International course on water and water management in the Philippines
4 January – 31 January 2017

Merlijn van Weerd, Marites Gatan-Balbas, Renée Hagen and Jovy Servitillo (editors)

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Cover: participants of the water course 2017

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Editors

Merlijn van Weerd

Marites Gatan-Balbas

Renée Hagen

Jovy Servitillo

With contributions by:

Dieneke de Weerd, Aileen Mae Binag, Coco Anna Tas, Andy Mulato, Ashley van der Zee, Anneroos Dijkstra, Jesrael D. Tuliao, Hansi Jane Garcia, Joseph Sanuco, Ruby van 't Hof, Marc van der Meide, King Pagaran, Jhon Cristofer Ramiscal, Anna van Delft, Gino Hermenet, Precious Guitilen, Reyward Managuelod, Teun Bolsius, Vincent van Delft, Lexter A. Ortiz, Rey Martin Melad, Gosia Suroz, John Braguldo Alingod, Lily Cannell van Dien, Yassine Hattay, Leana S. Galicia, Ashley Mae Malsi Marcos, Jemima Johanna Cárdenas Meijers, Alvin M. Ramos and Lars B. J. Nees.

Isabela State University, Mabuwaya Foundation and Leiden University

Cabagan, the Philippines and Leiden, the Netherlands

2017

Message

Water / Winter Course 2017

In January 2017, 12 Dutch, 1 Tunisian, 1 UK and 1 USA student went to the Philippines to meet their fifteen Filipino counterpart students, with whom they would participate in the Winter Course of 2017. Although the name Winter Course might confuse one in the Philippine context, something serious is going on with climate change.

The goals of the Water 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 2017. 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 seventh 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

Merlijn van Weerd kindly shared their knowledge and expertise on a wide variety of subjects with the students during lectures and workshops in Cabagan.

Mayor Edgar Go of San Mariano allowed the students to visit Dunoy Lake and to conduct a field work trial in his beautiful municipality in the foothills of the northern Sierra Madre Mountains.

Mayor Christopher Mamauag of Cabagan and Mayor Hilario Pagauitan of Santa Maria, local government officials and barangay officials allowed the students to conduct research in their municipalities and provided support and information.

The editors

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The participants of the 2017 course in front of the national monument in Manila (photo by Merlijn van Weerd).

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 4 – 31 January 2017. Thirty students participated in this course, 15 through Leiden University and 15 through Isabela State University. The students were enrolled in different studies: Cultural Anthropology, Liberal Arts and Sciences, Mechanical Engineering, China Studies, International Studies, Civil Engineering, History, Bio-pharmaceutical Sciences, Earth, Energy and Sustainability, Archeology, Biology, Education, Agriculture, Agribusiness, Agriculture Engineering, Agricultural Technology, Environmental Science, Computer Engineering, Hotel and Restaurant Management, Development Communication and Forestry.

The theme of the 2017 course was on the preparation, impact and aftermatch of natural disasters, notably of Typhoon Haima / Lawin that ravaged northeast Luzon in October 2016. 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 disaster risk management 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.

The group visited the headquarters of the Philippine Red Cross in Manila to learn how a national non-governmental organization prepares for and responds to the direct impact of natural disasters. The international non-governmental organization Safe the Children was visited where students were shown examples of longer-term responses to natural disasters, notably the rebuilding of schools. At the National Disaster Risk Reduction and Management Center of the Philippine government the students learned about early warning systems and preparation and response systems regarding natural disasters. Finally, the students visited the United Nations Office for the Coordination of Humanitarian Affairs, where they were informed of international response systems to natural disasters.

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. Magat Dam was visited to see one of the largest dams in the Philippines and its use for flood control, hydropower generation and rice irrigation.

In Cabagan at Isabela State University, a series of lectures was given by external and academic presenters on subjects related to typhoons and disaster risk reduction. A one day field trip was led by Perla Vissoro to assess the impact of typhoon Lawin in Tumauini and Ilagan. During a two day field trial in Dunoy in San Mariano, students were introduced to field conditions and to research methods. The field trial was preceded by a visit to the Municipal Philippine crocodile rearing station in San Mariano where students learned about the critically endangered Philippine crocodile and the efforts to conserve this species in the wild.

