from there to Dunoy. Released crocodiles in Dunoy lake, dinner.   | Diwagden- San Isidro- Dunoy    |
| 24/01/2015      | Hiked from Dunoy to San Isidro and did rainforestation tree planting on the way. Travelled back to Cabagan.   | Dunoy- San Isidro- Cabagan.    |

## RESULTS

Following the results of earlier research conducted (Guingab 2003), we aimed at obtaining a more up to date representation of the general population and its distribution in Sitio Diwagden. For this we used the data collected in the interviews as well as advice and knowledge provided by our site coordinator. The map was designed in cooperation with the other team assigned in Diwagden. Our census provided the following results: 37 households, 145 individuals distributed into 4 main ethnicities and a few other ethnical combinations (Figure 4). The majority of the population is Ifugao with 35% of the total population, followed by the Agta with 15%, and Ilocano and Kalinga & Ilocano each representing 11% of the total population.

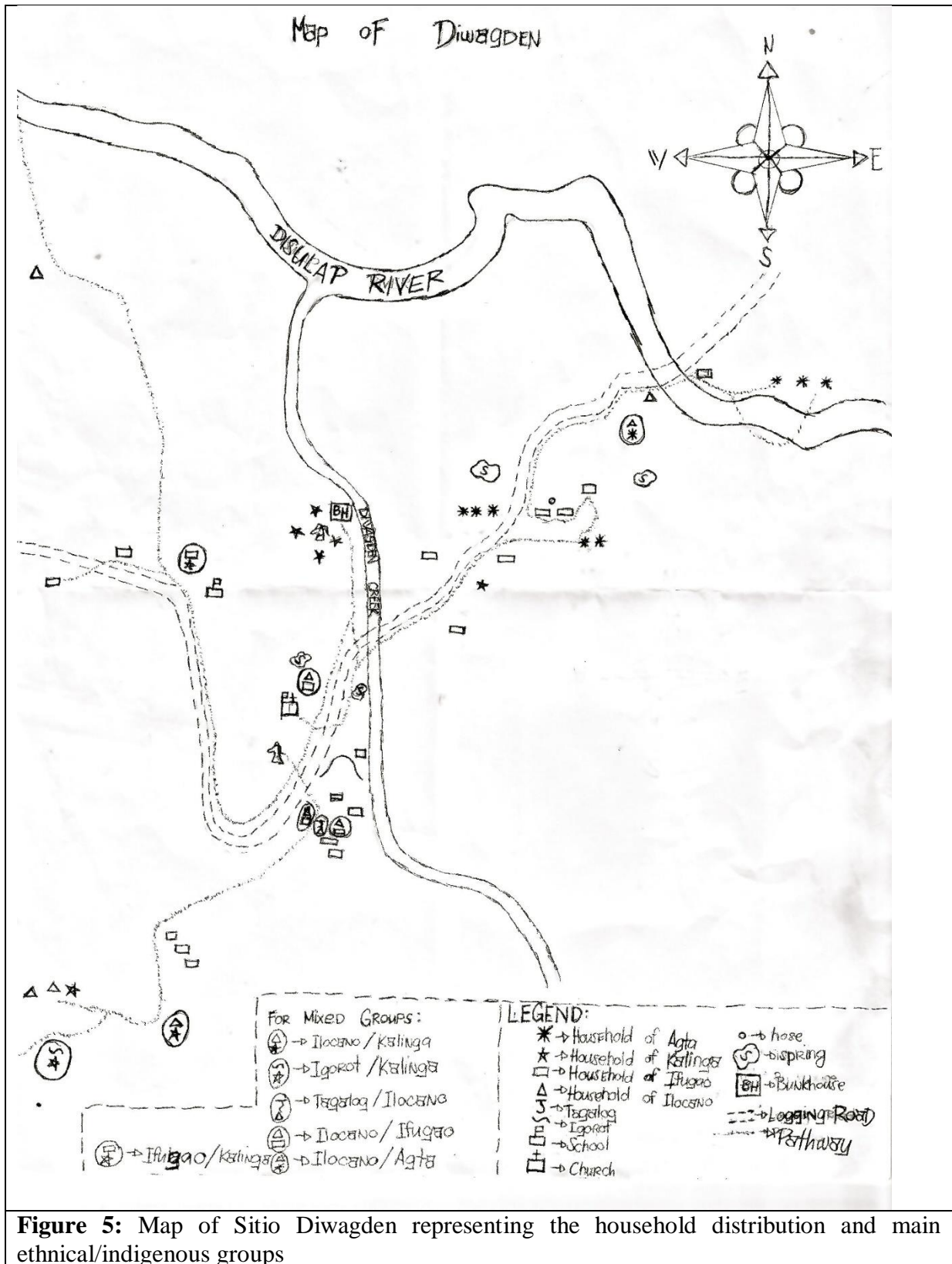


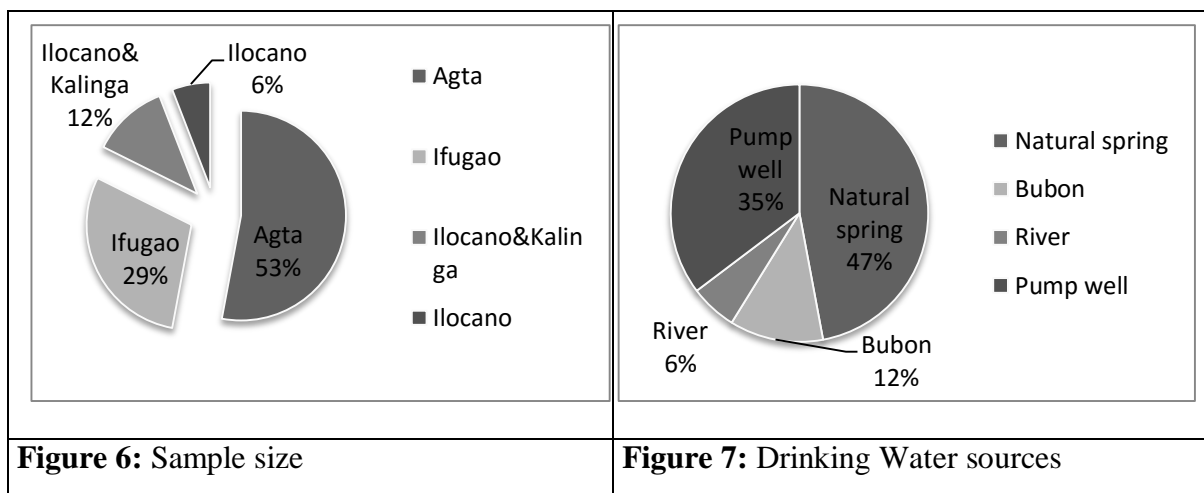
**Figure 4:** Overview of Diwagden’s population by ethnicity, January 2015

We further mapped the household distribution and main living organizations within Diwagden (Figure 5). As you can see, the different ethnical/indigenous groups could be clearly differentiated through household geographical distribution. Furthermore, a general trend is observed in the share of water sources which is also ethnically defined. In such scenario, the Agta and Ifugao households depend on a natural spring, the Ilocano and Kalinga & Ilocano share a pump well, the Ifugao households are also sharing a common pump well whereas the Agta of Upper Diwagden and Kamarasitan rely on river water sources, obtained either directly from the river or through “Bubon” natural filtration (Figure 5).

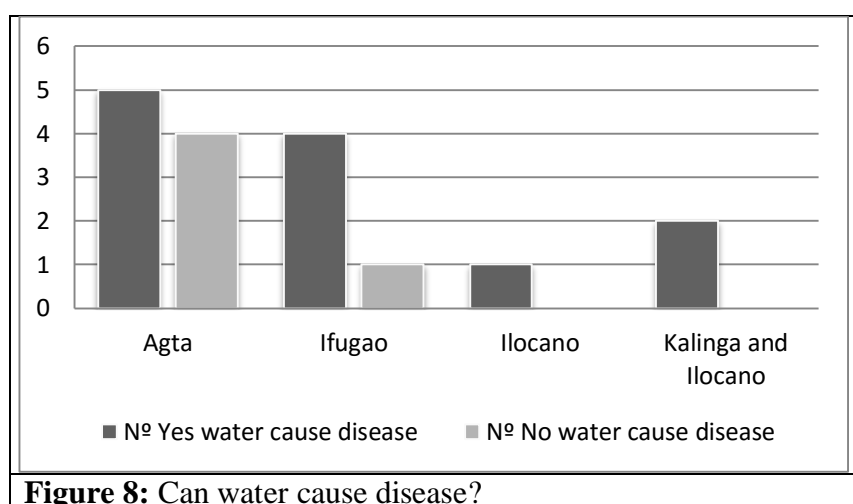
Focusing primarily on indigenous groups, 53% of our sample population composed of Agta, followed by Ifugao with 29% of the sample size, Ilocano-Kalinga with 12% and Ilocano with 6% (Figure 6). Therefore, 94% of our sample population were of indigenous descent and only one of the respondents was non-indigenous (Ilocano) but married to a Kalinga.

Although the main sources of water in Diwagden can be identified from the map, we have recorded water usage and graphed it for our specific population. Based on the chart, the main sources of water are natural springs used by 47% of the sample population, mainly Agtas, followed by pump wells utilized by 35% of the population, mainly Ilocano, Kalinga-Ilocano and Ifugao, the Bubon with a 12% and the river with 6%. Although some Agta from Northern Diwagden use the river as their main drinking water source, both the Bubon and the river have been mentioned as alternative water sources utilized during the rainy or drought periods (Figure 7).





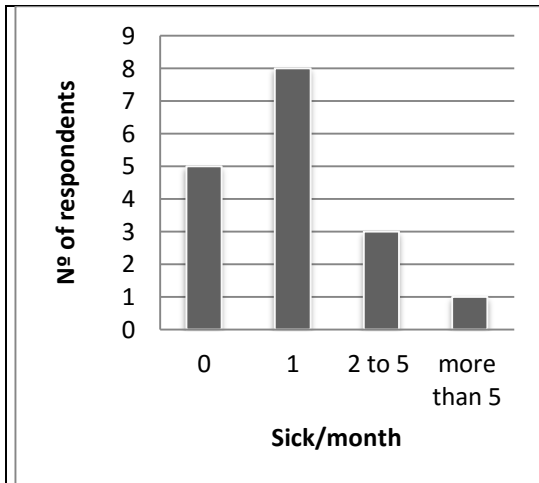
In order to determine the relation between water and disease as perceived by the sample population, we have graphed the positive and negative answers of respondents regarding their belief in the association between water and disease. We can see that among the Agta the discrepancy is the largest. This inconsistency is smaller for the Ifugao and non-existent for the Ilocano and Kalinga-Ilocano (Figure 8).



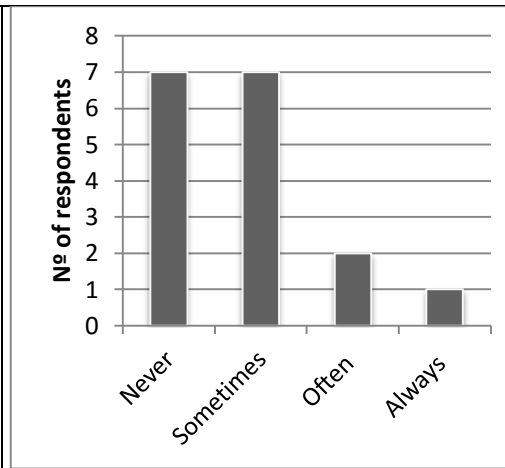
Furthermore, 8 out of 17 respondents claimed to feel sick at least once a month. Meaning, more than 50% of the sample population feel sick on a monthly basis (Figure 9). Only one respondent declared to feel sick more than 5 times a month.

Regarding the link between sickness and water, 41% of the population or 7 respondents either never or sometimes associate disease and water, while 12% claimed that they often associate experienced sickness with water and only 6% stated that they always relate experienced disease or sickness with water (Figure 10).

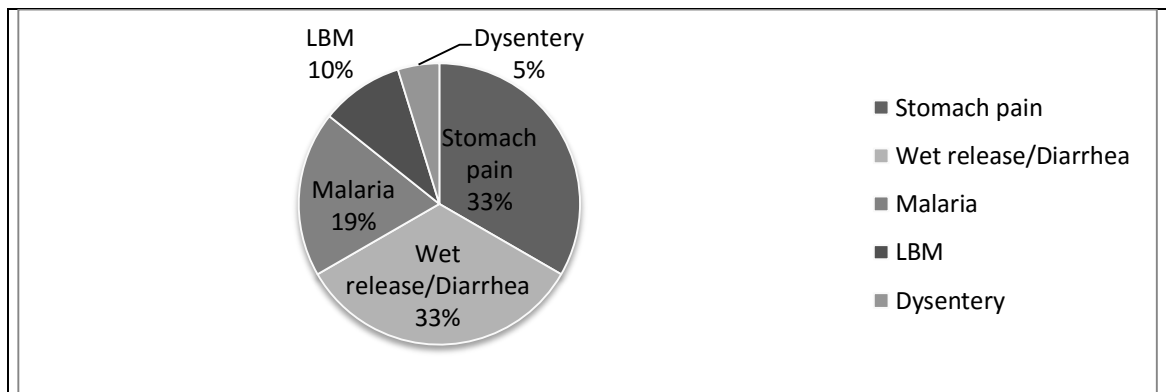
Among the main diseases experienced by the respondents, we included the symptoms because the majority of our sample population lacked knowledge regarding disease terminology. The most common symptoms were stomach pain and diarrhea with 33% of the population experiencing these, followed by malaria, LBM and dysentery (Figure 11).



**Figure 9:** Times/month sickness

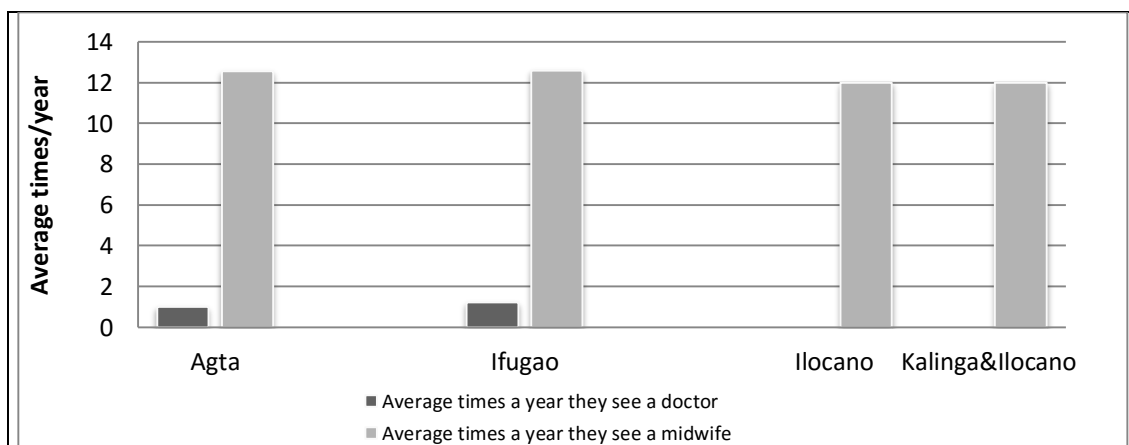


**Figure 10:** Relation between water and disease



**Figure 11:** Main symptoms and diseases

Last but not least regarding the regularity with which the respondents take regular health checks either with the midwife or with a doctor, we can see quite unanimous answers. Whereas the four groups see a midwife at least 12 times a year or once a month only, the Agta and Ifugao see the doctor once a year on average (Figure 12).



**Figure 12:** Yearly visits to the doctor and midwife per ethnicity



## DISCUSSION

### **What are the main indigenous groups in Sitio Diwagden?**

As shown in the graphs above, the main ethnic and indigenous groups in Diwagden are Ifugao, Agta, Ilocano and Kalinga, accounting together for a 70% of the total population. As Guingab (2003) identified in 2003, the approximate population of Diwagden oscillated around 120 inhabitants. With the census we carried out, we were able to account for 145 individuals and 37 households. This shows an increase in the population as well as in the number of households since 2003.

The main indigenous groups are Ifugao, Agta and Kalinga. The indigenous population of Diwagden accounts for 59% of the total population. The number shall be higher due to the fact that there are mixtures between indigenous and non-indigenous groups whose indigeneity or ethnicity remains unclear. These groups have been identified and categorized as accurately as possible (Figure 4). Therefore as De Vera's presentation (2015) pointed out, the indigenous population of the Philippines represents a high percentage of the total population and this becomes more obvious in rural and geographically isolated regions such as the foothills of the Northern Sierra Madre. Among these indigenous groups we decided to focus our research on the Agta, the latter being one of the most renowned and widespread Negrito populations across the Philippines (Galang 2006).

Due to this reason, 53% of our sample size were Agta from Diwagden, Upper Diwagden and one interviewee from Kamarasitan. The second most represented group in our sample population were the Ifugao, followed by the mixture of Ilocano and Kalinga and one Ilocano respondent. The reason why we included this Ilocano respondent despite being catalogued as not pertaining to an indigenous group is because the woman in this case was married to a Kalinga man. The regular marriages across ethnicities or indigenous groups are an example of the limitations of indigenous and non-indigenous identification.

As pointed out by Minter (2010), the Agta of the Northern Sierra Madre have traditionally been nomads and have migrated along the mountains depending on the available or exploitable source of livelihood. Although we have tried to identify nomadic practices with our research, all of the nine Agta interviewees, as representatives of their households, declared to be sedentary having been born in the same place, having moved very short distances for only once or twice in their lives, or not having any plans to move in the future. The main reasons for such sedentary behaviour as given by the respondents were schooling for their children and a sustainable livelihood. The Agta of Diwagden said to have moved from the "production" area in the last year while a few other respondents vaguely mentioned Palanan for past generation migration. Nonetheless, all respondents declared to have settled down, not practicing nomadism and not expecting to move in the near future.

As Guingab (2003) identifies, the main source of livelihood for the inhabitants of Diwagden is agriculture with plantations of banana, rice and corn. With our research, we can conclude that this was also the case for our sample population. Most of the respondents engaged in corn, rice and banana plantation. Most of them had their own farms but they also worked as hired labourers for other plantations. Other agricultural activities which were also mentioned were plantations of camote and cassava. No fishing, hunting or rattan gathering activities were identified by the respondents. However, we do know through observation that the Ilocano and Kalinga engage in periodic fishing while the Agta participate in hunting activities.

### **What are the main water sources in Sitio Diwagden?**

Following the UNESCO (2006) document on Water and Indigenous Peoples, we attempted to elucidate the indigenous populations' accessibility to drinking water, the continuous availability of the water source and the knowledge on safety or the need of testing to ensure the availability of safe drinking water.

The main sources of water in decreasing order of usage are natural springs, pump wells, bubon and river. Out of our 17 total sample population, 47% got their water from a natural spring while only 35% had access to a pump well. The Agta of Upper Diwagden were the only respondents who used the river, in this case the Diwagden creek, as their main source of drinking water. This is an example of how the Agta are still in a disadvantaged situation regarding access to safe drinking water and thus would eventually be more prone to water specific disease causing higher rates of child mortality and morbidity (Minter 2010). The situation of the Agta in Diwagden is a particular one since their access to the natural spring water was through a hose provided by a neighbouring Ifugao household.

As regards how they perceive their water, majority, if not all respondents, believed their water to be clean. When asked why, their responses were because "it is a water pump", "it is a spring", "no one lives near the water source", "it flows" or "no disease was experienced by any family members since drinking from that specific source". No respondent had any knowledge about water testing and not even the water from the pump wells was ever verified to make sure it is safe to drink.

Although people declared to have methods to know when the water is not safe to drink, such as the yellowish or murky colour typical of the rainy seasons when land falls occur or the limestone deposits after boiling, these are rather unreliable measures since it is mainly during the rainy season that most people fall sick because of the low water quality. It is also during this period that measures against unsafe water drinking are carried out such as boiling, or bubon natural filtration. Such measures are also employed during dry season, in which people, despite declaring to have enough water to drink, experience water shortages and have to shift from pump well use back to the bubon practice. Therefore, one could say that although the majority of the respondents declared to have continuous access and availability of "safe" drinking water with deeper enquiry one finds out that water quality decreases depending on seasonal rainfall making people dependent on alternative practices in order to ensure the prevention of disease.

### **Is water seen as a source of disease?**

The former argument leads us to the discussion of the association between water and disease. As Minter (2010) pointed out, morbidity and mortality rates among the indigenous Agta of the Northern Sierra Madre are higher than normal rates. For this purpose, we aimed at investigating the relation between safe drinking water practices and people's perception on the relation between the latter and waterborne disease.

When openly questioned about the association of the water and disease, the biggest discrepancies occurred among the Agta and Ifugao. In the case of the Agta almost half of the respondents declared to notice a relation between water and disease while the other half discounted such an association. While four of the five interviewed Ifugaos associated water with disease, only one discarded such relationship. The Ilocano and Kalinga-Ilocano identified water as a possible cause behind disease with no disassociating answers. Therefore, one can see that it is within the Agta that the biggest discrepancy occurs, while among the rest of the sample population water is widely viewed as a possible cause of disease. This discrepancy could be the

result of the Agta's exclusion or inaccessibility to health awareness programs and local health policies (Minter 2010).

To further elucidate the reasons of such discrepancy, we asked the people how often they feel sick in a month and how frequently they associate the experience of sickness with water. The results show that 47% of the sample population claimed to feel sick once a month while only 6% feel sick more than 5 times a month. When comparing this to the frequency that people associate between the experienced disease and water, we found out that half of our sample population said that they never or only sometimes associate their sickness to water. This only prove that although almost half of the sample population fall sick at least once a month the association of the experienced sickness and water use is rather small; hence, the tendency in the sample population to associate disease to different grounds and not particularly to water.

### **What are the main water related diseases or symptoms as identified by the respondents?**

When further analysis was done about the main symptoms or diseases experienced by the population, we found out that most of the symptoms explained and accounted by the respondents were related to waterborne disease. Among the symptoms, stomach pain and wet release (diarrhea) were the most common ones, while malaria and TB were the most commonly named other diseases. Loose Bowel Movement (LBM) and Dysentery were known only to a 15% of the sample size. When asked further about experienced diseases, the most common identified symptoms were coughing, shivering, cold, and flu.

Through the interview process, we found out that some of the respondents' children joined the "purga" program offered by the Barangay of San José for which children were treated on a yearly basis as a prevention strategy against worms.

To identify the ways in which the indigenous groups of Diwagden tackled disease, we asked them how many times a year they visit a doctor or a midwife for medical treatment. We found out that the groups who received more medical treatment either through the midwife or doctor were the Agta and Ifugao with a higher average number of annual visits to the doctor. The average number of respondents who received medical attention from the midwife throughout the year was equal across the four identified groups.

### **Conclusion**

The indigenous groups of Diwagden living on the foothills of the Northern Sierra Madre and in the buffer zone of the established NSMNP are the perfect example of De Vera's explanation on the overlap of high biodiversity regions with indigenous occupation.

Following the restrictions on water usage and short availability of water resources (UNESCO 2006) and the lack of inclusion of the Agta in the general healthcare policy, attributed to traditional nomadic practices and leading to higher morbidity and mortality across the Agta, this research aimed to illuminate the relation between water and waterborne disease as perceived by the indigenous groups themselves.

Through the research, nomadic practices across the indigenous groups were completely discarded with no identified nomadism. The stable agricultural livelihood together with child schooling provide enough reason for stable settlement.

When investigating access to safe drinking water, we found out that while the Ifugao and Kalinga had their own pump well the Agta population is still dependent on natural springs and

rivers. What is more, while having access to the natural spring they do not have control over its management since the hose connecting to the spring is provided and controlled by an Ifugao household. Therefore, one could say that the Agta are in an underprivileged situation regarding the control of water sources and dependency on external management.

While disease is quite common with a high percentage of the population claiming that they feel sick at least once a month, the population barely relates it to water. The Agta population was divided in their perception with regard to the direct relationship of water with diseases in the community. Further investigation into the main disease symptoms and experienced disease revealed that the main described symptoms are associated with diarrhoea while the main experienced diseases within the sample population are malaria, cold, flu, fever and in a few instances dysentery and worms.

Therefore, one can conclude that while waterborne diseases, as described by symptomatology, are common within the sample population, they are rarely associated to water. This disassociation is higher among the Agta population raising concern about the knowledge of these populations regarding waterborne disease and disease prevention methods. However, when enquired about the medical (midwife) visits the Agta denote the higher average of yearly visits to the midwife and doctor. The latter is somehow contradictory to the fact that more than 50% of the interviewed Agta population do not perceive water as a threat to their health. The high average of medical visits by the Agta remarks incongruity with the aforementioned idea that the Agta are often excluded from healthcare policies (Minter 2010). Nonetheless, and despite differences across the different studied indigenous groups on a general note one could say that water is generally seen as a possible source of disease through the represented population of Diwagden. Waterborne and water related diseases are part of the day to day narrative of the population. Therefore, there is a perceived relation between water and disease; nonetheless, the disease causation and prevention strategies remain obscure to the common knowledge of the indigenous peoples of Diwagden.

### **Strengths and limitations**

During the development of our research, we encountered different difficulties limiting our work and eventually leading us into bias. One limitation was the language barrier since we needed to do translations in Tagalog and Ibanag. Information could have been lost during translation or otherwise misinterpreted. Such is the case of “Bubon” which could represent a natural spring or a circular hole made beside a river with the purpose of filtrating the water. Another very important limitation is the lack of an accurate population census and geographical representation of the Sitio. Maps and census were not available. Although we believe our data to be representative of the total population size given the small number of inhabitants, data could still be deceiving when accounting for the total population including the non-indigenous groups. Lastly and maybe also related to language barrier and meaning lost in translation, the interviewees’ responses were sometimes inconsistent and contradictory and we often had to further investigate the matter to make sense out of it.

The strength of this field research trip relies on the teamwork done in cooperation with the site coordinator whose knowledge and local expertise proved useful in facilitating engagement between interviewers and respondents.

### **Further improvements**

For future research, it would be useful to have a more extensive knowledge prior to the field trip in order to accurately identify and address the relevant local challenges. This could include literature and academic studies but should also encompass culture and language facilitating communication and understating between participating parties and thus avoiding bias and miscommunication in the research.

### **ACKNOWLEDGEMENTS**

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## APPENDIX

### Questionnaire

1. Name
2. Age
3. Gender
4. No. of family members living in the house
5. Occupation/Livelihood
6. Religion/ Beliefs
7. Indigenous group/Ethnicity
  - if Agta: Do you live in the same place all year round? For how long have you been living here? Do you plan to move to another place in the coming year?
  - If nomadic/semi-nomadic: is migration linked to water/access to water?
8. Where do you get your drinking water from?
9. Do you have a different source of water for drinking, cooking or animal feeding or agricultural purposes?
10. Do you consider the source of water to be clean?
11. If so how do you know or test?
12. Do you have continuous access to water? /Access to water all year long
13. What is the distance to the nearest drinkable source of water?
14. Where do you defecate?
15. Is this close to you water source?
16. Do you associate water and disease?
  - If yes: In case of disease to you change your water source (the place where you get water from)
  - What are the diseases that you think are caused by water?
17. If so what disease and what symptoms do you experience?
18. How many times a month do you feel sick?
  - 1
  - 2-5
  - More than 5
19. Of the times you feel sick how often do you related it to water use?
  - Never
  - Sometimes
  - Often
  - Always
20. \_If you feel sick do you go to the health unit or do you have alternative traditional healing practices?
  - If yes: What? What beliefs? Are they disease specific?
21. How many times a year do you see a doctor or a midwife?
22. Where is the closest health unit?
23. Did you ever experience a major disease outbreak in the community/ Sitio of Diwagden?  
If so do you know what was the reason and how was it treated?

## WATER MANAGEMENT IN SAN ISIDRO, SAN MARIANO

**Raffy Ortega and Noor van Duijnhoven**

### INTRODUCTION

Water is central to human existence; the human population uses water for food production, the industry and the environment (SEARCA 2002). Scarcity of water, therefore, can have a devastating impact on humanity. With regard to the ever – growing world population, we need to manage the supply and distribution of water in order to maintain our existence.

In Southeast Asia, water availability has dropped by almost 55 percent during the past 60 years. The scarcity of water has a huge impact on the conditions in which people live, the availability of food and human health. The most affected by this problem are the poor in the rural areas, which experience many difficulties in obtaining water for drinking and cooking. To illustrate, the Asia and Pacific region hold 900 million of world's poorest people. This level of poverty is determined by, among other things, the difficulties that people encounter in their access to water. For many of these people, finding water for their crop is a life-threatening issue. The agricultural sector has a dependency rate of 70 percent on water for irrigation. In the light of the growing world population, a growth in crop yield is needed. An increase in crop yield can best be accomplished by improving the utilization of water rather than expanding the land frontier. Bad management causes severe watershed and ecosystem degradation and that causes the access to water to be even more threatened. Therefore, there is a need for more focus on improvement regarding the system of water distribution and the access to water sources (ADB 2001).

One of the countries in Southeast Asia that suffer from severe problems due to bad water management is the Philippines. In 1973 the national government of the Philippines enacted the Provincial Water Utilities Act. The act provides for the formation of the local water utilities administration (LWUA) which task is to form and regulate self-governed institutions which supply the water needs at the countryside. This means that the functions and responsibilities of the national government concerning the providence of potable and adequate water at the country side are appointed to the local government. This includes the construction, operation and maintenance of the infrastructure facilities concerning water supply such as rain water collection and the development of springs and wells (Bagunu 2004). Despite the act, and according to the World Bank, only 77 percent of the population in rural areas in the Philippines has access to an improved water source. Due to uneven distribution of water resources throughout the country, the occurrence of water shortages, especially in times of dry season, increases severely. Also, there is inefficiency in water usage due to the absence of well-regulated institutional arrangements, economic incentives and regulations which promote water conservation and rational use of water (Greenpeace 2007).

Studies conducted by the International Water Management Institute (IWMI) in 1999 concluded that slightly more than one billion people who live in arid regions will face absolute water scarcity by the year of 2025. This means that arid regions will not have sufficient water resources to meet reasonable needs for various purposes, such as drinking, cooking and irrigation, by 2025 (SEARCA 2002). This problem, together with the huge impact that bad water management has had on poor people in rural areas and the current situation concerning the water management in the Philippines, is an incentive to research the situation and possible improvements on the water distribution system in small villages in arid and rural areas in the Philippines.

Therefore, we have conducted a research in several small villages of the municipality of San Mariano, which is part of the province of Isabela in the Philippines. We mainly focused on the small village San Isidro and compare our result with the results acquired in other villages to be able to put our results in perspective. This research will hopefully make a small contribution to the water policy of the Asian Development Bank regarding the integrated management of water resources, the improvement and expansion of the delivery of water services, the conservation of water and increase of system efficiencies and the facilitation of the exchange of water sector information and experience (ADB 2001).

### **Background San Isidro**

San Isidro is a sitio (small village) situated in the municipality of San Mariano (Isabela province) at a 20 kilometer distance from San Mariano proper. As a sitio, it belongs to the barangay (large village) Disulap. Its neighboring villages are Villa Miranda in the north, San Jose in the south, in the east Palanan and in the west Disulap proper. It is near the Northern Sierra Madre Natural Park (NSMNP). The terrain is mostly characterized by mountainous slopes with few flat areas. The dry season initiates in January and ends in March each year. The wet season lasts from June to December. The water requirements of the locality are supplied by Dibilagen Creek and Banak/Disulap rivers (Plan International Philippines 1998). The sitio is divided in 4 puroks which together have access to five pump wells, five springs, one regular well, one uncovered and one covered water tank and Disulap river (Zipagan and Klaver 2014).

### **RESEARCH QUESTIONS**

#### **How is the water managed in San Isidro?**

What are the water sources that are used and how is the water distributed?

Is there sufficient water supply?

How does current water distribution system influence water scarcity?

Can improvements be made regarding the water distribution system?

How does water management in San Isidro relate to the other research sites in San Mariano?

### **METHODS**

**Table 1:** Time Schedule

| <b>Day</b>           | <b>Activity</b>  |
|----------------------|--|
| Monday 19 January    | Arrival at San Isidro  |
| Tuesday 20 January   | Visit to various water sources<br>Interview with 10 informants |
| Wednesday 21 January | Interview with 9 informants                                    |
| Thursday 22 January  | Interview with 6 informants                                    |
| Friday 23 January    | Leaving the research location                                  |

We used empirical research to address the practical problems regarding water management in San Isidro. In gathering data, we combined qualitative and quantitative research: combining the numerical data that we obtained from the interviews, such as the number of people that experience a water shortage, with the personal opinions of our interviewees regarding for example the causes of water shortage. The answers to the sub questions were formulated by



combining the interview surveys with existing data and research. In terms of research design, we focused on survey research. We interviewed 25 out of the 159 household heads in San Isidro in order to obtain information. We used these 25 interviews to draw conclusions about the current and expected state of water management in San Isidro. Also, we have used comparative analysis of San Isidro and other research sites, which are Disulap, Dunoy, Diwagden, San Jose and Villa Miranda, in order to give a broader spectrum in terms of possible problems and possible improvements that can be encountered and made in the future in San Isidro and possibly in the municipality of San Mariano as a whole.

For the interviews, regarding the household heads, we used availability sampling; we visited different houses in different puroks and interviewed the people who were at home, beginning with the Barangay Health Worker, whom we asked some basic information such as number of households since other officials (Barangay Captain and Barangay Secretary) were absent from the village at the time of our research.

We used descriptive data analysis in our results to make the obtained data more comprehensive and we combined that with inferential data analysis in the discussion in order to answer our research question (Aquino 2015).

We validated the claims of the respondents by using observation and visiting the various water sources. One of the photos we took from the river is displayed.



**Photo 1:** A carabao bathing in the river (Photo by N van Duijnhoven 2015)

## RESULTS

### Maps

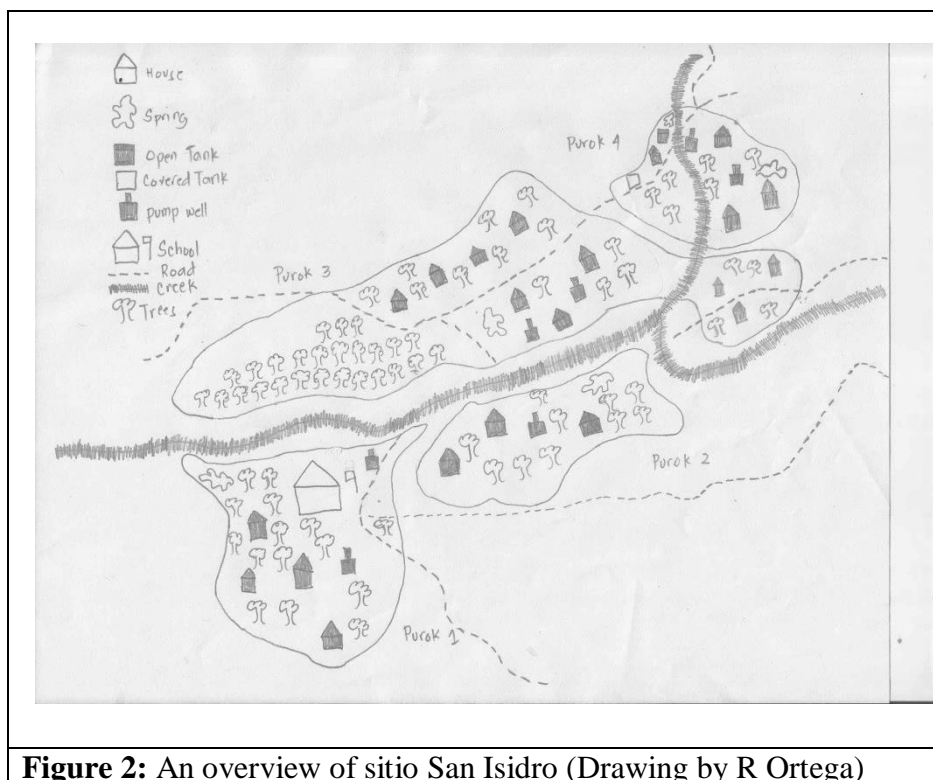
The two maps (Figures 1 and 2) are displayed which show the Google Earth image of the village, and the drawing we made of the sitio San Isidro.



**Figure 1:** An overview of sitio San Isidro (Screenshot from Google maps)

### Results of the interviews in San Isidro

The Barangay Health Worker, Gene Richel Gabatin, has provided the general information of San Isidro. She provided us with the profile of the sitio San Isidro which contained the amount of households (Sitio San Isidro 2014). Also, she provided the information that Purok 4 is the only purok that has a water distribution system, the rest of the puroks do not have a set system since most of the water comes from the river or pump wells. Adding to that, she provided a recommendation for improvement in the water supply of San Isidro, which was to obtain concrete for the springs (Gabatin 2015, pers. comm.).



**Figure 2:** An overview of sitio San Isidro (Drawing by R Ortega)

**Table 2:** Overview of the results of the interviews conducted in San Isidro

| <i>Purok of San Isidro</i> | <i>Number of interviewed citizens</i> | <i>Main source of water</i> | <i>Manner of distribution</i> | <i>Water sufficiency</i> | <i>Expected water sufficiency</i> |
|----------------------------|---------------------------------------|-----------------------------|-------------------------------|--------------------------|-----------------------------------|
| Purok 1                    | 4                                     | River                       | Bucket                        | Yes                      | Yes                               |
| Purok 2                    | 1                                     | Pump well                   | Bucket                        | Yes                      | Yes                               |
| Purok 3                    | 11                                    | Pump well                   | Bucket                        | Yes                      | Yes                               |
| Purok 4                    | 9                                     | Spring                      | Hose                          | No                       | No                                |

Note: all the results in table 1 are the most frequent answers.

The main water source that is used in each purok differs per purok. Purok 1 mainly uses the river as water source. Purok 2 and three mainly use pump wells and the main water source of Purok 4 is a spring. Puroks 2, 3 and 4 do not use the river as their main water source, but they use it for livestock and for washing their clothes. The distribution of the water is closely linked to the main water sources of the different puroks. In case of a pump well for example, one would always need a bucket to transfer the water back to the house. Same goes for the river. In case of a spring, hoses are used since in case of the bucket it would take too much time to gather the water. Concluding from that: Puroks 1, 2 and 3 use buckets and Purok 4 uses hoses in order to transport their water to their houses (Table 2).

During the interviews, the inhabitants of San Isidro gave different reasons for their water sufficiency and their expectance to have sufficient water in the future. These contained the presence of a pump well that has never dried out before and an ever-running river, on the other hand these reasons also contained problems in terms of manners of distribution, water pollution due to soil erosion and fear of population growth which will cause more pressure on water resources. The most commonly given answers are acknowledgements that there is sufficient water in Puroks 1, 2 and 3, but that there is not sufficient water in Purok 4, neither now, nor expected in the future (Table 2).

In Purok 4, the interviewed inhabitants explained the water distribution system to us. They explained that the water access was first given to the upper part of the purok and the lower part of the purok, which is situated on the other side of the road, had to wait for the upper part to be finished in order to access water from the spring (Photo 3). The interviewees living in Purok 4 stated that there was a formal policy, implemented by the purok leader which entailed that each household had the same set time to access the water. They explained that the formal policy was not followed since each household contained a different number of members which made each household to need a different amount of time to access the water in order to have sufficient water.

In Purok 3, the interviewed inhabitants stated that, especially during dry season, people of Purok 4 that lived next to the border of Puroks 3 and 4 would come and get water from their pump well. They commented on this that they feared that the water from the pump well would not stay sufficient for them if this continued.

In terms of improvements, the interviewed people stated that there should be more hoses and closed pump wells and springs.

### Comparison with other research sites in San Mariano

**Table 3:** Overview of the results of the interviews conducted in related research sites

| <i>Sitio</i>                | <i>Total number of households</i> | <i>Number of interviews</i> | <i>Main water source</i> | <i>Water sufficiency</i> | <i>Expected water sufficiency</i> |
|-----------------------------|-----------------------------------|-----------------------------|--------------------------|--------------------------|-----------------------------------|
| Disulap proper <sup>1</sup> | 107                               | 13                          | Pump well (92%)          | No/yes (50/50%)          | Yes (54%)                         |
| Dunoy <sup>2</sup>          | 38                                | 26                          | Spring well (65%)        | No/yes (50/50%)          | No (58%)                          |
| Diwagden <sup>3</sup>       | 37                                | 5                           | Pump well/river (40/40%) | Yes (60%)                | Yes (80%)                         |
| San Jose <sup>4</sup>       | 577 (whole barangay)              | 12                          | Pump well (67%)          | Yes (92%)                | Yes (100%)                        |
| Villa Miranda <sup>5</sup>  | 85                                | 23                          | River (43%)              | Yes (74%)                | Yes (65%)                         |
| San Isidro                  | 159                               | 25                          | Pump well (52%)          | Yes (52%)                | Yes (52%)                         |

<sup>1</sup> Baccay and Remmers 2015, this volume <sup>2</sup> Tasani and van Dijken 2015, this volume <sup>3</sup> Tiu and Versteeg 2015, this volume <sup>4</sup> Cabalonga and van Leeuwen 2015, this volume <sup>5</sup> Telan and Kos 2015, this volume

From the data that was collected in the other villages of San Mariano municipality, we can conclude that Disulap has the most number of households that use the main water source, which is 92% of the respondents. San Jose shows the most positive perception regarding water sufficiency, followed by Diwagden.

In Disulap, the reason for having an even amount in both negative as affirmative answers to the question if they had sufficient water is the shortage of water in the dry season. The informants stated that they solved this problem by going to other pump wells.

In Dunoy, the interviewed inhabitants consider the river to be their source of water whenever the spring does not provide (enough) water. They are afraid, however, that the river will run dry in the future due to over-usage.

In Villa Miranda, some of the interviewees stated that they got their water from the 'tank cooperative', which is a rich family that has constructed a distribution system in which they transfer water from the spring to a water tank, from which locals could get their water in return of payment.

## DISCUSSION

### **Water sources and water distribution**

As is stipulated earlier, the water resources in San Isidro consist of five pump wells, five springs, one regular well, one uncovered and one covered water tank and Disulap river (Zipagan and Klaver 2014). Quite remarkable is the fact that most of the 25 interviewees use the river for their livestock and to wash their clothes, while the main water source of Purok 1 is the river, which means they drink from the same water the livestock drinks of and bathes and clothes are washed in.

The water distribution in San Isidro is arranged by hoses and buckets. Since Puroks 1, 2 and 3 are mainly using buckets to transport their water, there is no system to distribute the water; people can just take as much as they want, whenever they want. In Purok 4, the water is mainly distributed by hoses and there is a system to distribute the water since the hoses are first used by the upper part of the purok and afterwards by the lower part.

### **Water sufficiency**

Most of the inhabitants of San Isidro seem not to be concerned about their water supply. The interviewees of purok one, two and three have sufficient water supply now, and also think this will be the case in the future (Table 2). Most of the people which live in purok four and are interviewed, however, stated that they do not have a sufficient water supply and also do not believe that they will have enough in the future, unless some changes are made. The interviewees in purok four fear that due to the continuous illegal logging high up in the mountains the soil will erode even more than it already does now and their spring will get polluted. This is a great danger to the water quality and will eventually, when the spring becomes too polluted, cause an insufficient amount of water to sustain the inhabitants of Purok 4.

### **The influence of the water distribution system on water scarcity**

Besides the fear of water insufficiency in the future due to soil erosion, a bigger concern of the inhabitants of Purok 4 is the water distribution system. The water from the spring is transferred by hose to their houses; the problem in this system is that there are only enough hoses for half of the amount of inhabitants in Purok 4 that use the spring as their main water source. This problem has led to an informal rule that the upper households get access to the spring first, and the lower part will get access after the upper part is done. This off course diminishes the opportunity of the lower part of Purok 4 to have a stable access to water.

In order to solve this problem, the leader of Purok 4 had implemented a new policy. The policy entailed that all households only had a certain amount of time to use the hose before the hose should be passed on to the other house. However, although this seemed a good solution in theory, in effect the policy never worked. The interviewed inhabitants of Purok 4 all stated that

the policy was not followed since some households contained more people and therefore needed more time to obtain water through the hose than others. Also, it was stated that some households did not pass the hose through to other households until they felt like doing so, which resulted in some households having the hose more than half of the day. These problems caused the people of Purok 4 that use the spring as main source of water to go fall back on their old system; giving the upper part access to water before the lower part. The respondents from Purok 4 did acknowledge that this sometimes led to problems such as the lower part having no water which led to them having to get the water from the river or a pump well, but it was considered the best way to deal with the situation.

Inhabitants from Purok 3 stated that the problem in the water distribution system in Purok 4 actually led to a problem in their purok as well. Since the inhabitants of the lower part of Purok 4 that lived near the border of Puroks 3 and 4 came to take water from their pump wells, the inhabitants from Purok 3 were afraid that this would lead to the pump wells to go dry due to over usage. Also, the inhabitants of Purok 4 who use a pump well as their main source of water were afraid that these pump wells would dry out due to over usage. This problem was especially perceived to cause a lot of problems during the dry season, when there is already a limited amount of water available.

The increase in population of the village is one of the main worries that all the interviewees showed when asked about their expected water sufficiency in the future. Due to increase in population, the number of households that rely on the water source increases per water source. Hence, the pressure on the water sources would severely increase. Their fear of population growth is grounded, since the population has grown from 139 households in 2014 to 159 households in 2015 (Zipagan and Klaver 2014). Considering the relative small size of the sitio of San Isidro, this can certainly cause a severe increase in pressure on water resources.

### **Improvements on the water distribution system**

When asked, the citizens of San Isidro were quite unanimous about improvements that could be made to the water distribution system. Almost all of them stated that all springs and pump wells should be cemented and closed in order to avoid pollution. This would be a very useful solution to the fear of soil erosion due to illegal logging high up in the mountains. Adding to that, off course, the local government should try to reach for better enforcement of the law that makes logging illegal.

Another common answer was that the amount of hoses should be so that there would be enough hoses for all households using the spring. That would ensure having enough hoses for the households that might come and settle in San Isidro in the future. This would solve the problem of the inhabitants of purok three and the inhabitants that used a pump well in Purok 4 that had to share their pump wells with the households that relied on the spring in Purok 4. Also, the tensions between households that were caused due to the insufficient water access, especially during dry season, would be resolved which would enhance the quality of social relations in Purok 4.

The problem of obtaining the hoses, however, stops this solution from becoming reality. The citizens of San Isidro stated that there was not enough money to obtain the hoses that were needed and to cement the pump wells and springs. A solution to this problem would be an incentive from the local government, but the local government is also restricted to certain budgets. In the light of the aim of the policy of the Asian Development Bank to improve and expand the delivery of water services and the increase of system efficiencies, the ADB could

provide an incentive to obtain more hoses and make closed pump wells and springs since that would lead to both an increase in efficiency in the water distribution system of purok 4 and an improvement of delivery of water services in the whole sitio of San Isidro (ADB 2001). Additionally, the local government could, over time, re-examine the number of households and that of water sources, and analyze whether the amount of water sources is still enough to sustain the households.

### **Water management in San Isidro in relation to the other research sites**

Our fellow students conducted interviews concerning the water distribution system and water scarcity in other villages in San Mariano municipality. The students conducted interviews in Disulap, Dunoy, Diwagden, San Jose and Villa Miranda. The results of these interviews show that in Diwagden, San Jose and Villa Miranda almost three quarters of the population believe that there is sufficient water supply now and that that will also be the case in the future (Table 3). This is very interesting in terms of their water distribution system and access to water resources, which appears to be efficient in those villages.

In Disulap, only half of the number of people interviewed experience that there is sufficient water supply and that this will stay the same in the future (Table 3). The reason for people to perceive that they do not have sufficient water and to have concerns about the water supply in the future is the shortage of water access in the dry season. In the eyes of the informants this is not a structural problem that needs solving, since they stated that they went to other pump wells instead and that these pump wells had no danger of drying out since they had never dried out before. We can wonder if this is a sustainable solution since it causes more intensive use of certain wells during the dry season.

In Dunoy, the number of respondents that consider that there is enough water is also around 50% (Table 3). This is the result of the difference between the citizens who consider going to the river for their water when the spring runs out of water being a proof of not having a sufficient water supply and the citizens that consider the river simply a different water source and since the river always has enough water, there is a sufficient water supply. In terms of expected water sufficiency in the future, however, more than half of the interviewed population of Dunoy states that there will not be a water sufficiency in the future. This fear is caused due to the fact that the river is their last source of water and if that runs out, the citizens have nothing left. The development of a concrete well and the development of more water sources in Dunoy could ensure a more sustainable water supply, therefore Dunoy could also benefit from the water policy of the ADB (ADB 2001).

San Isidro also appears to have fifty percent that state they do not have enough water now, and will not have enough water in the future. This is, as earlier explained, caused by the fact that the majority of citizens experience to have enough water themselves but acknowledge that there is not enough water for the inhabitants of purok four that use the spring as their main source of water (Table 3).

If we compare the different research sites, the inhabitants of the sites that experience having sufficient water supply now and also expect that to be the case in the future could help the other research sites in terms of possible improvements. The interviews in Villa Miranda showed that one rich family had set up a system called the 'tank cooperative' which provided water to other households. They got their water from a spring and transferred it by hose to a water tank. Other households could then, in exchange for a small payment, obtain a hose that was linked to this water tank and were ensured to have a sufficient water supply (Telan and Kos 2015). Since this

requires a lot of money to be invested, this might not be an option in the sitio of San Isidro. The reasons why the water supply is sufficient and why it is expected to be so in the future in Diwagden, San Jose and Villa Miranda would be an interesting occurrence to do more research on.

### **Water management in San Isidro**

Three major problems are shown in the water management in San Isidro. The first is the soil erosion due to illegal logging in the mountains which leads to the pollution of water sources in San Isidro. The second is the flawed water distribution system in Purok 4 which leads to a lack in access of water for half of the households that are using the spring as their main water source. The third is the continued increase of population which puts more pressure on the available water sources.

The first problem could be solved by making the existing water sources concrete. The second problem can be solved by obtaining more hoses so that every household will have a stable access to water. The problem in these two solutions is that there currently is a lack of money to obtain concrete water sources and more hoses. A possible solution can be to obtain an incentive from the ADB, which has a water policy which aim is exactly to solve problems like those occurring in San Isidro (ADB 2001). Another solution would be a different water distribution system, maybe comparable with the system of the 'tank cooperative' in Villa Miranda. Further research in other water distribution systems is therefore needed. The problem related to the population growth and growing pressure on water resources also indicates an opportunity for further research. San Isidro is not the only village that will profit from further research. Other small villages that also cope with a possible problem in the water management in the future, such as Dunoy, can also use the possible findings of further research.

To conclude, there is no immediate threat of human suffering due to water scarcity in San Isidro. There is, however, a structural problem in the manner the water is distributed which can, if not solved, have serious consequences for the inhabitants of San Isidro in the future. Although this research contributes in clarifying the water management in San Isidro, more research is needed since the amount of interviews is not representable for the entire population of San Isidro.

### **ACKNOWLEDGEMENTS**

We would like to express our warmest gratitude of appreciation to the following persons who helped us during this research: Mr. Marlon Anong and Mrs. Nora Anong, who served as our host parents in San Isidro, for their hospitality; Dorina Soler, who put time and effort in assisting us during our field research; Mr. Carlito Prejiliano, president of San Isidro Reforestation Association (SIRA) and his wife Mrs. Marlyn Prejiliano for their open welcome and assistance; and to Gene Richele Gabatin, one of the barangay health workers who provided information about the profile of San Isidro.

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## APPENDICES

### **Questionnaire for the barangay official**

1. Do you have an overview of the barangay profile of San Isidro?
2. Do you have a map of San Isidro?
  - 2a. can you indicate the water sources on the map?
3. What are the different sources of water in San Isidro and how many of each kind are there?
4. How many households are there in San Isidro?
5. How many individuals live in San Isidro?
6. How many puroks are there in San Isidro?
7. Of how many households exists each purok?
8. What are the sources of livelihood in San Isidro? (Can you give us an indication of how many people are working in each source of livelihood?)
9. How is the water divided between households? (Is there a system or can you take as much as you want?)
  - 9a. If there is a system, who manages it?
10. Has there ever been a water shortage in San Isidro?
  - 10a. If yes, in which water source?
11. Do you think that there will be enough water in the future for all people living in San Isidro?
12. Do you think that improvements can be made regarding the water distribution system in San Isidro? (For example, can water access be improved?)
  - 12a. If yes, do you think the government can help in these improvements?
13. As a barangay captain, what is your role in the water distribution?

### Questionnaire for the citizens of San Isidro

1. Where do you get water for:

| Water use        | Water source |
|------------------|--------------|
| Drinking         |              |
| Cooking          |              |
| CR               |              |
| Showering        |              |
| Washing clothes  |              |
| Livestock        |              |
| Vegetable garden |              |
| Irrigation       |              |

2. Who takes care of the different water sources?

3. How does the water arrive at your household? (for example; by bucket or hose)

4. How is the water divided between the households? Is there a division system or can you take as much as you want?

5. Do you have to pay for your water?

6. Do you have enough water in all sources, also in times of dry season?

7. Do you think you will have enough water in all sources in the future?

16a. why do you think that?

8. Can something be improved regarding the water distribution system?

17a. If yes; do you think the government can help in these improvements?

### Questionnaire for all research sites

Questions on background:

1. Location:
2. Date:
3. Gender:
4. What is your name?
5. How old are you?
6. What is your civil status?
7. What is your ethnicity?
8. What is your education level?
9. What is your profession?
10. Of how many members consists your household?

Questions on migration:

(ONLY FOR BARANGAY CAPTAIN)

11. Are there any formal or informal rules for new people who would like to live in this place? (what kind of?)

(FOR INHABITANTS)

12. Where were you born?
13. How long do you live here?
14. Where would you like to live and why? (fun question)
15. Do you think there should be rules for new people living in this sitio? Why?

(ONLY IF A PERSON HAS MOVED TO THIS PLACE)

16. Why did you move to this place?
17. Where did you live before you came here? (try to ask for the municipality and the specific barangay)

18. Why did you leave the former village?
19. Do you intend to stay here your whole life? (Yes or No. If no: why not?)
20. What steps did you have to do to settle here? (If there is no answer you can suggest for example; ask permission to the barangay captain, pay money.)

Questions on land tenure:

21. Do you have any land?
22. How much land do you have?
23. Do you have a title? (Can we see it? OPTIONAL)
24. How did you obtain the land?
25. What are your future plans with your land?
  - Sell it
  - Buy more
  - Obtain rights/secure title
  - Other.....

Questions on Non-Timber forest products:

26. Do you use products from the forest?
27. Do you gather or buy them?
28. What products do you gather and what product do you buy (options: fruits, vegetables, building materials, medicinal herbs, animals, honey)
29. Do you experience any decline in forest products?
30. Is it allowed to get products from the forest?

Questions on water sources, use and scarcity:

31. Where do you get water for:

| <i>Water use</i> | <i>Water source</i> |
|------------------|---------------------|
| Drinking         |                     |
| Cooking/dishes   |                     |
| CR               |                     |
| Showering        |                     |
| Washing clothes  |                     |
| Livestock        |                     |
| Vegetable garden |                     |
| Irrigation       |                     |

32. Do you have enough water in all sources, also in times of dry season? Yes/no
- 33a. Why do you think that?
33. Do you think you will have enough water in all sources in the future? Yes/no
- 34a. Why do you think that?
34. If the answer to 35 is no, in which source(s) do you expect a shortage?
- 35a. why do you think that?

Questions flood protection:

35. Do you experience floods?
36. How do you know about upcoming floods/typhoons?
37. How would/do you protect yourself and belongings against floods?
38. Is there something you can do to prevent floods?
39. Did you receive any information from the LGU about disaster preparedness? (Yes or No)

COMPARATIVE ANALYSIS DRINKING WATER, HEALTH AND SANITATION

INTRODUCTION

For the course of this year five different duos were assigned the topic of "drinking water, health and sanitation". Within this topic there were different interests: sources and management of drinking water; local waste management and sanitation; and water related diseases. This research was conducted in the municipality of San Mariano, Isabela. The four research locations were different villages within San Mariano, these were: Disulap, Villa Miranda, San Isidro and Diwagden. Each team had their own focus on one of the subtopics and their own corresponding questionnaire to interview the inhabitants of their assigned village.

All researches had overlap in interests on drinking water, health and sanitation. Therefore the teams decided to team-up and write a short comparative study on the four research sites. This comparative study is a collaborative introduction to the five case-studies.

The questions which we used for this comparison were:

1. What is the source of drinking water?
2. Is your water safe to drink and how do you know?
3. Do you ever get sick of the water and do you experience diarrhea and/or stomach ache?
4. What is the distance to the water source?

RESULTS

1. What is the source of drinking water?

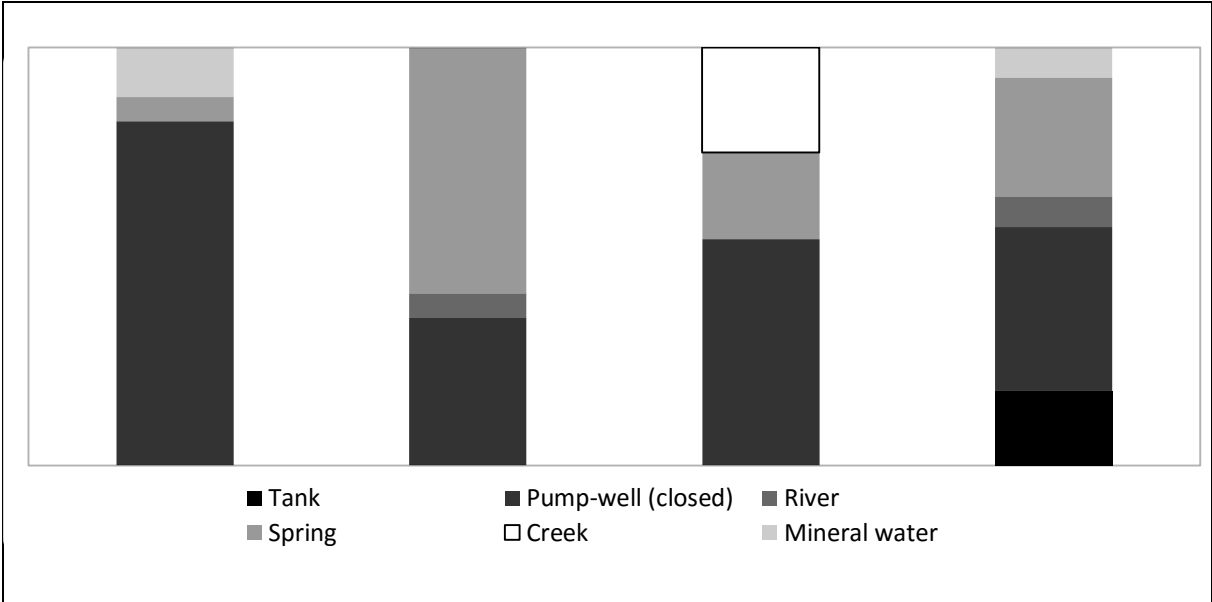


Figure 1: Distribution of sources in the four villages

2. Is your water safe to drink and how do you know?

In Disulap, 14 of the 17 respondents said that their water was safe to drink. Most of the respondents argued that the water was safe because it was clear. In Villa Miranda, 21 of the 28 respondents said that their water was safe to drink. They based this on taste and visual examination of the water. In San Isidro, 23 of the 24 respondents said that their water was safe

to drink, because it came from a natural source (spring or creek) or from groundwater. In Diwagden, all the respondents (17) said that their water was safe to drink. Most of them thought this because the water came from a natural source (river and spring).

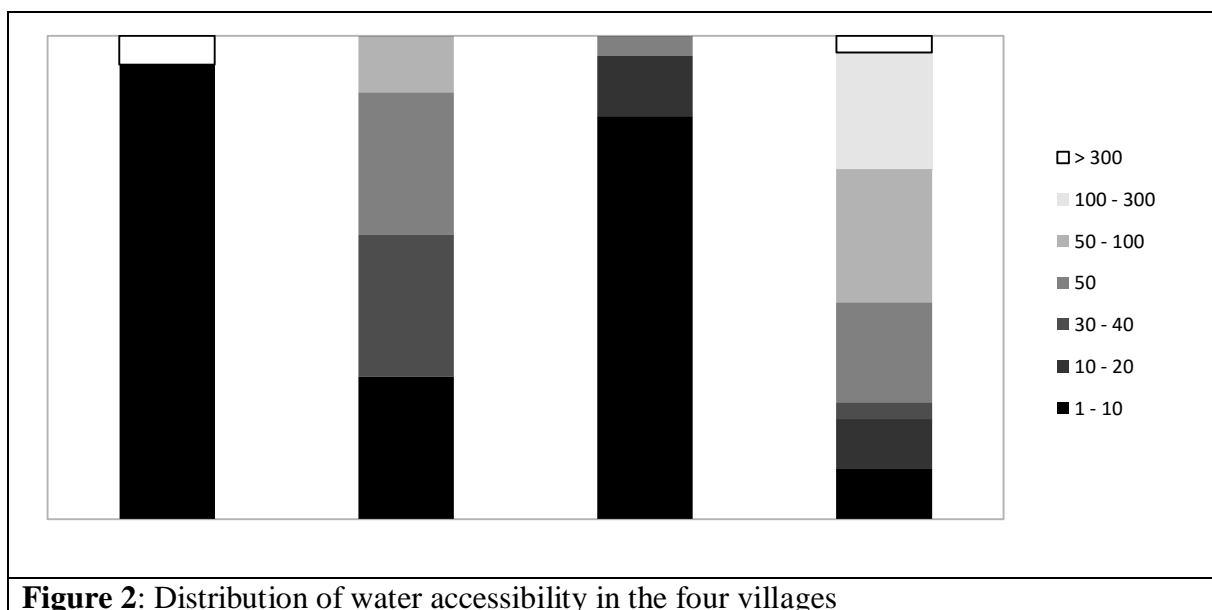
In general, we can conclude that most people in Disulap and Villa Miranda based their opinion on taste and visual examination. However, in San Isidro and Diwagden the majority of the population based their judgment on the fact that they considered their sources natural.

### 3. Do you ever get sick of the water?

In Disulap, 15 of the 17 respondents mentioned that they did not get sick. However, after a follow-up question it became clear that 10 of the 17 experienced diarrhea. In Villa Miranda, 19 of the 28 respondents said that they did not get sick from the water. Nevertheless, 15 of them did mention that they experienced diarrhea and/or stomach ache. In San Isidro, 21 of the 24 respondents said that they did not get sick from the drinking water. After follow-up questions, it came out that indeed most of them did not experience diarrhea. In Diwagden, 10 of the 17 respondents have sometimes or often experienced diarrhea.

We can conclude that there is a discrepancy between stating that they did not get sick from the water and really experiencing diarrhea and/or stomach ache. Based on our research we assume that there is a correlation between drinking possibly contaminated water and experiencing diarrhea. Our data however is not sufficient enough to validate this.

### 4. What is the distance to the water source?



**Figure 2:** Distribution of water accessibility in the four villages

## EFFECTS OF MIGRATION ON DEVELOPMENT IN DIWAGDEN, SAN MARIANO

**Edmund Tiu and Esther Versteeg**

### INTRODUCTION

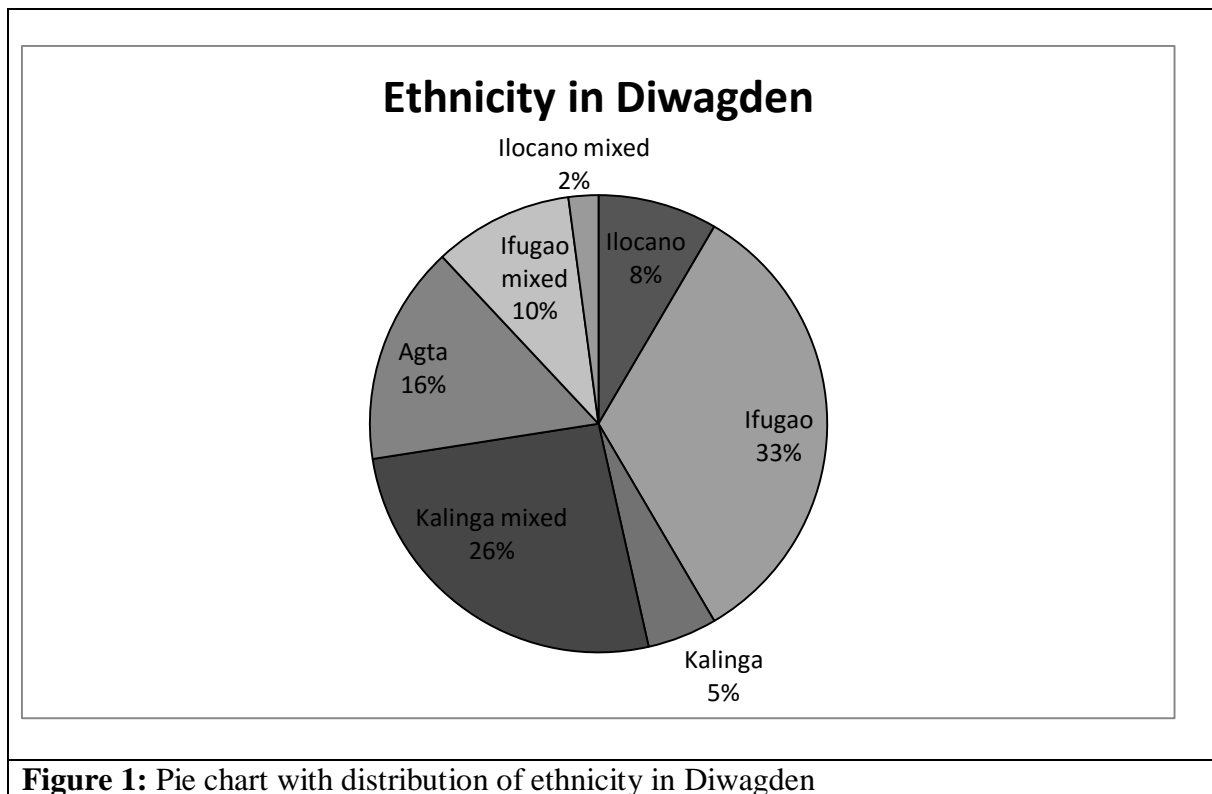
The Philippines exist in a total amount of 30 million hectares of land. This land is categorized into 'forestland' and 'alienable and disposable land' (A&D) (DENR 2015). The forestland is owned by the government and therefore cannot be used for private purposes. As of 2008, 53% of the land is forestland while 47% is classified as alienable and disposable land (DENR 2015). To put into perspective, in 1521 when the Spanish arrived it was reported that the land was covered with forest for more than 90% (DENR 2015). Although the name 'forestland' suggests that the land is covered with forest, it is not necessarily the case. Due to logging and agriculture large parts of the forestland are nowadays marginal lands or cultivated lands. Around 20% of the population in the Philippines live on forestlands. These people are mainly situated in the uplands.

Cultivating forestland creates complexities because the farmers are not the legal owners of the land and therefore do not have any security of their position. People are not really interested in investing a lot in the land when they do not own the land. Therefore development of the area is difficult. Besides that, there occurs the problem of land grabbing. When the value of the land goes up, outsiders will try to get the land for their own profit. The government actually recognizes these problems and therefore gives leases out to people who then can cultivate the forestland for 25 years. Although someone can cultivate the land, the land is still owned by the government. These leases can also be used in a negative way. Logging companies used to get commercial leases for logging purposes (Van Weerd 2015, pers. comm.).

Programs like the Socialized Industrial Forest Management Agreement (SIFMA) are implemented to give poor people leases. This program gives the poor farmer a piece of land provided that 90% of the land would be covered by trees. Those could be banana trees. Although the uplands are the poorest parts of the country, people move to the uplands because of the fertile soil on which they can practice agriculture (Lasco 2015). Programs like Rewarding the Upland for Environmental Services (RUPES) were introduced to reward poor people in the uplands for sustainable use of land and water. According to Lasco (2015), it is interesting to look at the development of these kinds of areas. Will the area be more attractive for migrants after development by programs like RUPES or development in general?

Van Dam (1998a) states that migration is based on a network providing security and assistance. Next to that land use is also a motivation for migrants. Motivation of migrants entering the Sierra Madre is a combination of source and destination motives (Van Dam 1998b). Two most important groups are the farmers and landless people from the Cordillera mountains or Ifugao (upland) and from the lowlands of Cagayan valley (lowland) (Van Dam 1998b).

The uplands are forestlands and not owned by the people but by the government, as mentioned. Therefore (sustainable) development of the uplands is difficult. Because of the population growth in certain areas of the Philippines and hence, now densely populated, it has become harder for people to make a living or to find a piece of land which they can cultivate. This population growth stimulates migration to other parts of the country that are relatively sparsely populated and where still land is available and unclaimed.



**Figure 1:** Pie chart with distribution of ethnicity in Diwagden

### Background

Diwagden is a small sitio belonging to the Barangay San Jose, which is one of 36 barangays in the municipality of San Mariano, Isabela. Agta and Kalinga were the first inhabitants according to historical sources (Van Weerd 2015, pers. comm.). The Agta led and sometimes still lead a nomadic life (Van Weerd *et al.* 2014). Around 1983, the first permanent settlers came to Diwagden. These migrants are Ifugao from the Cordillera Mountains (Van Weerd *et al.* 2014). After the logging ban in 1992, Ilocano families decided to stay and settle in San Mariano (Van Weerd 2015, pers. comm.). Nowadays, Ifugao make up for 1/3 of the inhabitants of Diwagden (Figure 1). Our census shows that Diwagden consists of 37 households and 145 inhabitants. Cultivation of corn is the main source of livelihood, but Ifugao people are now also starting to build rice terraces.

### RESEARCH QUESTIONS

Main question: *What are the effects of migration on the development of Diwagden, San Mariano?*

To answer this research question we formulated the following sub-questions:

- *What are the reasons for people to migrate to Diwagden?*
- *How do people manage the land in Diwagden and are there differences between inhabitants?*
- *How is Diwagden developed since the first permanent settlers arrived?*
- *How will Diwagden develop in the next 20 years according to its inhabitants?*
- *How do the effects of migration on development in Diwagden relate to Disulap, Villa Miranda, San Isidro, Dunoy and San Jose in San Mariano? (Comparative Analysis)*

## METHODS

The fieldwork was conducted from January 19 to January 22, 2015 in Sitio Diwagden, which is part of Barangay San Jose.

### ***Interviews***

Diwagden is known as a village with a multi-ethnic background. Therefore, we wanted to have a mixed sample of respondents with different ethnic background. Everybody we asked to interview was willing to cooperate.

We succeeded in obtaining a mixed sample with the help of our guide and key informant who led us to the exact location of the different ethnic groups in Diwagden. It appeared that most of them live together in bundled groups of houses scattered in the area that is called Diwagden. We tried to make a representative sample by interviewing a certain number of people according to the size of that ethnic group.

We had a limited time schedule of 2.5 days in the field and decided to interview around 5 respondents a day. We eventually interviewed 14 respondents, of which one is the barangay captain of San Jose.

We chose to conduct in-depth interviews to get more detailed information about the village. Because of our in-depth interviews we mainly used qualitative data. During the fieldwork we changed some questions to get the results we were looking for or to make the questions more understandable to our informants. We discovered that interviewing in an informal setting gave us a lot more information than by following the questionnaire *per se*.

### ***Observation***

The method of observation was used to get an impression of daily life. We stayed at the house of Ms. Terisita. She is an Ifugao lady and owns the only shop in the village. Because of that, her house was a meeting place and gave us the opportunity to meet a lot of people and observe how people in the village interact with each other. Next to that, we walked around the village to observe people's daily life and saw for example an Ifugao family building a rice terrace.

### ***Map and census***

We chose to make a map of Diwagden to show how the area of Diwagden looks like nowadays and what kind of changes happened since the first permanent settlers came to Diwagden. By showing this we can also illustrate the influence of migrants on development of the area in terms of land tenure.

The census was also made to look at the population growth of the sitio. We could compare the data with the data of last year to see how fast Diwagden is growing due to migration.

### ***Photography***

As evidence and illustration for our report we used photographs. Among other things, we took a panorama photo of the area to look at the current changes in the landscape. This showed that around Diwagden almost all land is converted into corn and rice fields.



**Table 1:** Time schedule

| <b>Date</b>            | <b>Activity</b>   |
|------------------------|---|
| <b>01/19 Monday</b>    | Traveled to San Jose and stayed the night.  |
| <b>01/20 Tuesday</b>   | Interviewed barangay captain of San Jose.<br>Hiked to Diwagden. Settle down in village and familiarize ourselves with the village.<br>2 interviews: Agta.<br>Observation: villagers making rice terraces. |
| <b>01/21 Wednesday</b> | 5 interviews:<br>3 Ifugao<br>1 Kalinga (from San Mariano)<br>1 Ilocano<br>Took panorama photo of Diwagden.  |
| <b>01/22 Thursday</b>  | 7 interviews:<br>1 Agta<br>1 Kalinga (from San Mariano)<br>5 Ifugao<br>Made map of Diwagden and did census with help of our guide Manong Amante Yog-yog and his sister Terisita.                          |
| <b>01/23 Friday</b>    | Hiked to Dunoy, while passing through San Isidro  |
| <b>01/24 Saturday</b>  | Travel back to Cabagan.   |

## RESULTS

In the next section, we present our results by answering the sub-questions.

### *What are the reasons for people to migrate to Diwagden?*

All 13 respondents from Diwagden were migrants. In several cases their parents moved to Diwagden when the respondent was a child, while in other cases they moved to Diwagden themselves. Therefore, the generation of adults now living in Diwagden were not born in the sitio and are migrants. Also the Agta we interviewed were not born in Diwagden but came from other parts of San Mariano. We should note that the Agta used to move around (are / were nomadic) and not settle permanently somewhere, but nowadays they tend to stay more in one place.

Our informants stated different reasons for deciding to migrate to Diwagden. The reasons also differ among the different ethnic groups. Agta decided to more or less stay in the same spot to be able to send their child to school. The Ifugao all mentioned that they or their parents came to Diwagden to find land that they could cultivate. The same goes for the Kalinga, but they also told us that they were in search for a new land to cultivate due to the war between the New People's Army (NPA) and the army of the government which forced them to go somewhere safe.

### *How do people manage the land in Diwagden and are there differences between migrants?*

Although the uplands are legally classified as forestland and owned by the government, people can actually in practice claim the land. As a consequence of this practice, an informal system of owning, buying and selling land was established. Claiming is done by planting banana trees around a piece of land and by getting consensus of others in the village. If a piece of land is still

covered with forest that would usually be removed by using slash-and-burn practices. We should note here that land grabbing is also a problem in the area. Conflicts

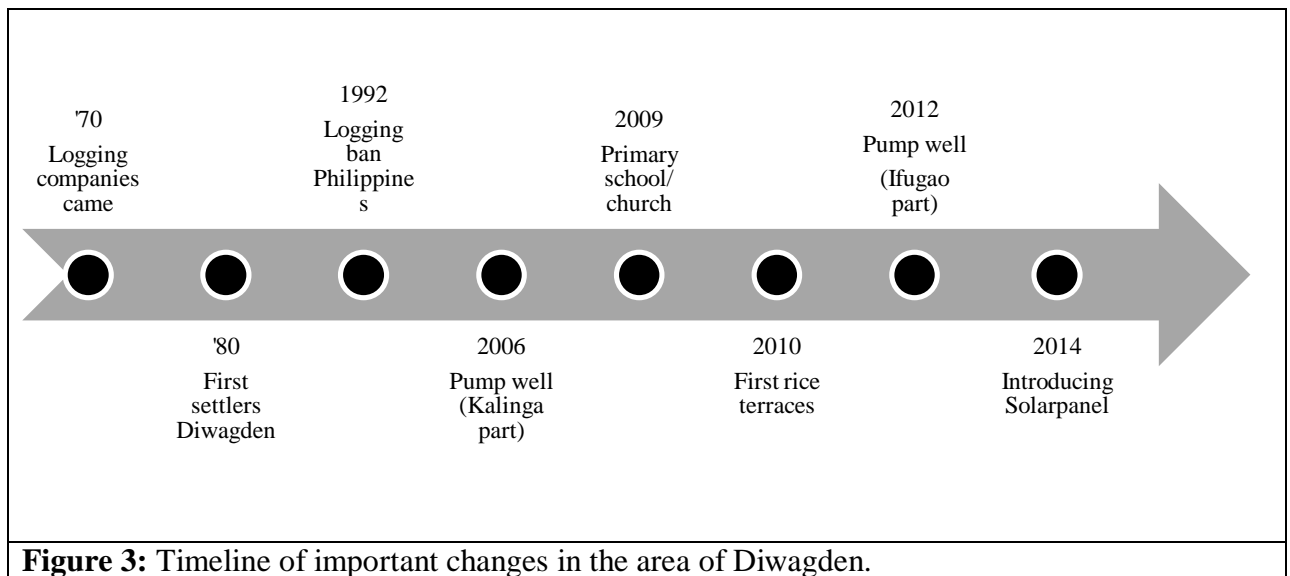


**Figure 2:** Ifugao people building a rice terrace in Diwagden, San Mariano (Photo by E.J. Versteeg 2015).

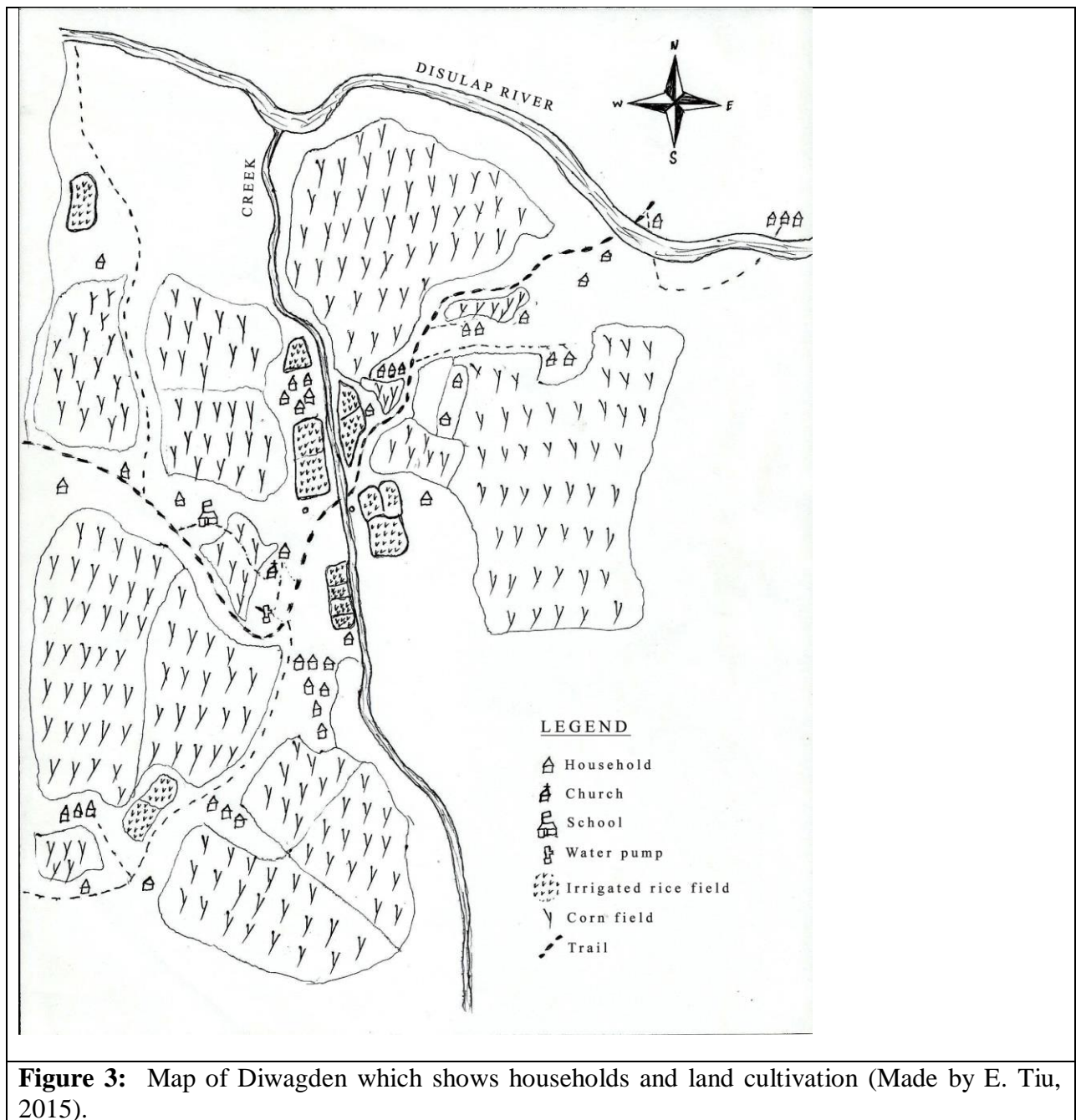
that can rise from these practices were said to be settled with the barangay captain, which lives in San Jose. Part of the informal system are the agreements people make with each other. We learned that the Agta have mainly agreements with the Ifugao in Diwagden.

With regard to agricultural practices, there are differences between the three main ethnic groups, namely Agta, Kalinga and Ifugao. Agta are hunter-gatherers

and their main source of livelihood is therefore the forest. Besides hunting and gathering, they also cultivate some corn, but mainly for their own consumption. The Kalinga in Diwagden cultivate irrigated rice and as an extra source of income also hunt and fish from time to time. Ifugao are the ones cultivating large parts of the area around Diwagden. Nowadays the main crop is corn, but since 2010 they also started building rice terraces to cultivate irrigated rice (Figure 2).



**Figure 3:** Timeline of important changes in the area of Diwagden.



***How is Diwagden developed since the first permanent settlers arrived?***

The first settlers told us that when they arrived in Diwagden, it was still covered with forest and only Agta people were living in and around Diwagden. The first migrants in the 1970s were the loggers but in the beginning of 1980s the first permanent settlers came. Our informant Ms. Terisita told us that when her parents arrived in Diwagden in 1983, only four Ifugao families and plenty of Agta were living there.

The influence from the Ifugao cannot be missed when looking around in the area of Diwagden. Around the sitio you can mainly see corn fields and since 2010, also rice terraces were used to cover the land (Figure 3).

Over the past years, many development projects were established (like the installation of the pump well, a school and rice terraces) which shows that Diwagden is developing in a faster pace (Figure 2).

In terms of regulations, there are also changes visible. An Agta respondent told us that they didn't need to ask permission to stay in one place before but nowadays, they had to. Almost all our Ifugao respondents told us that they had asked permission from the barangay captain to live in Diwagden. This shows that nowadays there are formal rules regarding migration into Diwagden.

***How will Diwagden look like in 20 years according to the inhabitants?***

Development of Diwagden is a work in progress. The timeline shows a lot of changes the last 10 years (Figure 2). When we asked respondents how they think Diwagden will look like in 20 years from now, they often answered that they think by then Diwagden will have evolved into a barangay. With this, they expect that the facilities like a high-school will become available. Also the construction of a concrete road was often mentioned. One respondent stated that "the construction of the road would be the door to development of the village". These kinds of changes would be welcomed with open arms, they told us.

When we asked the people if they thought that there will be enough land in the future most of them didn't know or couldn't respond to the question. Interestingly, we learned that Agta in Diwagden have sold a lot of and still sell land to migrants, but nowadays mostly make deals with Ifugao people. Depending on their financial situation, all the respondents would like to buy more land. The reason for this for some of them is ensuring a good inheritance for their children, while for others it is earning more money by having bigger yields from the land.

***How do the effects of migration on development in Diwagden relate to Disulap, Villa Miranda, San Isidro, Dunoy and San Jose in San Mariano?***

Why do people migrate to the research sites (Disulap, Villa Miranda, San Isidro, Dunoy and San Jose) in San Mariano? Two answers came up the most often. First, in every research site people answered that they migrated because of marriage. Secondly, except for Disulap, people were in search for vacant land and ended up in one of the barangays or sitios mentioned above.

However, between the villages there are differences in the size of the migrant population. In Disulap and Villa Miranda migration is not a big issue. Only 2 out of the 12 respondents were not born in Disulap at the moment of the interview, and in Villa Miranda the data showed that only 7 out of 20 respondents were born elsewhere, this being an indication of their migrant status. In San Isidro, 16 out of the 23 respondents were born somewhere else. San Jose and Dunoy can be seen as migrant hotspots. In San Jose, 10 out of 12 respondents were migrants and for Dunoy this was even 24 out of 25.

From all the research sites, Diwagden and Dunoy show most similarities. Both are remote villages at the foot of the Sierra Madre and have had a lot of migration. When we look at the duration of the stay we see that around 1/3 of the respondents in Dunoy are already living there for 20 or 30 years. Diwagden also knows a core of settlers, with people who were the first to settle. It seems that migrations come in waves, because in the past 5 years another large group of migrants moved into Dunoy. In Diwagden this was also the case, but these migrants were mainly the formerly nomadic Agta who decided to settle in the area of Diwagden.

Migration and development goes hand in hand. Although Dunoy and Diwagden are of the same size, Diwagden actually has more modern facilities. This is perhaps due the location of Diwagden near to San Jose and San Isidro.

## DISCUSSION

### **Conclusion**

In historical sources we can find that the Agta and Kalinga were the first to live in the area of San Mariano (Van Weerd 2015, pers. comm.). But until the beginning of 1980s, there were no permanent settlers in the area of Diwagden. Due to logging activities in San Mariano, migrants came into the area to find a job in hired labor sector. After the national logging ban in 1991 people who were already in the area started practicing farming and therefore created new villages. These villages are nowadays the larger barangays in San Mariano. Diwagden however is still a small sitio although the first migrants also arrived around the early 80s.

At the moment, Diwagden is a sitio in development. Every year new migrants come to Diwagden and new projects are started. Last year, there were more or less 25 households counted while our census showed a total of 37 households in the area of Diwagden, Upper Diwagden and Kamarasitan ( Van Weerd et al. 2014).

From a total of 145 inhabitants, 33% are Ifugao people from the Cordillera. This means that they have a large impact on the area. In search of land to cultivate because they are landless and the land in the Cordillera is expensive and mostly titled, they came to San Mariano where land is still relatively cheap and not titled. In practice, this means that people try to claim land that is not claimed by others. After they claimed the land, the forest will be cut to make room to cultivate the land. Of course, the land is actually owned by the government because of the classification as forestland (DENR 2015).

The reason that Diwagden is getting more popular for migrants is twofold. First, other parts of San Mariano are already taken and in the area of Diwagden, there is still land left that is not claimed because of its remote position. Second, the Ifugao people are used to cultivate steep areas and therefore the area of Diwagden on the foot of the Sierra Madre is no problem for them. This has even reached the point where Ifugao migrants are building rice terraces in Diwagden. The Ilocano people prefer the lowlands (Van Dam 1998a).

Due to migration, the population of Diwagden is growing. As a result, Diwagden is now a sitio of Barangay San Jose and is therefore also part of its ordinances. While in the past nobody had to ask permission to live in Diwagden, nowadays it is the other way around. We think it is likely that Diwagden will develop further in the future. According to the respondents inhabitants of Diwagden are open to it and the improvements of the last decade also show that. If a road would indeed be constructed, Diwagden could become more attractive for other migrants and would possibly grow again.

Based on our data, we would recommend more research on the development of Diwagden and the socio-economic and environmental consequences. If a road will be constructed, the life of the villagers is going to change.

### **Reflection on the research process**

Our research was a great learning experience for both of us. We learned a lot about conducting interviews and working in the field. One of our main challenges was getting the right information and making our questions understandable to the informants. We discovered that an informal setting gave us more information than following the order of the strictly set questionnaire. This had to do with the fact that we could ask follow-up questions and express our interest. It was also helpful to create a good atmosphere between the interviewers and interviewee. Related to this challenge we would recommend keeping the research to the point. The time in the field is short and you have to try to collect the right data. In our experience that is best done in an in-depth way, because people often do not give the right answer right away.

A comparative analysis would best be done with research groups that work on the exact same topic. Topic three became a melting pot of different sub-topics and therefore the comparative questionnaire was a burden to a lot of the research couples.

### **ACKNOWLEDGEMENTS**

We like to thank the people of Diwagden for welcoming us into their sitio and for participating in our interviews. Special thanks to our host family for opening their home to us. We also like to thank our tour guide and key informant Manong Amante Yog-yog Jr. for helping us in the field.