The students worked in couples (interdisciplinary, multi-cultural) on the development of a small field study proposal on a typhoon Lawin-related issue in the municipalities of Cabagan and Santa Maria.

After field work, four days were available to analyze data, write a final report and present the research outcomes.
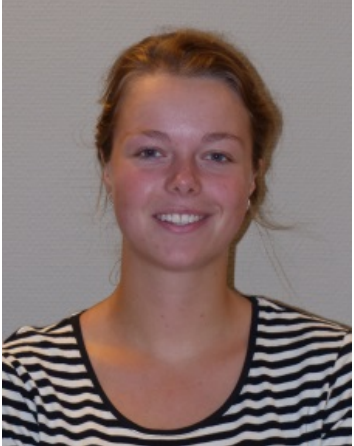
The hard work done, the students visited the rice terraces of Banaue, a world wonder of indigenous engineering and water management. In Batad, a UNESCO World Heritage Site, the students toured the rice terraces and helped restore part of a degraded rice terrace.

This booklet contains an introduction of the participating students, the course program and student reports of the field studies. Unfortunately two student reports could not be included as the files submitted by the students could not be edited. The booklet concludes with the facebook blog that was kept by the students.

The Editors

Participating Students
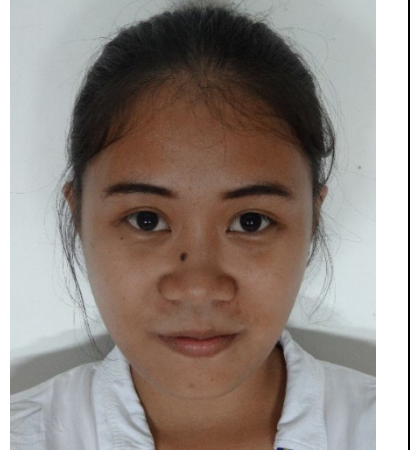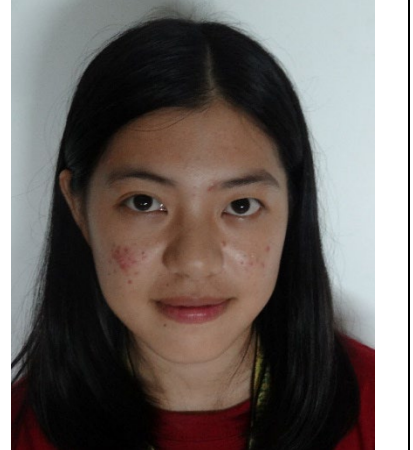
Leiden University students

Coco Tas Earth, energy and sustainability Leiden University	Marc van der Meide Mechanical Engineering Rotterdam University	Cannell van Dien Archeology Leiden University
Anneroos Dijkstra Cultural Anthropology Leiden University	Ruby van t Hof Cultural Anthropology Leiden University	Anna van Delft Cultural Anthropology Leiden University
Gosia (Margaret) Suroz International studies Leiden University	Gino Hermenet China studies Leiden University	Dieneke de Weerd Liberal Arts and Sciences Leiden University

Teun Bolsius Biology Leiden University	Ashley van der Zee International studies Leiden University	Vincent van Delft Civil Engineering University of Delft
Jemima Cárdenas Meijers History Leiden University	Lars Nees Bio-pharmaceutical Science Leiden University	Yassine Hattay International relations Leiden University

Isabela State University students

Alvin Ramos BS in Education	Hansi Jane Garcia BS in Environmental Science	Ashley Mae Marcos BS in Elementary Education

ISU Cauayan	ISU Cabagan	ISU Cabagan
Rey Martin Melad BS in Environmental Science ISU Cabagan	King Pagaran BS in Agriculture ISU Cabagan	Aileen Mae Binag BS in Biology ISU Cabagan
Lexter Ortiz BS in Computer Engineering ISU Echague	Andy Mulato BS in Agricultural Engineering ISU Echague	Precious Guitilen BS in Forestry ISU Cabagan
Reyward Managuelod BS in Agricultural Technology ISU San Mariano	Jesrael Tuliao BS Development Communication ISU Cabagan	Joseph Sanuco BS Agricultural Technology ISU Cabagan

John Braguldo Alingod BS Hotel and Restaurant Management ISU Cabagan	Jhon Cristopher Baccay BS Agribusiness ISU Cabagan	Leana Galicia BS Forestry ISU Cabagan

Staff

Marites Gatan-Balbas Course Coordinator Mabuwaya Foundation	Jovy Mendez-Servitillo Course Coordinator Isabela State University	Merlijn van Weerd Course Coordinator Leiden University
Jun Servitillo Isabela State University	Arnold Macadangdang Mabuwaya Foundation	Renée Hagen Leiden University

Bernard Tarun Mabuwaya Foundation	Nanette Cataggatan Mabuwaya Foundation	Leonalyn Tumaliuan Mabuwaya Foundation
Amante Yog-yog Mabuwaya Foundation	Joni Acay Mabuwaya Foundation	Dorina Soler Mabuwaya Foundation
Eso Tarun Isabela State University	Onia Gunayon Isabela State University	

Program Water Course 2017: 4 – 31 January 2017

Day	Date	Locality	Activity	Accommodation
Wed	4	Manila	Welcome, visit old Manila, National Museum	Manila: Pension Natividad
Thu	5	Manila	Visit Philippine Red Cross Visit Save the Children	Manila: Natividad
Fri	6	Manila	Visit National Disaster Risk Reduction and Management Center Visit United Nations Office for the Coordination of Humanitarian Affairs	Manila: Natividad
Sat	7	Travel: Manila - Imugan	Travel to Imugan	Imugan
Sun	8	Imugan	Imugan	Imugan
Mon	9	Travel: Imugan - Cabagan	Travel to Cabagan via Magat	Cabagan: CVPED Hostel
Tue	10	Cabagan	am: welcome, pm: lectures	CVPED Hostel
Wed	11	Cabagan	Lectures and workshops	CVPED Hostel
Thu	12	Cabagan	Excursion Tumauini and Ilagan to see typhoon impact	CVPED Hostel
Fri	13	Cabagan	Preparation proposal	CVPED Hostel
Sat	14	Fieldwork trial	Travel to San Mariano / rearing station/ Dunoy	Dunoy: tents and hostel
Sun	15	Fieldwork trial	Dunoy	Dunoy: tents and hostel
Mon	16	Fieldwork trial	Back to Cabagan, rest	CVPED Hostel
Tue	17	Cabagan	Preparation and presentation proposal	CVPED Hostel
Wed	18	Field (base Cabagan)	Area study	CVPED Hostel
Thu	19	Field (base Cabagan)	Area study	CVPED Hostel
Fri	20	Field (base Cabagan)	Area study	CVPED Hostel
Sat	21	Field (base Cabagan)	Area study	CVPED Hostel
Sun	22	Field (base Cabagan)	Area study / free	CVPED Hostel
Mon	23	Field (base Cabagan)	Area study	CVPED Hostel
Tue	24	Field (base Cabagan)	Area study	CVPED Hostel
Wed	25	Cabagan	Area study: reporting	CVPED Hostel
Thu	26	Cabagan	Area study: reporting	CVPED Hostel
Fri	27	Cabagan	Presentation results. Farewell party	CVPED Hostel
Sat	28	Travel: Cabagan - Banaue	am: travel to Banaue. Pm: Banaue	Banaue
Sun	29	Banaue	Banaue / Batad	Batad
Mon	30	Batad	Batad	Batad
Tue	31	Travel: Banaue - Cabagan/Manila	am: travel to Banaue. Pm: travel to Manila/Cabagan	Manila: Natividad

Field visit to Tumaunini to assess Typhoon Lawin damage with Perla Vissoro (Photo by Merlijn van Weerd)

Crossing Catallangan River during the field visit to Dunoy in San Mariano (Photo by Merlijn van Weerd)

Practicing interviews in Dunoy (Photo by Merlijn van Weerd)

Renée Hagen and students on top of a jeepney in Banaue en route to Batad (photo by Merlijn van Weerd)