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## APPENDIX

### Questionnaire

#### Questions on background

1. Location:
2. Date:
3. Gender:
4. What is your name?  
T:anong pangalan mo?
5. How old are you?  
T:ilang taon kana?
6. What is your civil status?  
T:may asawa o wala
7. What is your ethnicity?  
T:ano ang inyong tribo?
8. What is your education level?  
T:ano ang natapos nyo?
9. What is your profession?  
T:ano ang trabaho nyo?
10. Of how many members consists your household?  
T:ilan kayong nakatira sa inyong bahay?

#### Questions on migration:

##### (ONLY FOR BARANGAY CAPTAIN)

Are there any formal or informal rules for new people who would like to live in this place?  
(what kind of?)

(Meron pa bang pormal o di primal na batas para sa mga bagong nakatira ditto? (ano ang mga ito?))

##### (FOR INHABITANTS)

Where were you born?

Saang lugar ka ipinanganak?

How long do you live here?

Gaano katagal kana po dito?

Where would you like to live and why? (fun question)

Saang lugar mo gustong tumira? Bakit?

Do you think there should be rules for new people living in this sitio? Why?

May alam ka po bang Batas na dapat sundin para sa mga Bagong nakatira dito sa sitio? Bakit?

##### (ONLY IF A PERSON HAS MOVED TO THIS PLACE)

Why did you move to this place?

Bakit ka lumipat sa lugar na ito?

Where did you live before you came here? (try to ask for the municipality and the specific barangay)

Saan ka nakatira bago ka lumipat dito?

Why did you leave the former village?

Do you intend to stay here your whole life? (Yes or No. If no: why not?)

May Balak kaba na tumira ditto Habang buhay? (Oo : Hindi)

What steps did you had to do to settle here? (If there is no answer you can suggest for example; ask permission to the barangay captain, pay money.)

Anong mga hakbang na ginawa mob ago ka tuluyang tumira ditto? (kung walang sagot magbigay ng mga Halinbawa: Humingi kaba nga pahintulot sa punong Barangay o nagbayad ka ng pera?)

Questions on land tenure:

Do you have any land?

May lupa ba kayo?

How much land do you have?

Gaano kalawak?

Do you have a title? (Can we see it? OPTIONAL)

May titulo ba kayo? (Pwede ba naming makita? Ok lang kung wala)

How did you obtain the land?

Paano niyo nakuha yung lupa?

What are your future plans with your land?

Ano ang plano mo sa lupa para sa hinaharap/kinabukasan?

Sell it (Ibebenta mo ba?)

Buy more (Bibili ka pa ng iba?)

Obtain rights/secure title (Iapatitulo mo ba? o ipaglalaman mo ang karapatan mo)

Other..... (ano pa?)

Questions on Diwagden

Do you know about Forestland and Alienable & Disposable land? (If yes: what do you know about the differences?)

Can you draw a map of how the area looked like when you arrived? (houses, land cultivated, water sources and other marking points).

Can you draw a map of how the area looks like nowadays? (houses, land cultivated, water sources and other marking points).



# MIGRATION AND LACK OF LAND IN VILLA MIRANDA, BARANGAY DIBULUAN, MUNICIPALITY OF SAN MARIANO

**Leonisa Telan & Laurie Kos**

## INTRODUCTION

The topic of this study is on access and management of natural resources. Access to and management of an area can be influenced in many ways. This study is focusing on the access and management of migration and on the further influence of the migration on management of natural resources in an area. In the Philippines, there is a lot of migration towards uplands but there are little strategies how to deal with this trend (Lasco 2015). For this research we gathered information through a comparative analysis within six areas in the Municipality of San Mariano. As such the research questions will be about the motives behind the migration, regulations on migration, and how migration influences the area were the newcomers migrate to. Migration to an area causes an increase in population growth which might influence the availability of natural resources such as land and water. There has been little research done on this topic; therefore, this research is relevant to obtain more understanding on how research areas deal with the increasing migration and how this influences access and management on the natural resources of an area.

### **Research location**

This research is conducted in the municipality of San Mariano in Barangay Dibuluan in the sitio 'Villa Miranda'. This sitio was formerly known as Andarayan but is renamed of the Family of Miranda who bought most of the land of the sitio. Villa Miranda is surrounded by the Catallangan River and has a lot of forestland. The land in the area is mostly flat. The sitio is around 150 years old and there is a lot of diversity in ethnicities: Kalinga, Ifugao, Ilocano and Agta. There are different records about the amount of households but according to the records of the Watercourse of 2014 and a barangay official there are between 80-90 households. The inhabitants of Villa Miranda are mostly farmers and cultivate corn, sugarcane, cassava, rice and bananas. The Catallangan River is the major source of water for agriculture and domestic uses. The NGO Plan International has been working in the Barangay to assist on water supply. Furthermore, a group of inhabitants have been organized into a 'Cooperative'. This is a family organization which among others provides clean water to houses in exchange for a membership fee.

### **Theoretical background**

Many scholars described types of migration patterns worldwide (Lee 1976, Cox 1976, Kosinki and Prothero, 1985, Fritsma 1998). In this research, we refer to the way Cox (1976, in Fritsma 1998) described migration as “the movement of individuals or groups from one place of residence to another, with the intention of remaining in the new place for a substantial period of time”. Kosinki and Prothero (1985 in Fritsma, 1998) divide three categories on movement of people: daily, temporary and permanent migration, which involves a permanent residence of at least six months in the host community. In this research we will focus on the last type of residence. In order to specify the type of migration further, we can follow the distinction by Narain (1987 in Fritsma 1998) about internal migration in intra-regional migration and inter-regional migration. The first is migration within the same region but between different communities and the latter is migration between two regions of the same country.

## **Causes for migration**

The causes for migration stem from different factors. Contextual factors as economic, political and environmental factors provide constraints or possibilities for people to migrate. From an economic perspective, the division of land, tenure situation available and work can highly influence a person's decision to migrate somewhere. From a political perspective, the (local) government can also encourage or restrict people's wishes to migrate to another place. Last but not least the environmental setting like unoccupied land which is suitable for agriculture, land quality and natural calamities as flooding also influence the decision making process of households. For households themselves, household-size, availability of land and income are also important factor (Fritsma 1998).

Lee (1985) states that a reason for migration can be joining family and friends, who previously migrated to the place of destination. Lee (1985) describes that kinship ties in the Philippines appear to be an important factor in individual migration decisions. By external linkages Lee (1985) means that people who are less educated, older and married and who have no previous experience in migration will more likely rely on external linkages than others (Lee 1985).

### ***The impact of migration on an area.***

Fritsma (1998) writes about agricultural colonization in the Philippines; where people on a structural or individual level migrate to uninhabited parts of the country to transform uncultivated land into farms. This process can be regulated by (local) governments or by initiatives of pioneers. Fritsma (1998) states that frontier migration implies that opportunity motives outweigh scarcity motives in deciding to migrate.

Frontier migration is a form of agricultural colonization. This type of migration plays an important role in the Philippines: the movement from people of the lowlands to the uplands. Lasco (2015) states that there is a lot of migration to the uplands and stressed that there is not yet a strategy of upland management. In addition, De Vera (2015) notes that lowland farmers who migrate to uplands often still use their lowland farming techniques, which causes problems in upland areas. Ravenstein (1885, in Fritsma 1998) emphasizes that migration increases in volume as industries and commerce develop and transport improves. Frontier migration is an important environmental problem as it is often linked with deforestation. The agricultural expansion on an area can push the pioneer front into the forest which can imply scarcity deforestation, and a scarcity of forest products. Other examples of overexploitation of an area with many people are a lack of water or land (Fritsma 1998, De Jong 2003).

## **RESEARCH QUESTIONS**

According to the literature, migration can influence an area and its natural resources on large scale. This research is focused on how migration over the past years influenced land tenure in Villa Miranda. Therefore our research question is as follows:

How is land tenure in Villa Miranda influenced by migration? To answer the main question we came up with four sub questions:

Sub question 1: What is the history of migration to Villa Miranda?

Sub question 2: What is the current situation of migration to Villa Miranda?

Sub question 3: How does migration in Villa Miranda relate to the other research areas Disulap, Diwagden, Dunoy San Jose and San Isidro?

Sub question 4: What are the perceptions from the inhabitants of Villa Miranda on the possible effects of migration on natural resources?

## METHODS

### Comparative research

In this qualitative study on migration, the data was collected in six areas in the municipality of San Mariano. The following research locations were part of this research: Disulap, Diwagden, Dunoy, San Isidro and San Jose. The comparative questionnaire (see appendix 2) consists of 5 topics with questions where one topic is focused on migration and its influences on an area. In each of the research locations a separate team interviewed inhabitants with the comparative questionnaire using random sampling. The teams used structured questions on migration and land tenure (see Table 1 for the number of interviews per research areas).

In this research, we write about migration and migrants. However in the questionnaire we phrased the term migrants into 'newcomers' because this term was easier to understand for our respondents. We use the term to refer to individuals or groups who moved to another place of residence with the intention of a permanent residence of at least six months in the new area.

**Table 1:** Number of respondents per research area

| <i>Research area</i> | <i>Respondents</i> |
|----------------------|--------------------|
| Disulap              | 18                 |
| Diwagden             | 5                  |
| Dunoy                | 26                 |
| San Isidro           | 25                 |
| San Jose             | 12                 |
| Villa Miranda        | 23                 |

### Case study

Besides the comparative analysis, the focus of this research is the Sitio Villa Miranda. In this sitio, 23 semi-structured interviews were conducted, based on random sampling. We had one key informant who was the only barangay official we were able to interview named Mr. Remigio Tagao. We used the structured questions according to the comparative questionnaire but also asked 5 extra in depth questions. We tried to interview inhabitants who lived in different parts of Villa Miranda to collect a random sample of the inhabitants (see annex 1). The field work took place between 19-23 January 2015 (Table 2).

**Table 2:** Time schedule research Villa Miranda, San Mariano municipality 19-23th of January 2015

| <i>Monday 19 of January</i> | <i>Tuesday 20 of January</i> | <i>Wednesday 21 of January</i> | <i>Thursday 22 of January</i> | <i>Friday 23 January</i> |
|-----------------------------|------------------------------|--------------------------------|-------------------------------|--------------------------|
| Arriving in the afternoon   | Conducted 7 interviews       | Conducted 12 interviews        | Conducted 4 interviews        | Left in the morning      |
| Orientation of the village  |                              |                                | Draw a map of the area        |                          |

### Field validation

To validate the data obtained from the interviews, we used secondary data as well. During the fieldwork we noted down our observations in the field. Furthermore, we took several pictures to illustrate our data. Unfortunately, there was no information to be obtained from the Barangay Captain or the Secretary. They were away at the time therefore we were not able to interview them. Due to changes in the time schedule of the study program we were also not able to conduct interviews and extra documentation from the municipal office of San Mariano.

### **Reflection research**

As far as the research itself we would like to mention some suggestions for a follow up research. In the first place, data from the barangay captain, secretary and the municipality of San Mariano should be obtained. This can provide reliable data and can be an opportunity to verify information from the interviews. We would therefore encourage a follow up research to include possible valuable information such as specific numbers on households/families for the past years (to see if there is an increase), ordinances about migration or the specific steps which migrants have to take when moving to an area. Secondly, it is possible that some of the data got slightly misinterpreted by the respondent or the researcher due to translation from English/Tagalog into Ilocano or Ibanag and then back to English. Before going into the field it would be wise to test the questionnaire in a pilot area and to see whether your questions are being understood and how the translation between the research partners can be improved. Thirdly, a larger research population in Villa Miranda can provide more thorough data. We would recommend a follow up research which would encourage interviewing at least half of the households from Villa Miranda. Despite these shortcomings we are content with the cooperation during the research and in the fieldwork. By discussing experienced difficulties in the beginning of the fieldwork we avoided irritations and had an interesting and enjoyable time. We are satisfied with our sample of 23 informants given the short period of time we had for our fieldwork.

### **RESULTS**

#### **Sub question 1: What is the history of migration to Villa Miranda?**

There is little information known about migration in the region of Villa Miranda before the Second World War. Villa Miranda is part of the ancestral lands of the Kalinga tribe who were therefore the first ethnic group living in these lands and the earlier settlement of Catalanganes (referring to their dialect and the river in the area) (De Jong 2003). De Jong states that during the mid-sixties the first Ilocano migrants came to Villa Miranda. Knibbe and Angnged (2004) mention that in the 70s and 80s more Ilocano and Ifugao immigrants started settling in this area, looking for vacant land. In the 70s, the Ilocano already outnumbered the Kalinga. In the same period there was a logging boom in the area. De Jong (2003) mentions that the logging activities caused more migration to the area of Villa Miranda which influenced the area. For example major forest areas were cut down and agriculture spread widely. Destructive practices were applied by the migrants such as unsustainable upland agriculture, dynamite fishing, and timber poaching. After this period many loggers settled in the area and began to cultivate crops for selling and own consumption (Van Weerd en Van der Ploeg 2012, Cacayuring and Aartsen 2015). The three elderly informants of this research who migrated even before that period to Villa Miranda were in fact Kalinga (1) and Ilocano (2). They confirmed that their families moved to Villa Miranda looking for land to cultivate. Rodrigo Aginaldo, 73 years old, stated *"When I was 14 years old we came to live here. There were only 6 households and there was still a lot of forest"*. Remegio Tagao, 57 years old, told us *"My family opened up some forest land to cultivate. But in the 70's a lot of loggers from Bicol came to move here and cut trees"*. Knibbe and Angnged (2004) state that until recently Villa Miranda and other areas along the Catallangan were less accessible from the lowlands, only by foot and water buffalo from the remote Palanan to San Mariano. In the late 90s, the road to Villa Miranda was improved and people began to plant yellow corn because they realized that this could be sold in the market for a good price. Walking through area of Villa Miranda, we observed a lot of corn lands and many respondents mentioned that they cultivate corn.

Knibbe and Agngned (2004) mention that their informants told them that land is getting scarce and that they have to go further in to the forest to find new land for farming. They also state that a dispute over landownership has been fought out at the time of their research and write that the importance of land ownership has increased.

**Subquestion 2:** What is the current situation of migration to Villa Miranda?

The current population mostly consists of Ilocano and Kalinga. Using random sampling we selected and interviewed 23 people. From them, there were 8 who were of mixed Kalinga – Ilocano origin, 6 Ilocano, 3 Kalinga, 2 mixed Ilocano - Ibanag, 1 mixed Ibanag - Kalinga, 2 Ibanag and 1 Agta (see figure 2).

Of the 23 respondents, 13 were born in Villa Miranda while 10 were born somewhere else but all within the province: 3 in Minanga, 2 in Alibadabad, 1 in Disulap, 1 in Malunak Soliven, 1 in Binatug, 1 in Centro San Mariano and 1 in Centro San Jose (see Appendix 2 for a map). Although almost half of our respondents were not born in Villa Miranda according to interviews with the informants and the key informant the barangay official Remigio Tagao, there was no migration movement to Villa Miranda. All of the 23 people who were interviewed were farmers. They still cultivate corn like the previous migrants but expanded their land use with cassava, banana and rice.

**Motivations to migrate to Villa Miranda**

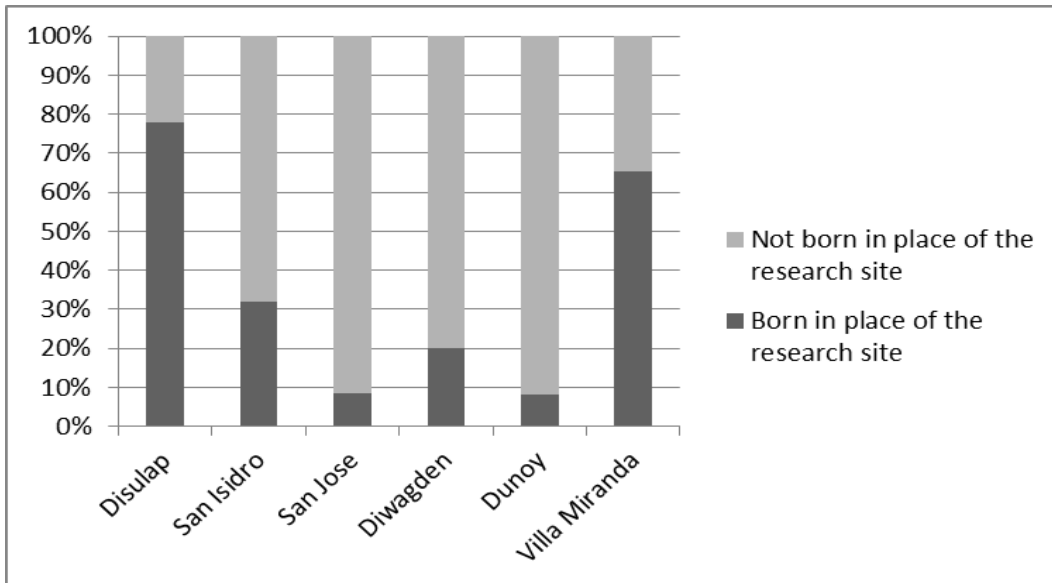
The motivations from the 6 respondents who moved here more than 30 years ago were source of living and vacant land. From the respondents who migrated here in the past years three moved because of marriage, two because of source of living, one because of children living here, 1 because they were able to get a house here from family members.

From the 23 respondents, 10 expect more family members to come to Villa Miranda mainly because of marriage and source of living. 60% of the respondents stated they liked living in Villa Miranda because of the free food (vegetables, fruits and wild animals).

**Sub question 3:** How does migration in Villa Miranda relate to the other research areas Disulap, Diwagden, Dunoy San Jose and San Isidro?

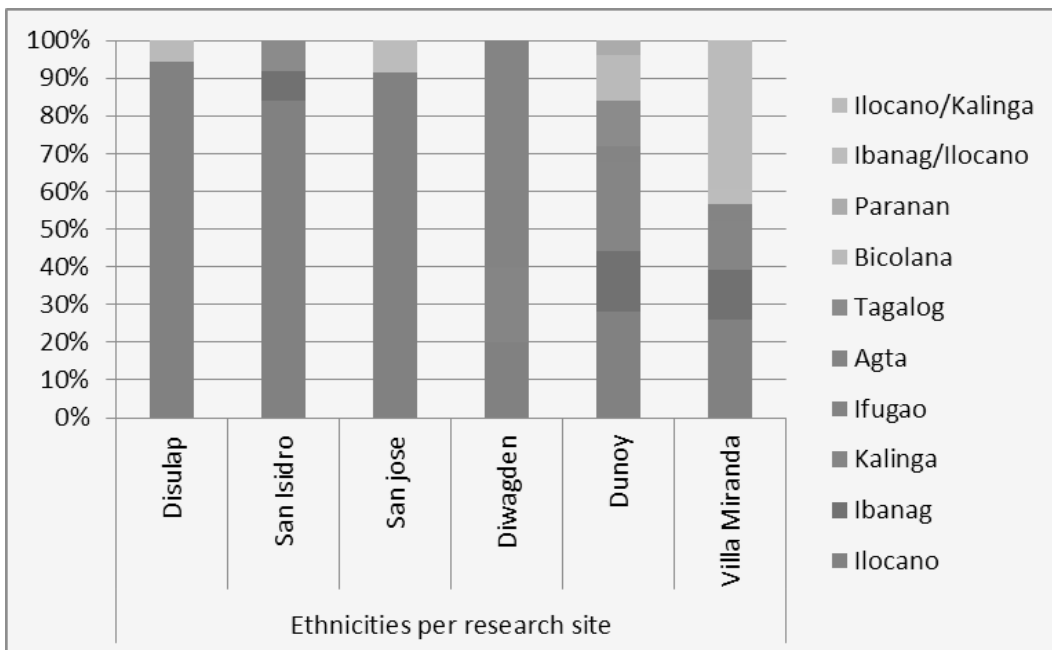
In this subquestion, we compared the results of our data in Villa Miranda with the other research areas: Disulap, San Isidro, San Jose, Diwagden and Dunoy.

In the figure below we learned that only in Disulap (70%) and Villa Miranda (65%), more than half of the respondents were born in the areas where they were currently living. Dunoy (5%) and San Jose (8%) and Diwagden (20%) have the least original inhabitants among their respondents. San Isidro holds a position in the middle (30%) of the respondents who were born there.



**Figure 1:** Percentage of respondents per research site are who are born or not born in the place of the research site

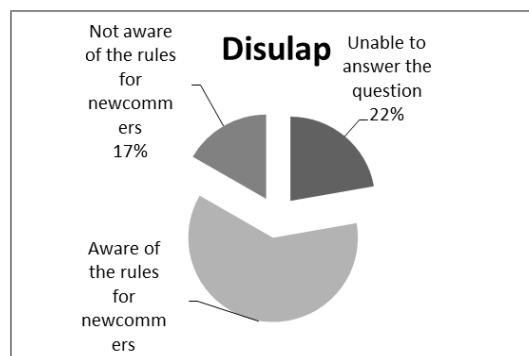
Furthermore, we compared the ethnicities among the research sites (Figure 2). There is an obvious overrepresentation of Ilocano among the places. In the areas of Disulap, San Isidro and San Jose there are only 2 or three ethnicities among the informants and no Kalinga people. In Diwagden, Dunoy and Villa Miranda, 4 to 7 ethnicities were among the respondents and in these three villages there were Kalinga informants.



**Figure 2:** Percentage of the ethnicities of the informants per research site

The informants who were not born in the place where they were now living are also asked if they knew of any rules for new people who come to live in their areas. Most of the people were aware of rules considering migrants (Figure 3). These informants described that when a person likes to live in their place he should ask permission from the barangay captain and that after six months he will be considered as new inhabitant in the area. After this period they are also allowed to vote during elections.

In Villa Miranda, the interviewed migrants were asked what steps they had to follow to be allowed to live permanently in Villa Miranda. From the interviewed migrants 6 of the 10 were approached by the barangay captain. Furthermore 5 of the 6 had an interview with the barangay captain and mentioned that they were asked why they came to live here and if they were family of any earlier inhabitants.



**Figure 3:** Percentage of informants in all research areas who were aware or not aware concerning rules for migration

None of the respondents knew of any cases where permission to live in their area was not granted by the barangay captain. Four respondents were not interviewed by the barangay captain, two of them state they did not need an interview because they married an original inhabitant. Another two other informants told us there was no barangay captain in that time or any rules for migrants. The barangay official was unable to tell us when the rules got implemented but he guessed that was in the 1990s. He also told us that the rules among migrants were ordinances from the municipality of San Mariano. He was unable to repeat what exactly was stated in the ordinance but he mentioned that migrants should receive a permit after they got interviewed by the barangay captain. However none of the respondents had a document which could serve as a permit. Unluckily we were not able to go to the municipal office of San Mariano to verify the ordinance about migration.

**Sub question 4:** What are the perceptions from the inhabitants of Villa Miranda on the possible effects of migration on natural resources?

The informants of Villa Miranda were asked if they were satisfied with the current rules for migrants. 17 of the informants stated they were satisfied with the rules as they were now. Two respondents did not know about rules and were therefore unable to answer if they were satisfied. Four people mentioned they were not satisfied with the current rules. From two of them it became clear they did not know the rules after all because they mentioned that there should be an ordinance and an interview with the migrants, which as stated above is already an ordinance. However the other two respondents gave a more critical note. One of them stated that migrants *"grab land without asking permission"*. He stated that migrants will also cause population growth and that more people will not improve the poverty in Villa Miranda. This man mentioned furthermore that there were inhabitants of Dunoy who come here to plant and cultivate illegally on the land of Villa Miranda. The barangay official confirmed this story about illegal planting. The second respondent who was not satisfied with the rules on migrants told us the rules should be stricter because population growth will increase. He said that population growth will cause more fighting and killings related to land use.

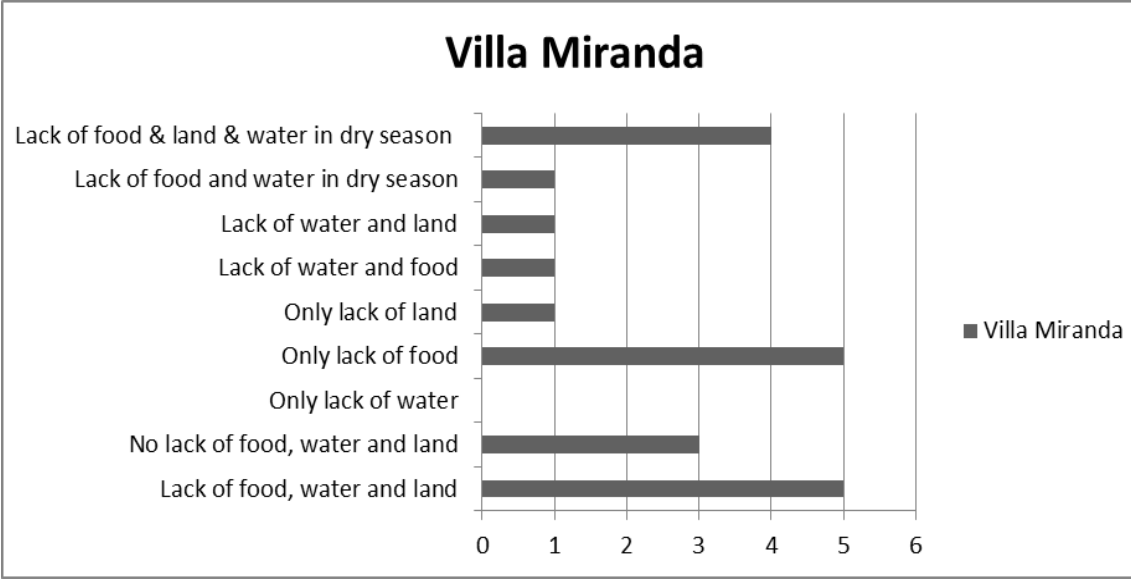
In total, there were 4 respondents who mentioned there were fights on land and two of them also talked about killings. The barangay official stated that the barangay police is afraid to come to Villa Miranda because of the killings. They therefore ask the barangay official and his colleagues to analyze the fights, report to them and also accompany the persons involved in bringing them to the police station of San Mariano.

We have asked the informants if they owned land and if they had titles for this land. Of the 23 respondents, 20 told us that they have land. From those 20 respondents, 9 had no title to their lands. Six of the respondents stated that parts of their land had titles, two had titles from their

parents, two bought land and one respondent did not know if they had a title to their land. All of the respondents stated they would like to buy more land and secure titles if they had the money for it. None of the respondents had titles for all their land.

Furthermore we have asked the respondents about whether they notice population growth in Villa Miranda. Almost all of them (20 of the 23 respondents) said there was population growth. When the informants were asked on how many children they had, most of them responded to have between 5-8 children.

Lastly, the 23 respondents were asked if they experienced lack in land, water or food. The answers on this question can be found in figure 4.



**Figure 4:** Amount of informants in Villa Miranda who experienced a lack in either water, food or land or a combination of these three natural resources

From the 23 informants, only 3 did not experience any difficulties with water, food or land. This is opposed to 5 informants who experienced a lack in all three natural resources. 4 persons described to have a lack of water in dry season and a permanent lack of food and land. Furthermore, 5 persons experienced only a lack of food and the other respondents experienced a lack in one or two of the three.

**DISCUSSION**

Regarding sub questions 1 and 2 we can conclude that there used to be a large migration movement to Villa Miranda between the 60s and 80s and in that time Villa Miranda has expanded and more (forest) land has been exploited, agriculture increased rapidly and the access to the area was improved. Our data is in line with the literature of Fritsma (1998) and de Jong (2003) who also describe about how the logging area and migrants looking for vacant land in that period heavily influenced areas. The migration has stabilized around the 1990s. Nowadays there is little migration and people mainly migrate because of marriage or joining families. Almost half of the respondents expect more family members to move to Villa Miranda in the future. The motivations for migration to Villa Miranda have changed from looking for vacant land in the 1990s (Fritsma 1998) to join kin or family which is a major reason described earlier by Lee (1985).



We have also related the obtained data to the other research sites in San Mariano, accordingly to sub question 3. We noticed that San Jose, Dunoy and Diwagden have the most migrants in their areas while Disulap and Villa Miranda, the older villages have a more balanced number of people who are born or not born there. Looking at ethnicities Villa Miranda has a high number of Ilocano/Kalinga respondents compared to the other villages. This might be because Villa Miranda was already a village before the logging boom took place and therefore has a mix of the old Kalinga tribe members and the Ilocano migrants. The other villages are relatively younger.

We used the comparative data to find out about the awareness of the respondents considering rules for migrants to the area. More than half of the informants were aware of some sort of rules for migrants. However when we asked migrants about the implementation of the rules to their presence in Villa Miranda it seemed that the implementation of the rules was not always applied. Most people had an interview with the barangay captain but none of them ever received any proof of residency about which the barangay official told us that was obligated for migrants. However there is little data to verify the actual ordinance on migrants and we were unable to speak to the barangay captain about his interviews with new people.

Almost all respondents were content with the current rules on migrants. Only two respondents reacted more critically stating that migration would cause more population growth and therefore lead to more land scarcity. This is in line with Fritsma (1998) who states that migration can lead to lack of land in an area.

Furthermore it was interesting that four people mentioned fights and killings in Villa Miranda. Surprisingly the barangay official told us that the barangay police was afraid to settle these fights and were reluctant to come to Villa Miranda. From this we can certainly conclude that these fights must be rather violent and intimidating. Unfortunately this could not be verified with the barangay captain or the municipality of San Mariano. However it seems clear that there is a lack of land which is causing irritations between the inhabitants of Villa Miranda. This can be verified with another question about whether informants experienced a lack of water, food or land. The lack in food and land were the most named natural resources. If we relate this to our data which shows that almost all our respondents mentioned a population growth in Villa Miranda, these irritations about land might become a bigger problem in the future.

When looking at the causes of the experienced lack in land, migration was only mentioned two times during the interviews. Since there is nowadays little migration to Villa Miranda, migration will probably no longer be a cause for the current increasing population growth. From our data it became clear that the increase in population was related to a lack in natural resources. It can be concluded that there is a lack of water, food and land due to the population growth in Villa Miranda.

Particularly the lack of land seems already to be a reason for conflict. This issue is important to address, especially that we conclude from our data that there will be a continuing increase of the population in Villa Miranda. This will imply more people who have to live somewhere and there are more mouths to feed. Seeing that a lot of people live from the food of land, a scarcity in food and land is intertwined. There are two other possible scenarios which have to be kept in mind as well. The first scenario is that almost all the interviewed migrants expect more people to come, which will also lead to a population growth. A second scenario is the possibility that people will buy more land or secure titles on their current land. All the people who had land

had intentions to secure titles on their current land and to buy more land. If this happens, this might also put more pressure on the issue of land scarcity. These intentions were mostly all about when the family had more money in the future but must nevertheless keep in mind regarding the issue on land.

We would encourage the municipality of San Mariano and the barangay officials to see this matter as a priority and to discuss possible options on how to deal with the current fights and how to prevent more fights in the future. Possible recommendations can be to implement some sort of family planning so that the population will not rapidly increase. Another recommendation is to discuss the issue on land scarcity with the farmers and to come up with ways to cooperate on land with cultivating or work together on pieces of land. Thirdly, we encourage the municipality of San Mariano and the barangay police to stop agricultural encroachment by people from outside of Villa Miranda. Finally, we recommend the officials to obtain more clarity on land and the titles so that they can have an estimation how much land is currently occupied and might be claimed in the future.

#### ACKNOWLEDGEMENTS

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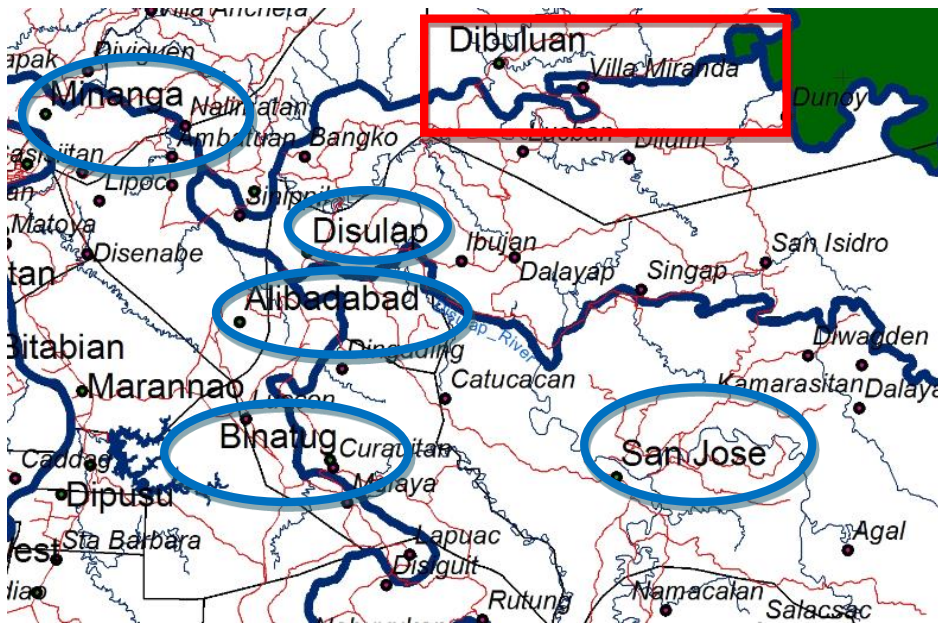
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**Annex 1: Map of Villa Miranda**



## Annex 2: Origin of migrants in Villa Miranda



Migration from the 50s/60s to Villa Miranda: Mostly from Minanga. Recent migration from the 90s to Villa Miranda: Mostly from San Jose, Disulap, Alibadabad, Binatug

## Annex 3: Questionnaire:

Basic information:

- Location
- Date
- Name respondent
- Age
- Gender
- Ethnicity
- Education
- Profession

- Where were you born?
- How long do you live here?
- Where would you like to live and why? (fun question)
- Do you think there should be rules for migrants/newcomers to this area?
- Are you satisfied with the current sort of regulation on migrants, Why (not)?
- How do you look at the population growth in Villa Miranda? Do more people cause difficulties with sharing water? Or land? Or something else? No answer: Is there a scarcity in something?

**Only if the person is born in another place ask following questions as well:**

- Why did you move to this place?
- Where did you live before you came here? (try to ask for the municipality and the specific barangay)
- *Would you consider yourself from this place and why?*
- Do you intend to stay here your whole life?
- What kind of steps did you have to do/follow to settle here? (for example, ask permission from the barangay captain, pay money..)
- *Do you still have kin/family relations with your former place?*
- *Do you expect more family members coming to this place? Why?*

**Questions for the Barangay captain:**

- *Do you have a map of the area?*
- If not: can we draw a map with your help?*
- *Where do the most recent newcomers of Villa Miranda live? When did they arrive in Villa Miranda?*
- *Where do the most recent newcomers come from?*
- *Why do you think the newcomers move to Villa Miranda?*
- *Are there more newcomers moving to Villa Miranda in the last five years?*
- *Do you observe scarcity in land or water or other things due to more newcomers moving to Villa Miranda?*
- Are there any formal or informal rules about newcomers in this place?
- *If there are ordinances: when are they implemented? Can we see/read them?*
- *Do you think the people are aware of these rules?*
- *Which steps do the newcomers have to follow to live here?*
- *Are you happy with these rules for newcomers? (Or do you think they should improve)*

## LAND TENURE SCENARIOS IN SAN JOSE, SAN MARIANO

**Learnie Cabalonga and Lisa van Leeuwen**

### INTRODUCTION

Within the Philippines there are two types of land: alienable and disposable land (A&D land) and forestland, which is government owned (Huijbregts 1996). Most of the forestland is actually not covered with forest anymore, due to intensive logging activities from the 1970s to the beginning of the 1990s. The deforested land is still classified as forestland, since the Philippine national law states that land with a slope larger than 18% must be classified as forestland (Oposa 2002). Most of the marginal land that was left after the deforestation activities is now used for agricultural purposes (Snelder 2015). However, since the land is already owned by the government, it is legally impossible to own a title over this land (Hambach 1998). It is because of this law that people that live on forestland are illegal settlers. They do not own any rights or title concerning the land. A&D land on the other hand can be titled. People are able to obtain a title and property rights to the land.

In the municipality of San Mariano, in the Isabela province, in Northern Luzon, there are many illegal settlers. This is caused by large scale deforestation in San Mariano. The forest cover declined by 10,165 hectares in a period of 16 years (LGU San Mariano 2010). In this research we have focused on Barangay San Jose, located in the municipality of San Mariano. We will examine the land tenure scenarios in this specific Barangay to get a better understanding of how people secure their land in San Jose.

San Jose is a village 25 kilometers from San Mariano proper. It is bounded on the north by Sitio Nursery, Barangay Disulap, on the south by Barangay Casala, on the east by Palanan and on the west by Binatug (Plan International 1998). The Northern Sierra Madre Natural Park (NSMNP) is east of San Jose. The area used to be part of the Sierra Madre forest and is the original homeland of the Agta indigenous community. During and after the large scale deforestation that ended in the 1990s, San Jose attracted different people. The early settlers, the Ilokano, which are seen as original inhabitants together with the Agta, and the later settlers, migrant communities like the Ifugao, obtained land in the region. The Barangay now hosts a mix of original inhabitants and migrant communities, but the Ilokano are still the dominant ethnic group. The total population in 2010 was 2235 within 561 households (NSO Census 2010).

The management of land and land tenure depend on the type of land and on the claim people can make to their land. By the type of land we mean A&D land and forestland. Based on our findings we distinguished three groups in our research: the ones that have a title to the land, the ones that do not have a title but do have formal property rights and people with informal possession rights without any title or property rights. In this research, we have used the following definition of land property: “an entitlement permitting the holder to exercise superiority against others over some aspects what he seeks to control” (Murphy 1977). Another important concept in our research is land tenure. By this we mean the method by which individuals or groups acquired, hold, transfer or transmit property rights in land (Ogolla 1996).

People living in forestland can obtain property rights to their land with temporary tenural instruments, introduced by the government. Examples are government programs like the Social Industrialized Forest Management Agreement (SIFMA) and the National Greening Program

(NGP). SIFMA is an agreement between a person and the Department of Environment and Natural Resources (DENR) by which the latter grants the right to develop, utilize and manage some forestland to the person in order to reforest the area (DENR 2015). This agreement gives the person temporary property rights for a period of 25 years. The conditions of the SIFMA include that the person will use 90 per cent of his land for reforestation and 10 per cent for his own agricultural purposes. SIFMA was introduced in San Mariano but the program was cancelled in 2004 because the beneficiaries did not follow the provisions of the agreement (Yadao 2015, pers. comm.).

The NGP is a livelihood program, initiated in 2011 by the DENR, to rehabilitate forest on open land. Farmers on public land with an area larger than 50 hectares can apply for the program. The NGP pushes and educates the beneficiaries to practice agroforestry: a combination of crops and trees. The NGP is introduced on a national level and it is also implemented in the municipality of San Mariano.

### RESEARCH QUESTION

In order to get a better understanding how people obtain and secure their land, we would like to answer the following question:

*How do people obtain and keep their land in San Jose, San Mariano?*

To be able to answer our research question, we will use the following sub- questions:

1. How do people obtain their land?
2. How do people keep and protect their land?
3. What motivates the people in San Jose to choose to legalize their land, or not to do so?
4. Are people aware of their current and possible future rights concerning their land?
5. How is land tenure in San Jose related to land tenure in the other villages in San Mariano?

### METHODS

**Table 1:** Time schedule

| <b>Date</b>               | <b>Location</b>                      | <b>Activity</b>  |
|---------------------------|--------------------------------------|--|
| Monday 19 January 2015    | Cabagan-San Jose                     | Travel from ISU Cabagan to San Jose, arrival in the late afternoon in San Jose   |
| Tuesday 20 January 2015   | San Jose                             | Meet our host family, interview Barangay captain, introduce ourselves, obtain information about San Jose, interviewed 7 other respondents  |
| Wednesday 21 January 2015 | San Jose                             | Interviewed 8 respondents  |
| Thursday 22 January 2015  | AM: San Jose<br>PM: San Mariano, LGU | Interviewed 3 respondents, after lunch traveled to LGU San Mariano, interviewed MENRO official and Local Assessment Operation Officer I in the Assessors Office, traveled to rearing station |
| Friday 23 January 2015    | San Mariano, Dunoy                   | Traveled from rearing station to Dunoy, released crocodiles  |
| Saturday 24 January 2015  | Dunoy, Cabagan                       | Return to ISU campus Cabagan   |

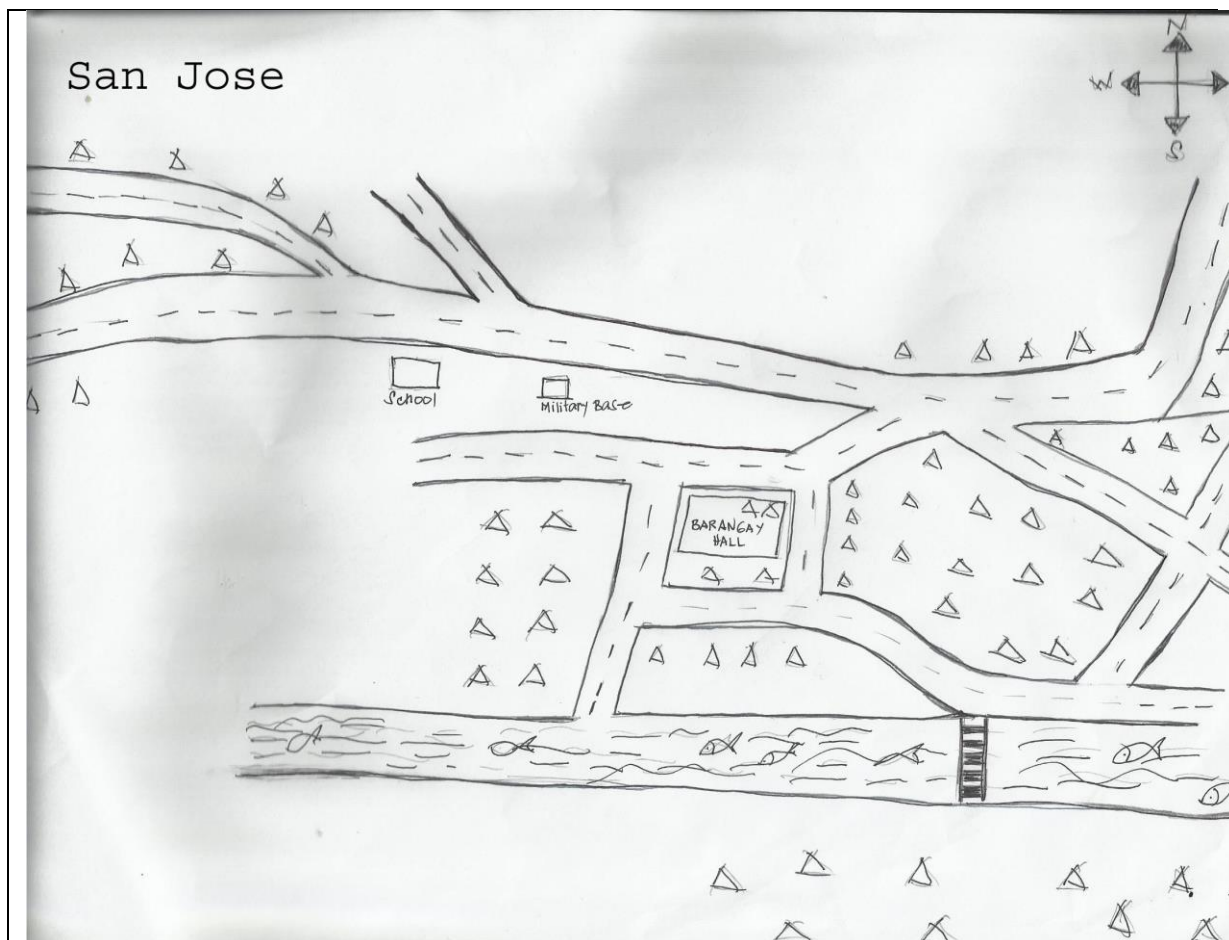
For this research we conducted interviews in San Jose from January 20 to January 22, 2015. Our group of respondents consists of the inhabitants of San Jose, including the Barangay Captain of San Jose, and also the Local Government Unit (LGU) officials in San Mariano. The preparation for the fieldwork took place in the ISU campus in Cabagan.