Student Reports

INTRODUCTION:
TYPHOON DISASTER MANAGEMENT IN THE PHILIPPINES

By Dieneke de Weerd

INTRODUCTION

In the 1990's the United Nations declared the International Decade for Natural Disaster Reduction with the basic aim of promoting a more proactive strategy of pre-disaster planning and preparedness (Bankoff 1999). A natural disaster is characterized by an extreme phenomenon in terms of magnitude and frequency, a complex relation between human physical systems and an event that takes place within a defined location and is of limited endurance (Bankoff 1999). While natural hazards cannot be prevented, their effects can be mitigated (O'Brien, 2006). Natural disasters are clearly conditioned by human activities because the way in which societies deals with hazards causes hazards to turn into disasters (O'Brien, 2006). Disasters originating from natural hazards are commonly categorized into two groups: hydrometeorological and geological. While hydrometeorological hazards are water and weather related, geological hazard includes volcano eruptions and earthquakes (Juan *et al.*, 2010).

Throughout history, Asia has been disproportionately vulnerable to natural disasters (Bankoff, 1999). Especially the Philippines is known as one of the most disaster-prone countries in the world, as it is both meteorologically and geophysical a world's disaster hotspot (Gaillard *et al.*, 2007; Bankoff, 2003). In 2016 the Philippines even ranked third in the World Risk Index (WorldRiskReport, 2016). The country is extremely vulnerable because the country is situated between two deep-sea trenches and experiences extreme seismic activity (Juan *et al.*, 2010). On top of that, the Philippines has 300 volcanoes, of which 22 are classified as active (NDRRMP, 2011). However, between 1905-2009 80% of the hazards experienced by the Philippines were classified as hydrometeorological hazards (Juan *et al.*, 2010). The geographical location of the Philippines results in an average of 20 typhoons each year (Huigen and Jens, 2006). The Philippines experiences more of these hazards than any other country in the world (Bankoff, 2003). Poverty is intrinsically linked to vulnerability during natural disasters due to the location, housing, and employment of poor people (Juan *et al.*, 2010). Two third of the Philippine poor are primarily dependent on agriculture for their livelihood and this sector is extremely vulnerable to natural disasters (Juan *et al.*, 2010). These natural disasters have affected over half of the population of the Philippines between 1964 and 1989 alone (Bankoff, 1999). These events have caused thousands of lives and cost billions of pesos in damage to infrastructure and lost production (Bankoff, 1999). Typhoons have accounted for 65% of the lives and 78% of the damage between 1970 and 2000 (Juan *et al.*, 2010).

On 19th of October 2016 Typhoon Lawin, one of the strongest typhoons to ever hit the country, made landfall in Northern Luzon causing widespread damage (Tabel, 2017; UNOCHA, 2016). In order to better understand the vulnerability of the Filipino's and their resilience towards natural disasters the research in this booklet focuses on the preparedness, impact, and recovery prior and after typhoon Lawin hit Cabagan and Santa Maria. This introduction aims to give comprehensive background information about typhoon development and the development of disaster management in the Philippines to better understand the research conducted. First, typhoons in the Philippines are explained in depth while also paying attention to the impact of climate change. Secondly, the history of disaster management in the Philippines and the impact of typhoon Haiyan are discussed. Lastly, the current disaster management framework is explained through a focus on typhoon Lawin.

TYPHOONS

The Philippines experiences an average of 20 typhoons a year, equivalent to over 25% of the total number of such events in the world (Bankoff, 2003; Huigen and Jens, 2006). 95% of these tropical cyclones originate in the Pacific Ocean and mainly affect the eastern half of the archipelago (Bankoff, 2003). While the water from the tropical typhoons is vital for flourishing agriculture, typhoons can have a large impact on livelihoods of the Filipino's (Kubota and Chan, 2009). Typical characteristics of typhoons include strong winds, heavy rains, landslides and storm surges (Perla, 2017; Huigen and Jens, 2006). The impact of typhoons can be felt mainly through losses in agriculture, infrastructure, lives, and diseases and injuries (Lai *et al*., 2004; Juan *et al*., 2010). In order to better understand the impact of typhoons, tropical typhoon classifications and development are explained. To understand what role typhoons are going to play in the future the impact of El Niño and climate change are investigated.