Farming is the main livelihood activity in San Jose (Plan International 1998). For that reason almost every household owns some land which qualified them as our respondents. To answer our research question, we distinguished three categories of people:

- Those with titled land
- Those with formal rights to land but no title
- Those with informal possession rights but without a title or formal rights

We aimed to have an equal distribution of these three groups. Therefore, we took a non-random sample of the population to represent our categories. Because of the cancellation of SIFMA, we were not able to acquire an equal distribution. The NGP was the only program in San Jose by which our respondents have formal property rights to forestland and therefore this group is smaller than the other categories.

Our fellow researchers also collected some data for our research in other villages in the municipality of San Mariano. The data was used to compare some of the issues in San Jose with those in other villages. All research teams were divided over different barangays and sitios in San Mariano. The research sites for our comparative analysis are Disulap, Villa Miranda, Diwagden, San Isidro and Dunoy.



**Figure 1:** Map of Barangay San Jose (by Learnie Cabalonga)



## RESULTS

We interviewed 19 respondents in San Jose. To answer our first sub question (how do people obtain land in San Jose, San Mariano) we categorized five different methods in which people could obtain their land: inheritance, buying, clearing forest themselves or a combination of inheritance and buying and clearing and buying.

A high number of respondents, 37%, obtained their land by inheritance from parents or relatives (Table 2). There were often no official papers involved, although some of them make use of papers signed by barangay officials and witnesses. This is also the case for people that bought untitled land: 16% of our respondents bought untitled land and therefore they have no formal legal rights (Table 2). A way of obtaining formal rights is buying titled land, which is done by 21 percent of our respondents (Table 2).

**Table 1:** Classification of land and how it is obtained by the respondents

|                    | Titled land |            | Property rights |           | Possession rights |            | Total     |             |
|--------------------|-------------|------------|-----------------|-----------|-------------------|------------|-----------|-------------|
|                    | N           | %          | N               | %         | N                 | %          | Total N   | Total %     |
| Inherited          | 4           | 21%        |                 |           | 3                 | 16%        | 7         | 37%         |
| Bought             | 4           | 21%        |                 |           | 3                 | 16%        | 7         | 37%         |
| Cleared            |             |            |                 |           | 2                 | 11%        | 2         | 11%         |
| Inherited & bought |             |            | 1               | 5%        | 1                 | 5%         | 2         | 11%         |
| Cleared & bought   |             |            |                 |           | 1                 | 5%         | 1         | 5%          |
| <b>Total</b>       | <b>8</b>    | <b>42%</b> | <b>1</b>        | <b>5%</b> | <b>10</b>         | <b>53%</b> | <b>19</b> | <b>100%</b> |

Another way in which our respondents obtained land is clearing it themselves. 11% used this method (Table 2). Those that practice “slash and burn” farming accounts to about 5% of the total respondents while 58% of our respondents use forestland for their own agricultural purposes. Of the 58%, only 5% of the respondents have a legal tenurial instrument from the government’s project NGP (Table 2).

This small representation of respondents with property rights in San Jose is caused by the cancellation of the whole SIFMA program in 2004. According to the Municipal Environment and Natural Resources Office (MENRO), it was cancelled because the beneficiaries did not pay the required taxes and the beneficiaries did not maintain the required 90% forest cover (Yadao 2015, pers. comm.). In the past, 8 respondents had a SIFMA agreement (Table 3). In 2011, the NGP replaced the SIFMA program. Of our respondents only 1 former SIFMA holder is now involved in the NGP and has property rights on the forestland.

**Table 3:** Number of respondents involved in the former SIFMA program

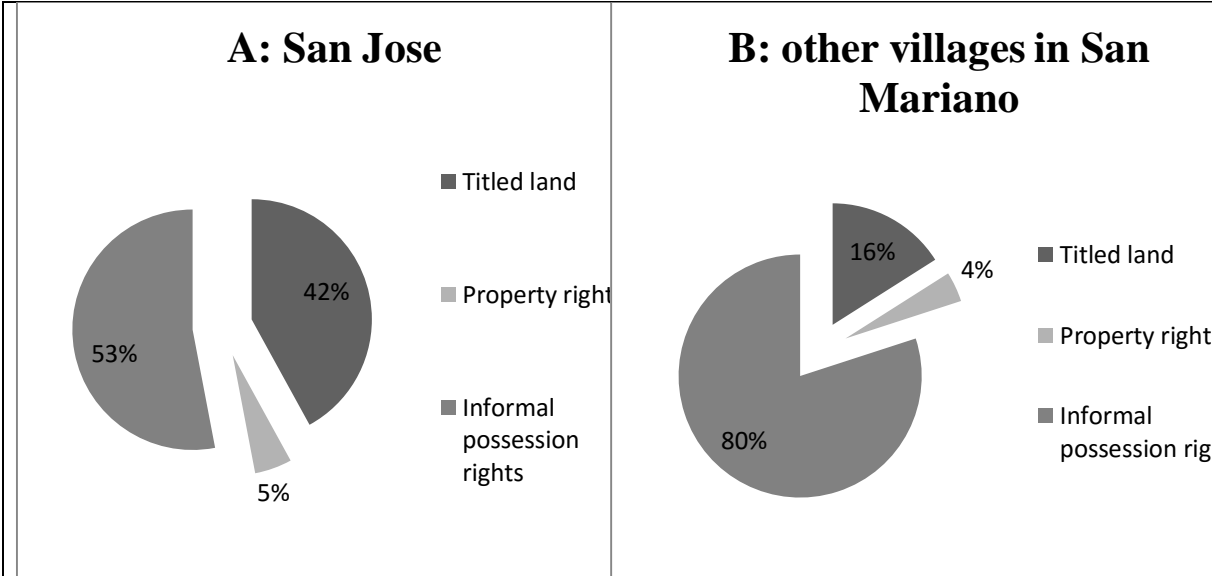
|          |                |
|----------|----------------|
| SIFMA    | 8 respondents  |
| No SIFMA | 11 respondents |

The rights people can claim to their land form the main instrument for people to secure their land. This answers our second sub question (how do people keep their land in San Jose, San Mariano). In this report we distinguished between titled land, property rights by a government program and informal possession rights or no rights at all. The majority of our respondents in San Jose do not have formal property rights or a title: 53% own informal possession rights (Table 2). In addition to the rights, everybody marks their boundaries by either trees or a fence. This makes the boundaries of their land visible to other people and their neighbors.

The main response to our third sub question (what motivates the people in San Jose to choose to legalize their land, or not to do so) is that everybody wants to obtain rights to their land, especially get a title to the land, but that in most cases it was not possible to obtain rights. They resided on forestland, where it is impossible to obtain a title, and they could not fulfil all the requirements for property rights of a government program. Some of our respondents feared to get involved in a government program and therefore chose not to obtain property rights. The fear is based on the lack of knowledge about the program and the insecure future of government programs in the Philippines.

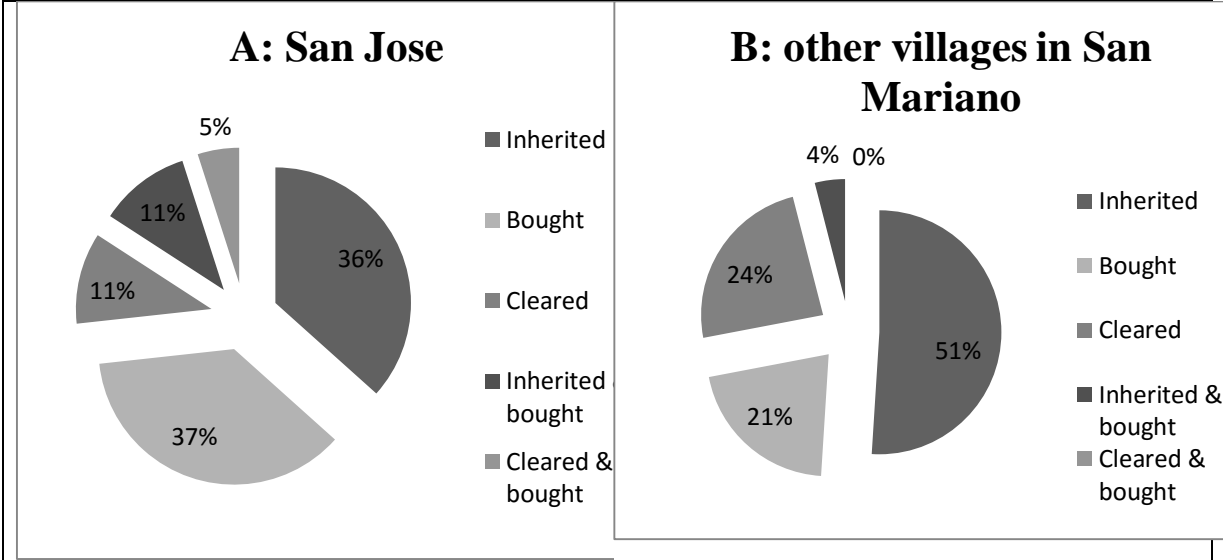
Our fourth question (are people aware of their current and possible future rights concerning their land) resulted in very different answers. Some people are aware of their rights or their lack of rights, but many people in San Jose believe that you have a legal basis if you pay taxes, even when you are residing on forestland. According to our interview with the MENRO, paying taxes does not provide any legal basis (Yadao 2015, per. comm.).

In our last sub question, we compared land tenure in San Jose to land tenure in other villages in San Mariano. There were 57 respondents in the other villages. There are some striking similarities. The majority of the respondents use forestland for agricultural purposes and have no formal rights to their land. This can be explained by the large areas of open forestland, generated by the large scale deforestation, that are now used to provide the livelihood of many farmers. In both cases, there are not many people involved in a government program: 5% in San Jose and 4% in the other villages have formal property rights (Figure 2). There is a significant difference between respondents with titled land in San Jose (42%) and in the other villages (16%) (Figure 2).



**Figure 2:** Graph showing the categories of land in A (San Jose) and B (other villages in San Mariano)

The way in which people obtained the land also shows similarities: in both cases a majority obtained their land by inheritance (37% in San Jose and 31% in the other villages) (Figure 3). In the other villages, there is a significant higher percentage of people who cleared the land themselves in comparison with San Jose.



**Figure 3:** graph showing how people obtained their land in A (San Jose) and B (other villages in San Mariano)

**DISCUSSION**

The people of San Jose obtained their land in different ways. We categorized inheritance, buying (with or without any legal papers involved), clearing the land themselves, or a combination of the former if the respondent owns multiple parcels of land.

Most of our respondents inherited or bought their land. In most of the inheritance cases, people did not use any legal basis. Instead, they divided the land themselves by agreement between and among the inheritors, often the children of the family. Sometimes they included possession papers signed by Barangay officials and other persons that served as witnesses. These possession papers are informal and have no official legal status. This means that the ownership is not acknowledged by the government but it is respected by inhabitants of the Barangay and it also helps to secure their land. This is also the case for people who bought untitled land. They obtained their possession papers in the same way: signed by the Barangay captain and witnesses.

A way to obtain legal ownership that is acknowledged by the government is to buy titled land. However, buying some land that is titled does not give you a title: the original owner still possesses the mother title and the buyer can start a process to title the land. Even if the buyer does not have the official title under his name, he does have all the legal rights that come with the ownership of titled land. Buyers of titled land can only obtain a title if they are capable to pay for the whole process. This process takes a lot of time as we have seen with some of our respondents. One of them started the process five years ago and has no official title under his name until now. The long process is probably caused by inefficient communication between the LGU, the government and the applicant. In an interview at the LGU, the Assessors officer said that it should not take longer than 4 months (Curibang 2015, per. comm.). This long application process is an example of the communication with inhabitants in San Jose.

Some of our respondents said to have cleared the land themselves when they arrived as migrants in San Jose at the beginning of the 1970s. They had heard that land would be theirs after opening up the land. These informal settlers have no title or possession papers. Informal settlers cannot own their land, for this it would be necessary to change the status of the forestland into A&D land. It is possible for informal settlers to obtain temporary property rights by a contract with the government.

The reason that most of our respondents only have informal possession rights and no property rights is that the SIFMA program was cancelled. Many people in San Jose were initially involved in this program, because of the help of Plan International with the application (Balbas 2015, pers. comm.). The cancellation of the whole program by the government took away the property rights of the beneficiaries and made them illegal settlers again. When we interviewed our respondents we found out that not all beneficiaries of SIFMA were aware of the fact that SIFMA was cancelled. Some received a letter of cancellation and some attended a meeting, but the information about the cancellation and the reasons behind it were not communicated properly to the inhabitants of San Jose.

In 2011, the NGP replaced the SIFMA program. Of our respondents only 1 former SIFMA holder is now involved in the NGP and has property rights on the forestland. Many of our respondents were not aware of the existence of the NGP. The respondents that were aware of the program were not enthusiastic about getting involved in the NGP. Reasons they gave were uncertainty about how the NGP would work and the dissatisfaction with the proposed budget to cover the costs. According to the technical assistance team of the NGP, the program was initially not successful because of different climates and because of the requirement of more than 50 hectares (B+WISER 2015, pers. comm.). This disqualified most people in San Jose, because the agricultural land in San Jose is divided in many small parcels.

The way in which people secure their land is by having official rights, paying taxes and by marking their land with either trees or a fence. Sometimes there are conflicts, especially when land is divided between and among inheritors without legal papers. The exact location of the boundaries is often not entirely clear. There are even cases where the trees that serve as boundaries were moved by neighbors in order to increase their land. We noticed that people rather avoid conflict and try to obtain an official title to their name if the land is titled. The title would provide a legal basis for their claim on the land.

All of our respondents with a title stated that they pay taxes. The government pushes them to pay the taxes, together with the Barangay officials, because the Barangay receives a part of the taxes via Internal Revenue Allotment (IRA). But also without tax notifications, most people pay their taxes. They feel more secure by paying taxes to the government, even though their ownership is not influenced by the payments. The amount of tax they have to pay is influenced by their payments. If they will not pay on time, the tax penalties increase.

For the respondents that were involved in the former SIFMA program, there is no requirement to pay any tax anymore. The reason for this is that it is forestland. However, some of our respondents receive notifications to pay taxes over the forestland, even though that is not possible according to the Municipal Assessor of the LGU, and some do pay the taxes because they think that it might give them more rights to their land in the future. This is also not the case according to the Municipal Assessor. People who are involved in a government program like the NGP are obliged to pay taxes, but once the agreement is cancelled, there is no more obligation to pay taxes.

Our respondents all claimed to be motivated to obtain formal rights and legal documents, but at the same time they are aware of their possibilities concerning the rights to which they can make a claim. The majority of our respondents practice agriculture on forestland. This makes ownership impossible since it is government owned (Hambach 1998). Our respondents are dependent on the agriculture they practice on the forestland. Property rights would secure their property and livelihood. They can be obtained if people engage in government programs, like the NGP. All these government programs are temporary and most are initially unsuccessful. This sometimes resulted in cancellation of the program, like the SIFMA. As we have mentioned before, the problems of government programs in San Jose mostly concern the requirements of the agreement, like high taxes and large areas of open forestland, and the unclear communication between the government and inhabitants in San Jose.

There is also a possibility to improve the communication between inhabitants in San Jose. Some of our respondents had heard that SIFMA was canceled and some had not. If communication between inhabitants would improve, it creates more awareness about possibilities to gain rights and about their current situation.

## RECOMMENDATIONS

Based on our research we have two recommendations. We have seen that many respondents do not have up to date information about government programs. This lack of knowledge creates uncertainty about government programs. If the government wants their reforestation and livelihood programs to be more effective, they should pay more attention to provide the information. The first recommendation is concerned with an improvement of communication. We have also seen that it is impossible for many inhabitants of San Jose to fulfill the requirements of government programs: therefore we would suggest adjustments of the requirements for government programs.

The communication should improve between both the government and the inhabitants of San Jose and among the inhabitants of San Jose. The inhabitants and Barangay officials should spread the information they receive and the government should make sure that everybody receives the same documents, in order to provide everybody with information about their own rights. A possible option to improve communication and information is to introduce an obligatory yearly meeting in San Jose, organized by the government, for inhabitants of San Jose. In this meeting the government representative should provide proper information about the land situation and about their current rights and possibilities. It is important that the inhabitants are informed about the purpose of taxes, whether inhabitants have titled land or possession rights to forestland.

Our second recommendation is to initiate a property rights agreement that is also suitable for people with smaller pieces of land, like many inhabitants in San Jose. An adjustment of requirements for a government agreement would qualify more inhabitants in San Jose than there are now. If this adjustment is combined with proper communication and information about the program, it might result in more property rights for people in San Jose, and also in other areas in San Mariano.

Our research shows some strengths and some weaknesses. Our main aim was to get a better understanding of land tenure scenarios in San Jose. Despite our small sample of the population in San Jose, we were able to provide a general overview of those scenarios in San Jose. The short amount of time to collect the data and the more qualitative focus in our research make it

difficult to say something about land tenure in general. However, the comparative aspect enables us with a broader view on land tenure scenarios in the municipality of San Mariano. Even though the sample size is small, our research provides a lot of information about how people obtain land and how they secure their land in these villages in San Mariano.

#### ACKNOWLEDGEMENTS

We conducted this research very smoothly, not pressured and successful. But of course we could not have done this by ourselves. That is why we want to thank all the people who supported us. First, we want to thank our mentors who were always there for us. Our host family and the Barangay captain of San Jose Florentino Bunao and his family for welcoming us and giving us the best hospitality ever. We would like to thank all our respondents for providing us with the honest answers. We would also like to thank the LGU San Mariano, especially to the MENRO and the Assessor's Office, for their time and information. Special thanks to the technical team of the NGP, the B+WISER project, who took some time to explain the NGP. We would also like to thank Ma'am Nina and Sir Jouel for letting us use their laptops to write our report.

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## APPENDICES

### **Comparative questionnaire**

Location:

Name:

Age:

Gender:

Ethnicity:

Date:

Birthplace:

Time in San Jose:

Occupation:

### **Questions on migration:**

(ONLY FOR BARANGAY CAPTAIN)

1. Are there any formal or informal rules for new people who would like to live in this place? (what kind of?)

(FOR INHABITANTS)

2. Where were you born?

3. How long do you live here?

4. Where would you like to live and why?

5. Do you think there should be rules for new people living in this sitio? Why?

(ONLY IF A PERSON HAS MOVED TO THIS PLACE)

6. Why did you move to this place?

7. Where did you live before you came here?

8. Why did you leave the former village?

9. Do you intend to stay here your whole life?

10. What steps did you had to do to settle here?

### **Questions on land tenure:**

11. Do you have any land?

12. How much land do you have?

13. Do you have a title? (Can we see it?)

14. How did you obtain the land?

15. What are your future plans with your land?

▲ Sell it

▲ Buy more

▲ Obtain rights/secure title

▲ Other.....

### **Questions on Non-Timber forest products**

16. Do you use products from the forest?

17. Do you gather or buy them?

18. What products do you gather and what product do you buy (options: fruits, vegetables, building materials, medicinal herbs, animals, honey)

19. Do you experience any decline in forest products?

20. Is it allowed to get products from the forest?

### **Questions on water sources, use and scarcity**

21. Where do you get water for?

22. Do you have enough water in all sources, also in times of dry season? Why do you think that?

23. Do you think you will have enough water in all sources in the future? Why do you think that?

24. If the answer to 35 is no, in which source(s) do you expect a shortage? Why do you think that?

**Questions flood protection**

25. Do you experience floods?

26. How do you know about upcoming floods/typhoons?

27. How would/do you protect yourself and belongings against floods?

28. Is there something you can do to prevent floods?

29. Did you receive any information from the LGU about disaster preparedness? (Yes or No)

Make five (or more ) pictures of the river and make sure the shore and the surroundings are included!



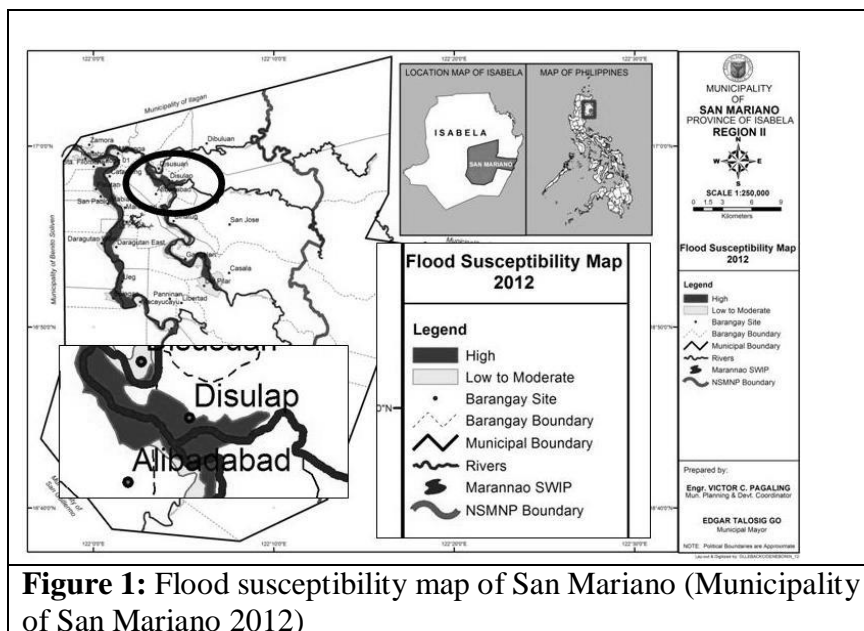
# FLOOD PROTECTION IN DISULAP, SAN MARIANO

**Joost Remmers & Elexie D. Baccay**

## INTRODUCTION

The Philippines is considered both geophysically and meteorologically to be a hotspot for natural hazards. Typhoons and floods are only some of the hazards that occur several times a year (Bankoff G. 2003). Due to climate change, weather circumstances change for the worse, especially in the tropical areas of the world. This creates a larger variability in the amount of rain with higher maxima and minima. As a consequence of this the frequency of floods in the rainy season increases (Balderama 2015). A flood means a temporary cover of land by water which is not normally covered by water (European Parlement 2007). Floods can cause material damage, trauma and suffering in the Philippines. Bankoff stated that Northern Luzon is the most heavily affected region of the Philippines (Bankoff G. 2003).

San Mariano is the municipality where this research was conducted. It is a municipality in North Luzon which contains coastline, some mountain area of the Northern Sierra Madre Natural Park (NSMNP) and a large area of the Cagayan Valley (Bartolome 2015). The research location Barangay Disulap lies 20 km away from San Mariano town proper (NSMNP-CP 2001). It has 2298 inhabitants (in 584 households) of which 530 (in 107 households) live in Purok 1 (Barangay Disulap 2014). Barangay Disulap is one of the 36 barangays of the municipality of San Mariano (Van Weerd 2015). The barangay is divided into two parts by the Disulap River and is situated near the connection of this river to the Disabungan River. The landform of the area is mostly fluvial and has terraces and active floodplains as major landform elements (Egmond 2003). From the flood susceptibility map of the local government in San Mariano can be derived that Disulap is in a high risk area (Figure 1).



Disulap and San Mariano are working together in the dissemination of the National Greening Program (NGP). This is a nationwide reforestation program which is developed to plant 1.5 billion trees covering 1.5 million hectares (DENR-PAWB 2013).

## RESEARCH QUESTIONS

Main Research Question:

How are the Barangay Disulap and its inhabitants prepared for floods?

Sub Question 1: What is the land use and is there a relation with the impact of floods?

Sub Question 2: How do inhabitants of Disulap get informed on typhoons and floods?

Sub Question 3: How do inhabitants and the local government protect their land against floods?

Comp. Question : How does flood protection in Disulap relate to other sites in San Mariano?

## METHODS

Between January 20, 2015 and January 22, 2015, several research methods have been used to gather appropriate information to answer the three main sub questions. Interviews (IV), site investigation (SI) and field validation (FV) were used at different moments during the fieldwork in Disulap. (Table 1)

**Table 1:** Brief time schedule of field work and methods used in Disulap (IV: interview, FV: field validation, SI: site investigation)

| <i>Date</i> | <i>Time</i> | <i>Method</i> | <i>Amount</i> | <i>Location</i>                                       | <i>Description</i>                         |
|-------------|-------------|---------------|---------------|---|--|
| 20/01/2015  | 09:00-16:00 | IV            | 5             | Lowland, Purok 1                                      | Adult inhabitants (m/w)                    |
|             | 16:00-17:00 | IV            | 1             | Lowland, Purok 1                                      | Barangay Secretary (w)                     |
|             | 17:00-18:00 | IV            | 1             | Lowland, Purok 1                                      | Barangay Counselor (m)                     |
| 21/01/2015  | 9:00-11:00  | FV/SI         | -             | Lowland, Purok 1, Riverbanks                          | -  |
|             | 11:00-14:00 | IV            | 2             | Lowland, Purok 1                                      | Adult inhabitants (m/w)                    |
|             | 14:00-17:00 | IV            | 2             | Lowland, Purok 1, near river, 1-2 km from town proper | Adult inhabitants (m/w)                    |
|             |             | FV/SI         | -             | Lowland, Purok 1, near river, 1-2 km from town proper | -  |
|             | 18:00-19:30 | IV            | 1             | Lowland, Purok 1                                      | Barangay Captain (w)                       |
| 22/01/2015  | 10:00-11:30 | IV            | 1             | Lowland, Purok 1                                      | Adult inhabitants (w), group interview (4) |
|             | 12:00-14:00 | FV/SI         | -             | Upland, Purok 1-2                                     | -  |
|             | 14:00-17:00 | IV/SI/FV      | 1             | Lowland, Purok 1, 1-2 km from proper                  | Adult inhabitant (m)                       |

The basic structure in interviews with inhabitants was a questionnaire developed before fieldwork was conducted. After every interview, a short discussion between the two researchers was conducted to evaluate the content and order of the questions. This resulted in more relevant conversations about topics that were discovered during interviews. For instance: tree planting projects, specific proposals of the Barangay government, evacuation centers. When new relevant topics were discovered they were included in the interviews with the other respondents. Interviews with inhabitants often lasted for around 50 minutes.

In the interviews with the representatives from the local government the basic questionnaire was replaced for other more relevant questions for policy makers. An interview about relief goods and evacuation situations was conducted with the Barangay Secretary, also an interview about lectures and trainings in flood protection, proposals and projects and financial affairs was conducted with the Barangay Counselor and finally an interview about all earlier stated subjects was conducted with the Barangay Captain. Interviews with representatives from the Barangay government often lasted for about 70 minutes.

When a respondent made an important statement attempts were done to validate this in other interviews. A priority during interviews was to validate thoughts and statements of the local government together with the inhabitants. For instance: when the Barangay Counselor stated that it is not allowed to live in areas that are prone to floods it was checked if the people in these areas had this knowledge. Another priority in this research was to validate thoughts and statements of inhabitants by comparing them with representatives of the Barangay government. For instance: when an inhabitant stated that rocks for protection against the rising river were used for building a road an attempt was done to check this with the Barangay Captain. In our opinion it is of great importance for the reliability of the information to hear it from multiple sources.

Another way of checking statements made during interviews that was used is field validation. This was executed in two ways: during the interview and during site investigation. When a respondent made a statement about his direct surroundings the question was asked if he could show the site during the interview. When a respondent made a statement about a place farther away from the interview site the location and statement were noted and visited during site investigation. By using these two methods an attempt was done to validate all the important statements about locations.

The last method used during fieldwork was site investigation. This was executed using two different methods. Firstly, sites were visited which were mentioned in interviews. At these sites the statements were validated and further observation was done. Secondly, observations of land use, morphology of the river and geographical differences were done. All were documented using photographs, notes or were confirmed using maps of the local government unit in San Mariano.

Besides research on flood protection in Disulap, five other research groups asked five questions from the questionnaire in the appendix. These were general simple questions referring to the first three sub questions. The other research groups were based in San Isidro, San Jose, Villa Miranda, Dunoy and Diwagden. In the section results of this report the answers to those questions in each Barangay or Sitio are briefly described. In the section discussion of this report all the descriptions of other cities are compared to Disulap. This gives a brief answer to the extra question: How does flood protection in Disulap relates to other sites in San Mariano?

## RESULTS

The first three sub questions of our research can be divided in three categories which are land use at the site, information and protection. These themes will be covered in this chapter of our research report.

### **Land Use at the Site**

During the site investigation, only Puroks 1 and 2 were visited. Purok 1 was located next to the Disulap River and is a lowland area. Purok 2 was situated on the hill slope and on top of the hill. Agricultural land is dominant in the area and the only crop planted next to the river is corn. Sometimes a rice field is situated behind the cornfield but most of the time corn is the only crop until the built area. In the lowland there is a small difference in height between the farmland next to the river and the built area. The difference is mostly around 1 to 2 meters. During rainy season the cornfields always get flooded several times. Corn harvesting happens twice a year and most respondents state that in the last three years two harvests were destroyed by severe flooding and wind. At some places between the farmland and the river in Purok 1 is a small area of rocks and ground. This is the location where the Adopt-A-River program is executed (Figure 2).

Built areas start right after the farmland near the river. Around 2/3 of the households are situated between the main road and the river. This area is almost flat but never got severely flooded so far. But still the water often reaches the first part of some of the houses. The kitchen of Nelia Mallilin which is next to cornfields flooded already a few times. In the low lying area signs of landslides and bad waterways can be found in several places. No real damage has been done by flooding in this area until now but because of heavy rainfall erosion takes place. Respondents state that this is the cause of the deforestation in the uplands (Figure 2).

The upland area of Disulap is also mostly cultivated and used for corn farms and rice fields. Very few patches of forest are left in the upland area. On top of the hill close to Purok 2 the Adopt-a-Mountain project is executed. The number of people living in the upland is lower than in the lowland of Disulap (Figure 2).

### **Information**

People need to be informed about what to do when floods and typhoons are about to occur. They also need to be alarmed when the natural hazard is about to reach their living area. This part of the results-chapter covers two subjects: access to information and evacuation procedures.

There is one factor that plays a major role in the improvement of information about natural hazards: the fact that Disulap was recently connected to the electricity network. Since more or less one year almost every household has electricity. Many respondents said that before this the sources of information were the radio, the Barangay Captain and gossips from other inhabitants. Most of them experienced hearing unreliable information from these sources. At that time, they had no idea how strong a typhoon would be and only heard the megaphone of the Barangay Captain as an alarm. Nowadays there is electricity in Puroks 1 and 2 and the inhabitants say they have more reliable sources of information. They can monitor typhoons on their own or their neighbors' televisions. Almost every respondent stated that information is easier to get and is of better quality nowadays.

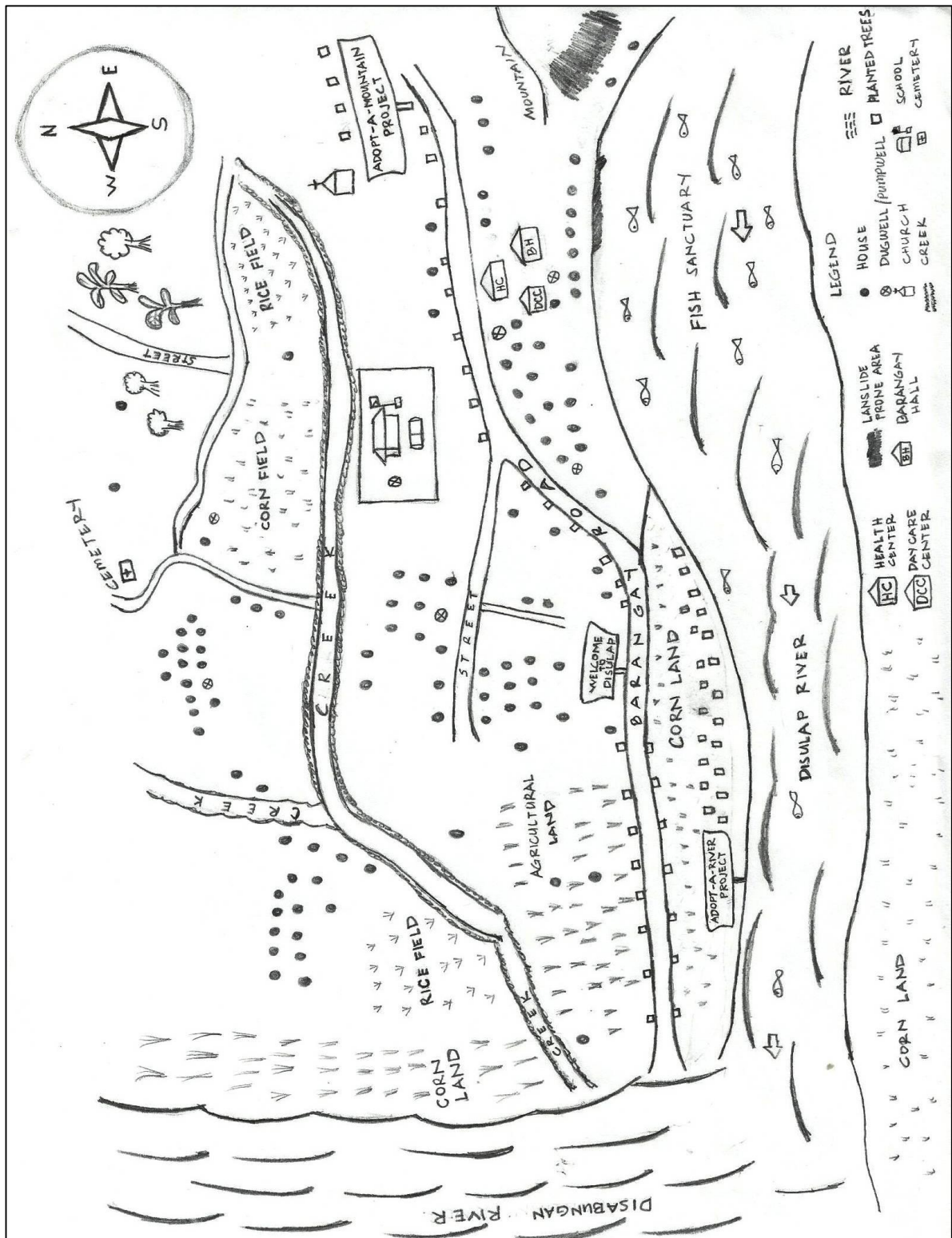


Figure 2: Sketch Map of Disulap, Puroks 1 and 2 (by E.D. Baccay 2015)

When a strong typhoon or a heavy low pressure area is close to Disulap people are more alert for news about this event. Most of them watch television and listen to the radio and talk about it with their neighbors or relatives. Also the Barangay Captain watches the news on television and has contact with the local government in San Mariano through text messaging with her cell phone. Typhoon strengths are measured in signal numbers and when this signal reaches number 2 people in the lowland start preparing because the Captain will inform them about the storm. During the Barangay meetings which are held 4 times a year (most recent was on January 15, 2015) people hear what they need to prepare in cases of emergency. Most respondents talked about preparing the following goods: foods, medicines, flashlight and clothes. This information is provided by the Barangay Councilor. He attended a training at the Barangay Disaster Risk Reduction Management Council (BDRRMC) about flood protection and how he should inform the inhabitants of his Barangay. When the typhoon is of the strength of signal 3 or 4 the Barangay Captain calls for evacuation three hours before the typhoon will reach the site. This information will reach the inhabitants via a house-to-house information system. The Barangay Councilor, Captain, other Barangay Officials and Police try to go past every house to call for evacuation. The appointed evacuation sites are the Barangay Hall, the school, daycare center and the health center. The Barangay Captain emphasized that households in the lowland have special priority meaning that they are the first households to be informed (in the Barangay Hall there is a list of all the households living in lowland).

Many respondents said that the Barangay Captain and other Officials are doing a good job in informing them about evacuation. According to the Barangay kagawad, the preparation also improved because the funds are better distributed and the focus of the government has shifted from relief goods as food to longer lasting goods as medicine, coats and boots. However, three respondents said they were not informed about evacuation and typhoons by the Barangay Officials. These were mostly inhabitants who lived the farthest from the town proper, in Purok 1.

### **Protection**

The protection of the houses, belongings and land of the inhabitants of Disulap happens in several ways. Firstly, they can be protected by inhabitants thru taking precautions just before a typhoon or heavy rain is about to happen. Secondly, inhabitants can protect themselves by changing land use around the area during quiet time. Thirdly, government can take measures to prevent natural disasters. In this section we discuss the most important and effective protection measures of the Disulap community.

Most inhabitants of Disulap take measures to minimize the damage of a typhoon and flood as much as possible. Most of the respondents take the precautions the Barangay Captain and Councilor informed them about in the meeting. Besides that, they take extra measures when a typhoon is approaching. At first they put all their belongings inside plastics to prevent them from getting wet. Also most of the inhabitants tie their roof to the walls or ground to prevent it from flying away. Besides that people who live in the lowland and have livestock tie the animals on higher ground (carabaos) or take them inside the house (dogs, chicken).

According to a considerable number of inhabitants, there are adjustments you can make as a civilian to the land around your house to decrease or prevent damage from floods. The most popular option in the whole area is to plant trees. In several interviews respondents answered that they plant trees around their house or compound and near their crops. According to them this causes a decrease in land erosion and an increase in infiltration. The trees they plant are almost all mahogany, bamboo, coconut trees, Gmeliana or fruit trees. Inhabitants can think of

several problems that occur after they planted new trees. The new planted trees near the river can be washed away during periods of heavy rain. Also a respondent said that the trees near cropland are planted in less fertile grounds because of the use of pesticides. This causes them to grow slower and make them more vulnerable. Finally large animals can destroy new planted trees because they have not grown big enough yet to resist them.

Other ideas and methods to prevent their land from floods and the erosion caused by floods were also mentioned by respondents. One household head has plans to cement the ground in and around their house to prevent the ground from being washed away. In Purok 1 (on a location farthest from the town proper near the river) we spoke to three people who prevent their house and belongings from flooding in the following ways. Marlon Pitpit lives next to a waterway from a waterfall and he and his brothers built their own dike to prevent the compound from flooding (Photo 1). The canal created by the making of that dike leads to their rice fields. Rolin Baliuag has several waterways around his compound which he cleans and digs before heavy rain occurs (Photo 2). Estherlina Cabasag has two waterways around her house to drain water when heavy rain occurs. Both Marlon and Rolin live far away from the barangay proper.



**Photo 1:** Marlon Pitpit showing his small self constructed dike between a natural stream from a waterfall and his compound in Purok 1, Disulap. (Photo by J. A. Remmers 2015)



**Photo 2:** Rolin Baliuag showing how he cleans one of his self made drainage canals and dams near his compound in Purok 1, Disulap. (Photo by J.A. Remmers 2015)

In the town proper, the inhabitants mostly depend on the (local) government regarding issues like flood protection, erosion and landslides. The Barangay Officials have submitted a few proposals to help protect this part of Disulap against floods. Firstly they proposed a project for a dike in front of Purok 1. Secondly, they proposed a project for a permanent concrete waterway in Purok 1 instead of the current not functioning drainage canal. Finally, they subscribed last year for the National Greening Program (NGP) of President Aquino and got admitted. According to the Barangay Councilor, this is a plan to plant millions of trees in the Philippines in a short period of time. The Councilor responsible for this program told in an interview that the seedlings are distributed for free by the government and the army helps in distributing and

planting them. In Disulap, the effects of this program are visible. Currently, there are two sub-programs of the NGP running in Disulap: Adopt-a-River and Adopt-a-Mountain. The weekend before the fieldwork for this research was conducted, around 200 trees were planted near the riverbank of Disulap River of Purok 1 and on the tops of the hills in Purok 2. We observed that all of the new planted trees from the program were mahogany and bamboo. Almost all respondents were very enthusiastic about Adopt-a-River and Adopt-a-Mountain because they were involved in the dissemination. Together with the Navy, they went planting them in the weekend; they liked this activity and therefore support the program. An observation during site investigation was that the seedlings were not visible that well. Both at the river and on the hilltop is a sign that says the project is disseminated at the location (Photo 3, Photo 5). The only mark next to a seedling was a wooden stick with a small black plastic on top (Photo 4). When talking to the Barangay Captain she responded that seedlings were getting damaged by carabaos which were staying near the river. The Captain asked the inhabitants to let their carabaos loose somewhere else but during site investigation there were still some carabaos near the river. Though, when driving through Disulap two days after our fieldwork, we saw that the seedlings were protected by small triangle fences made of bamboo. The program did not reach the river shore near the end of Purok 1 yet but the respondents in this area knew for sure that this was going to happen.

|  |   |   |
|--|---|---|
|  |   |   |
| <p><b>Photo 3:</b> Adopt-a-River signboard at Purok 1 (Photo by J.A. Remmers 2015)</p> | <p><b>Photo 4:</b> Planted seedlings along Disulap River, Purok 1 (Photo by J. A. Remmers 2015)</p> | <p><b>Photo 5:</b> Adopt-a-Mountain signboard at Purok 2 (Photo by J.A. Remmers 2015)</p> |

### Comparative Research

In San Jose people do not experience floods. During typhoons they evacuate to a safe house with their children and with their animals if they have some. No information is given by the Municipality of San Mariano or the Barangay Captain. Besides evacuation they also secure their house and belongings.

Just like in San Jose, inhabitants of San Isidro do not experience floods in their housing area. However, rice fields in the low areas get flooded. Updates about typhoon strengths and paths arrive through radio and television. Some people responded that they get informed by the Municipality and the Barangay Officials but not all of them. During typhoons inhabitants of San Jose place their things in plastic bags and either stay by their houses or evacuate to the school. A majority of the respondents said that people had to plant trees and banana plants to



prevent floods. Other respondents do not know any way how to prevent their houses from floods. Some respondents also said that illegal logging must be stopped in the area.

Houses in Diwagden are situated in high areas and therefore people do not experience floods. If a typhoon is about to hit Diwagden information is given by the local government, radio and television. There are different measures to predict an upcoming flood. Some people say that if snails come up on the side of the river and snakes go away from the water a flood is coming. In order to protect themselves against strong typhoons, the inhabitants of Diwagden go to a nearby cave.

Dunoy is not a flood prone area. Inhabitants are not experiencing floods. When a typhoon is about to hit the area they are informed through portable radio. In their house they secure their belongings and stay inside during the typhoon. Some of them move to another place to be safer. There is barely any dissemination of information by the local government or Barangay Captain.

In the lowland of Villa Miranda inhabitants experience floods. The main source of information is the radio. They also get informed by the local government unit with the help of the Barangay Captain. In preparation they store food and water, tie everything to the house and keep their animals in safe places. Sand dikes around the house were built by some respondents to prevent their houses from flooding. Some people stay in their houses during typhoons but others evacuate to the school or stronger houses.

## DISCUSSION

The three major pillars for flood protection used in this research are the land use at the site, information and protection. During our interviews, the respondents gave useful answers to questions about every subject. In this part, all three subjects will be briefly discussed. It will become clear that there are many good developments in flood protection procedures, but also that there are aspects where there is need for improvement.

### **Land Use at the Site**

While doing site investigation in Disulap one thing became very clear. Almost the whole area is completely made and modified by humans. Human activities can increase the frequency of events like landslides, washing away of trees and excessive runoff of water. These are the negative consequences of heavy rain, typhoons and floods. By protecting their house and area from flooding people also protect the site. This is the case because all the land area in Puroks 1 and 2 is owned or used by inhabitants. Protecting cornfields is hard if they are situated near the river. The only thing that really can be done to protect your income there is to harvest the corn before start of the typhoon season. Some respondents already stated that they try to do this.

### **Information**

When reviewing our research results, one thing is clear immediately: access to information has improved considerably over the last years. Using radio and especially television the inhabitants experience very good access to information. But although access to information is very well organized there is still a small lack of information during typhoons, floods and evacuation. The Barangay Police, Councilors and Captain go house-by-house to call for evacuation to the designated areas. Almost every respondent was very content with the current behavior of the Barangay Captain and her companions during evacuation. But still some households are not informed about evacuation before typhoon. Especially in the flood prone areas far away from the barangay proper, there is a lack of information about evacuation during natural hazards.

This could be improved by making a simple checklist for evacuation, which could be used to make sure that everybody is informed about the evacuation and to monitor the inhabitants who are really evacuating. With this tool the Barangay Officials can improve the safety of the inhabitants of Disulap.

### **Protection**

After reviewing the information that was derived from site investigation, interviews and field validation an interesting distinction was seen. There is a difference in handling with floods between households near the Barangay Proper and those living farther away from the proper. During interviews it was noticed that inhabitants of the Barangay proper in Purok 1 were used to get more help and information from the government. When talking about protection they also referred often to government proposals like the dike, the drainage canal in Purok 1 and the Adopt-a-River/Mountain project. Some of them planted trees themselves but that was everything they did against floods. Moving farther away in the village, observations were done of own built and maintained waterways, dikes and lots of self planted trees. Most of these measures are very effective against floods and erosion. Still the different governmental organizations deserve compliments for their Adopt-a-River and Adopt-a-Mountain project. Inhabitants support it, liked it and said they will take care of those trees.

When doing fieldwork, we noticed a difference in the tree planting program and the other proposed flood protection measures. The Adopt program in Disulap is disseminated together with the community. Trees are planted “for the people and with the people.” Based on interviews and observations, it can be stated that this approach works in Disulap. It might therefore be a good idea for the local government to learn from inhabitants like Rolin Baliuag and Marlon Pitpit on how they sustain their land by using very simple methods. This knowledge can then be used to set up a new simple community based program in the Barangay. This program could include cleaning and digging out the drainage canal(s), making new small waterways in built areas and preventing erosion. Because inhabitants are content with the leadership in the Barangay and the Adopt-a-River/Mountain programs are well received we think there is a good foundation for more improvements like these. This can make the Barangay less dependent on funds and approved proposals from local or national government and can improve flood protection at the same time.

### **Comparative Research**

When reading the results of the comparative research one thing is very clear. Not the whole municipality of San Mariano experience floods. This is mostly because the other barangays and sitios are closer to the Sierra Madre Mountain Range than Disulap. This means the landscape is more elevated there and that there are less floodplains so the chance of floods becomes lower.

Information about natural hazards is heard by inhabitants of the villages from different sources. The main source of information in other research sites is the radio. Only in San Isidro, Diwagden and Villa Miranda some respondents talked about getting informed by either Barangay Officials or local government. However not all respondents there were getting informed by them.

Protection of houses against typhoons and floods happens in other places the same as in Disulap. People tie their roofs and increase the strength of their house. Besides that almost every respondent cover their belongings in plastics. Only in Villa Miranda inhabitants responded that they get food and water before a natural hazard is about to hit. Also in Villa Miranda some respondents built sand dikes around their houses to prevent their house from floods.

Evacuation and location of households during typhoons and floods differs between every research site. In Dunoy, San Jose, Villa Miranda and San Isidro some households stay inside their house during evacuation. In all places people evacuate but to different locations. In San Isidro and Villa Miranda the evacuation site is the school just like in Disulap. In other villages they evacuate to other stronger houses or places. People in Diwagden evacuate to a cave when a really strong typhoon occurs.

How flood protection in Disulap compares to the other research sites in San Mariano is a difficult question. Some of the sites do not experience floods but only typhoons so floods are not relevant there. What is noticeable is that all measures that were named by inhabitants of other research sites also are used in Disulap. From the answers on the comparative questionnaire the impression could be that Disulap is better prepared because the different protection measures are being used by more respondents in Disulap.

Reflecting on this comparative research it must be said that only very general (and mostly short) questions were asked. This resulted in very general short answers. Because of time consuming questionnaires lots of research groups were not able to ask further questions about the answer of respondents to the comparative questionnaire. This could have led to incomplete data. Still some of the answers that were given are very useful and we think we were able to sketch a general image of flood protection in these barangays and sitios elsewhere in San Mariano.

### **Reflection**

During the fieldwork in Disulap several aspects of flood protection became very clear. This gave more insight on the context of the research questions which were made before fieldwork. The most striking observation is that an abstract concept like “flood protection” does not mean much to people in the daily life. They try to protect themselves from floods, erosion, wind and all kinds of natural hazards at the same time. Different protection methods often intertwine with each other and have overlap in different circumstances. When talking to the inhabitants we realized that they were never protecting themselves only against floods but also against strong winds, landslides, erosion and excessive rain. However, in our opinion this research is relevant because most methods in flood protection are also useful for protection against erosion, providing good waterways and infiltration.

## ACKNOWLEDGEMENT

At first, we want to thank Edmund Jose for his great work during the week in finding host families, data and relevant sites to visit. During the fieldwork we interviewed over 15 inhabitants of Disulap and we want to thank them for the hour they all gave up to answer all of our questions. From the 15 respondents, we especially want to thank Rolin Baliuag and Marlon Pitpit for showing us their own made flood protection measures. We are also grateful for the good care that Elizabeth P. Domingo showed us and we still admire her stamina during our 90-minute-interview on Thursday evening. The other research couple in Disulap, Kiki Klerks and Kelly Gatan, also deserve a place in this section for their search to flood and elevation maps at the local government unit in San Mariano. Last but definitely not least we want to thank Loreto, the Barangay Treasurer of Disulap, for hosting us the whole week and giving us a safe sleeping place for the nights.

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## APPENDIX

In this appendix the short version of the questionnaire used in the interviews with the inhabitants of Disulap is written down. The actually used version has translation in Tagalog and several small follow-up questions to certain answers. The comparative questionnaire is also not included in this appendix because it is irrelevant for this research about flood protection. Q1 till Q5 are the questions included in the comparative questionnaire of the other groups.

Location: Highland/Lowland

Date:

Name:

Ethnicity:

Age:

Education:

Gender:

Profession:

Circle the right answer:

|                        |     |    |
|------------------------|-----|----|
| Electricity:           | Yes | No |
| Mobile Phone:          | Yes | No |
| Television:            | Yes | No |
| Radio:                 | Yes | No |
| Internet Accessibility | Yes | No |

Q1: Do you experience flooding?

Q2: How do you know about upcoming floods?

Q3: Do you receive information from LGU/Barangay Captain about disaster preparation?

Q4: If strong typhoon/rain is forecast, how do you protect yourselves when it is coming?

Q5: Is there something you can do to prevent floods?

### Information

Q1: Does the information help you?

Q2: Do you think the way of informing you about typhoons and flood preparation has improved over the last 5-10 years?

Q3: Do you miss some information?

### Protection

Q1: Do you attend trainings or lectures regarding flood protection?

Q2: What did you learn there?

Q3: Do you think trainings/ lectures about flood protection can help in your protection?

Q4: Who gives the training?

Q5: What is the difference of having training than you don't have this?

Q6: What have you learned from the floods that you had experienced?

### Site

Q7: What is your land used for?

Q8: Is flooding a problem in this area?

Q10: What do you think about the government infrastructure in the river?

Q11: How would you improve flood protection for yourselves and for Disulap?

# IMPLEMENTATION OF RULES AND REGULATIONS TOWARDS MANAGEMENT OF COMMUNITY FISH SANCTUARIES AT DISULAP, SAN MARIANO

**Kelly Gatan & Kiki Klerks**

## INTRODUCTION

Worldwide, excessive exploitation of common-pool resources is a major problem. For example, destructive fishing has led to a drastic fall in the fish stock of many domestic watersheds. In the Philippines, a country coping with a rapid increase in population, this environmental problem is a threat to the diet and livelihoods of a large part of the population (Green et al 2003 in Vermeersch 2014). By now, this issue has been recognized by politicians and hence different national laws, such as the Republic Act no. 8850, aim to protect aquatic resources. Furthermore, the work of non-governmental organizations (NGO) such as Mabuwaya Foundation Inc. in Northern Luzon, have contributed to the rise in awareness of these problems in the public and the implementation of conservation projects. Hence, politicians, NGOs and local communities are working together to establish community-conserved protected areas in order to ensure biodiversity and a steady population of species in various ecosystems. In the case of aquatic freshwater resources, several protected river areas serving as a breeding ground for exploited fishes, have been implemented to address unsustainable fishing methods and declining fish stocks (Van Weerd 2015). For example, in the municipality of San Mariano, 15 fish sanctuaries were set up in different Barangays (villages) with the help of the Local Government Unit and Mabuwaya Foundation Inc. (Vermeersch 2014).

San Mariano is located along the foothills of the Northern Sierra Madre in the province of Isabela in Northern Luzon. Numerous rivers, creeks and tributaries flowing through the area are vital in the daily sustenance of more than 61,000 residents (LGU San Mariano 2014). These inhabitants were subdivided among 36 villages known as “Barangays”, of which three were classified as urban. They use their water resources for bathing, washing their clothes, irrigating their fields, transporting crops to town and above all fishing (Vermeersch 2014). Booming of population in the course of the year is due to large migration flows since 1950s (Van Weerd and Van der Ploeg 2012). Each Barangay consisted of 6-11 “sitios”. A sitio is an original settlement location.

On the other hand, the use of *bungbong* (dynamite fishing), *kuryente* (electro-fishing) and noxious or poisonous substance such as sodium cyanide were largely adopted and resulted in an overexploitation of freshwater resources and a consequent degradation of the freshwater ecosystem (Vermeersch 2014). But this destructive method of fishing is now strictly prohibited in the declaration of the barangay and municipal ordinance. In San Mariano, violations of this provision shall be punishable by imprisonment ranging from five (5) to ten (10) years without prejudice (Municipal Ordinance NO. 2012-004, LGU San Mariano). This ecological decline has severe impact in domestic needs as well: decrease in fish stocks poses a threat to part of the less fortunate population in San Mariano, mainly those living hours away from the urban center. In addition, unpaved road and lack of money often prevent these people from going to the urban center to buy food and other needs. In the past 10 years, this need has little by little taken effect through the establishment of Community-Conserved Areas (also known as CCA's). Since 2006, 15 different Barangays in San Mariano have established their own community-managed fish sanctuaries, aiming to preserve their own freshwater environment. They have been encouraged by a local independent non-profit organization dedicated to the conservation of the critically endangered Philippine freshwater crocodile. This non-profit organization is called Mabuwaya Foundation.

Disulap is located closest to San Mariano town and it lies 20 km away from the said town. It is bounded in the North by Villa Miranda, Dibuluan in the South, San Jose in the East, and Palanan in the West. It is adjacent to the Northern Sierra Madre Natural Park (NSMNP). The residents usually use tricycle and a “banca” (boat) to cross the Disabungan River easily and bring them from the town proper of San Mariano to Barangay hall in about 20 minutes. The roads are unpaved and turn quite slippery during rainy season. Land transportation consists of six-wheel-drive trucks or locally assembled four-wheel-drive vehicles and carabao-drawn carts. There are more than 500 households, including sitios (smallest unit of barangay); this Barangay is one of the largest in the municipality San Mariano. Majority of the inhabitants are engaged in agriculture and forest product extraction and the bulk of the residents are composed of Ilocano-speaking people and relatively many Kalinga make up the population.



Disulap River

In this short research, we have looked at how Barangay council implements the rules and regulations regarding Management of Community Fish Sanctuaries. Disulap's fish sanctuary is situated in the Disulap River that flows along the Barangay. As stated in the original ordinance enacted in 2006, the length of the fish sanctuary is 1.5 kilometers, with the upstream boundary in Sitio Kapungdulan and the downstream boundary in Disulap proper. The ordinance furthermore prohibits all fishing methods in the declared fish sanctuary. These clear rules and regulations have been revised comprehensively in a new ordinance in 2008. In section 5, it states that "fishing is not allowed in designated area, especially during the months of May to August which is the mating season for the fish, except during the patronal fiesta" (annual celebration of the Barangay). And the section 6 saying "anyone who wants to go fishing in the sanctuary has to wait for six months after this they were given fourteen days to do fishing after which, they need again to wait for six months before the sanctuary is open for fishing" (Ordinance fish sanctuary Disulap, 2008). The rules and regulations regarding the fish sanctuaries differ across barangays; however all of them have a common goal: prohibiting the use of destructive fishing methods in a certain part of the river or creek, to provide the necessary non-catch zones for fish stocks to recover in the long run (Vermeersch, 2014).

In this research, we will also use the Management Effectiveness Tracking Tool (METT). It was originally designed and developed by The World Bank and World Wide Fund to keep track and monitor the management of protected areas. The METT is built around the WCPA Framework, which consists of different elements: context, planning, input, output processes and outcomes. These different elements are seen as a basis for effective and good area management. The METT is one of the two most widely adapted globally applicable generic systems developed to assess protected area management effectiveness. It is also used to report progress towards the Convention on Biological Diversity. METT has been designed to track and monitor progress towards worldwide protected area management effectiveness.'(1) In this case the tool has been used to compare three different fish sanctuaries (protected areas) within the municipality of San Mariano. This led to the next main research question: *Is the policy of fish sanctuaries in Disulap successful following the management effectiveness tracking tool?*

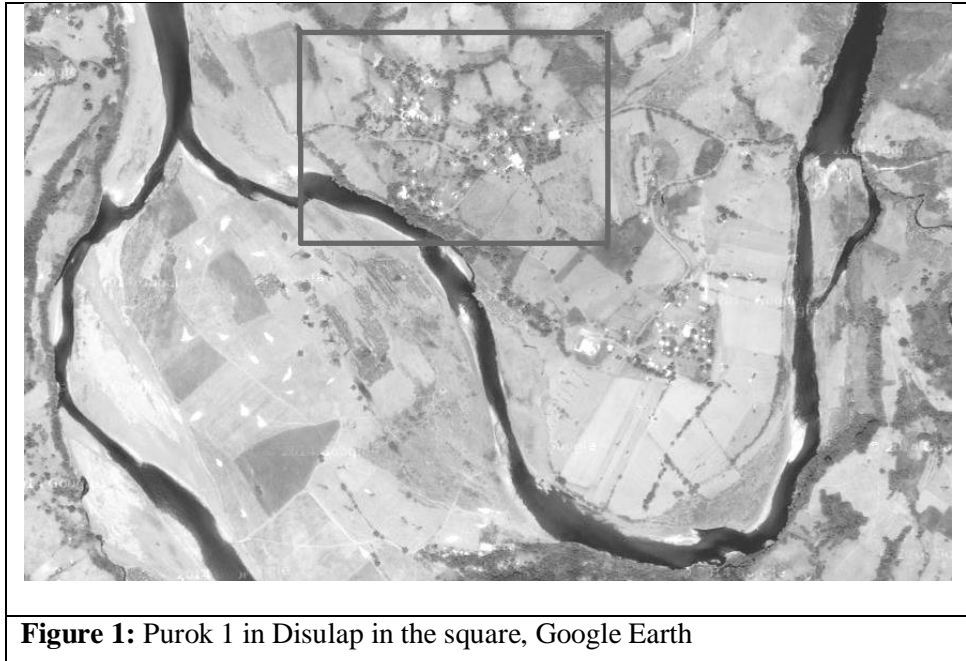
## RESEARCH QUESTION

Is the policy of fish sanctuaries in Disulap successful following the METT?

### Sub questions:

- Which fish sanctuaries are implemented in San Mariano?
  - To what extent do the local authorities experience conflict and with whom? and what is the main reason behind it?
  - What do local governments do to gain extra support of the inhabitants?
  - Are there any NGO's involved?
- How do the authorities ensure that the fish sanctuaries are well implemented?
  - What do local authorities consider as successful implementation of policy?
  - Which methods does the local government use to inform the people about the fish sanctuaries?
  - Are there any feedback mechanisms?
- To what extend do fisherman follow the fish sanctuaries?
  - Are there any consequences for illegal fishing activities? And which methods are used for illegal fishing?
- What is the impact of the fish sanctuaries in the Barangay (in the fields of economics, biodiversity and fishery methods used)?





**Figure 1:** Purok 1 in Disulap in the square, Google Earth

## METHODS

The aim of our research is to find out if the policy of fish sanctuary in Disulap is successfully following the management effectiveness tracking tool. We will give special attention to the Barangay officials, fishermen and LGU members, since they play a vital role in our research. There are several different officials active in Barangay Disulap; we identify five of them: the Barangay captain, the Barangay secretary, the Barangay kagawad, the tanods (Barangay Policemen) and the LGU members- the secretary for Sangguniang Bayan and Municipal Agriculturist. The Barangay is headed by one Barangay captain, the Barangay council which is composed of secretary and seven different kagawads, each of them have their own field of expertise. If a fisherman violates the rules and regulations of the community-managed fish sanctuary, the Barangay officials headed by the kagawad on peace and order will be the ones responsible in enforcing the law and for possible sanctions and punishments. Mabuwaya Foundation has a fundamental role in the establishment of fish sanctuaries thus, this non-profit organization encouraged them to efficiently preserve species roaming around freshwater habitats that are also intensively used by communities (Cacayurin and Aartsen, Water Course 2014). The World Bank and the WWF composed a model to measure the effectivity of management in protected areas. The Management Effectiveness Tracking Tool (METT) is coupled with the WCPA framework which describes the process that has to be followed for good management in protected areas. METT is designed to help monitor progress toward improving management effectiveness. In this research we will use the second version which more readily applies to all terrestrial areas and in particular wetland protected areas. The METT helps to report progress and make it possible to add a score to this report (WWF International 2007). We adjusted the METT for our case, a smaller area existing of three barangays in San Mariano (see appendix). At the end of our research we will fill in the METT assessment form, as complete as possible, and will support it with our findings in the field. And make a score comparison with the other two barangays, San Jose and Villa Miranda.

### **Data gathering**

Our research study consists of three parts; the first part is doing literature review. We had studied earlier about previous conducted research on management of community fish sanctuaries in San Mariano area. We also looked up for the written ordinances declaring the fish sanctuary and we assessed their fish sanctuary using the METT. All this we used in building a basis for our information. This can also determine how effective the enforcement of law is in Disulap.

The second, wide-ranging part is the conducting of interviews with the inhabitants of Disulap. We performed this interview to verify if the policy of fish sanctuary in Disulap is successfully following the METT. We used semi-structured questionnaires which Kelly translated into local dialects or languages (Ilocano, Ybanag and Tagalog). We constructed two different questionnaires for fishermen, Barangay officials and we asked some questions in METT assessment to the Secretary for Sangguniang Bayan and Municipal Fisheries technician. During our interviews, we asked the same questions but in different ways to gather most reliable and valid answers and results. However, this was a tedious part for me since every interview is different, respondent will not always respond in the same way that's why we need to simplify and explain the question by giving more specific example. In choosing our respondents we used snowball sampling, which means that the people who we interviewed can recommend other people who might want to participate. We always depended on the willingness of the people to participate in the research (for fishermen). We conducted interviews in a nearby purok; we only had few representatives for the population of Disulap.

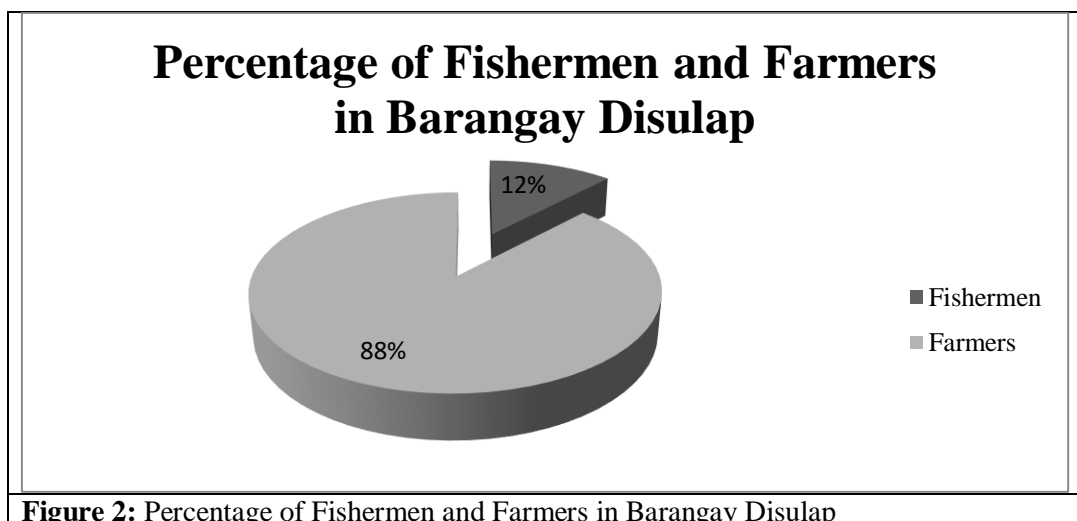
The third part of our research study is doing observation (sight investigation) and participate in fishing trip. We went in a fishing trip together with the site manager and the local fishermen to check whether they will apply the illegal method of fishing and other practices like fishing inside the fish sanctuary. The purpose of this is to verify if these fishermen follow what they have mentioned during the interview. During the trip we were interested in seeing he community-managed fish sanctuary to do curious inspection in the area. We were also interested in the information billboard (public notice) or other landmarks on which fishermen become aware of the boundaries of the fish sanctuary. During this trip we conducted informal interviews (in conversational tone) with our site manager and the local fishermen in order for us to get more information on how and why people fish and where do they fish.

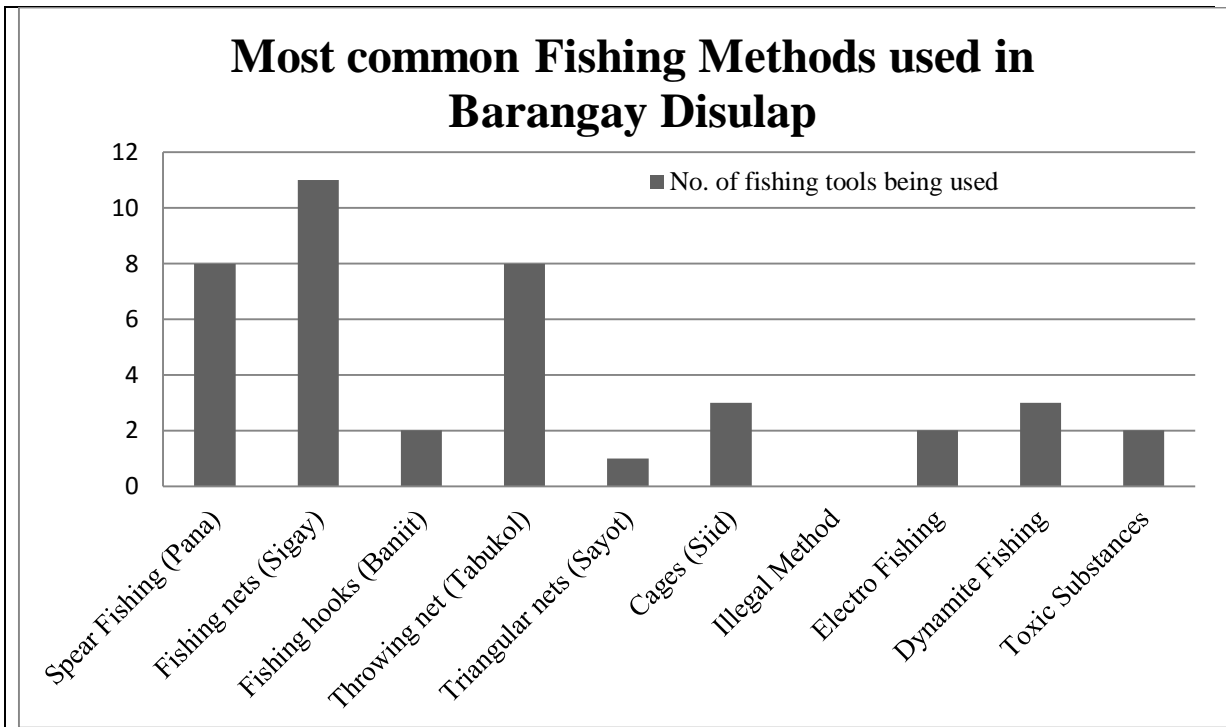
**Table 1: Time Schedule**

|                     | <b>Activities</b>   | <b>Location</b> |
|---------------------|---|-----------------|
| <b>Monday 19</b>    | Travelling to Barangay Disulap, San Mariano, Isabela.<br>Arrival at Barangay Disulap and planning for interview   | Disulap         |
| <b>Tuesday 20</b>   | Interviews with three fishermen, two wives of fishermen and one Barangay kagawad.   | Disulap         |
| <b>Wednesday 21</b> | Interview the Barangay captain, Barangay secretary, two tanods (barangay policemen), one Barangay kagawad and two wives of fishermen.<br>Trip to the fish sanctuary fishing with local fishermen and with sir Edmund Jose-our site manager. | Disulap         |
| <b>Thursday 22</b>  | Interviews with secretary to the Sangguniang Bayan (LGU members) and fisheries technician.  | LGU San Mariano |

## RESULTS

We made two questionnaires, one for fishermen and one for Barangay officials. We started interviewing the fisherman and his wife (N=7). In the beginning, we asked some general questions and later we asked questions related to the fish sanctuary and the management. Most of our respondents (n=4) fish only once a week. Others did it twice a month, once a month, or only during rainy season because the water is high at that time. All our respondents fish for personal consumption and they fish next to their farming activities. The amount of fish they catch varies from 10 small fish to four fish in half a day. “Golden” and Tilapia are the most common caught fish, and one respondent also caught shrimps. They use different methods to catch fish (Graph 1). The opinions of our respondents about the difference in fishing stock over the last 10 years differ. The majority of 57% said that there is less fish available, it is harder to catch fish and the fish they catch is smaller. They prefer the situation ten years ago. Other people said that they catch more fish now than 10 years ago. They also notice a difference in species that increased. However, 86% of our respondents think that a fish sanctuary is necessary and they are glad to have one. The fish sanctuary provides a high fish catch during fiesta and holy week. It is important to have a sustainable river protection to provide fish for next generations. Only one respondent thought that the fish sanctuary was unnecessary because it provides only a bit more fish. But most of the fish is inside the sanctuary and it is prohibited to fish inside. All our respondents were informed by the Barangay captain. The time varies from around 2006 till 2013. At the question if people still fish inside the sanctuary, five respondents answered that nobody does it because it is prohibited. Only two people know that there are people fishing inside the sanctuary. Reason for that is that they are ‘hardheaded’. All of the violators come from Barangay Disulap. To inform the people, there is a meeting during the year where all the heads of the households are invited. The frequency of the meetings differentiate according to our respondents. Two of them attend a monthly meeting, one of them 10 meetings a year, another two meetings a year and the last one only attend one meeting during fiesta. The fisherman would like to have more fish stocks but they have faith that they will have it in the future.





**Figure 3:** Most common fishing methods used in Barangay Disulap



**Figure 4:** Fishing tools next to the house of respondent 1, Disulap (Photo: K. Klerks 2015)

We interviewed nine officials (n=9); the Barangay captain, Barangay Secretary, four Barangay Kagawad, two Barangay Tanods, Fisheries technician of Office of Municipal Agriculture and secretary for the municipal councilor at the Local Government Unit (LGU). The main reason they established the fish sanctuary is that they will have a bigger fish population in the Disulap River. But also the biodiversity and the future generations play a role. The exemptions of the ordinance are during the fiesta and holy week. Also when there are important visitors for the Barangay, the captain can give permission to fish inside the sanctuary. Fishermen who fish during these periods always have a share in their catch. Fishing is only allowed in the open part of the fish sanctuary. There is always a closed part of 200 meters from the Barangay Hall in Disulap. The boundaries of the sanctuaries are known by all the respondents, only their response about where they are vary in starting point. It ends in Kapungdulang but half of the group says it starts in Disulap, the other half says it starts in Sitio Liptong. But 100% of the respondents know that the boundaries are not adjusted in the past. For a sanctuary of 1.5 km it is important to have people employed who manage the fish sanctuary. The response on the question who and how many people are employed to manage the fish sanctuary, the ones who were named are the Barangay officials, Barangay Tanod, The Kagawad on Peace and Order and the inhabitants themselves. Everybody had different experience of the trainings they receive (Table 3).

The organizations who played a role in establishing the fish sanctuary in Disulap are the Barangay of Disulap with the officials and People organizations, the LGU, Mabuwaya Foundation and Plan International. When the fish sanctuary was established, 44% of our respondents did not experience any conflict. In the LGU they could tell us that in the beginning, the inhabitants were against the sanctuary because they would have no place to fish anymore. To compromise these people, they made an open and a closed area in the sanctuary so that they could catch fish during open season. There was also conflict when the Barangay ordinance was adjusted in 2008. The Barangay captain did not ask for help from the Barangay Kagawad. And there is still a minority who want to transfer the sanctuary to another area. There is no special role for indigenous people. They have to maintain the river and protect the fish sanctuary like all inhabitants have to do. The authorities disseminate information to the constituents mostly via assembly meeting. Even if the meeting is not about the fish sanctuary, they will always remind people of them. This also counts for emergency meetings. In the Liga ng mga Barangay, the heads of the Barangays come together and discuss subjects like the fish sanctuary. The Barangay of Disulap also uses billboard to mark the beginning and end of the fish sanctuary. To monitor the fish sanctuary on water quality, the Kagawad on Peace and Order goes two times to the river and removes wood and garbage that are floating in or near the river. To monitor the area on violators, the Barangay Tanod conducts foot patrol two times a week. Only when they hear of plans that people will fish inside the sanctuary, they will go more often. But also the Barangay officials, especially the Kagawad on Peace and Order, are responsible for monitoring the area. The members of the LGU would like to see that they can send municipal policeman but they have not enough resources for it. If the Tanod catch violators, than they have to pay a fine. The first time is 500 PhP, the second 750 PhP and the third time 1000 PhP. The fish that is caught and also their fishing tools are confiscated. All the people who are caught are from within Disulap, so no outsiders. The frequency that it happens varies, every respondent had a different experience.

One of the respondents answered that he only knew about one violator that is caught during the night. Another respondent knew about two violators that were caught in 2014. But another respondent answered that he knew about five violators in the last year. There is a big difference between these numbers. There were also respondents who did not know about violators in the past. And one of the Barangay Tanods, who worked in this function for 10 years, caught six fishermen during this period. There were several researches done by the Mabuwaya Foundation, mostly about crocodiles.

Most of the respondents also remembered a Dutch girl who did research about fish sanctuaries in the summer of 2014. The impact of economics is minimal because they fish for their own consumption. Three of the respondents said that there are more fish available now, especially during fiesta and holy week. Because of this, inhabitants do not need to buy food during this period. There is a bigger impact on the biodiversity. There are more species now according to 77% of the respondents. For the future, they want to maintain the fish sanctuary.

Improvements would consist of a bigger area for the sanctuary or a bigger permanent closed area. And also better dissemination of importance of the sanctuary so that there will be more fish sanctuaries in the future.

**Table 2.** Trainings/Seminars that the barangay officials attended

| Respondents  | Mabuwaya Foundation | BFAR <sup>1</sup> | LGU-PNP <sup>2</sup> | No training |
|--------------|---------------------|-------------------|----------------------|-------------|
| 1            | 1                   |                   |                      |             |
| 2            | 1                   |                   |                      |             |
| 3            |                     | 1                 |                      |             |
| 4            | 1                   |                   |                      |             |
| 5            |                     |                   |                      | 1           |
| 6            | 1                   |                   |                      |             |
| 7            |                     |                   |                      | 1           |
| 8            |                     |                   | 1                    |             |
| 9            |                     |                   | 1                    |             |
| <b>Total</b> | <b>4</b>            | <b>1</b>          | <b>2</b>             | <b>2</b>    |

<sup>1</sup>Bureau of Fisheries and Aquatic Resources. <sup>2</sup>Local Government Unit-Philippine National Police

## DISCUSSION

### **Research question: Is the policy of fish sanctuaries in Disulap successful following the Management effectiveness tracking tool?**

To be able to compare the three researches done about fish sanctuaries in different areas within San Mariano we use the METT tool (see appendices). The total score for the fish sanctuary management in Disulap is 36 out of 54 questions. The maximum score would be 54 so the METT score is 66,67%. Improvements should be made starting with a proper management plan for the fish sanctuary. Important is to include good feedback systems, budget regulations and regular trainings for the staff. There are also opportunities for more economic benefits but for an optimal functioning of the sanctuary, the closed part should be enlarged to 0.5 km. In the area of outcomes and context the fish sanctuary had a high score. The ordinance itself and the performance are overall good. In comparison to the other reports in Villa Miranda and San Jose, the Disulap fish sanctuary scored quite well, San Jose scoring 34/99 and Villa Miranda scored 37/99. To conclude, all researches done score around the same average, although scoring differently on different issues. In the future, we suggest that a better collaboration and exchange of knowledge be realized between the different protected areas so as to improve all different situations.

**Which fish sanctuaries are implemented in Disulap?**

Following the Barangay Ordinance No. 2008-002, the fish sanctuary starts in Disulap from the back of the barangay hall and ends in Sitio Kapungdulan. The length of the sanctuary is 1.5 km according to the ordinance. But the Barangay Captain said that the distance was only 800 meters. The distance did not change over the years but in the first versions of the ordinance, the distance was only estimation. Now they know the exact distance and that is around 800 meters. In the whole fish sanctuary, it is prohibited to catch fish. Exceptions on this rule are during the fiesta, holy week and when there are special guests who visit the Barangay. In case of special guests, the Barangay Captain has to give permission to catch fish within the sanctuary. All the fish that are caught for this reason should be given to the Barangay Captain, who will ensure that it goes to the special guests. During fiesta and holy week it is only allowed to fish in a small part of the fish sanctuary. This part is from Sitio Solsol to Sitio Kapungdulan with a distance of 500 to 600 meters. This ensures that the most important part of the sanctuary, the place where fish lay their eggs, is still saved. Except the Barangay ordinance, there is also a municipal ordinance about the fish sanctuary that starts in Disulap. The Municipal Ordinance No. 12-004 has the same content as the Barangay Ordinance No. 2008-002. When the Barangay ordinance was established and polished by the Barangay officials and the Local Government Unit (LGU) in 2008, they discovered that the process was not complete. Following the book of the Philippines Fisheries Code of 1998, the ordinance has to be approved by the municipal council before it would be an official municipal ordinance.

**To what extent do the local authorities experience conflict and with whom? And what is the main reason behind it?**

The LGU experienced conflict when the Barangay ordinance was established with the inhabitants in the area of the fish sanctuary. In the first proposal for the ordinance, it was prohibited to fish in the fish sanctuary without any exemptions. The fisherman complained that they would not have enough food, especially during fiesta. Therefore, the compromise is made that it is prohibited during the whole year with the exception of the Fiesta and Holy Week. The Barangay officials from Disulap did not experience any conflict.

**What do local governments do to gain extra support of the inhabitants?**

Besides the exceptions in the ordinance itself, the spreading of information plays an important role in gaining the support of the local inhabitants. Every quarter of the year, there is an assembly meeting where all the heads of the households gather. Even if the fish sanctuary is not the topic of the assembly meeting, the officials will remind the inhabitants of the sanctuary. All of our respondents thought that the fish sanctuary was positive because it ensures them of enough food during fiesta and holy week. Without the fish sanctuary the whole river would be overfished and there would be no fish left. Not only for fiesta and holy week but also for the next generation. All parents found it very important that their children would still have the ability to fish in the Disulap River.

**Are there any NGOs involved?**

The NGO that is involved is the Mabuwaya Foundation. They helped with the technical aspect of the fish sanctuary and the ordinance. They also provide trainings to the Barangay Tanods to inform them about the purpose and importance of the fish sanctuary. And they also provide the billboard to mark the beginning and end of the fish sanctuary (Photo 2). So all the people are aware of the boundaries.

**How do the authorities ensure that the fish sanctuaries are well implemented?**

The Barangay Tanod (police) members monitor the fish sanctuary at night to see if there are fishermen fishing within the sanctuary. This is normally done two times a week. However, when they hear from inhabitants that there are people fishing in the fish sanctuary at night, they will go every evening. The inhabitants play an important role in controlling the fish sanctuary. If they see somebody fishing within the sanctuary, they will report it to the Barangay Captain. The violators have to go to the Barangay Captain to prove they are innocent. Otherwise they have to pay a fine and all their fishing tools will be confiscated. The officials ensure that all the inhabitants know about the sanctuary by informing them about it every assembly meeting. All the heads of the households are invited for these meetings and for the ones who miss the meeting, the Barangay Tanod visited their houses and will inform them. The area which is always closed is nearby the Barangay Disulap. Therefore it is easy to control the area because the people who live near to the river will immediately notice if there is somebody fishing inside the sanctuary. For this reason, violators would need to fish at night to have a chance of not being caught.

**What do local authorities consider as successful implementation of policy?**

In the last years they only had five violators. This means that people agree on the fish sanctuary and there is a big support. People who violate the rules and go fishing inside the sanctuary are stubborn according to our respondents. But of course we need to bear in mind that it is not possible for the Barangay Tanod to catch all violators.

**Which methods does the local government use to inform the people about the fish sanctuaries?**

The methods local government use is the assembly meeting that is held every quarter of the month. This meeting is a way to disseminate information about the management of fish sanctuary and how to enforce the law as stated in the ordinance.

**Are there any feedback mechanisms?**

The Barangay Kagawad on Peace and Order with the barangay policemen checks the area two times a year. He will go to an elevated area to see if the quality of the water is good enough. If the water is clear than the quality is good and that is good for the fish inside the fish sanctuary. Sometimes the water is murky and most of the time this is caused by heavy rain. Unfortunately, they cannot do anything about it except to wait till it is clean again. All the wood and garbage that are flowing in the river are removed by the Barangay Tanods. In this way they try to keep the sanctuary clean.

**To what extent do fishermen follow the fish sanctuaries?**

The entire fishermen we spoke to are agreeing with the fish sanctuary because it ensures them to have enough food during fiesta and holy week. Because of this agreement, they will follow the rules of the ordinance and will not fish inside the sanctuary. Most of the people who fish are also farmers, so it is not their main source of income or livelihood. The fish that they catch are only for their own consumption and not to earn money. Therefore, the incentives for following the rules are very small. Outsiders are not allowed in the fish sanctuary and are also never seen in there. Violators are always people from the Barangay.



**Are there any consequences for illegal fishing activities? And which methods are used?**

Violators always have to pay a fine and their fish equipment will be confiscated. The first fine is 500 PhP, the second is 750 PhP and the third is 1000 Php. If the violators caught any fish inside the sanctuary, this will also be confiscated. The three most common illegal methods used in area of Disulap are *bungbong* (dynamite fishing), *kuryente* (electro-fishing) and noxious or poisonous substance such as sodium cyanide. Since the National Fisheries Code of the Philippines banned the use of destructive fishing methods to prevent further devastation of the marine ecosystem (See interview).

**What is the impact of the fish sanctuaries in the barangay (in the fields of economics, biodiversity and fishery methods used)?**

There is no impact of the fish sanctuary in the field of economy because there is no income, they catch fish for consumption only. There are no people employed and no payment for environmental services. But because of the fish sanctuary, the people have enough food during fiesta and they do not need to have a loan to buy food. This can also be seen as an economic benefit because it saves money. But we have to keep in mind that during the rest of the year, most of the people have to buy their own fish at the market in San Mariano. In the field of biodiversity, they know different species commonly caught in the Disulap River. Since the establishment of the fish sanctuary, more varieties of fish species have been observed. Most of them are inside the sanctuary. Although some of the fishermen engaged in using destructive methods, the majority of the inhabitants used legal fishery methods such as spear fishing, fishing nets, fishing hooks, throwing nets, triangular nets and cages.

**Strengths and weaknesses of the research**

The weakness of the research is the short amount of time that we had to gather all the information. We had only three days to find respondents and to conduct interviews. Also the number of respondents is very small. Because of the incorrect unit of analysis we could not make a conclusion for the whole area and this research is not representative. The strong points are that we have been into the field and could take the interviews ourselves. Therefore we could ensure that the answers were all very clear to us and we could ask follow up questions to gather more information. Because we used two questionnaires, we tried to get two stories and we combined them to make a complete overview.

**ACKNOWLEDGEMENT**

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## APPENDIX

### Questionnaire for Fisherman

Location:

Name respondent:

Age:

Gender:

Settlement history:

Date:

Ethnicity:

Highest education:

Profession/livelihood:

Q1: How many times a week do you fish and where?

Q2: How much do you catch? Is it for personal consumption?

Q3: Which species do you catch?

Q4: Which fishing method do you use?

Q5: Do you notice a different in fishing stock over de last 10 years?

Q6: Should a fish sanctuary be necessary in your opinion? (If yes: Q7; If no: Q9)

Q7: What is your opinion about the fish sanctuary (kind of the same as Q6)? When where you informed about it?

Q8: Do people still fish inside the sanctuary? If yes, are they from Disulap or outsiders?

Q9: Are there any discussion or meetings in the Barangay about fishing conditions or area protection?

Q10: How do you see the future for you as a fisherman and for the Disulap river? What can be improved?

### Questionnaire for Barangay Officials

Location:

Name respondent:

Age:

Gender:

Settlement history:

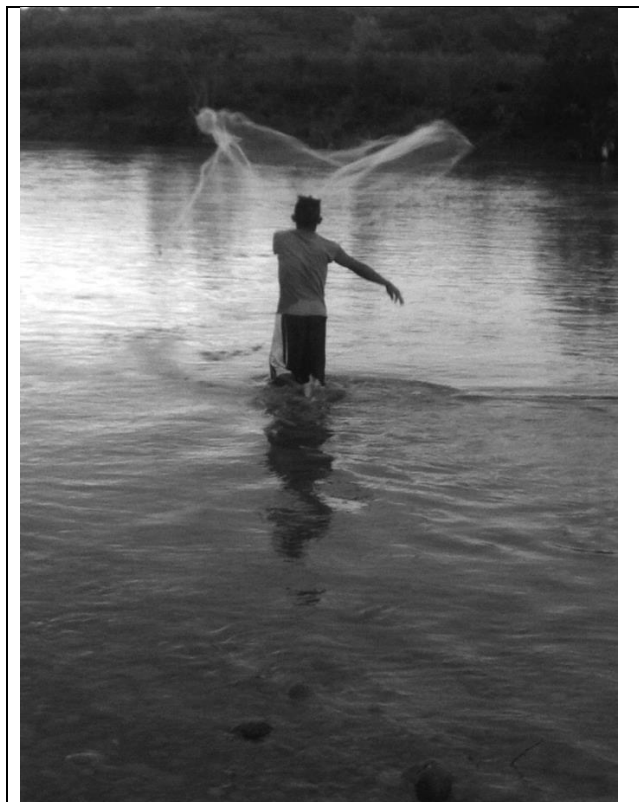
Date:

Ethnicity:

Highest education:

Profession/livelihood:

- Q1: Can you tell us something about the fish sanctuary in the area of Disulap. Why is it established? Are there any exemptions in the ordinance?
- Q2: Do you know the boundaries? If yes, where are the boundaries and is it adjusted in the past years?
- Q3: Who and how many people are employed to manage the fish sanctuary? Do they get any specific training?
- Q4: Did you experience any conflict and with whom when the fish sanctuary was established?
- Q5: Who were involved in establishing this fish sanctuary in your Barangay? Was there a role for indigenous people?
- Q6: How did the local authority disseminate information to the constituents?
- Q7: Are there any monitoring systems nowadays for the fish sanctuary?
- Q8: What is the percentage of fishermen/famers?
- Q9: Which fish methods do fishermen use? Are there any illegal fishing methods?
- Q10: Are there any consequences if fishermen fish in fish sanctuary? Who is responsible for checking the area? (If yes: Q10; If no: Q11)
- Q11: How many times did you experience this? Is there a difference in people within the Barangay and outsiders?
- Q12: What is the impact of the fish sanctuaries in the region in the fields of economics and biodiversity?
- Q13: Are there any discussion or meetings about the fish sanctuary? Who participated in it and how often did it take place?
- Q14: Is there any research done about the fish sanctuary?
- Q15: What would be your ideal future for the fish sanctuary? How can it be improved?



**Photo 2:** Fisherman fishing outside the sanctuary with fishnet, Disulap (Made by K. Klerks 2015)

# LOCAL KNOWLEDGE OF THE FISH SANCTUARIES IN AND AROUND VILLA MIRANDA

**Shela M. Ramirez & Saskia van Otterloo**

## INTRODUCTION

The most basic of all natural resources on earth is water; everything in this world exists and thrives because of water. Fishing, one of the oldest types of livelihood still provides the main source of food for many people on earth. In the Philippines, fish is an important source of food and income for many people. Around 1.3 million Filipinos directly depend on fish for income (Green et al 2003 in Van Lieshout 2014).

Overfishing and the declining fish stocks as the result of it have become a major problem over the years. Locally, regional bodies have the task to implement the law (Van Lieshout 2014). The general problem is overfishing, which leads to the loss of biodiversity and the deterioration of aquatic environments. Socio-economically, due to overfishing human food security and the livelihoods are jeopardized (Green et al 2003 in Van Lieshout 2014).