Typhoon classification
Typhoons are tropical cyclones with high-intensity wind speeds. According to the intensity scale used by the Japan Meteorological Agency (JMA), a tropical cyclone is designated as a typhoon when the sustained wind speed exceeds 118 kilometers per hour (kph), and a super typhoon has winds of at least 190 kph (Mas, 2015; Bricker *et al.,* 2013). In December 2015 PAGASA updated their warning system and cyclone classification, in which a super typhoon is classified with winds over 220 kph (Figure 1)
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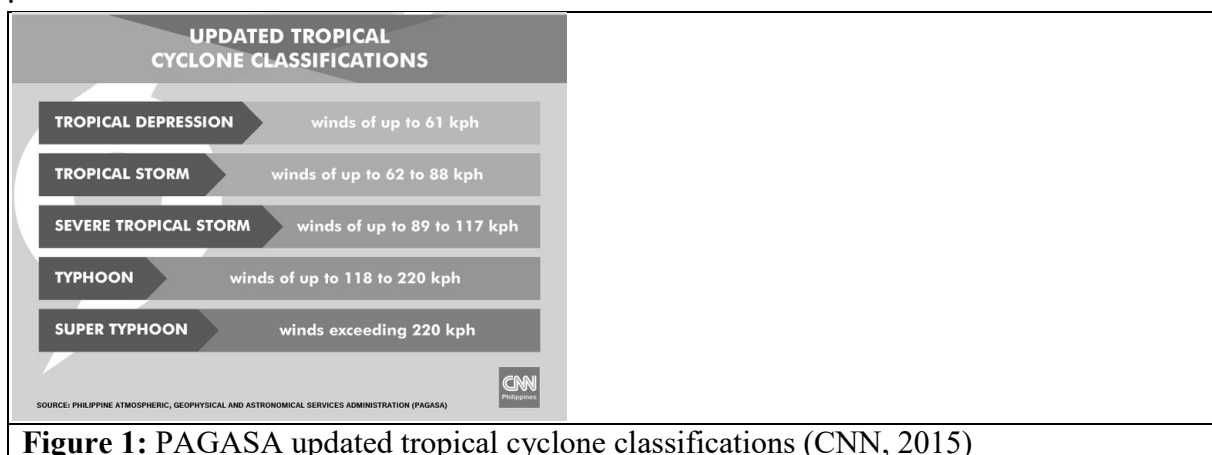
Figure 1: PAGASA updated tropical cyclone classifications (CNN, 2015)

Typhoon development
Most tropical cyclones form over tropical warm oceans where sea surface temperature (SST) is higher than 26.6 Celsius (Ho *et al*., 2004). High SST is favorable for tropical cyclone formation and intensification, while strong vertical wind shear is unfavorable for the formation and tends to weaken storm intensity (Ho *et al*., 2004). On top of that, there are many other factors that influence tropical cyclone activity (Ho *et al*., 2004). The majority of North Pacific tropical cyclones occur during June−October (Elsner and Liu, 2003; Figure 2). However, data analysis of the typhoons during 1880-1994 indicates a slow shift towards more typhoons in the end of the year (Huigen and Jens, 2006). The three main islands of the Philippines experience different amounts of typhoons. Northern Luzon experiences significant more tropical cyclones than the other Filipino islands (Figure 3).

El Niño
El Niño Southern Oscillation typhoon hypothesis states that tropical cyclone formation during an El Niño event shifts eastward, with typhoons tending to curve north (Elsner and Liu, 2003)
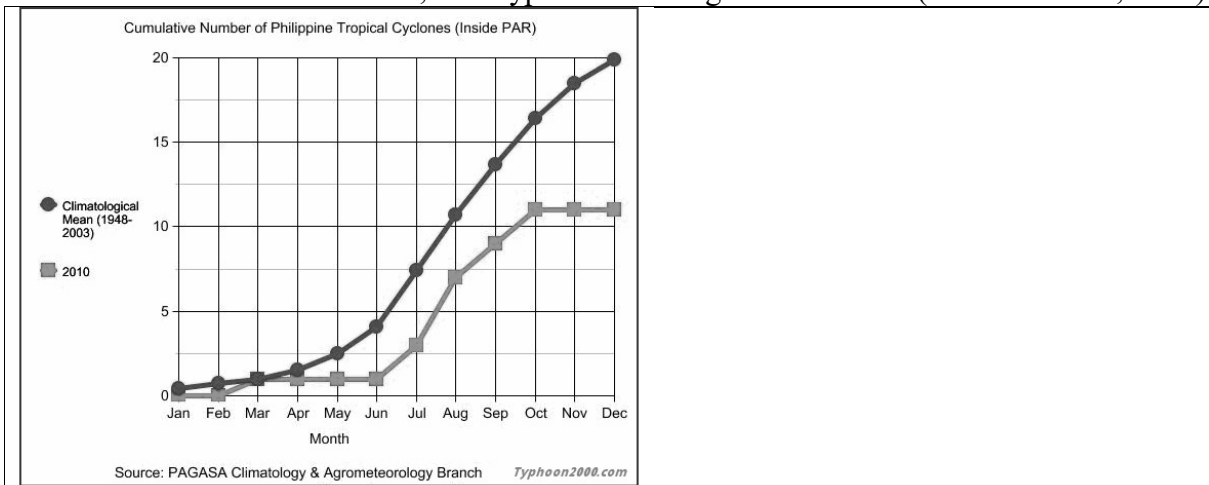
Figure 2: Cumulative Number of Philippine Tropical Cyclones (Inside PAR) (Typhoon2000, 2017)
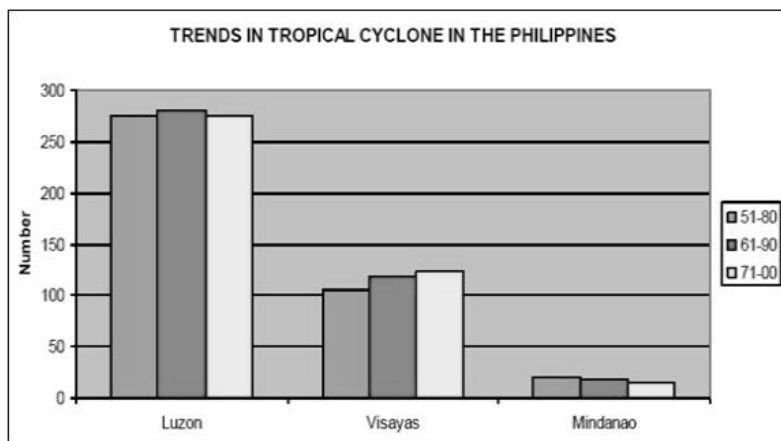
Figure 3: Decadal changes in intense tropical cyclone occurrence in the three main islands in the Philippines (1951-2000) (PAGASA, n.d)

During El Niño events, when SSTs in the central and eastern equatorial Pacific are higher than normal. (Elsner and Liu, 2003). This results in a significant decrease in typhoons that make landfall in the Philippines during the autumn of El Niño. The decrease is associated with the eastward shift of tropical cyclone tracks during El Niño years (Kubota and Chan, 2009). However, in La Niña years typhoon landfalls are more common in the northern Philippines (Saunders *et al.*, 2000; Elsner and Liu, 2003).

Climate Change
While tropical cyclone occurrence shows natural interdecadal variability it is clear that climate change affects the intensity and frequency of occurrence of the hazards (Kubota and Chan, 2009; O'Brien *et al.*, 2006). More extreme weather events in the future are likely to increase the number and scale of disasters. Climate change will impact poor people the most since they tend to live in high-risk areas such as unstable slopes or floodplains, they cannot afford well-built houses and they work in climate-sensitive sectors (Juan *et al.*, 2010). The research conducted by Leana S. Galicia and Yassine Hattay in this booklet demonstrates the need for investment in resilience building of vulnerable communities to ensure that communities are

prepared for the impact climate change has on the intensity and frequency of typhoons in the future. Juan *et al.* (2010) highlight that innovation of the methods and tools of Disaster Risk Reduction (DRR) are powerful ways to adapt to climate change.