To stimulate grass root intervention and participation of the resource users in decision-making, planning, acting and evaluating processes, 'local ecological knowledge' has been incorporated in natural resource management (Armitage 2005; Berkes 1993; Warren 1991; Flavier 1995; Davis & Wagner 2003 in Van Lieshout 2014). This knowledge relates to any knowledge that people collectively hold about their ecosystems, generated through interpreting the world (Sillitoe 1998 in Van Lieshout 2014). There are also different national laws protecting fisheries and aquatic resources like the Republic Act No. 8850, aiming to develop, manage and conserve fisheries and aquatic resources, through a set of restrictions and regulations.

### **Area description**

In Villa Miranda, a sitio located in the municipality of San Mariano, Isabela Province, fishing sanctuaries have been set up to protect declining fish stocks. In the sanctuaries, where fishing is made illegal, fish are able to thrive and the spillover effect occurs into the rest of the river. In several parts of the municipality of San Mariano, 10 fish sanctuaries were set in place by the Local Governmental Unit with the help of the Mabuwaya Foundation, Inc. Our research has focused on the local knowledge and the different national and regional laws and above all, the role the locals play in and around the fish sanctuaries. Our main question is therefore: What is the role of the local fishermen in and around the fish sanctuaries at Villa Miranda in the management of the sanctuaries?

Our research location is Villa Miranda, a sitio in Barangay Dibuluan, municipality of San Mariano, province of Isabela in the Philippines. The village consists of around 100 households and the inhabitants consist mainly of Kalinga and Illocano people, who have migrated from other areas. It is the largest sitio in Dibuluan, as told by many respondents. The sitio is located in the curb of the Catalangan River (Figure 1). Agriculture and farming are the main sources of livelihood, and the land tenure consists mostly of forest land and Alienable & Disposable land, this is a type of land that covers 48% in the Philippines. Fishing is an important source of food but does not belong to the top sources of livelihood. The fish sanctuary is located two hours away (by foot) from the village (Balbas 2015, pers. comm.). A small Agta community who live on the other side of the river are fishermen who trade and sell their catch to the locals in Villa Miranda.

## RESEARCH QUESTIONS

### Main question:

What is the role of the local population in and around the fish sanctuaries at Villa Miranda in the management of the sanctuaries?

### Subquestions:

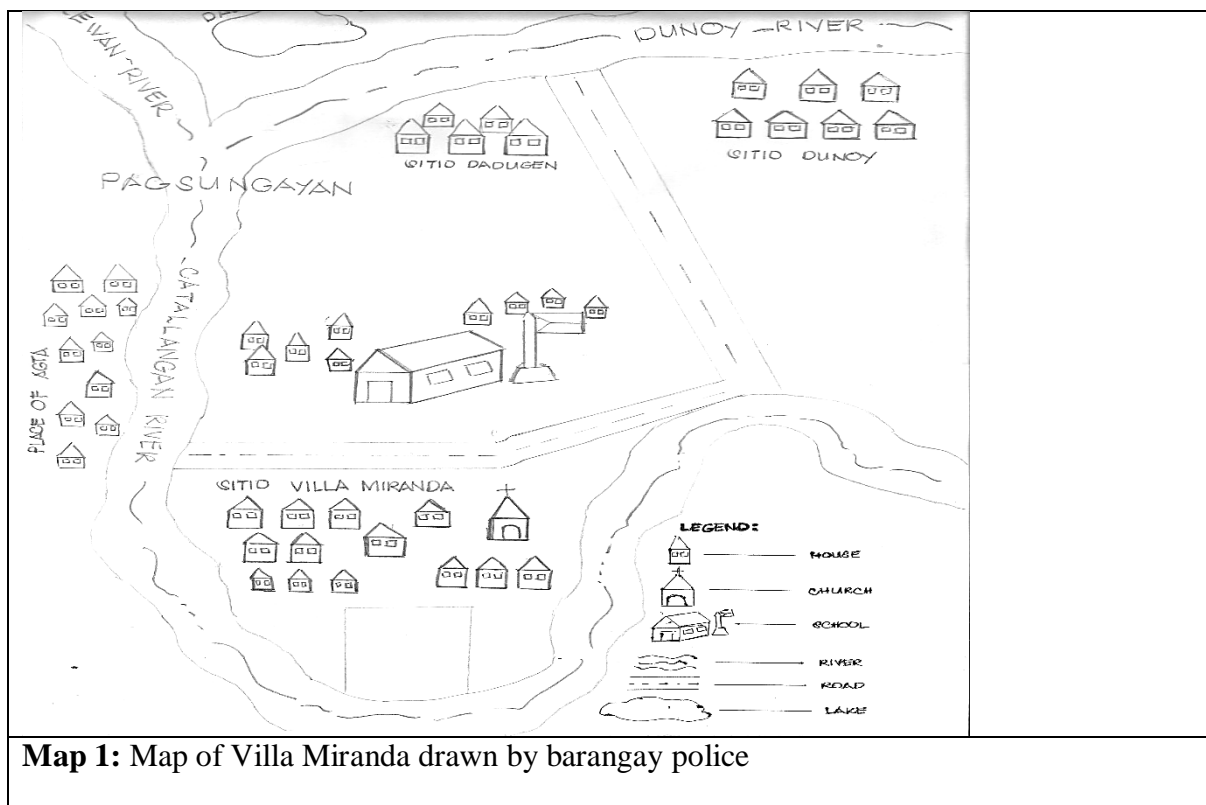
- Is there knowledge of (local) laws protecting the fish sanctuaries?
- What type of equipment is used to catch fish outside of the sanctuaries and how, has this changed over the past years?
- How much and what type of fish is caught? Has this changed since the fish sanctuary came into existence?

## METHODS

This research is based mostly on qualitative research techniques (Aquino 2014). Our chosen method was interviews with the local farmers, fishermen and barangay officials. Over three full days, 29 interviews were conducted. We also observed and used field validation to validate the fish sanctuary meaning that we went to the site to see what it looked like and see if it was where the ordinance says it is. Map drawing was an important part of the research, as well. As a part of the interview, we asked our respondents to draw the surroundings to help us better understand our study area. The maps showed us the different view each interviewee had about their village and surroundings.



**Photo 1:** Billboard showing that there is a fish sanctuary near Villa Miranda



Reflecting on our methods it seems that interviewing was a simple and direct way to get answers, we had no problems understanding most respondents as one of us spoke the same language e.g. Ilocano, Ybanag, as most of our respondents. On the other hand, photo elicitation would have made for an interesting and in some cases more interactive interview, but because of time constraints we chose not to use this method. In order to make a comparison between the groups focusing on fish sanctuaries our group will use the Management Effectiveness Tracking Tool (METT) to analyze the situation in the three different areas. The METT analysis is added in the appendix, and will be discussed in a later chapter.

### Time schedule

| Date     | Activities  | Location         |
|----------|---|------------------|
| 01/19/15 | Travel to our research area Villa Miranda, getting to know host family                              | Villa Miranda    |
| 01/20/15 | Conducting interviews with locals: farmers, <i>barangay kagawad</i> , <i>agta</i> , <i>tanod</i> )  | Villa Miranda    |
| 01/21/15 | Interview: <i>agta</i> , <i>barangay kagawad</i> (host family) and farmers/fishermen                | Villa Miranda    |
| 01/22/15 | Interview farmers/fishermen, visit to the Calewan Fish Sanctuary, Farewell Party and picture taking | Villa Miranda    |
| 01/23/15 | Travel to San Isidro, hike to Dunoy, release crocodiles!  | San Isidro-Dunoy |
| 01/24/15 | Travel back from Dunoy to Cabagan campus  | Dunoy-Cabagan    |

## RESULTS

### Is there knowledge of (local) laws protecting the fish sanctuaries?

In short, the answer to this sub question is, yes. All respondents except the Agta population on the other side of the river knew of the fish sanctuary. The interviewed locals could tell us of the fines that any person who violates the ordinance pays: 500 PhP for first offense and 1,000 PhP for second offense. Secondly, most inhabitants fish in the Catalangan River (see map above) for their own consumption. The overall knowledge that respondents have about the fish sanctuary are split into three main answers.

**Table 1:** Overall knowledge of respondents about the fish sanctuary

| Knowledge                                       | No of respondents that answered positive out of 29 |
|---|--|
| Follow and know about rules and regulations     | 12   |
| Avoid illegal fishing, used traditional methods | 2  |
| Nothing/ they do not know about their role      | 10   |

### What type of equipment is used to catch fish outside of the sanctuary?

The area outside of the sanctuary, mostly the Catalangan River, is where the inhabitants of Villa Miranda fish. Most of the respondents use the *pana* or spearfishing method because this is an easy and affordable way to catch fish. Aside from this, it is important to state that the sitio prohibits any type of illegal fishing (e.g. electro fishing), only traditional, sustainable methods are legal in the area. Non-destructive fishing methods include fish net or *sigay*, which has big net holes as to only catch the larger fish. According to the respondents, the triangle net or *sayot* is used especially during the rainy season because that is when the river is at its deepest and they can catch many fish. The *sayot* itself is made by shaping three bamboo sticks into a triangle supporting a gauze-net as to form a triangle. Another type of equipment is the hook and bait, in which a small earthworm is attached to a small metal fishing hook used to bait fish. The *bingwit* is then thrown into a calm part of the river. Schools of tiny *balamban* fish are usually attracted to this type of equipment, also attracting larger fish that get hooked. Lastly, a cage or *siid* is used to catch tilapia. The cage is made up of a gauze net or screen. This again shows that there is local knowledge on what is wrong and right to use and that local laws and national laws protecting areas seem to be effective ( Van Lieshout 2014).



**Photo 3:** The Calewan river, overlooking the sanctuary

The Agta we interviewed also told us that he uses *pana*, *goma* eye-goggles and a flashlight in fishing. He also goes fishing inside the sanctuary as he cannot read and does not know about the protected area and ordinance. Fishing is the main livelihood for the Agta, as they do not own their own land to cultivate crops on. The fish the Agta catch are also being sold to the inhabitants of Villa Miranda.

The different types of fishing equipment become visible in the table below. The tables shows how many times which equipment was mentioned by the interviewed respondents. It also shows that spearfishing is the most used type of equipment. When there are two numbers it means that the answer was answered the same number of times, e.g. the small net and big net where both mentioned eight times.

**Table 2:** Types of equipment

| Type of fishing-equipment  | Times mentioned / used by respondents | Ranked |
|--|---------------------------------------|--------|
| Spearfishing   | 11                                    | 1      |
| Small triangle net ( <i>sayot</i> ), big net or ( <i>sigay</i> ) | 8 / 8                                 | 2      |
| Hook and Line ( <i>Bingwit</i> ), cage ( <i>siid</i> )           | 4 / 4                                 | 3      |
| <i>Tubulko</i>   | 1                                     | 4      |



**Photo 2:** Residents showing the different types of fishing equipment, *sayot* on background

**How much and what types of fish are caught in the area around Villa Miranda?**

Tilapia, eel and *ikan* are the fish types that are mostly caught, followed by shrimps, mudfish, *balamban*, catfish and *kurilao*. The fish catch depends strongly on weather conditions. On warm sunny days, more fish are caught compared to rainy days. Secondly, equipment and other necessities are easier to use when the weather is calm. The most popular fish types are ranked one to six. Tilapia is the most caught fish whereas catfish are rarely caught by the inhabitants.



**Table 3:** Types of fish caught by inhabitants.

| Type of fish                       | Number of respondents catching the fish | rank |
|------------------------------------|---|------|
| Tilapia                            | 16                                      | 1    |
| Eel                                | 10                                      | 2    |
| Milk-fish ( <i>ikan</i> ), shrimps | 9, 9                                    | 3    |
| Mud fish                           | 7                                       | 4    |
| <i>Balamban</i>                    | 6                                       | 5    |
| Catfish, <i>Kurilao</i>            | 5                                       | 6    |

The inhabitants gave us different reasons for either visiting or not visiting the sanctuary. The reasons are tabulated below in Tables 4 and 5.

**Table 4:** Reasons for not visiting the sanctuary

| Reasons for not going into sanctuary                   | Number of respondents' answer | rank |
|--|-------------------------------|------|
| Far away/ time consuming                               | 10                            | 1    |
| Because of huge stones, deep river, difficult crossing | 5                             | 2    |
| Afraid of crocs/doesn't know the way                   | 6                             | 3    |
| Too old  | 2                             | 4    |

**Table 5:** Reasons for visiting the sanctuary

| Reasons for visiting  | Respondents' answers | rank |
|---|----------------------|------|
| To see fish/crocs   | 3                    | 1    |
| Pass by on way to farm                                      | 2                    | 2    |
| Beautiful area, and great water quality                     | 1                    | 3    |
| Bring visitors, know where it is located                    | 1                    | 4    |
| Look at the area, see the view                              | 1                    | 5    |
| To fish inside the sanctuary, does not know it is protected | 1                    | 6    |

Out of 29 respondents, only one fished for livelihood while the other 28 were farmers and fished only for private consumption. The main agricultural crop are corn, cassava, banana (sold), rice and beans (for own consumption). Secondly, and which is important for our METT analysis, it is necessary to know that locals could tell us of improvement in the area in terms of biodiversity, ecology, and economy.

## DISCUSSION

### **What is the role of the locals in and around the fish sanctuaries at Villa Miranda in the management of the sanctuaries?**

The locals we interviewed follow and know about the rules and regulations and the ordinance and fee. Most locals who fish for their own consumption avoid illegal fishing and use traditional methods. However, there are still locals in the village who do not know what their role is or do not have a role. Some respondents we interviewed had no knowledge whatsoever on the existing activities and programs for the protection of the fish sanctuary.

The people just follow the laws and or ordinance they know about and avoid doing illegal activities such as electro-fishing. Respondents also spoke about a more personal initiative to contributing to protecting the area, although the whole fish sanctuary, protected area is a community based effort. Respondents told us about the 'spy on their neighbors' who fish in the sanctuary, a prohibited act. Locals informed us that they report prohibited or illegal activities to the authorities, in this case, the barangay police. This could not replace the formal sanctuary, but certainly does help regulate the area.

### **Management Effectiveness Tracking Tool**

To be able to compare the three researches done about fish sanctuaries in different areas within San Mariano, we used the METT tool. The Calewan river fish sanctuary scored a 37/99. Improvements should be made in the areas of management and demarcation of the fish sanctuary. Also objectives to manage and protect the area should be better formulated. An idea would be to ask guidance from a researcher or for instance an NGO. Thirdly, the budget surrounding the fish sanctuary should be better organized. An improvement would be to use the money gained with fines to support the area directly. Areas on which the fish sanctuary scored high were staff organization, resource management and involving local inhabitants. These things were well-organized on a local scale, whereas the points to improve on would be more effective if aid and knowledge were sought from elsewhere, as discussed above. In comparison to the other reports in Disulap and San Jose, the Calewan fish sanctuary scored quite well. San Jose scored 34/99 and Disulap scored 36 points out of 18 questions that they were able to answer. To conclude, all researches done scored around the same average, although scoring differently on different issues. In the future, we suggest that a better collaboration and exchange of knowledge will be realized between the different protected areas so as to improve all different situations.

### **Main challenges and problems**

The two main issues while in the field where the fact that the people cannot read and write, and secondly that we underestimated the number of fishermen in the village. The problem of literacy was almost only an issue among our Agta respondents. These people lived on the other side of the river and as mentioned earlier fished in the sanctuary for the simple reason that they did not know that it was a protected area. Illiteracy is in this case a challenge and a problem. A way to solve this would be to organize activities around the protection of the area, so that the Agta would become more informed. Informal lectures or information days could be the solution. Secondly, it would help us to know a little more about Villa Miranda and the area surrounding it in order to formulate our questions in a different way. Now, we focused mainly on the role of fishermen, later finding that most of the respondents were farmers. This could and would all be improvement points for further research. Another thing would be to have different sets of questions for barangay officials and for local inhabitants, so as to elicit different and more varied information from both groups about their knowledge and the effectiveness of the fish sanctuary.

Thirdly, an improvement to the area would be to add more billboards and most importantly add more languages to the billboards, instead of the billboards being just in Ilocano. In relation to the METT analysis, we could advice that the management of the area should become more structured. This would also help improve the issue of language and billboards. On the other hand, there are many strengths and opportunities in the area as most of the interviewees actively participated and knew about the sanctuaries. Using mostly traditional, sustainable ways of fishing, and not overfishing the area.

## ACKNOWLEDGEMENTS

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## APPENDICES

### I) Questionnaire

#### Basic questions

Date:

Name Respondent:

Age:

Ethnicity:

Settlement History:

Highest Education:

Profession/livelihood:

Location of intv.:

Gender/Sex:

Income:

1. Do you have fish sanctuary (ordinance) in VM?
2. Do you fish? If NO go to Q9, do you know about fishing?
3. What equipment do you use to fish and why, has this changed over time?
4. Are there limitations to the amount of fish you catch?
5. When do you fish, time of day, time of year?
6. How important is fishing as a livelihood in for you?
7. How much and what kind of fish do you catch? KG/hour
8. Has this (7) changed over time?
9. Do you have a role in managing the sanctuaries, if so what is it?
10. Can you draw a map of the area and mark important places?
11. Why do you, or do you not visit the sanctuary?

## SUSTAINABLE FISHING IN SAN JOSE

**Raymond Andres and Thomas Schmitt**

### INTRODUCTION

The Barangay (village and governmental unit) San Jose is located in the municipality of San Mariano, in Isabela province. It is classified as a rural area with a size of 15,577.94 hectares and is located about 17 kilometers from the municipal seat of government in San Mariano proper. The Barangay San Jose has a total population of 2,722 inhabitants that live in 577 households. The village is divided into 6 puroks (neighborhoods) and among the puroks are a sitio (small village) called Diwagden and Sitio Kamarasitan that we also visited. The Barangay is presently managed by Barangay Captain Florentino R. Buñao.

San Jose, formerly known as Dimalsug, used to be a remote sitio of the large Barangay Disulap. The increase of population led Sitio Dimalsug to be separated from the mother Barangay. It was registered as Barangay San Jose in honor of the former mayor, Jose Miranda, who was heading the Municipality of San Mariano during the conversion of the said sitio to the barangay status. The village is located in the outer layers of the Sierra Madre mountain range bordering the Northern Sierra Madre National Park (NSMNP). San Jose itself inhabits mainly migrants while Agta, Kalinga and Ifugao can be found in the sitio Diwagden. (Barangay Report 2012). These can be referred to as indigenous peoples since they are distinct from the mainstream population in way of life, language and culture and live in a distinct geographical area (De Vera 2015).



**Photo 1:** A screenshot of the Barangay San Jose showing the different puroks and the river

## RESEARCH QUESTION

What Role do fish sanctuaries play in a community-based management of river resources towards Sustainability in San Jose?

*Sub question 1:* What are the interests, methods and motivations of fishing?

*Sub question 2:* How effective are laws governing the fish sanctuaries?

*Sub question 3:* How are wetlands and the river system conserved?

*Sub question 4:* How effective does the sanctuary function?

## METHODS

**Table 1:** List of activities

|                                    |   |
|------------------------------------|---|
| Tuesday January 20 <sup>th</sup>   | Interviewed 14 Residents of San Jose<br>Interviewed teacher of the local School<br>Visited to the fish sanctuary  |
| Wednesday January 21 <sup>st</sup> | Interviewed 2 Agta in Diwagden<br>Interviewed 2 Kalinga in Diwagden<br>Interviewed 1 Ifugao in Diwagden<br>Interviewed 1 former illegal fisherman<br>Visited to the Sanctuary   |
| Thursday January 22 <sup>nd</sup>  | Interviewed the Barangay Captain<br>Interviewed the Barangay Secretary<br>Analyzed the Barangay Profile<br>Interviewed the Barangay Treasurer<br>Interviewed the former Barangay Captain<br>Interviewed the Chief Tanod (local police)<br>Visited to the Sanctuary<br>Interviewed the LGU – Dep. Of Agriculture |



**Photo 2:** An overview of the location of the main village San Jose and the sitio Diwagden as well as the Agta settlement in sitio Kamarasitan

### ***Interviews***

Interviews were the most fundamental method of this research. These were structured into three different types: with local Farmers in San Jose, with indigenous people in Diwagden and sitio Kamarasitan and with barangay/municipality Officials. It was chosen to draw ideas from local farmers of their perceptions of the fish sanctuary and its implementations, as well as to learn about their motivations for (sustainable) fishing. The interviews with the indigenous representatives (Agta, Kalinga, and Ifugao) in the Sitio Diwagden were conducted to learn about their motivations of (sustainable) fishing and compare them to the farmers in San Jose. We expected the interests in fishing and motivations for limited exploitation of the fish resources to be different between indigenous people and local farmers. Hence, these interviews of the indigenous peoples had a shortened questionnaire. All interviews were semi-structured, meaning that a questionnaire was available and themed around the sub-research questions, but additional in-depth questions, clarifications and discussions were added to the interviews.

The questions for the officials who were interviewed for this research were based on the Management Effectiveness Tracking Tool (METT), but were adjusted to the interviewee: The barangay captain provided us with general information, clarifications and questions that came up during other interviews (also validation of comments mentioned by villagers). For example, people were talking about exceptions in the sanctuary applicability which the captain clarified that this is an idea which still needs to be passed through in the barangay council. The barangay secretary provided us with the barangay profile and the treasurer was interviewed for clarifications of the imposing of penalties, lists of violators and gave us insight into not-imposed penalties. The former barangay captain was interviewed in order to learn about the motivations and the process of the introduction of the sanctuary and some differences in implementation between 2006 and now. Lastly, the Municipal Agricultural Officer of the Local Government Unit (LGU) of San Mariano clarified some questions that did arise in the research and added valuable knowledge.

### ***Fish sanctuary visits***

In addition to the 27 interviews that were conducted, visits to the river formed an effective support for the results of this research. This method was chosen to validate what we have heard during interviews, such as billboard demarcation and waste disposal, but it also provided us with evidence about violations of regulations that none of the interviewees had shared with us.

### ***Official documents***

Apart from scientific literature that formed an essential support for the background, official documents were a great asset in gaining knowledge about fish sanctuaries in San Jose. For example, the implementation of the ordinance from 2006 and the Barangay profile are contributing to this paper.

### ***Management Effectiveness Tracking Tool (METT)***

The METT was developed to evaluate protected areas worldwide. Hence, it judges the area on different categories that they should fulfill in order to be effective. The results of this research have been used to rate the 30 different issues of the METT tool. Thereby, we obtained a score for each of the six categories and a final score that is comparable to the fish sanctuary in Villa Miranda and Disulap where a similar research has been conducted in the frame of this course.

## RESULTS

### Motivations, methods, and interests

In San Jose, the main source of livelihood is farming and hence, except for some informants such as the school teacher, 85% of our respondents make their living from agriculture. For the farmers, a river that runs through the village is a source for fishing that serves as a valuable addition to their daily diet. The number of times our informants practice fishing ranges from twice per month to twice per year with an average at about one time per month. Usual fishing times are 3 hours from 9pm to 12am.

Comparative analysis with the data from Diwagden has shown that the situation there is different from San Jose. The population in the sitio consists of indigenous groups such as Agta and Kalinga for whom fishing is an essential livelihood. The indigenous people fish at least once per week and the catch are used for consumption, but also exchanged at the local market for coffee and rice.

**Table 2:** An overview of the main differences between local farmers in San Jose and indigenous peoples (Agta, Kalinga and Ifugao) in the sitio Diwagden

|                         | <i>Ilocano (San Jose)</i>                           | <i>Indigenous (Diwagden)</i>               |
|-------------------------|---|--|
| Methods                 | Baniit: 36%<br>Pana: 36%<br>Sigay: 18%<br>Karas: 9% | Stick and goggles (spear fishing)<br>Sayod |
| Livelihood              | Farming   | Farming and Fishing                        |
| Importance of Fishing   | Consumption   | Consumption and Market                     |
| Enforcing limitations   | Tanods  | Themselves: only few Tanods                |
| Limited Exploitation    | Rules and Regulations                               | Future Fish Resources                      |
| Problem of exploitation | Fishing inside sanctuary                            | Electro-fishing                            |



**Photo 3:** Dominic Rodriguez illustrating the usage of the Pana fishing method (Photo by T Schmitt 2015)



Fishing tackle (Baniit) is the equipment used by fishermen when fishing. Almost any equipment or gear used for fishing can be called fishing tackle. Some examples are hooks, rods, reels, baits, lures, spears, nets, gaffs, traps, waders and tackle boxes. Bow fishing (Pana) is a method of fishing that uses specialized archery equipment to shoot and retrieve fish. Fish are shot with a barbed arrow that is attached with special line to a reel mounted on the bow. Some freshwater species commonly hunted include common carp, grass carp, bighead carp, alligator gar, and paddlefish. Spear fishing is an ancient method of fishing conducted with an ordinary spear or a specialized variant such as a harpoon, trident, arrow or eel spear.

### **Community involvement in San Jose**

The fish sanctuary in San Jose is a community-conserved area. This means that the inhabitants of San Jose are involved in the implementation of this project. Indeed, 100% of the respondents agreed on the importance of the project and support the existence of the sanctuary. In 2006, the villagers were integrated into the decision-making by voting on the ordinance. In order to strengthen the public awareness and appreciation of the fish sanctuary, awareness raising projects, such as posters are created in schools and incorporated in the school program. However, these awareness raising projects are mainly kept within the school and do not involve the entire population.

One of the major environmental problems the village has faced in the last years is waste management. In the past decades, many people were just throwing their trash into the river. Now, the ordinance of the sanctuary prohibits this since it has negative effects on water and wetland quality. Billboards all over the village remind the inhabitants of this regulation and are in general respected. Furthermore, *twice a year*, the Barangay Captain holds a general assembly for all inhabitants of the village to inform about updates, including environmental issues of the sanctuary. This way, the community is involved in solving issues such as the waste management: the inhabitants are supposed to dig holes for their trash instead of throwing them into the river and according to the answers that we received in the interviews, this is being accomplished to 100%.



**Photo 4:** One of the simple billboards reminding the citizens about waste management next to the river sanctuary (Photo by T Schmitt 2015)

However, interviews have shown that San Jose's fishermen are not aware or concerned about the environmental effects that overfishing in the sanctuary or improper waste management might cause, but mainly respect the regulations "because it is the law" (Naño 2015, pers. comm.).

### **Implementation**

In 2006, the former Barangay Captain of San Jose, Rodolfo Ramirez, implemented the ordinance declaring a Fish Sanctuary in San Jose. The ordinance regarding the implementation of the fish sanctuary was attested and approved by the Barangay council of San Jose on September 2, 2006. The location of the sanctuary is the intersection of the Ditaly River and San Jose River downstream to Purok 2 with a length of 1.5km. It was executed through the cooperation of the Local Government Unit of San Mariano and the Barangay council of San Jose in order to maintain the sufficient supply of fish in the community.

The ordinance contains six sections stating different human activities in the sanctuary that are prohibited with corresponding penalties for every offense. Based on our interviews, all of the respondents are aware of the said ordinance and 86% are aware of the exact penalty while the other 14% don't know the exact amount. Hence, in the sanctuary, "the catching of fish of any kind" (Ordinance No. 06-07) is prohibited. Furthermore, waste should not be thrown into the river and "the washing of chemical spraying equipments and containers along the sanctuary is also prohibited" (Ordinance No. 06-07).

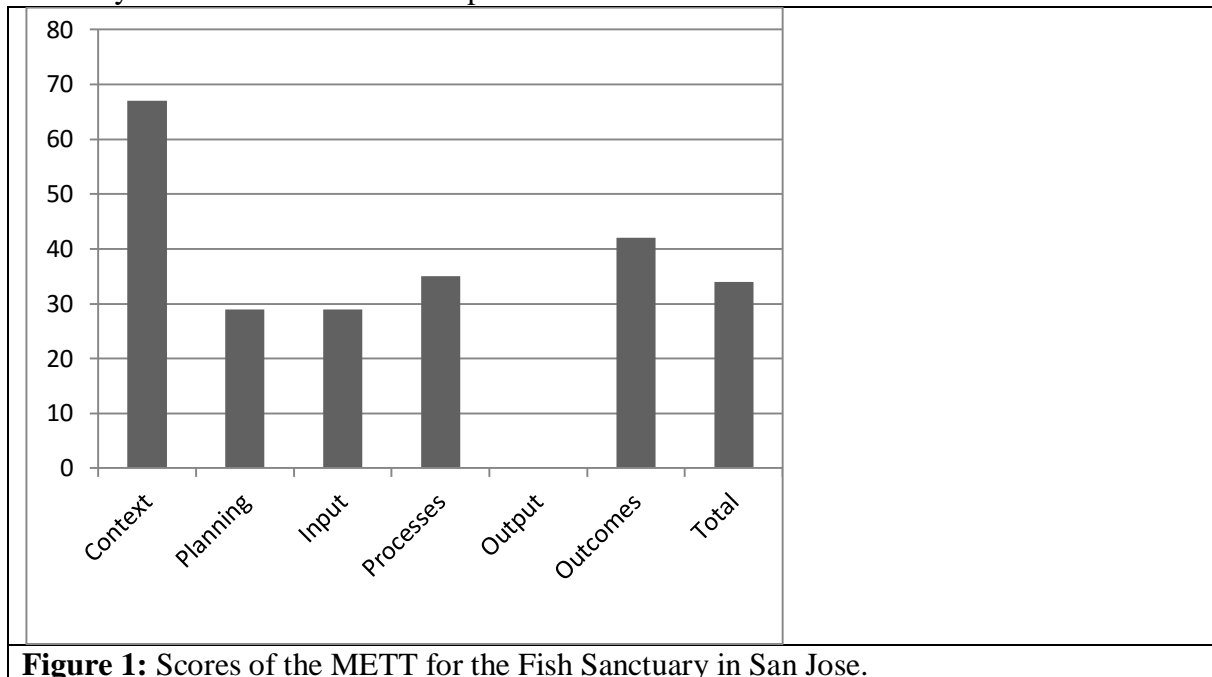
We have also learned that there are some violators who did not yet pay their penalties. According to the Barangay treasurer, Mrs. Rosalina Laño, the violators just apologized for what they have done and easily got away with a warning.

Barangay Captain Buñao informed us that there are eight tanods (Barangay police) in San Jose guarding the area. At least three times a week, one of these is monitoring the protected area. But on the first day of our research, we already saw two people fishing inside the sanctuary: a lady and later on a child. According to the result of the interviews we conducted, 62% agreed that the number of tanods is already enough to guard the area and 38% suggested that it is still needed to add one or two more tanods in the Barangay. We have also learned that not all violators are caught and especially children often get away with just a warning.

Billboards informing the people about the fish sanctuary also do exist. One is located in the entrance of the sanctuary, in the intersection of Ditaly and San Jose rivers, and one is located in Purok 2.

## Management Effectiveness Tracking Tool

The results of this research were used to obtain a score for the METT. The scores of the sanctuary in this evaluative tool for protected areas are as follows:



**Figure 1:** Scores of the METT for the Fish Sanctuary in San Jose.

In comparison with two other researches done in Disulap and Villa Miranda, the score of 34 (out of 30 questions) seems relatively low (Disulap: 36 out of the 18 questions they were able to answer and Villa Miranda 37 out of 30 questions), since few issues, such as tourism, were not applicable to this specific fish sanctuary in San Jose. To conclude, all researches done score around the same average although scoring different on different issues. We suggest that a more intense collaboration between the barangays with fish sanctuaries in the municipality could lead to a better exchange of knowledge and help the particular barangays in all situations.

## DISCUSSION

In the following section, the previously presented results will be used to discuss the questions this research is trying to answer. Finally, a selection of significant results of the METT analysis will be analyzed.

### What are the interests, methods and motivations of fishing?

In order to have a valid overview of different kinds of motivations for fishing, we conducted this research both in the village San Jose itself where mainly Illocano migrants live and in the sitio Diwagden to find a more diverse set of ethnic groups.

While in San Jose the main reason for fishing is just to obtain an addition to food, the motivation of them to follow the regulations (no illegal fishing methods and no fishing inside the sanctuary) are mainly due to the law and existence of penalties. In Diwagden, on the other side, fishing plays an essential role for providing the basic needs of the inhabitants and for their income. This can also be seen by the results of the interviews which show that the Agta and Kalinga worry about the future availability of fish of the river since “their children also rely on it” (Almonte 2015, pers. comm.). They see destructive fishing methods, such as electro-fishing, as an enormous threat to the river. Indigenous groups often have their own motivations for “sustaining conservation areas” (De Vera 2015) which explains this behavior. In this case, our

Agta respondents do not favor illegal fishing methods since it destroys the small fish and they are afraid that their children may not be able to provide for their daily food needs in the future. Hence, the fish sanctuary is a great way in limiting fishing in San Jose where most people did not express particular concern of depletion of the river, but for indigenous groups, the way of dealing with the environment is different. For example, the Agta follow their own rules that restrict their use of water resources and hence do not practice exploiting fishing methods due to their own experiences that they have gained from ancestors instead of Philippine laws (De Vera 2015, Almonte 2015, pers. comm.).

### **How effective are laws governing the fish sanctuaries?**

Firstly, the laws in the ordinance imply punishments between 500 PhP and 2000 PhP and even imprisonments. However, paradoxically, a Barangay can only implement a penalty of up to 1000 PhP (Ordinance No.06-07, Van Weerd, pers. comm.).

The chief tanod of San Jose, Rogelio Galisti, clarified that the implementation of penalties is a duty of the LGU in San Mariano, but eventually the Barangay captain decided to take care of small issues within the Barangay. On the other side, the sanctuary is only recognized as a Barangay ordinance and not amended by the LGU in San Mariano (Rodriguez 2015, pers. comm.). It was also denied by the municipality that penalties would be implemented by them, but that it would be the tasks of the Barangay and that there are just few check-and-balance systems in place between municipality and Barangay. In any case, the ordinance is not valid for Barangay enforcement since the penalties are too high and there are confusions between the different actors about responsibility for enforcement that should be clarified in order to be able to effectively govern the sanctuary.



**Photo 5:** Merlinda Zipagan Cureg, head of the Department of Agriculture of San Mariano (Municipal Agriculture Officer), proudly shows that she supports sustainable fishing initiatives (Photo by T Schmitt 2015)

Another aspect of the effectiveness of law governance is the controlling and monitoring of the area. Majority of the people interviewed are aware of the fact that one of the eight tanods of the village is patrolling the protected area 3 times a week and hence are afraid of getting caught. Most of the farmers have also mentioned that they have never seen anybody fishing in the sanctuary. However, our own observations have pointed to a different practice (Photo 6), namely that there are people, especially children, fishing in the sanctuary without being caught. This can be explained from our results that some of the guarding tanods are afraid of getting a bad reputation in society when they too strictly implement the regulations, and have too little resources and capacities. In addition to trainings for the tanods, the introduction of citizens' arrest could solve some of these issues since several respondents let us know that they would give children warnings, but do not think that they have any impact. However, there are cases when people actually got caught by the tanods and brought to Barangay officials. But numbers and names mentioned differ and although we tried hard to find an exact number by interviewing different officials and citizens, we can only speculate it to be around 5 cases since 2006. Hence, we can conclude that there is room for improvement in terms of controlling the area, but the Barangay is doing relatively well considering that "laws in the Philippines are not that strict" (Almazan 2015, pers. comm.).



**Photo 6:** A woman fishing inside the sanctuary (Photo by T Schmitt 2015)

The reason why many fishermen claimed that they are afraid of fishing inside the sanctuary is due to the penalties that they had to pay. The effectiveness of laws hence also depends on the actual implementation of the payment of penalties. This has happened, for instance, in the case of Tesus Magallares who violated the ordinance in 2014 and paid 500 PhP, but other cases such as Gerry Campos or children fishing, got around the laws without having to pay their penalty after they got caught. People are also aware of the fact that the implementation is sometimes lacking and that the officials sometimes humanize the law because of poverty. A possible way

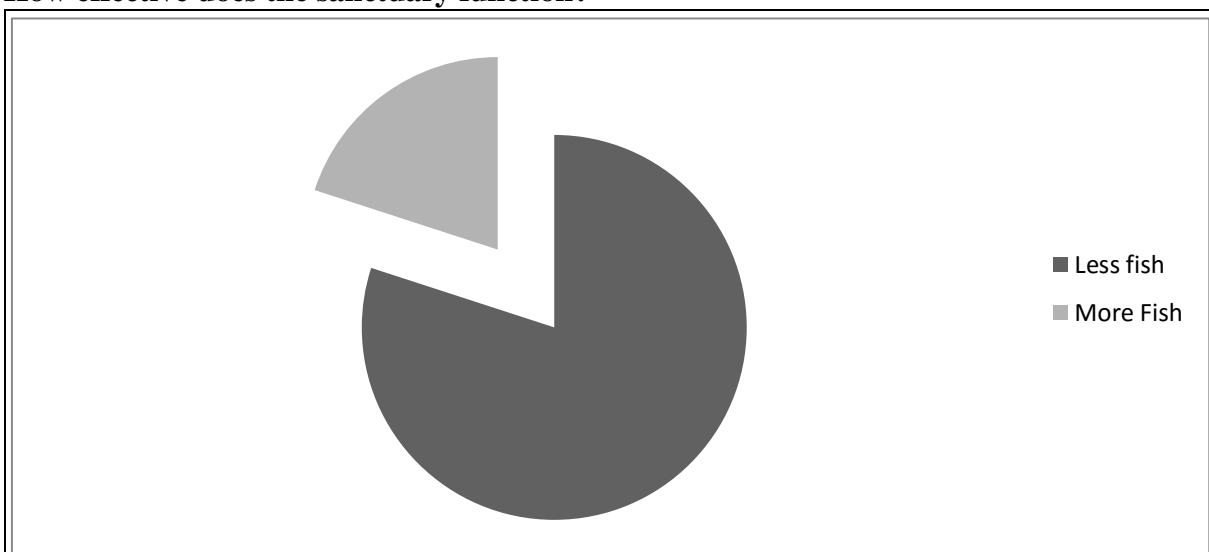
of dealing with this problem might be the introduction of community service instead of financial payments.

### **How are wetlands and the river system conserved?**

According to Philippine law, there should be 10 meters of uncultivated wetlands on both sides of a small river (Balbas 2015, pers.comm.). This wetland conservation is essential for protecting the entire ecosystem of a river since these areas are hotspots of biodiversity. (Biodiversity Management Bureau 2015). However, the implementation of this rule is lacking in the Philippines since many farmers rely on this area. In San Jose, however, the stream of the fish sanctuary is located around well-maintained strips of wetlands that actually met this criteria. On the other side, the fish sanctuary is merely designed to be a recovery habitat for fish species and except for waste management (which was specified for wetlands and upstream) no other parts of the ecosystem, such as wetlands or upstream parts of the river, are integrated in the ordinance. For example, according to the fish sanctuary ordinance, it is not allowed to wash chemical equipment inside the sanctuary, but it could be washed upstream of the sanctuary with toxic particles flowing into the sanctuary.

In the case of Sitio Diwagden, we have observed that they have more problems than in San Jose proper in terms of illegal fishing methods. The five indigenous people that we have interviewed told us that the sitio is located very remotely and there are no permanent tanods monitoring the implementation of laws and regulations. The usage of electro-fishing and toxic chemicals “by Christians” (Almonte 2015, pers. comm.) are a fear for many indigenous peoples since they might destroy the small fish (Almonte 2015, pers. comm.).

### **How effective does the sanctuary function?**



**Figure 2:** The perception of people of the amount of fish since the implementation of the fish sanctuary

Through our research, we found out that there are many species of fish that can be found in the river (inside and outside the sanctuary). The respondents were unanimous in claiming that tilapia (an exotic species introduced by the local government) is the species that they catch mostly and they said that there are still dalag (mudfish), bangkok, catfish, karpa (Golden Karp), shellfish, and eel. Concluding from the interviews conducted, 80% of our informants stated that they catch less fish now compared before the implementation of the sanctuary although 20%

believe that there is an increase in the number of fishes that they catch. However, this is not necessarily due to the sanctuary, but could rather be a result of an increase in population and fishermen.

Overall, the positive feedback from the population about the implementation of the protected area contributes to the effectiveness of the sanctuary. The response from one of the fishermen that he would fish in the sanctuary once in a while whenever it is raining and there are many fish, shows that the population does care about the sanctuary since this farmer would probably not want to overexploit it. In general, we often got the response that people would never fish inside the sanctuary, because “it is the law” (Laño 2015). Half an hour later, we observed one woman fishing inside the sanctuary (Photo 6). A more elaborate study would be needed to get valid results about the biodiversity that is saved within the sanctuary and the number of violators.

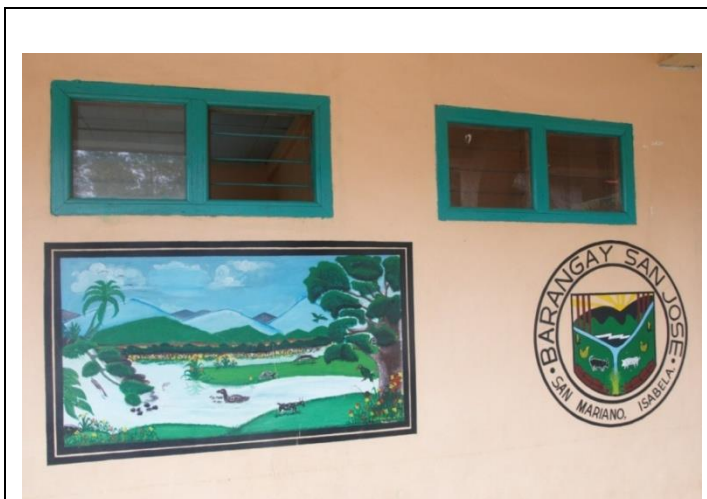
### **Suggestions from the Management Effectiveness Tracking Tool**

Several comments and next step suggestions in the METT evaluation have already been expressed and discussed in this chapter. An overall overview can be found in Appendix C.

One of the issues concerning the sanctuary that was found in the METT analysis was that there is no particular budget for the sanctuary. Also, the implementation and monitoring could be improved if a people’s organization or management board would overlook and take care of the sanctuary. Additionally, it would be a great step to clarify the ordinance in such a way that it can be held liable on court, either by enforcement through the Barangay with adjusted penalties or through the municipality after amendment by the Local Governmental Unit (LGU). Finally, the billboards that are used for demarcation of the boundary of the sanctuary are very useful, but some additional ones visible in the village and in busy areas such as the hanging bridge could serve as a useful addition.

Additional positive outcomes of the METT examination were the awareness raising projects and involvement of the community via voting for the protected area

### **Conclusion**



**Photo 7:** A picture and the logo of the Barangay San Jose showing the importance of the river and its fish to the village (Photo by T Schmitt 2015)

In conclusion, the fish sanctuary in San Jose is a great way in dealing with the population growth and threatened fish population of the river. The population overall respects the sanctuary, but there are several violations which could be lessened by a stricter implementation of the rules and regulations that are specified in the ordinance.

We can also conclude that the fish sanctuary in San Jose plays an essential role in a community-based management of river resources towards sustainability in San Jose and serves as an effective breeding ground for fish, but improvements in the enforcement and of the

regulations community-involvement could add to the effectiveness of the protected area.

## ACKNOWLEDGEMENTS

We would like to give our warmest and whole-hearted thanks and appreciation to the following people who have extended their efforts to help us, their knowledge to complete our study, their arms to keep us safe and sound during our field week and for their unending support for us to be successful in our research: To our host family, Mr. and Mrs. Mario Sotto Jr., who warmly welcomed us in their house, for giving a nice accommodation, and for always cooking food for us. To Barangay Captain Florentino R. Buñao, for showing us his support as student researchers in their community, for always inviting us to have a *merienda* and to have a cup of coffee, and for all the information that he had shared to us. To our respondents - the farmers and fishermen of Barangay San Jose, the teachers of San Jose Elementary School, the Barangay Chief Tanod, Barangay Secretary, Barangay Treasurer and to the officials of the Local Government Unit of San Mariano who showed their willingness to answer our questions and shared their knowledge that greatly contributed in the completion our research. To our field coordinator Dominic G. Rodriguez for his valuable inputs and for being a great help in the field. Above all, we would like to thank our Almighty God for giving us the knowledge and strength to be able to accomplish this report and for always guiding us to make us safe and sound in every place that we trekked.

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## APPENDICES

### Appendix A: Interview Questionnaire for Fishermen

*Date, Location, Name, Age, Gender, Ethnicity, Education, Profession/Livelihood*

*Sub RQ 1: What are the interests, methods and motivations of sustainable fishing?*

1. What role does fishing play in your everyday life?
  - a. How often do you fish?
  - b. What methods of fishing?
  - c. What purpose? Subsistence? Consumption? Luxury goods?
2. Where do you fish?
3. Are you worried about the future of the river? *If yes, then 3*
  - a. Why?
  - b. Biodiversity? (Variety of Fish in the river)
4. Do you think that this fish sanctuary is necessary to conserve the fish?
  - a. Is it enough or should it be expanded?
  - b. Why?

*Sub RQ 2: How effective are laws governing the Fish Sanctuaries?*

1. Are you aware that there are rules and regulations about fishing?
  - a. How does it affect you?
  - b. Are you following these rules?
  - c. Are you willing to pay a certain amount if you are caught violating these rules?
2. How does your Barangay regulate fishing in your community?
3. Do you know any cases of violation?
  - a. Are they punished?
  - b. What kind of punishment?
4. Are you involved in the management or design of the sanctuary?
5. Do you see flyers, billboards or other communications (in school) regarding rules and regulations about fishing around the sanctuary?

*Sub RQ 3: How are wetlands and the river system conserved?*

1. How does waste management work here?
  - a. What happens to your trash?
  - b. Does it go directly into the river?
2. According to Philippine law, there needs to be a 20m wetland area that is not cultivated. Do you/are farmers respecting these?
3. Are you washing clothes/using chemicals inside the sanctuary?

*Sub RQ 4: How effective are the sanctuaries?*

1. Have you observed an increase in your catch since the implementation of the sanctuary in 2006?
2. What species of fishes do you catch mostly? Inside and outside the sanctuary?
3. Where do you usually catch more fish? Inside or outside? How many? Average/hour?
4. If you fish inside the sanctuary, do you see/catch more fish inside or outside of the sanctuary?

## FOREST AS A SOURCE OF LIVELIHOOD IN THE SITIOS OF DUNOY, MALAYA AND DADUGEN IN THE BARANGAY DIBULUAN, SAN MARIANO

**Nehimiah D. Tasani and Tim van Dijken**

### INTRODUCTION

In just a few centuries, the world lost a vast share of its forests including the loss of tropical rainforests. The loss of these forests has become an important topic of concern these days. While the cutting of a tropical rainforest for timber gives a high return at one moment, it will then again take many years before the same piece of forest can be cut again (Polet 1991). This is in contrast with the collection of non-timber forest products (NTFP), which have a much shorter turn-over period and some of them even have high economic values. The concept 'non-timber forest product' includes all biological materials other than timber which are extracted from forests for human use. These products include foods, resins, gums, medicines, rattan, animals, and raw materials, especially rattan, bamboo, small-wood and fibers (De Beer and Mcdermott 1996). The high economic value (richness) of the forest in terms of NTFP exceeds the value of timber by far. NTFP are providing substantial inputs into the livelihoods of people in developing countries. Increased attention is paid to the conserving of tropical rainforests and NTFP because of their values for biodiversity, carbon sequestration and other environmental functions provided by these forests. Another factor is the growth in awareness that the use and sale of NTFP form important parts of the livelihood system of very large numbers of people, inside as well as outside tropical forests (Ruiz Pérez and Arnold 1996).

In the Philippines large scale logging of the countries' widespread forests has taken place in a relatively short time from the 70s to the 90s and is referred to as the logging boom. The municipality of San Mariano, one of the largest municipalities in the Philippines covering an area of 1.469,5 square kilometers, used to be a logging area which grew stunningly in times of the logging boom. San Mariano used to be a town that never slept, fed by a continuous supply of timber from the surrounding forests. Timber got transported from the cutting areas in the widespread forests by powerful logging-trucks. Regularly these trucks took additional passengers with them, mostly people who executed slash-and-burn to establish farms at the forest borders. Slash-and-burn is the activity where people clear an area with fire to use it for agricultural purposes (Persoon and Van Der Ploeg 2003).

In 1992, a logging ban became effective in the Philippines and in that way also prohibited the logging in the San Mariano area. In the time of the logging boom most of the forests up to the beginning of the Sierra Madre mountain range in San Mariano have been cut. After the logging ban, San Mariano turned into a municipality where the main source of livelihood is agriculture (Persoon and Van Der Ploeg 2003). Nowadays the northern range of the Sierra Madre mountains is part of the Northern Sierra Madre Natural Park (NSMNP), which is the largest protected area of the Philippines and was declared as a protected area in 1997 (UNESCO 2015). The National Integrated Protected Areas System NIPAS Act (RA7586) is enacted by the Philippine government to protect and maintain these areas. The NIPAS Act states that no extraction of any natural resources within the boundaries of a protected area is allowed.

The ongoing loss of rainforest is a growing problem for people, biodiversity and carbon sequestration. For people, loss of forests means a decline in NTFP and other services. In the process of collection of NTFP conflicts are inevitable between conservation and development. The harvesting of forest products involves some damage and disturbance to a forest's ecological structure and hence affects biodiversity. Some highly demanded and therefore sought after species may not be able to withstand pressures, causing drastic declines in their population or even total distinction (Ruiz Pérez and Arnold 1996).

The original inhabitants of the Sierra Madre, the Agta (also referred to as Aeta, Ata or Agay) were probably among the earliest people to enter the Philippines (Top 2003). The Agta are considered as ecosystem people. Many tropical forest inhabitants such as the Agta use refined and complex forest management techniques and methods to increase the market value of their forest while also maintaining other values such as high plant biodiversity, a multiplicity of outputs and uses, and flexibility of production (Ruiz Pérez and Arnold 1996). This relation with the forest can be seen as forest management. Wiersum (1998) defines forest management as “the organization and control of the creation, maintenance and/or sustained utilization of forests, trees and associated resources”. The NIPAS Act prohibits all people to extract any resources from the NSMNP, except for the Agta who may extract resources for religious tradition purposes only. Although this Act is prohibiting people to enter the NSMNP and extract resources people are still gathering and hunting in the park. Therefore it is interesting whether people are actually aware of these protection rules. As people should maintain these forests and be aware of the real value of these forests this research will try to get a better insight in the share the tropical forest plays in the livelihood of people in the sitios and the way they manage the forest in Dunoy, Dadugen and Malaya.



Photo 1: Border of the Northern Sierra Madre Natural Park (Photo by T. van Dijken 2015)

### **Background of research area**

Our research has been conducted in the sitios of Dunoy, Dadugen and Malaya. These villages are located in the Barangay Dibuluan, San Mariano, Isabela, Region II in the Philippines. The inhabitants of these sitios are generally farmers and often secured their land through slash-and-burn. Most of the inhabitants of the sitios own land but none of them has a title. Dunoy and Dadugen are located at the edge of the Northern Sierra Madre Natural Park (NSMNP). The Catalangan River is the border of the NSMNP. Dunoy has a total of 21 households of which seven of them are Agta households sited at the other side of the Catalangan River in the NSMNP. The Dunoy area used to be forest area but turned into grassland after the large scale logging during the 70s and 80s. Dadugen is a village with six households; the people live close to Cabagan River, which is also located next to the boundaries of the NSMNP. Malaya is a larger village consisting of 11 households. In all three sitios, most people are farmers and mostly cultivate white and yellow corn, cassava, white rice, string-beans, mung-beans and bananas.

In a comparative study, the sitios of Dunoy, Malaya and Dadugen, sitio Villa Miranda, sitio Diwagden, sitio San Isidro, Barangay Disulap and Barangay San Jose, all located in the Municipality of San Mariano, will shortly be compared on the usage of NTFP and awareness of forest management.

### **RESEARCH QUESTIONS**

A lot of people depend on the forest and NTFP, although there are strict rules prohibiting extracting resources from the NSMNP. The inhabitants of San Mariano do gather and/or buy NTFP for their livelihoods. To research the interaction of the people in the sitios of Dunoy, Malaya and Dadugen with the tropical rainforest in the NSMNP and to get insights into what degree they manage the forest the following research question has been formulated:

*To what extent does the forest play part in the livelihood of people in the sitios of Dunoy, Malaya and Dadugen, San Mariano?*

To answer this research question the following sub questions will be answered:

**Sub-question 1:** What products do people get from the forest and in what quantities?

**Sub-question 2:** Do people experience a decline in non-timber forest products?

**Sub-question 3:** Do the people have some kind of forest management and if so what does it consist of?

**Sub-question 4:** What are the sources of livelihood of the people?

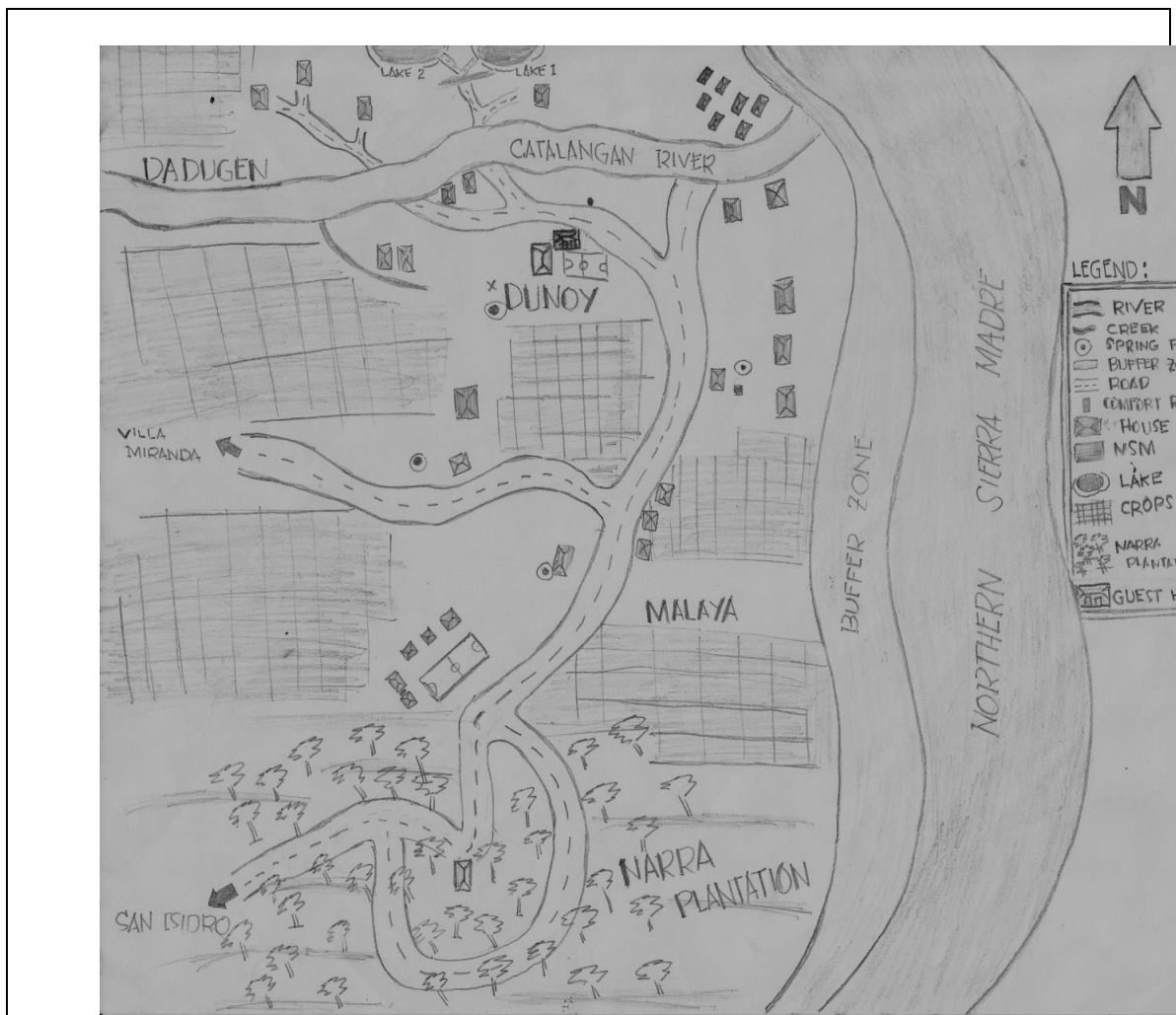
**Comparative question:** How does the use of non-timber forest products relate to other research sites in San Mariano?

## METHODS

This research consists of three parts, of which the first part is a literature research. The literature research serves as the theoretical foundation on which the research questions are made.

The second part is the interviewing of people who live in the sitios of Dunoy, Malaya and Dadugen. Together with other researchers, based in different sitios, a questionnaire has been prepared. This questionnaire combines quantitative questions to use in a comparative study and qualitative questions more directed on the subject of the research in Dunoy, Malaya and Dadugen regarding the use of NTFP by the people. During interviews questions have been asked in different ways to obtain the most reliable and complete information. Some questions were also added during the interviews to the questionnaire in order to gather more information.

For the third part of the research the area has been observed. These observations are used to create a map of the area and acquire insights in land-use and the vegetation in the zone near to the NSMNP. The observations are also used to validate the answers of the questionnaire.



**Figure 1:** Sketch Map of the sitios Dunoy, Malaya and Dadugen  
(Drawing by N.D. Tasani 2015)

In total, 27 households out of the 38 households in Dunoy, Malaya and Dadugen have been interviewed. As there was enough time to visit every household in the three sitios there has been no sampling. Depending on which member of the household was home the interview was held with the man or woman. This resulted in 21 interviews held with the men of the households and six with the women of the households. The average age of the respondents is 40.9 years, where the oldest is 67 years old and the youngest is 19 years old. The average number of family members within the households is 5.8. Here, the smallest household consists of two family members and the two biggest households consist of 12 family members. The highest education level was 1<sup>st</sup> level of secondary education but this was only one person, most people living in the sitios did not finish their elementary education. The main ethnicities of the respondents are Ilokano and Kalinga, other ethnicities were Tagalog, Bilocano, Ybanag and Agta. As the Agta families stayed farther into the forest at the time of the research, it was only possible to interview one of the Agta-families household heads.

**Table 1:** Time schedule

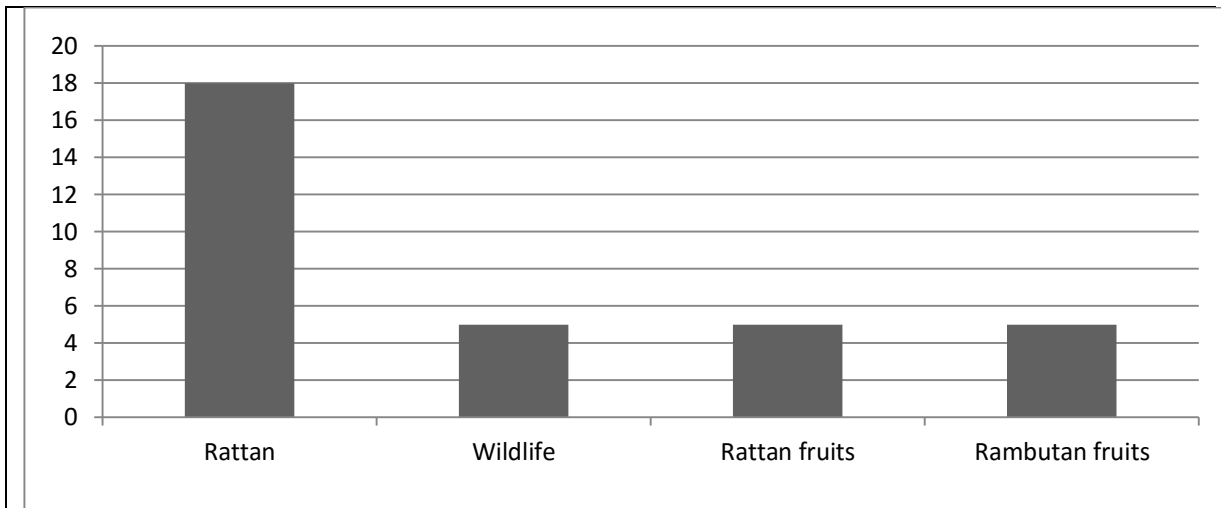
| <b>Date</b>      | <b>Activity</b>  |
|------------------|--|
| January 19, 2015 | am: Travel to Rearing Station<br>pm: Travel to San Isidro  |
| January 20, 2015 | am: Travel to Dunoy, Interviews in Malaya<br>pm: Interviews in Dunoy                               |
| January 21, 2015 | am: Interviews in Dadugen<br>pm: Interviews in Malaya  |
| January 22, 2015 | am: Interviews in Dunoy<br>pm: Interviews in Dunoy   |
| January 23, 2015 | am: Interviews in Dunoy<br>pm: Release of crocodiles   |
| January 24, 2015 | am: Tree Planting in Reforestation Project of People's Organization,<br>pm: Travel back to Cabagan |

## RESULTS

The results obtained in this research will be presented through the answering of the four sub-questions.

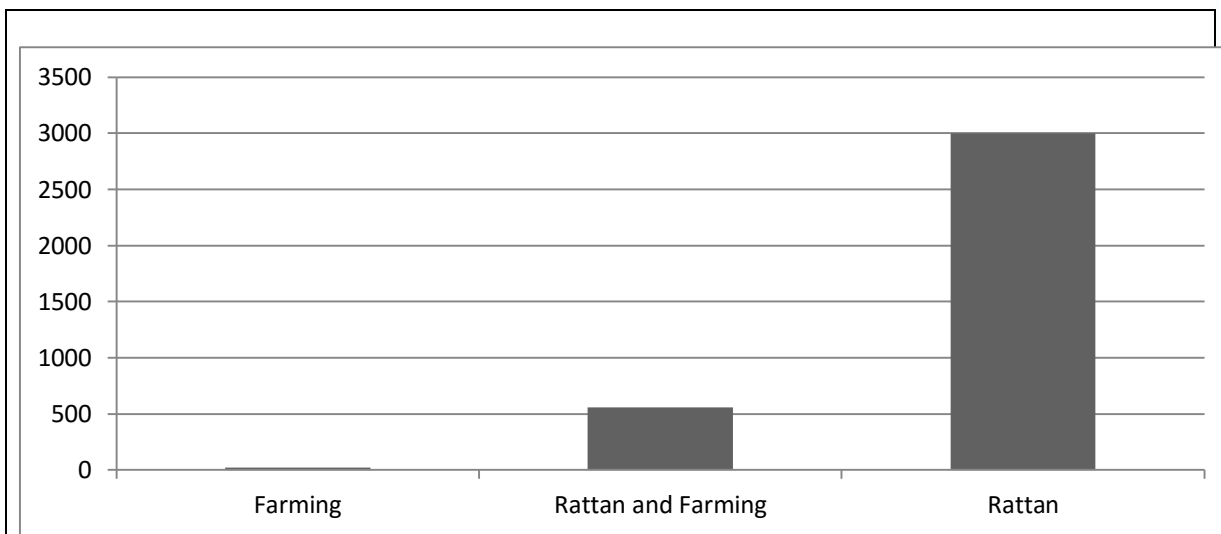
### **What products do people get from the forest and in what quantities?**

In the sitios of Dunoy, Malaya and Dadugen, there were four households of the 27 households which stated that they did not use any NTFP. The households which did not gather any NTFP were mostly self-supporting in their livelihood; they grow a lot of vegetables and fruits and have a lot of cattle. The other 23 households who do use NTFP all gather these products themselves. People mostly gather rattan. Only five of the households stated they hunt animals, five were gathering rattan-fruits and five were gathering rambutan fruits (Figure 2). Only one household stated they were cutting timber to use for the building of their house. The Agta are dependent on the forest in the NSMNP and gather and hunt a lot of NTFP such as jungle fowls, wild pigs, fruits and vegetables, rattan and lizards.



**Figure 2:** Households gathering of non-timber forest products

A distinction is to be made between households whose source of livelihood is farming and households whose livelihood consists partly or totally on the gathering of rattan. Households whose livelihood is partly dependent on the gathering of rattan gather substantial more rattan than families that are farming. Among the households partly dependent on the gathering of rattan and the households completely dependent on the gathering of rattan, there is again a large gap in the amount of rattan they gather (Figure 2).



**Figure 2:** Number of 6ft rattan pieces gathered a month separated on their source of livelihood.

### **Do people experience a decline in non-timber forest products?**

In the three sitios the majority of the 22 households stated that they experienced a decline in NTFP, only one stated that they did not know whether there is a decline and four had no answer because they did not get non-timber forest products (Figure 3).

People give several reasons why there is a decline in NTFP. Most people are aware that more people gather and state this as the reason for the decline in NTFP (15 out of 22). Another reason for a decline in products is that they are seasonal. For the decline in wildlife in the forest, hunters say that because of other gatherers animals went further into the forest. Also hunters tell that the decline may come because they have less luck in catching the animals. People who gather

rattan give various reasons for the decline such as, it is harder to reach the good rattan and the carabao has to get further into the forest and can therefore take less rattan with him. The people who only depend on rattan-gathering mentioned they left Aurora province because of the decline and scarcity of rattan there. They also plan to stay in Dunoy as long as the gathering of rattan can support their livelihood.

**Do the people have some kind of forest management and if so what does it consist of?**

Of all the households, majority (17 out of 27) are not aware of any rules of protection of the forest in the NSMNP. Only 10 households are aware that there are rules on extracting resources from the forest in the park. The people who do know there are rules in play to protect the NSMNP have different beliefs of what these rules are. Some said that it is allowed to cut timber from the forest when you acquired an ordinance from Barangay officials. Others do know of rules but do not know the content of the rules. Others mention the Mabuwaya Foundation implementing rules protecting the forest in the NSMNP because they have a crocodile sanctuary in the park. People also stated that hunting is not allowed but gathering is. One person said the Department of Environment and Natural Resources is implementing rules but did not know what these rules consist of. The people whose livelihood depends entirely on the gathering of rattan said it was not allowed to gather rattan in the NSMNP but stated that their boss had a permit which allowed them to collect. When asked whether there should be more rules implemented to protect the forest, the majority (8 out of 14) said that would not be necessary.



**Photo 2:** Nehemiah D. Tasani with Rattan gatherer Luis Lagata (Photo by T. Van Dijken 2015)

**What are the sources of livelihood of the people?**

The main source of livelihood is farming (21 out of 27) in the households of the three sitios. There are three households, which next to farming, are also gathering rattan for their livelihood. In Dunoy, there are four households of labourers whose main source of livelihood is rattan-gathering. These four households are also the only households who do not own any land and thus are not in the position to cultivate any land. In Dadugen, there is one household whose livelihood depends on the gathering and selling of bamboo. As mentioned before there are 23 households that collect NTFP. Most households have a variety of animals consisting of carabao, chickens, pigs, cats, dogs, ducks and one household also has a horse. These animals



provide eggs and meat for the people. People eat their chickens, pigs, ducks and dogs. The carabao is mainly used to transport goods and plow the farmlands while the horse is used for transportation. People obtained their land mostly by executing slash-and-burn in the areas deforested during the logging boom. The People's Organization (PO) has implemented a project to plant new trees in the area. Last year unfortunately, nine hectares got burned down because the neighbouring sugarcane farmer lighted his sugarcane on fire and lost control over the fire (Van Weerd 2015, pers. comm.).

### **Comparative studies**

In the sitios of Dunoy, Malaya and Dadugen, a total of 27 households were interviewed of which 23 use NTFP. Most people gather building materials and fruits. All people only gather NTFP. Only one household stated they were using timber for the building of their house. Five of the households were hunting animals in the forest. The minority of the households (10 out of 27) were aware of some rules prohibiting extracting products from the NSMNP.

In Barangay Disulap, the researchers interviewed a total of 15 households of which 10 use NTFP. People in Disulap mostly consume foods such as fruit and vegetables and both gather and buy these products. Only one of the households stated they also consumed animals from the forest. This relative low number of people consuming animals from the forest corresponds with the overall awareness of rules in play prohibiting the gathering of animals, timber and products such as rattan. The majority (12 out of 15) of the interviewed households know these rules are implemented.

In the sitio San Isidro the researchers have interviewed a total of 25 households of which 15 use NTFP. People in San Isidro mostly consume foods as fruits and vegetables and use building material from the forest. There are seven households who consume animals that are hunted in the forest. Although relatively a lot of people still consume animals from the forest, majority (17 out of 25) of the households know that it is prohibited to get some of these products from the forest.

In Barangay San Jose, 13 households were interviewed and all of them are using NTFP. Most of the people in San Jose buy their NTFP instead of gathering them. Favorite products are fruits, vegetables, building materials and medicinal plants. Nearly half of the households in San Jose (6 out of 13) are consuming animals from the forest. More than half of the households (7 out of 13) know that there are some rules prohibiting the hunting of animals and cutting of timber although some of them state that with a permission of the Barangay officials you are allowed.

In Sitio Villa Miranda, the researchers interviewed 23 households, all of whom use NTFP. Most of the households in Villa Miranda gather the products themselves; favorite products are fruits, vegetables, building materials and honey. A vast majority of the households (19 out of 23) consume forest animals. Fewer households (10 out of 23) are aware of rules prohibiting the gathering or hunting of these products. One of their arguments was that the people who live in the area are allowed to gather NTFP but people from outside are not.

In Sitio Diwagden, the researchers interviewed five households of whom four are using NTFP. Most households gather the products themselves and the majority (4 out of 5) consume animals from the forest. Only a few households (2 out of 5) know that there are rules implemented protecting the forest.

### **DISCUSSION**

## **Conclusion**

In the sitios of Dunoy, Malaya and Dadugen the NSMNP plays a role in the livelihood of the people. Although not a lot of people are totally dependent on NTFP for their livelihood. Only for the four households gathering rattan for a living and the one household gathering bamboo does NSMNP play substantial part in their livelihood. One household is using timber from the forest. Most families have a farm where they grow mostly cassava, corn and sometimes rice. All of the families have animals mostly consisting of carabaos, dogs, chickens, ducks and cats. For the majority of the households (21 out of 27), the forest only plays small part as a source of their livelihood as most of them have sufficient food from the lands they cultivate and their cattle. The Agta families (7 households) however are fully dependent on the use of NTFP for their livelihood, although they are actually only allowed to extract resources for religious traditions.

It is remarkable that none of the people in the sitios are aware of the NIPAS Act prohibiting the extraction of any resources in the NSMNP. There are people who are aware of some rules but mostly they believe only hunting wildlife is not allowed. All people are aware that it is not allowed to collect timber from the NSMNP but believe that they are allowed to gather products as vegetables, fruits, honey, medicinal herbs and building materials. When observing the area of Dunoy, Malaya and Dadugen a lot of the area was covered with grassland and a minimum of trees. As the people living in the area told a lot of the land used for cultivation has been secured through slash-and-burn activities. This on its turn makes the conservation of these areas such as reforestation hard. People are aware that there is a decline in NTFP and mainly believe this decline is because of the number of people gathering them. But when we asked the respondents whether there should be more rules to protect the forests, the majority of them do not think that that would be needed. This can of course also be connected with the fact that they are gathering and are aware that when there would be more rules it would affect them too.

About the whole population not being up-to-date concerning the rules implemented in the NSMNP, which is only a footstep away for these people, we would recommend that the people be informed by the local government regarding the protection of the national park. It is important to tell the people why it is a protected area and what are the gains coming with it concerning biodiversity, endangered species, NTFP and carbon sequestration. Especially when taking the rattan gatherers into account who are extracting all the nearby rattan in the forest of the NSMNP. They, in contrary to most inhabitants of the sitios, are not from the area and specially moved there to gather this rattan as a source of their livelihood. They moved here because of shortage of rattan in the Aurora province where they come from and they plan to stay till they cannot make a living here anymore. If we take that into account, this means all the good rattan in the area are expected to be extracted. When comparing the amount of rattan that farmers and farmers who partly depend on extracting rattan with the amount of people who are entirely dependent on the gathering of rattan there is a huge difference. The way people, who live in the sitios for a longer time and plan to stay, interact with the forest seems to come closer to sustainable utilization of the forest in the NSMNP than the way rattan gatherers are extracting resources from the park. The rattan gatherers will only stay in this area till the resources of rattan are so scarce that they will have to move on to another area.

It is a waste of effort, time and money for the reforestation project of the People's Organization which partly got destroyed by the neighboring sugarcane farmer who put his sugarcane on fire. The lack of attention being paid to protect this reforestation project may also have to do with the overall lack of knowledge concerning the values of the forests and services and the NIPAS Act. Therefore more attention should be paid towards information signs at the borders of the

NSMNP so people who are visiting and entering the park will be informed about the rules. For the population more information from Barangay Dibiluan and the municipality of San Mariano could be spread.

**Comparative studies**

In these studies the different sitios of this research will be compared with the sitios of San Isidro, Diwagden, Villa Miranda and the Barangays San Jose and Disulap. In all locations where research is conducted the majority of the people use NTFP. Mostly people gather fruits and vegetables but building materials as rattan and bamboo are also extracted from the forest. What is remarkable is the big difference in usage of NTFP in different places and the awareness of some rules protecting the forest in the NSMNP. In Dunoy, Malaya and Dadugen and Disulap people significantly hunt/consume less animals than people in the other locations. In Disulap a lot of people are aware that there are rules in play to protect the forest in the NSMNP, this is consistent with the amount of people hunting/consuming animals from the forest (10%). Only in Disulap, San Isidro and San Jose the majority of the people are aware of some rules of protection. More distribution of information about the forest protection of the NSMNP could be good to raise this awareness in the other places (Table 2).

**Table 2:** Use of NTFP, animals and awareness of protection rules

| Sitio / Barangay          | Use of non-timber forest products | Consuming / hunting of animals | Awareness rules of protection |
|---------------------------|-----------------------------------|--------------------------------|-------------------------------|
| Dunoy, Malaya and Dadugen | 85%                               | 22%                            | 37%                           |
| Disulap                   | 67%                               | 10%                            | 80%                           |
| San Isidro                | 60%                               | 47%                            | 68%                           |
| San Jose                  | 100%                              | 46%                            | 54%                           |
| Villa Miranda             | 100%                              | 83%                            | 43%                           |
| Diwagden                  | 80%                               | 80%                            | 40%                           |

**Reflection**

The fieldwork conducted was for a period of four days, and in this short period we have been able to gather a substantial amount of information through interviews and observations. We interviewed the majority of the inhabitants in the sitios of Dunoy, Malaya and Dadugen. For further research it would be important to interview more of the Agta families as well as the missing households in Dadugen. These families rely on the forest in the NSMNP for their livelihood and are therefore important key informant in research concerning the use of NTFP and management of the forest by local communities. As we worked together with a total of six groups to be able to do comparative studies between different sitios and barangays this also meant we had a long questionnaire. In the case of this research we have been able to compare these different barangays and sitios in the awareness of rules implemented in the NSMNP and the use of NTFP. On the other side, the long questionnaire also meant that we had less time for a more in-depth more qualitative interview, something that might be interesting when researching the relationship between local communities and the forest. The questions we used had to be somewhat turned sometimes to get the information we were looking for. Luckily one

of the researchers speaks Tagalog, Ilocano and Ybanag which was good to be able to communicate with all the interviewees in this area. For further research we would advise to contact the municipality of San Mariano and question them about the program they are implementing to enforce the NIPAS act. Furthermore it would be interesting to meet the Barangay captain of Dibiluan which we unfortunately could not meet during our stay. Another party considered to be aware of the value of the forest and the NSMNP would be the People's Organization. They could be a possible actor in the rising of awareness of the values of the forest and the rules in play. More in-depth questions with the Agta could be focused on the religious traditions and extraction of resources from the forest. Furthermore it is also good to ask people through what channels of communication or actors they would like to receive information about the conservation of the forest and the NSMNP.

## ACKNOWLEDGEMENTS

This research would not have been possible without the help of many individuals. We therefore would like to thank the people of Dunoy, Malaya and Dudagen for allowing us to interview them. In special, we want to thank our host family Victorino Montanes and Domingga Montanes in Dunoy. We had a more than pleasant stay and will not forget the delicious food we had each breakfast, lunch and dinner. We would also like to thank Bernard Tarun for the perfect guiding, nice conversations and good laughs! And last but not least we would like to thank all people involved within this winter course, without you this would not have been possible!



**Photo 3:** Nehimiah D. Tasani, Tim van Dijken and Bernard A. Tarun  
(Photo by Tim van Dijken 2015)

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## APPENDICES

### Questionnaire

Location:

Name respondent:

Age:

Gender:

Settlement history:

Highest education:

No. kids:

Date:

Ethnicity:

Place of birth:

Profession:

Civil status:

No. people in household:

Q1: Do you use products from the forest?

Q2: Do you gather them or buy them?

Q3: What products do you gather and what product do you buy (fruits, vegetables, building materials, medicinal herbs, animals, honey)?

Q4: How do you gather the products?

Q5: How do you transport the products?

Q6: How much products do you get from the forest?

Q7: For what price can you sell one piece?

Q8: How many times a month do you get products from the forest?

Q9: Is there a decline in products you get from the forest? (over time)

Q10: Do you know why there is a decline?

Q11: Is there some sort of local (non- or official) forest protection / Is it allowed to get products from the forest?

A: What are the rules of the protection?

B: Do these rules help/work?

C: Should there be more rules?

Q12: What are your other means of living?

Q13: What vegetables/fruits do you grow?

Q14: What animals do you have?

Q15: Do you think you will do the same work in the future?

### Overview of key informants

| Name               | Sitio   | Gender | Age | Households size | Ethnicity              |
|--------------------|---------|--------|-----|-----------------|------------------------|
| Marilyn Gonzales   | Malaya  | female | 32  | 6               | paranan                |
| Romar Pacleba      | Malaya  | Male   | 28  | 8               | ilokano                |
| Rosalia Pacleba    | Malaya  | female | 60  | 8               | kalinga                |
| Rolinda Etchore    | Malaya  | female | 42  | 6               | kalinga                |
| Dnilo Pacleba      | Malaya  | male   | 30  | 4               | ilokano and<br>kalinga |
| Joseph Velasco     | Dunoy   | male   | 34  | 4               | kalinga                |
| Victorino Montanes | Dunoy   | male   | 53  | 5               | ybanag                 |
| Rommel Armada      | Dunoy   | male   | 44  | 6               | tagalog                |
| Osmondo Mondoñedo  | Dunoy   | male   | 67  | 4               | ilokano                |
| Joel Francisco     | Dunoy   | male   | 19  | 3               | ilokano                |
| Luzviminda Waña    | Dunoy   | female | 55  | 2               | tagalog                |
| Antonia Ortega     | Dadugen | female | 57  | 5               | ilokano                |
| Marcial Corpuz     | Dadugen | male   | 44  | 10              | ybanag                 |
| Danilo Kalautit    | Malaya  | male   | 40  | 4               | ilokano                |
| Ricardo Velasco    | Malaya  | Male   | 53  | 4               | kalinga                |
| Dominador Velasco  | Malaya  | male   | 37  | 8               | kalinga                |
| Salveno Maramag    | Malaya  | male   | 55  | 12              | ybanag                 |
| Rommel Velasco     | Dunoy   | male   | 26  | 4               | kalinga                |
| Tuning Magas       | Dunoy   | male   | 40  | 8               | agta                   |
| Jesus Lagata       | Dunoy   | male   | 48  | 1               | bicolano               |
| Joseph Riño        | Dunoy   | male   | 38  | 1               | bicolano               |
| Luis Lagata        | Dunoy   | male   | 49  | 1               | bicolano               |
| Jeron Velasco      | Dunoy   | male   | 20  | 2               | ilokano                |
| Vic Waña           | Dunoy   | male   | 34  | 5               | tagalog                |
| Warlito Pitpit     | Dunoy   | male   | 38  | 12              | ilokano                |
| Romy Aggabao       | Dadugen | male   | 55  | 3               | ybanag                 |
| Minerva Etchore    | DUnoy   | female | 33  | 8               | kalinga                |

## Facebook blog Water course Philippines 2015

<https://www.facebook.com/pages/Watercourse-Philippines/>

The



water course 2015 has started!



How Elexie and Corinne experienced Monday the 5th of January.



Elexie: Welcome! To the International Course on Water and Water Management with a theme “Community Management of Water Resources”. This is a very good opportunity and experience to us student participants. It's exciting!

So, we started the first day in getting to know each other which we met and know more about our course coordinators, staffs and our co-students from the Universities of Leiden, Rotterdam, Amsterdam and Delft in Netherlands. Afterwards, we visited Intramuros which we can find things about the Philippine history, about the Philippine heroes especially Dr. Jose Rizal, the Philippine National hero. This is really a very nice place, the old buildings, the church, and of course the Manila Hotel. Then after the tour, we went to the Mall of Asia to get around and to enjoy shopping or just a window shopping

Then Finally! The most awaited time is the DINNER TIME at Vikings! It's an eat all you can restaurant where we can eat whatever we want that our tummies really deserved after a long day. After the enjoyable dinner, we get back to the hotel and take a rest. So this is how our first day end, we had a very good and enjoyable day and I'm hoping to have it again on the next day!

Corinne: After months of excitement the course finally started! In Manila we began our journey, where we also met our Philippine counterparts. We started of the day with an introduction round. It immediately became apparent that Filipino's love music, such as playing the guitar and of course (karaoke) singing. After the introduction round and Merlijn's 1000 rules (joke) we went to Intramuros where Fort Santiago is located. Here we learnt about Philippine history and especially about revolutionary Dr. Jose Rizal. We also visited one of the oldest buildings in Manila: a church. We couldn't go inside due to a wedding, but we did see the treasure chambers. Then we went to one of the biggest malls of the world: Mall of Asia. We (window) shopped for about an hour and then we went for the big finale: dinner at Vikings. This restaurant is an all you can eat and we had the best food from all over the world. Also we could dance a little bit, because the employees sang for one of our students, for her upcoming birthday. It was a really good start of the course. We have a really nice and gezellige (Dutch for "fun") group, with whom we will have a great experience. I'm very excited for the rest of the course, so let's do this!



## **How Leonalyn and Laurie experienced Tuesday the 6th of January.**

Leonalyn: The history of the Philippines is one of the most important thing we need to learn and appreciate for us to understand the present situation or status of the Philippines. We visited the Rizal Park. This place witnessed the hard work and pain faced by the Filipinos national hero Dr. Jose Rizal just to get the freedom of the Philippines.

Laurie: The second day of the watercourse started with a small briefing of the day and a name remembering game in Pension Natividad in Manila. It will probably still take me some time before I will know the names but luckily for our nametags! In the morning we went to the National museum of the Philippines. A tour guide showed us around and we learned about Philipinan traditions, rituals such as ways of rice cultivation. For lunch we went to the famous Philipinan fast food place 'Jollibees'. Philipinans love this place! To me it is like a Macdonalds with rice options. From now on forward we will probably eat rice three times a day. In the Netherlands for me, its mostly around one or twice a week! Afterwards we went for a stroll in the Jose Rizal Park, named to Rizal the national hero, because he was executed here. While I was busy with sunblock and mosquito repellent, I also had to be in many selfies and groupies (photos) cause the Philipinian students loove to take photos, one normal and one 'waki waki' (crazy looking). Afterwards we went with our bus to our next destination: Los Banos. We stopped halfway for a beautiful swimbreak. We arrived in the evening at our hotel on the University campus and went for dinner nearby. Here I ate my first weird thing; the eyeball of a fish. Crunchy! During dinner a lot of questions were asked about Philipinian and Dutch customs, there are quite some differences but the groups get along pretty well and I'm looking forward to the following weeks:)



## **How Noor and Shelah experienced Wednesday the 7th of January.**

Noor: Today we visited the botanical gardens and the IRRI and ICRAF institutes. In the botanical garden we enjoyed a beautiful hike tour guided by Manong Jouel. Due to his educational background in forestry, Manong Jouel was able to teach us a lot about trees and animals that are present in the botanical garden of Los Baños. When I mention botanical garden, you'll probably get the idea it looks like the botanical garden in Leiden, but the opposite is true. Where in the botanical garden in Leiden everything is very structured, the botanical garden in Los Baños was a very big tropical forest, where you had trouble to find the name of trees. Due to the high density the botanical garden was way more beautiful than the one we have in Leiden. Also, their botanical garden is 20 times as big as the one in Leiden and is situated at the foot of a mountain, which you had to climb in order to go deeper into the botanical garden. Also, the paths were mostly non-paved, which made the hike even more challenging and excited. Afterwards, we visited a museum in which the diverse animals that can be found in the Philippines, were displayed. In the afternoon we learned about the irrigational systems concerning rice fields and had a football game with the university team. It was a very interesting day in which we learned a lot, including football strategies. Merlijn said: winning first, second comes fun. We students, however executed that the other way around.

Shelah: International course on water and water management with the theme: "Community Management of Water Resources" is now on its third day when its officially started. Philippines has a lots of tourist spots, which Filipinos should be proud of. One of this is Makiling Botanic Gardens in Los Banos. We visited it and we saw different kinds of endemic trees (trees you can found only here in the Philippines) and we really enjoyed hiking in this place. Afterwards, we visited the University of the Philippines Los Banos Museum of Natural History where we can found collection of preserved insect pests, butterflies, birds, snakes, shells and many others. We also take some photos which serve as a remembrance in that particular place. On the other hand we visited two prestigious institutions which is International Rice Research Institute (IRRI) and ICRAF. We started with a slide show presentation. Here we learned about rice, which is the most important crop that improve the lives of farmers. It's interesting because Philippines had a lot of arable land for agricultural purposes. Lastly, we enjoyed playing football with the national football players of the IRRI. Some of us didn't know how to play football, because it was our first time to play it, but we really did our best so that we can participate in the game... Based on my experience, football is fun and enjoyable sport, because it is so exciting especially when you kick the ball and run over the opponents. We did a good job in this game, and we hope that we can play football again, when we come back at the Isabela State University Cabagan Campus with our fellow counterparts. It was a great day and indeed it is God's will to be with, in the international water course 2015.



### **How Alexandra and Aireen experienced Thursday the 8th of January.**

Alexandra: After an early morning and long bus drive we arrived at lake Taal, Batangas province. Life vest on jumped on the boats towards the volcano island; “an island within a lake, within an island within a lake within a larger island”. After a long and scorching “warming up” hike and we reached the view-point with panoramic views to the tiniest lake formed inside the volcano’s crater. A very active volcano erupting for the last time in 1977 and expected to erupt again in 2012, with no eruption to this day, and so considered an endangered zone. Following the hike and bumpy boat ride we enjoyed an abundant delicious lunch with the local sweet water sardines and dry fish. Three lectures and a few hours later we hopped on the kayak’s for a short trip at sunset time. Before the hectic bus drive to Quezón UP Campus we tried the local coffee liquor to ease our way through Metro Manila traffic jams. Before arrival to the Student Hotel we stopped for a quick “International dinner” at the Pizza Hut in one of Manila’s huge shopping malls.

One of the best day trips so far, Lake Taal and its magnificent views, landscape and biodiversity shall be called one of the highlights of this watercourse. Personally I was amazed by the high energy and enthusiastic vibes of the Punsod local coordinator and facilitator in charge of touring the group and merging local knowledge and challenges with international impressions.

Aireen: Every day is a gift from God to cherish and a new experience to share. January 8, 2015 (Thursday), the international water course team went to visit Taal Lake as well as the volcano. In order for us to reach the destination place, it took almost 3 hours of travelling. And finally! We arrived at the place. I had experienced various things and happenings in our way to have a glimpse of the Taal Volcano’s crater and its lake inside. The first one was that, we’ve been stranded in the middle of the lake. Secondly, when we hiked in the volcano, I rode in a horse. Unfortunately, I fell down from the horse and miraculously nothing happened to me. Then, we rode again in a both for us to reach the hall which we were staying. Before, I am afraid of the water in the lake because I have fear of drowning but amazingly I had unintentionally appreciated the water. My fear was suddenly disappeared, furthermore I really enjoyed the big waves which passed and hit us. Definitely it is really an awesome adventure to be treasured! Oops! That does not end my journey for that day. In the afternoon, we had three lectures from different professionals of the University of Santo Thomas and UP Los Banos regarding some facts about the management of Taal Lake and Volcano. But before I forgot, we had tawilis for our lunch, and for your information, Tawilis is the smallest sardines which can only be found at Lake Taal. Isn’t it special? Indeed, January 8, 2015 is momentous for it includes superb experiences. Many things and memories had happened, thus, it should be treasured. God Bless everyone!



### **How Thomas and Edmund experienced Friday the 9th of January.**

It's Friday, January 9th: our fifth day here with this course. In the previous days, one might have thought that we are tourists on vacation, but today was quite a bit of theoretical background. Nevertheless, this was everything but boring: Early in the morning, we started with the bus from our Hotel in Quezon City, Manila towards the Asian Development Bank: ADB. After having received our very own ADB Identity card, we were welcomed at an auditorium where employees (for example the principal economist of one of the world's most important banks, Dr. Bauer) explained us what they do, how the bank works towards development of Asia and how this links towards water management projects. While the European students were finally able to recognize some of the basic issues with which the country struggles and for what the bank helps, the Filipino students were amazed by the very organized and beautiful library which we see in our tour of this institution. After having had the pleasure to visit the Philippines based Asian development bank, we moved on to learn about a different side of Asia: The Department of Environment and Natural Resources DENR where experts gave us an overview of the importance of biodiversity and the role of biodiversity management, mainly in wetland ecosystems. After this, we visited their recovery zoo for endemic and exotic species where we - under others - encountered the Philippine crocodile. After a break at our Hotel at the campus of the University of the Philippines, Dave De Vera gave us a very interactive and interesting presentation about indigenous peoples in the Philippines. He had great facts and stories to share since he has worked with indigenous people for all his life and is a true specialist in his field. It was very interesting to see how such groups manage water and natural resources. They are not only conserving the forest, but also balance the biodiversity in forests.

Overall, it was a very interesting day that gave us a great overview over the struggles and some solutions of the Philippines Biodiversity and Water issues.

## How Esther and Kelly experienced Sunday the 11th of January

Esther: On Saturday, after a long ride by bus and jeepney we arrived at Imugan, where the Ikalahan people live. They live in a +1000m mountain and practice agroforestry and harvest non-timber forest products of which they make delicious jelly. We stayed at a pension in the mountains that was established by pastor Rice. Sunday started relaxed. Instead of breakfast around 6.30 a.m. we could enjoy breakfast at 9 a.m. Breakfast in the Philippines is still quite hard for some of the Dutchies. Rice and meat in the morning is not the first thing on our mind. Everyday the European and Filipino students learn about each other's cultures. Sunday me and some others started to teach a few Filipino students a card game called "pesten" (or "teasing"). After a nice game of cards it was time for a hiking trip to the waterfalls, led by the one and only sir Arnold! The waterfalls are used as a resource for the irrigation system in the rice fields downhill. Although the day started foggy, the trip was really nice and gave us the opportunity to see some dagwey plantations. But of course the goal of the trip was to see the waterfalls and to swim in the lake! Only a few of us dared to take a dip in the lake because of the low temperature of the water and the air. It's actually possible to have cold weather in the Philippines at a high altitude! After our trip it was time to take the bus to Isabella State University in Cabagan, where we will be getting more lectures in the coming week.

Kelly: Imugan is a place where you can see indigenous people/ethnic group which is Ikalahan. In addition, this is a place where you can experience a cold weather, because of its high elevation/geographical location. On the other hand, the climate condition is far different in the other place here in the region 02. This place is located in the Caraballo Mountain ranges, which separates Cagayan Valley from Cordillera Province. They use their land in agricultural purposes and they grow "sayote", ginger, potato and soft broom. They have also protected areas which they want to preserve for future generations. They can speak both Ilocano and Ikalangyan. They also produce different jams made up of bignay, guava, hibiscus and dagwey. As we hike in the Imugan waterfalls, which are located on the top of the mountain, we crossed Imugan hanging bridge, then we walk in a very slippery and steep road that's why most of us are afraid to go in high elevation. On the other hand, when we are near the waterfalls we crossed the river twice, but instead of losing hope we tried our best to reach the end point which is the waterfalls. The height of the waterfalls measures around 25-27 feet and it has pristine water quality. Then we walked, approximately 1 km from Kalahan Educational Foundation Dormitory (KEF Dormitory) to the Imugan Waterfalls. This place is like paradise and the best place to live in.



## **How Learnie and Lisa experienced Monday the 12th of January.**

Learnie: It's Official!!! The official water and water management has started. We welcome each other. Got lectures from the different people/lecturers that I think we will be needing in our field work. It's Videoke Time! But before that, the selected ISU dancers showed different dances in welcoming our foreign counterparts. Seeing them dancing the TINIKLING was the very best part of the day. But the most exciting part was that you can see their happy faces that they really appreciate the singing of videoke...

Lisa: The first day of our second week was all about welcoming us at the Isabela State University (ISU) campus in Cabagan, Isabela. The day started surprisingly good when Alexandra and I found out that two of the (cold) showers actually worked and that we were not restricted to the use of buckets, which most of the other students used the night before.

After our rice breakfast, an opening prayer, the national anthem and some welcoming speeches, we had a interesting lecture by Dr. Snelder about marginal lands. The rest of the day was filled with lectures bij Jouel, Merlijn and two representatives of the municipality of San Mariano, where we will conduct our field work.

Despite our shortage of sleep and the long day, everybody (especially the Philippine students) was suddenly full of energy when we heard about the videoke (the Philippine word for karaoke). At first our Philippine counterparts dominated the microphone, but after some beers, most of the Dutch students also found the way to the mic. It was a nice way of finishing our first day on the ISU campus.



## **How Leonisa and Saskia experienced Tuesday the 13th of January.**

Leonisa: On the 3rd day of staying in CCVPED which is located in ISU-Cabagan, we have many undertaking to be done especially in seminars and lectures but thanks God for giving us omnipotent lecture for imparting their knowledge to us. As I mentioned earlier this seminar is very much important to us because this will give us some idea about community water management which is our core in conducting this research. Lecture for a purpose!!! Dr. Orlando Balderama is a professor at ISU-Echague Campus. He lectured about Integrated Water Management in Cagayan River Basin. Dr. Gerard Persoon is a professor at Leiden University who teaches Anthropology. He lectured about environmental research context. On the other hand, Dr. Dante Aquino who is a professor also at ISU-Cabagan lectured about Environmental Field Research Methods and Data Analysis.

Dominic Rodriguez from Mabuwaya Foundation explained to us the program field trial at Puerta: What to expect and what to bring. Then, Merlijn, Jouel , and Gerard Persoon also lectured on our incoming proposals and what should be in it. And lastly, we develop field research proposal with our counterparts.

Saskia: After an eventful evening of traditional dancing and videoke (full of laughter, singing and dancing on the Filipino side and awkward singing along on the dutch side).A full day of lectures was planned. After a breakfast consisting mostly of rice, warm veggies and meat our first lecture started off at 0900AM. Early-ish for the dutchies, our counterparts had already been up for a few hours.. The first lecturer Balderama talked to us about different aspects of the environmental issues at hand here in the Philippines and about the importance of stakeholders. After a much loved coffee and biscuit break our second lecturer, Persoon gave a lecture on different realities and the difference between facts and norms, defining problems and different ways of focusing on context. We also talked about the importance of thinking and acting interdisciplinary. The third lecture was all about research methods and analyzing data, preparing us for the fieldwork and writing of the research. After a lunch (rice) and a nice nap in the sun, we, the 26 participants where split into couples, all the couples where designated a research topic and a village for next week and in the afternoon we got busy writing and preparing our research proposal and organizing our ideas. Late in the afternoon, before rice-dinner we had our last lecture, by Sir Dominic preparing us for our test fieldwork in Balete the next day. I think nobody really was prepared for all the mud we encountered but there will probaly be more about that in the next blog... So far I have really been enjoying my time here although it's hard to adjust to the whole rice for breaky thing.

### **How Kiki and Melody experienced Wednesday the 14th of January.**

Kiki: Today the field trial started, my first experience with working into the field. The day started well with the sun that was shining and the promise of a beautiful hike. The hike would take three hours and we only have to cross a river one time. For me, as a dutchie, it was quite a survival experience. We were walking while we were slipping through the mud. At a certain point the mud came up high to my knees. Luckily we paused for several times and the nicest one was at a small barangay. While sitting in a small (HUT), Gerard Persoon told us that it was the church of the barangay. It was very interesting to hear all the experiences and share the knowledge with the supervisors. We walked for four and a half hour in the bright sunshine within the beautiful nature of the Philippines. When we arrived everybody was devastated and very happy that we were friendly welcomed by the owners of the house. They made us a delicious lunch and after that we had a tour through the village. But because we are still in the Water Course, there has to be an educational part. Therefore we practiced a interview with an Ifugao woman to practice for the field work. For me this was very important so that we could have some extra (tips) before we have to do it ourselves. After diner we made a big bonfire and sing songs underneath the stars. It was an very nice but intensive day with a lot of beautiful nature, information about the area and of course a lot of fun!

### **Melody: Struggling For a Purpose: The Field Trial**

It was a sunny day when I woke up this morning, and what's my schedule for today? YES! Our field trial to Puerta. I really just expected it to be a total package of fun. So, we ride on the jeep for an hour until we reached a part of San Pablo. Wait! Wait a minute, are we going to hike in the hills that I just see? Oh no! Yeah, I think we're going to hike. In fact, the sceneries was really amazing. Taking a look at the green hills with some different green trees are just like



paradise for me, but wait, hiking up there? Let's see... So let's begin, at first, it was really beautiful. I was so amazed to see how this place was covered with all the things I expected, a natural forest, but at the same time I really got tired. Passing a creek, and hiking up and down the hill is quite tiring. When we reached the village where we were going to stay, I was so amazed that they were Ifugaos. I realized how blessed I am, when I learned more about the Ifugao culture. How they conserve and manage the water and their environment. Yes! Everything has a purpose, I think I already realized it because of this field trial. I'm blessed because of everything I have now. And for what I have learned today ... To share what blessings I have, that some may not own.





## How Dylan and Nehemiah experienced Thursday the 15th of January.

After a long night without too much sleep - as the dog kept waking us up - we could finally enjoy the real morning beauty that the Philippines has to offer. Tired and worn out from the hike and evening-dances yesterday, today's quietness was much appreciated. As the sun was only about to show its face again, we were all ready to practice our interview-skills. Gathering data on the spot, trying to pull key information out of the local people. A challenging, but fun assignment to do with your Filipino counterpart. With drinking water and corresponding health issues as research topic, it was surprisingly easy to gather lots of information in a very short time span.

Not long after the interview, breakfast was served. A necessity for the following 1,5 hour hike back to the jeepney, although this road was a lot more accessible. But first, let's take a gouphe! Filipinos love taking pictures, selfies and group-photos, so before leaving at least 26 group-pictures were shot.

During the nice hike back we had the chance to do some swimming, some cleaning and of course, some cliff-jumping; a very smart thing to do, when you're afraid of heights. The rest of the day has been a bit of a layday, going to the market, washing some clothes and writing some blogs. Now it's time for a drink and a good night sleep!



### **How Tim and Raffy experienced Friday the 16th of January.**

Tim: This day was actually the first day we did not have a scheduled program for the day, which was actually good! Everyone has been busy constructing their proposal for our fieldwork we will start coming Sunday. It was great to hear what people want to research and see them work together with their counterparts. In the afternoon everyone presented a photo we had taken on our fieldwork trial to Balete, Merlijn van Weerd and Gerard Persoon gave us good tips on where we should focus on and for what purposes you would take a photo when conducting fieldwork. It turned out that it's actually easy to fool people with a photo when you don't tell the real story. Tomorrow we will finalize and present our proposals and the Dutchies will prepare a typical Dutch diner, I'm looking forward to it!

Raffy: It's Friday! It was hard day for us because we do our research proposals all day long. All students are busy in doing their own proposal. Some students are in the library, session room, mabuwaya office but me and noor my partner we stay together inside of the internet room to work on our own proposal. It's quite hard for me because it is my first time to expose on that kind of research proposal but im happy because i know that im learning something new and different . My day ends with tired neurons of my brain but im happy and very grateful because I am experiencing these kind of opportunities.

### **How Joost and Raymond experienced Saturday the 17th of January.**

#### **BEYOND THE PERFECT SCORE By Joost and Raymond**

Joost: Finally Raymond and I can write our blog for the Facebook page of the Winter Course! What a relieve! Today I (Joost) woke up at 7 a.m. to start with writing and finishing our research proposal for the coming fieldwork in the Barangay of San Mariano. Together with Elexie (she's the woman who makes this Facebook page possible!) With lots of coffee (it was too much fun yesterday evening) and good atmosphere we managed to write a beautiful and very interesting research proposal. In simple words you can describe it like this: because of climate change rainy seasons will get wetter in the Philippines which could be the cause of an increasing amount of floods in the future. To tackle this problem Elexie and I are going to do a study on the flood preparation in the Barangay Disulap. This is a small town near two rivers in the Cagayan Valley.

Besides doing research we are also going to live there which I probably will enjoy very much. Already I've promised Elexie that I will cook her and the guest family some lovely (hopefully non poisonous) palaka. After our fieldwork I will try to let you guys know if we survived that meal! Because of an approaching typhoon (very rare in this time of year) our trip has been delayed for one day. But still there is enough time to do fieldwork! The one extra day we have left in Cabagan we will spent on visiting the Callao Caves and hopefully we see 10000's of bats flying out of the caves there at sunset. Don't stop reading though because in the next part of this blog Raymond (one of the most fanatic videoke singers of this group) will tell you all about the presentations of the research proposals and the special dinner we had last night.

Raymond: 'Twas a stressful day. In the morning, everyone is busy making their presentations for their proposals. After a few hours, the presentations finally began. Everyone ... absolutely everyone have great proposals and all the efforts are well applauded and not wasted. (clap clap clap). As they say, "There is always a rainbow after the rain". Here it is! The long awaited "Dutch Dinner" --- OOoooppppsss! a very nice ending for a very stressful day.

I was amazed with the foods! They were completely different with the usual dinner of the Filipinos, (Where is the rice?! Where is the rice?!). I was amazed with the cheese, oh yah! It's a real cheese! There are foods called kruidnoten, stuffed egg, ginger bread, stamppot, stroopwaffles, Spanish jamon, the large-size pork, and of course my favorite, the rookworst --- and they completely made my day! Another thing that turns the night with a 360 degree twist is the Videoke. It is really good to see the foreigners singing in the Videoke and probably that's an influence coming from the Filipino delegates in this course. I, myself, really feel the happiness of everyone especially for the foreigners because this is not their usual way to have a Party. Yeah! I keep on insisting and insisting and insisting everyone that my voice is really good, and to prove it I sang Whitney Houston's "ONE MOMENT IN TIME", but unluckily Kuya Arnold ruined the song! Hahaha ... just kidding, Peace Kuya Arnold . But kiddingly aside, the night was really fun, it doesn't matter if you are a Filipino, a Dutch, a German or a Romanian ... the most important thing is that everyone enjoyed the Party and the day really deserves a PERFECT score. Yehey!



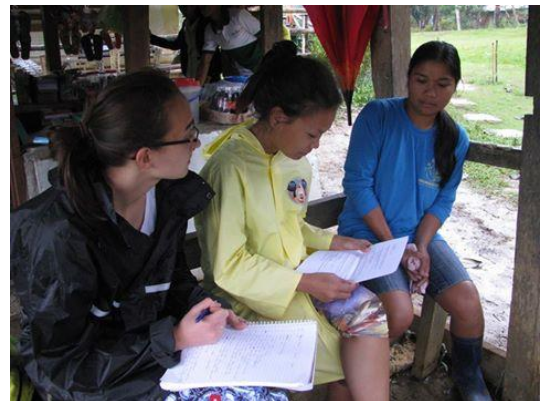
### **How Elexie and Corinne experienced Sunday the 18th of January:**

Today was an extra day off. We were supposed to go into the field today, but because of the storm it was decided to leave tomorrow. As we were free we could finish our research proposals this morning. In the afternoon some of us went to the market and the park in Cabagan. Others went to the Callao Cave in Pena Blanca. We went with the second group to the cave. We hired a van with a really nice driver and we cramped it up with 12 Filipino and European students. On the way to the cave we stopped a moment to get a delicious chocolate cake, because Leonalyn almost won a bet from Dylan. When we arrived at Pena Blanca, we first had to cross a lake in a wooden boat. The boat was quite full with us in it and it wobbled a little bit, but luckily we made it safe to the other side. Our guide kuya Willy took us on a tour through the caves. It was beautiful to see how nature made the limestone caves, it was so big! In the caves live bats, but due to the bad weather we couldn't watch them fly out of the cave. We did see a family of bats when we were inside, the guide told us to look up and close our mouths haha. After the tour we went back across the lake and on our way back to ISU we stopped for a family visit at Leonisa's sister. We got cookies and drinks from her and she was really nice. We thanked her for her hospitality and eventually went back to ISU. Tonight we got a good meal and packed our bags for the fieldwork. It's still raining and cold, so we hope the weather will get better tomorrow, as we have to hike again. Nevertheless, we are prepared to go into the field and do our research. We are excited for the upcoming week! Next weekend we will have internet connection again, and then we will update you guys about our fieldwork

## How Laurie and Leonalyn experienced Monday the 19th of January.

Laurie: Today was the first day of the fieldwork week. Before everyone spread out to their villages we went to the market of San Mariano to get our groceries for the coming week. This was quite a challenge because I did not recognize a lot of the food products and my partner did not cook that often. Eventually we ended up with (surprise!) a lot of rice, one pack of pasta (joepie!), some veggies and unfamiliar fish. After the market we went to the Mabuwaya office where we learned about the Philippine crocodile and what the Mabuwaya foundation did to protect him and his habitat. A snack and a short briefing later we all spread out to the villages where we would stay for the coming week. Me and two other teams went to Villa Miranda where we arrived after a tricycle ride, boat trip, very bumpy truck ride and a small hike. Arnold was our coordinator and introduced us to a barangay official. This man divided us among some of the houses. Me and Leonisa were very lucky to be in a house with our own room, the house had electricity since two months and they also had a kind of C.R. which was next to two pigs. My hostfamily consisted out of a lolo, his grandson and an adopted agta boy. For dinner we cooked the food we brought and I immediately got introduced to all the family members who lived near. They were very interested in my skin color and blond hair. Understanding each other was still a problem but with translation of Leonisa we were able to communicate. So far a nice welcome in the village where we would be living and taking interviews the next week!

Leonalyn: It's the first day of being in the field for this course and we need to work hard to make our research possible and worth it. We were supposed to leave on Sunday, but because of the typhoon we left on Monday morning. We rode a bus going to San Mariano and had a shopping for our one week foods and important things we need in the field. Luckily we didn't need to buy that much, but other teams who were in very isolated villages had to bring everything (read: hiking with 5 kg of rice). Afterwards we had a short lecture about the crocodiles and about the area we will stay in. I and my gorgeous partner, Corinne, were destined to make our field research at Sitio San Isidro. We had a very good dinner at night. It's quite hard for us to adjust because the area we've been in is quite isolated and no cell phone signal and current but we still made it!!!



### **How Shelah and Noor experienced Tuesday the 20th of January.**

Shelah: ... GOD is GOOD all the TIME... it was a great day and indeed it is a wonderful day to every one of us... We're here at our host in barangay Dibuluan, Sitio Villa Miranda in the person of Mr. and Mrs. Remegio Tagao. I'm happy because they make us feel that we are not away from our home and they are very accommodating. They treat us like their own children. We feel that we are one family in this home even though I really miss my family in Cabagan and it's been a long time when we are apart. On the other hand, we also interviewed 17 respondents in this barangay ... wow!!! This is the first day of our field research and I experienced and learned a lot of things especially on how to deal with other people because it was my first time to go with other place and make some interviews. I have to divide my time because my counterpart Saskia is suffering from headache and she needs rest. I need also to care for her so that she will get better and it's my responsibility in our host family to help them also in doing household chores like cooking and washing the dishes. I'm tired but it doesn't matter on my part because I know that this is the will of GOD for me and for the people around me especially on doing things that are difficult to deal with.... This experienced is one of my unforgettable moments in my life (one of the best day in 2015). May GOD bless us always...

Noor: As you all know, we were spread over different, very small, villages. Raffy, Corinne, Leonalyn and I were situated in San Isidro. As we arrived late in the evening of the 19th, we stayed the night at the host family of Corinne and Leonalyn. First thing to do in the morning was therefore to pack our things and go and meet the host family. Our host family consisted of 5 people; mom and dad, their two children and one grandchild. After getting to know each other, we went to explore the village and to conduct our first interviews. Due to the rain, roads were muddy, so when we had to cross a river to get to purok 1, we had the hardest time to climb up from the river to the road again, since the road was one big bath of mud. You can imagine, this was conceived very funny by the local people; those foreigners who had trouble with walking through the mud, slipping around and falling. Nonetheless, we made it to reach the elementary school and went on doing our interviews from there. The first interviews, for both of the teams, were full of hitches, but by trial and error, it got better soon. In the afternoon we were already able to conduct the interviews fluently, without any misunderstandings our hitches. In struck me how calm and relaxed the people were; they acted like they had all the time in the world, with no stress at all. That is a very positive difference from the Netherlands to encounter. In the late afternoon we called it the day and went back to the house where Corinne and Leonalyn stayed. We reflected upon the day and played cards there. As soon as it was getting dark, around six o'clock, Raffy and I went back to our host family to cook our dinner. While slipping and trying not to fall, we found are way through the dusk. After a short dinner, we both went to bed; tired of a day full of new impressions.

### **How Aireen and Alexandra experienced Wednesday the 21th of January.**

Aireen: AMAZINGLY AMAZINGIt was our second day in Villa Miranda, a sitio of Dibuluan San Mariano for fieldwork. This day we interviewed 20 residents of the place. They were the Kalinga, Ilocano, Ybanag and Ifugao. It was very interesting to talk with them since they have different perceptions regarding water for drinking and the diseases they can get from it, which is our (me & Janneke) main research topic. Furthermore, we took picture of the sources of drinking water of the people in the village used to have. Wait a minute.... Its not the only thing we did for the whole day. We made the amazingly amazing experience. We prepared a special dinner for the family we stayed. It was special because it was our first time to cook heart of banana, with the recipe of ukoy and salad, and with the help of Ma'am Mylene, one of the

teachers whom we conduct our group interview. Actually , it was very funny because we (me & Janneke) almost eat all the ukoy and salad. Isn't it funny???Indeed, an amazing moment to remember is the great experience I have encounter! I enjoyed much staying at Villa Miranda.

Alexandra: First wake up in Diwagden after one day and a half journey including buses, boats, jeepneys, and long and muddy hikes. Still, we proudly and dirtily made it safe to the foothills of the Northern Sierra Madre. An early morning to kick start our day with scrambled eggs and the by now typical and appreciated fried rice. We started our interviews with the Agta, to which we were introduced the previous evening and got the chance to carry three more interviews. We had some time to also room around and take pictures of their main water sources and housing conditions. Noontime we walked down to our Ifugao host family where we found lunch ready for us. Some rice and wild pig. Merlijn and Tess joined our site for the day and together we headed to the Kalingas (the third indigenous group) where we interviewed three households. It was interesting to notice how in such a small village each of the indigenous groups had their own ways of living and the construction of houses greatly differed among the three of them. Before the sunset we went for a swim (or shower) to the Disulap River, habitat of the Philippine Crocodile and ideal place for crocodile conservation and observation. After a much deserved shower and change of clothes we walked back to our Ifugao "home" just in time for some more pork and rice!

### **How Edmund and Thomas experienced Thursday the 22th of January.**

Third day and the last day of our research interview. In Sitio Diwagden, barangay San Jose in the municipality of San Mariano. I woke up early in the morning to cook our breakfast before we went to interviews. After breakfast, Tess en Merlijn grouped for meeting about making a map. After that we (I and my partner Esther) started to interview Agta and other ethnic groups until lunchbreak. But before we went to cook our lunch. We went first on the top of the hill and we took photos of the village for making a map and documentation. After that we went in the house that we stayed in. we prepared eggplant with egg for our lunch with our foreigner counterparts. After lunch we went again to interview some Ifugao and Kalinga. And after interviewing, we're happy with my counterpart, because we did nice interviews. At the night after dinner we gathered to make a map of Diwagden with the help of the staff of Mabuwaya Foundation Kuya Amante and his sister.

Thomas: By now, we have reached the highpoint of the course and many of the Dutch students are already afraid of the cold and rainy weather that is waiting for them/us. So, good that we got a reminder on how rain feels like while we were in the field for the last few days. However, besides the rain, our research is progressing. We have been interviewing about 20 fishermen of the village San Jose, we hiked for hours to find Agta, Kalinga and Ifugao indigenous groups in the mountains of Diwagden got informed about awareness rising projects in schools and hence slowly started to get an image of how the fish sanctuary is performing. However, my Philippine counterpart Raymond and me are still trying to find out more clearly about the functioning and implementation of the rules and regulations of the fish sanctuary in the village. Therefore, today on the plan: interviewing officials such as the chief of the police, village government and in the afternoon go to the municipality government in San Mariano to interview the department of agricultature. After that, we earned a nice BBQ at the market and went back to Mabuwaya's crocodile rearing station where our guide Dominic was waiting for us to release some small crocodiles: This exciting day ended with a hammock sleepover above crocodiles that we could hear jumping into the waterpond once in a while during the night.. .



### **How Grace and Janneke experienced Friday the 23th of January**

Grace: Finally! After the amazing experience of interviewing the different ethnicities of Sitio Diwagden, we had to travel to Dunoy for our "crocodile release". Wait a minute, why are my tears falling, huhu. Yes I will be missing our host family (maraming salamat po). It's time to go, still we were happy because kuya Amante a.k.a. "Don Don" (fieldwork guide) is coming with us to hike up to Dunoy. We were laughing along the way suddenly I was shocked, are we going to pass this river? No, I mean seriously are we going to pass this? "Yes, don't worry the water will just be up to your legs" answered kuya Don Don. Okay, that was a relief, at least I was wearing shorts that time. Hooray! I'm not wet! I'm not dirty. So we hiked some more, until we reached a muddy spot and guess what, the mud was just so sticky slippery. "SPAAT!" mud on my shorts and on my bag, while I was just sitting on the mud. So yes, we arrived at San Isidro to meet our co-studs (and for lunch, I'm hungry) with my mud stained shorts. After lunch, we hiked again to Dunoy, and now I was much more used to hike so far, because of the hike experience we had with the team who were also destined to Diwagden. We arrived at Dunoy and released some crocs, we actually named our crocodile after our guide: Don Amante. After that we had a bath in the river that was freezing cold. All in all I was happy for a day full of experience.

Janneke: Today was the final day; the last day of our actual fieldwork research in San Mariano. Aireen and me had been staying in the sitio Villa Miranda for four days and felt like we had enough information to start a proper analysis with. We had to hold a lot of interviews in the last couple of days, tasted the best food I probably ever had and experienced the real life of the Barangay people- at least for the time being. In the morning we said our goodbyes to our host family. We already had our farewell party the night before and I assumed we all felt the result of that the morning after. Everyone seemed thankful but quiet in the final remaining hours. All the students left Villa Miranda at 09.00 am in the morning and luckily we were immediately picked up by the logging truck just outside the sitio.

We travel in the truck for about an hour and arrived in San Isidro for lunch. All the students came together there so obviously we also used this time to share our adventures. Our supervisors made sure we were all prepared for the next ride in the logging truck, and we arrived at the farm near the Disulap on time. This, the Disulap lake, was where we would release our crocodiles. Groups of four students had the supervision and ability to name the crocodile, and we all got to take pictures with them. The mix between overwhelming excitement -we got to hold crocodiles- and feeling like a stereotypical tourist -we took pictures of us holding the crocodile- made it a unique event. Nevertheless, this was one of the coolest things I've done ever. Our crocodile was named Sir Hercules Edmund. The evening was spent at the farm; eating and watching the variety of pets (and probably also foods) scattered around the buildings. We reminisced about the afternoon and topped that up with some local gin. Processing all of this in my sleeping back made me realize this day might have been one of the best days. Ever. So far.

### **How Kelly and Esther experienced Saturday the 24th of January.**

Kelly: After gathering of data, hiking in a mountainous and muddy place with barefooted, bathing in a pristine and cold lake and eating fried bangus with boiled egg, we had to say good bye for the host family we stayed for one night in Dunoy- a small sitio in Barangay Dibuluan which consist of five households and more than fifteen individuals with different ethnicity like agta, ilokano, ybanag and others.

Cold weather condition!!! This is always a scenario in a mountainous area. Obviously we are chilling that's why we woke up at 6:30 a.m. because we will be leaving Dunoy at 8:00 a.m. Next, we are hiking for almost forty minutes to reach Malaya- a place where we planted the Narra trees. This advocacy is also known as National Greening Program of the Department of Environment and Natural Resources (DENR) which mandates "Nationwide Reforestation Program via Executive Order No. 23 to establish 1.5 billion trees covering 1.5 million hectares for productivity in the uplands, self-sufficiency in wood and forest products, economic security and environmental stability. After tree planting, we hiked for almost an hour going back in San Isidro and we ate "sinabawang manok" for our lunch. On the other hand, we departed that place and we ride in the big truck crossing one river going back to the rearing station of Mabuwaya (a shaky ride that makes our whole body agonizing) to bring back the things that we used in releasing the crocodile. After which we ride on big boat to cross again the other river in order for us to arrive at San Mariano where the bus is waiting for us. We traveled going back to Cabagan and we had a quick stop in North Star mall Of Ilagan city to have shopping. We arrived in Cabagan at 6:00 p.m. and we take a rest for a few minutes before we ate our splendid dinner. Thanks GOD!!! We arrived safe and sound!!!

Esther: Saturday was the end of a pretty intense but awesome week in the field! The day before we all arrived in Dunoy after a 2 hour hike from San Isidro. We stayed in Dunoy for a little tradition of the watercourse: to release juvenile crocodiles raised by the Mabuwaya foundation in a crocodile sanctuary. The rest of the day was of course all about telling stories and sharing experiences from the field. Some of us discovered the hammock as a great sleeping experience, but I chose a tent instead to spend the night. After a lovely night of sleep in our little tent Alexandra and I woke up around Filipino time: 6 a.m. I'm lucky to be blessed with some "Versteeg genes" (thanks dad!) which means that I can sleep everywhere, but I never thought that I could adapt to waking up around such a time The programme of the day was to travel back to the campus in Cabagan, but before we would actually arrive there we had still a long travel ahead. It started with the hike back to San Isidro. Half way we stopped at a 'Rainforestation project' where we had the possibility to plant seedlings to help the forest grow back. After lunch the next part of the journey was scheduled: driving back for 1,5 hours in a old logging truck. The truck is actually the only vehicle that can drive on the muddy road from San Isidro to San Mariano this time a year. Although everybody felt a bit shaken by the truck, the spirit was still there and when we transferred to our last vehicle (the bus) we could enjoy the singing skills of Raymond and his choir for the next 4 hours (joke!).



### **How Lisa and Learni experienced Sunday the 25th of January.**

Lisa: Sunday the 25th was a day to which all students looked forward to. Besides being Alexandra's birthday, it was our first day off in this course and it was fiesta in Cabagan. After washing the mud from the field out of our clothes, we went to Cabagan to see the parade: the main attraction of the fiesta. The parade was formed by many groups of children dancing through the crowded streets of Cabagan. The big finale took place in the park, where all groups gathered for a final performance. It was funny to see family members of participants of the parade joined the parade to protect their children from the burning sun with an umbrella. It was also funny to see how dancers in the parade suddenly forgot their steps and just stopped as they saw a group of white, tall people watching the parade. After a delicious lunch at Beth's place, everybody spent the rest of the day relaxing and enjoying the sun.

Learni: It's free day! It's Fiesta day! (Cabagan). Of course we went to the fiesta, but before that we went first to the church. Then we watched the beautiful Zambali Parade (enjoy! Picture! Picture!).



### **How Leonisa experienced Monday the 26th of January.**

Good morning to everyone!!! This is our second day in ISU-Cabagan after having a field work in San Mariano. Morning Session: Merlijn discussed about the format on how to make reports and after which we started to write and analyze our data. The three groups have their own meeting for their comparative study about each topic. BREAK TIME!!! Have a coffee and cookies... We enjoyed working with our counterparts. Then, we continue doing our reports. Thinking rationally and searching in the library/internet will make you exhausted but this is the reminder to give your best shot whatever you do. LUNCH TIME!!! ...We enjoyed eating a lot of foods which was prepared for us by the HRM students...The same routine that we need to be accomplish ....Finally, it's our time to take a rest...God bless us all .. take care

### **How Kiki and Melody experienced Tuesday the 27th of January.**

Kiki: Today was a relaxed day for most of the students. Everybody was working on the final version of their research. But luckily we have still tomorrow and Thursday morning to finish it. The weather is lovely. Almost no clouds and a temperature around 27 degrees Celsius. That was a good reason for the Dutch students to lay outside in the sun during lunch break and get a nice tan. Funny enough that causes a lot of shocked reaction by the Pilipino students who are not participating in the course. Because why would you like to have a tan? Little culture difference. In the afternoon there were a lot of group meeting with the supervisors and after diner everybody was still working on their piece. Unfortunately this day was not more exciting

but with an eye on the coming weekend, with a visit to the rice field in Banaue, there will be less boring Facebook posts than the one of today.

Melody: I woke 6:30 am due to excitement because we'll gonna run. I immediately go to the bathroom to brush my teeth and wash my face. After preparing some stuff, i need to go to the bed of charming Grace, to the rooms of beautiful Leonalyn, tall Tim and Boss Dylan to wake them up. 7:03 am we ran around the campus to burn some FATS! (because they always say that I am fat) Then after, we stayed at the campus the whole day to start analyzing our data. BREAK TIME!!! Some of the dutch students chilled under the sun to get tanned then we filipinos had chitchats about lovelife, likes and dislikes. In the evening, we watched movies (horror) , Annabelle and Wrong Turn VI.

### **How Dylan and Miah experienced Wednesday the 28th of January**

Dylan: Wednesday, the day that breaks the week. The day that makes us all excited. And of course, the day we'll have the most of fun. Waking up completely sore from our beautiful morning run the day before and totally excited about another day of research enjoyment. After our breakfast, not sure what it was, but most probably rice with some meat, a wonderful cold bucket shower waited for us. For the once who don't know, the water is pretty scarce and so we shower with amazing little buckets. After this great morning wake up, the computers were started once again and the data analysis could start. All Filipino/Dutch duo's worked extremely well together, like one giant researcher with two heads. No way we would let time win this game, so we worked our asses off. Working until the end of dawn, going to bed completely satisfied and ready for the big presentation tomorrow. YIEHA.

Miah: Goal for the day: "To create a quality output for the final presentation." This is our 3rd day to prepare and to polish the presentation that we will be conducting tomorrow. It's quite hard for me or shall I say us to work against the clock. At the morning, Tim and I were too confident and cool about our presentation but about 10 am, we started to rush our work and I actually felt that "panic thing" for I knew that the other couples were done with theirs. After all, we end with something that we (including all couples) could be proud of. And we are all looking forward for tomorrow's mind blowing presentation. The best of luck and God be with us always.

### **How Raffy and Tim experienced Thursday the 29th of January**

Raffy: Thursday the 29th, Oh My G. Final Presentation Day! In the morning, every team was busy preparing their own presentation. Everyone was rushing especially me together with my partner, Noor. We finished the powerpoint of our final presentation at exactly 11:45am. In the afternoon, I'm really nervous, but when the presentation was about to start, I saw my Campus Administrator, Dr. Clarinda together with my two Professors, Engr. Raphy and Ma'am Eloi and 'twas really a great feeling. I appreciated their full support and effort for me. I did not really expect that they will attend in the program. Thanks Ma'am and Sir! After the long and stressful day, everyone deserves a party for a job well done! A lot of foods and (hard and soft) drinks was served. A cultural show from ISU San Mariano was also presented which really entertained us especially when everybody dance the Big brother's team song "Pinoy Ako". The cultural show enlightened the history of the Philippine crocodile. (BITUN Socio Cultural Group- a partner of Mabuwaya Foundation for disseminating the importance of croc in biodiversity). The day ended with a smile in each and every one of us for finally completing the course but at the same time sadness wrapped my feelings thinking that this course is about to end.

Tim: Today is the day of the final presentations! Most of us got out of bed really early to finish their research and prepare the presentations we have this afternoon. I didn't think me or my fellow study mates would experience any kind of stress during this course but today it proved to be otherwise. Putting in enough pictures, align the text in the format Merlijn asked for, make sure the used references are in the reference list and also finish our presentation before 12.00!! After all everybody managed to finish their researches and proposals and finished their presentations. So at 14.00 the presentations started, all groups presented their researches and their results collected from the fieldwork. I was amazed by the amount of data everybody collected and the conclusions and advices people had for possible solutions and further research. All people involved with our watercourse attended and Merlijn and Jouel thanked them for their work and commitment making this possible. After the presentations all of us received a diploma for successfully finishing this course. As it was the last day in the CCVPED Hostel we ate outside with all people who attended the presentations. The food was delicious! While finishing our dutch desert, ice-cream WITH STROPPWAFELS, we got treated a show by students from the ISU about the catching and saving of the Philippine crocodile. Thank you for this amazing stay in the CCVPED Hostel and all the people involved to make this possible.



Joost & Tim having a pancit cabagan XL on their way to Banaue

### **How Raymond and Joost experienced Friday the 30th of January**

Raymond: "THE VOICE" during the BAMBANAue trip!

'Twas a real treat last night! Party Party! And for this day, trip to Banaue! Yehey!!! We departed in Cabagan at exactly 7:30 in the morning. Oooooops, an ice breaker during the quarter of the long trip! The Bambanti Festival! We visited the different booths with giant scarecrows which represents the different towns in Isabel. It's a pity! We missed the street dancing yesterday. During the road trip, here I am again, I just don't know why and I keep on wondering and wondering why can't I stop my mouth from singing, uh oh, why can't I? Even if everyone don't want to hear my very beautiful voice, I just keep on singing and singing. That day, Sir Jouel made me realized that my voice is not really good. Oppp wait wait wait! But at last, I found out that he was wrong. Hahahaha. Uh oh, I will really miss this. It's exactly 5pm when we arrived in Banaue Hotel. The visit to the view point of the terraces was postponed, but its ok darling. The day ended with a photo shoot together with my Filipino counterparts. Slap lecker for the foreigners! G.S.I.S. for the Filipinos (Goodnight.Sweetdreams.Iloveyou.Sleepight).

Joost: It is time for me to write a blog again! What an honor! Because today was a day full of travelling I actually don't have that much to say about our activities during this day. Therefore I would like to dedicate the first part of this blog to two very important women for me during this course. First there is Corinne. Maybe you already noticed but Corinne is the administrative brain behind this blogging system on Facebook. She really wants us to write every blog on time. That is why I am writing this blog during a lovely beer with my course mates. But it is really good that Corinne is so strict because otherwise nothing would happen. Because the Dutch boys in this course are really lazy in writing down their experiences. If Corinne would be the only one that was chasing us with her commands she would get really tired. Luckily there is Nina. Nina is not a student anymore, but still a small student lives inside of her! I really enjoyed Nina's company until now because we had lots of great experiences. We partied together at the Fiesta of Cabagan, spent a day in Disulap together and had a great dinner in Banaue today. But now Nina is in her role as supervisor again. This was really helpful during research but now she is also correcting the sentences of my blog. But I think I can speak for all of us that we really appreciate her presence here. Today we woke up at seven o'clock in the morning for our journey to Banaue. The home of the famous Ifugao rice terraces. On our way here we stopped in Ilagan for the annual scarecrow festival of the province of Isabela. Every municipality was represented there by a small stand and a big scarecrow. In both their objects the main sources of income of the Municipality were shown. San Mariano, the Municipality where we did our research, actually had a real Philippine Crocodile in front of their stand. We only stopped here for an hour because Banaue is quite far away from Cabagan. Along the way the bus was working fine, except some cooling problems along the way. During lunch Tim and me had a lot of Pancit Cabagan which was really good but everybody had to wait for us because it took a lot of time to finish it. After the lunch Merlijn went out of the bus and Arnold Macadangdang was our new tour guide! This meant that announcements now took a little bit longer and were more funny. Thomas (the German guy) and me were sitting on the last seats of the bus and had lots of room to sleep during the trip. There was a family of cockroaches living there and everybody was scared but because we are brave guys we stayed there the whole trip. Besides Joost & Tim having a pancit cabagan XL on their way to Banaue sleeping I mended my headphones twice and also broke them twice and learned Thomas a new card game. When we arrived in Banaue we went immediately to the market and looked at some beautifully antique wood carving art. After that we had a beer with view on the rice terraces which was also really nice! Our stay overnight is at the Banaue Hotel. This is also the place where we had dinner which was amazing. Proper vegetables and really nice seafood.. Some people had some drinks after dinner but I was off course not participating because I never drink beer (or rice wine). Thank you for reading my blog and if you read it all you can call me because you can come pick up a prize in Delft! Kind regards,

### **How Elexie experienced Saturday the 31st day of January**

Its Holiday! Here we are spending the last days of the course in Banaue. It was so sad to think that this is about to end. We woke up early this morning and had breakfast to the hotel. It was so entertaining that kuya Bernard of mabuwaya is telling stories while I am eating with Grace & Aireen, another laughs and jokes again. Afterwards, we packed, waited for others and walked to the jeepney "our ride to Batad". Of course I sat on top of it so I can have the best view of Banaue from the side roads of the mountain. Seating in my both sides was kuya Arnold & Edmund (mabuwaya staffs) "the best tatay jokers of the course". Kuya Arnold is really enjoying the trip, ""its holiday" he said then I laughed because he is lying down on the jeepney. After minutes of travel, we hiked to ride again to the second jeepney because landslide badly happened to the road going to Batad. After this, another hike again going to the hotel where we

will stay, it was a long walk to reach this place but the amazing view surprised us, the famous landscape in the world "rice terraces". In the afternoon we explored in the place and hiked again going to the best waterfall of batad "Tappia Falls", it is far from where we stayed but it's worth. The water is very cold but I decided to swim and I liked it. With Ate Beth and her husband, I enjoyed swimming like a mermaid in not so deep part of the water. Then we went back to hotel, had dinner and party at night. Merlijn and Jouel played guitars and sung with us. This was so unforgettable because we danced the otso otso and spaghetti song "the watercourse dance steps". The party ended at 10:30 and it so sad to imagine that this is our last night together in the course. I am very thankful for the precious times we shared together and I am hoping that we can gather again. Dankjewell my dear friends!







## How Laurie experienced Sunday the 1st day of February.

The very last day of the watercourse! We woke up with the view of Batad and had breakfast while still gazing at this amazing world wonder. After a rainy hike back we drove with the jeepney to get our bags in Banaue and drove with the Isabela bus to our lunchplace. This was our last filipino/europe meal together and when it was time to split up, all the smiley faces turned sad. A lot of long hugs and tears came down. Funny to realize we've only know each other for one month but when witnessing this farewell you realized how much we got attached to each other in these four weeks.

This month went by so quick, filled with interesting visits, lectures, research, fieldwork, more research, presentations, long/short/ muddy hikes, bus rides, jeepney and tricycle rides, cultural surprises on both sides but mostly a lot of fun, singing and jokes. I am looking forward to the exchange of all the waki waki pictures! Thanks to everyone for this awesome month and mabuhay!:)



## How Leonalyn experienced Sunday the 1st day of February.

The last day. I don't know if what I'm gonna feel this time, be happy and excited 'cause I will see again my family or be sad and scared that this will be the last chance that I can see and mingle to my new and cheerful friends (Dutch & Filipinos). Mixed emotions, but the important thing is that I found an extraordinary friends that we will keep in our hearts. This course is one of the happiest and unforgettable moment in my life, the hiking, foods, pressure for the research and the joy & happiness we shared and faced together and most important, the essences of our research.

I hope there would be WATERCOURSE for the following years. It is worth continuing for the foreigner and Filipino students to learn more about the water, wetlands and its management. Watercourse is one of the big opportunity for the Filipino & foreigner students to learn more about the water, wetlands & proper management of water and the present problems that the water is facing in the Philippines, and how they can address and solve these, they have the chance to socialize to the foreign students. For the foreign students to learn and study the Philippine culture, sources of water, it's wetlands, and give ideas on how to conserve water for the future. The studies conducted by the course are worth reading for and sharing for all the Filipinos and foreign people to let them know what are the latest situation of the potable water and how can it be manage properly & conserve for us to avoid the shortage of water in the future.

And for all the people behind this WATERCOURSE, sir Merlijn, Jouel, Dominic, Edmund, Bernard, Gerard, ma'am Tess, Dorina, Beth, Joni, Nina, Mayo, anti Onya, hrm students sir June etc. thank you sooooo much! I learned a lot!! And for the magaganda and mga piging Dutch, Romanian, German & Filipino students, thank you, though we don't have the chance to be together completely again, hmhmhm there are facebook & other social networks to keep in touch. I miss you!!! Rule #1: English (nosebleed) Rule #2: Mingle (my favorite rule) hahaha Rule #3: Respect each other Etc.