DISASTER MANAGEMENT IN THE PHILIPPINES

Disaster management is a collective term encompassing all aspects of planning for preparing and responding to disasters (Soriano, 2017). It refers to the management of the consequences of the disasters (Soriano, 2017). The focus of disaster management is to reduce the risk posed by actual and potential hazards (O'Brien, 2006). In the Philippines learning to live with hazards and coming to expect disasters has been part of the daily routine for a long time (Bankoff and Hilhorst, 2009). Since the seventeenth-century mutual assistance associations and networks at a local level devoted to sharing risk and spreading misfortune have developed in the Philippines (Bankoff and Hilhorst, 2009). This section looks at the evolution of disaster management in the Philippines starting from the culture of resilience to the formalization of disaster management to the alterations made after Haiyan struck the country.

The Culture of Resilience
Filipino's share a distinctive cultural heritage that is shaped by the threat of hazards (Bankoff, 2004). Throughout their lives, Filipino's are constantly reminded that their country is exposed to all types of calamity and that these are part of their normal lives (Bankoff, 2004). This has resulted in the "normalization of threat" which is entrenched in many decision-making processes (Bankoff, 2004). Delfin and Gaillard (2008) found that societies with low-risk perception are likely to adjust poorly to threats of natural hazards, while those with a high-risk perception tend to behave in a positive anticipatory way. Much of the Filipino resilience to withstand all these hazards lies in the intangible qualities generated by shared cultural attitudes and community spirit (Bankoff, 2004). In the Philippines hazards are often anthropomorphized (Bankoff, 2004). This seems to be an attempt by people to deal with the hazards and to incorporate the hazards within the structures of people's everyday cultural construction of reality (Bankoff, 2004). Another coping strategy often deployed is conveyed in the Tagalog expression *bahala na*, which can be translated as 'leaving it to fate' (Bankoff, 2004). The research conducted in this booklet by Hansi Jane Garcia, Joseph Sanuco and Ruby van 't Hof also indicates that people use this coping strategy as their interview respondents felt that they cannot do anything to prepare except pray to God. This coping strategy seems to be similar to the explanations that the high frequency of disasters is almost always explained in terms of location. However, the high frequency of disasters can also be contributed to the focus of disaster management on immediate disaster response while largely overlooking the long-term underpinning factors of vulnerability (Delfin and Gaillard, 2008).

The Start of National Disaster Management
While cooperation and resilience have existed for centuries in the Philippines national disaster management only started to take off in 1954. In 1954 the National Civil Defense Administration was established to ensure basic assistance in times of national emergency (Bankoff, 2003). In 1970's efforts were made to integrate the disparate efforts by the creation of the Calamities and Disaster Preparedness Plan (CDPP) (Bankoff, 2003). There was a clear aim to devise a comprehensive relief structure that included all levels of government (Bankoff, 2003). This included the national government, regional, provincial, municipal and barangay level (Medez-servitillo, 2017). Soon it was realized that disaster management should not only focus on providing the appropriate relief and rehabilitation services (Bankoff, 2003). This led to the establishment of the Philippine Atmospheric Geophysical and Astronomical Services

Administration (PAGASA) in 1972. PAGASA is primarily responsible for detection, monitoring, and forecasting of tropical cyclones and floods (Bankoff, 2003). While there were developments prior to 1978, this year marks the real start of the institutional and disaster management system currently in place in the Philippines. The Presidential degree 1566 created the National Disaster Coordinating Council (NDCC) (Juan *et al.*, 2010). This body is composed of the 18 national departments and the Philippine National Red Cross (Delfin and Gaillard, 2008). The set-up is intimately tied to the military and defense apparatus (Delfin and Gaillard, 2008; Figure 4). In 1991 the existing governing framework on disaster management was completed with the enactment of the 1991 Local Government Code. This code mandates the creation of a local calamity fund (LCF) from 5% of its annual revenue from regular sources (Delfin and Gaillard, 2008).
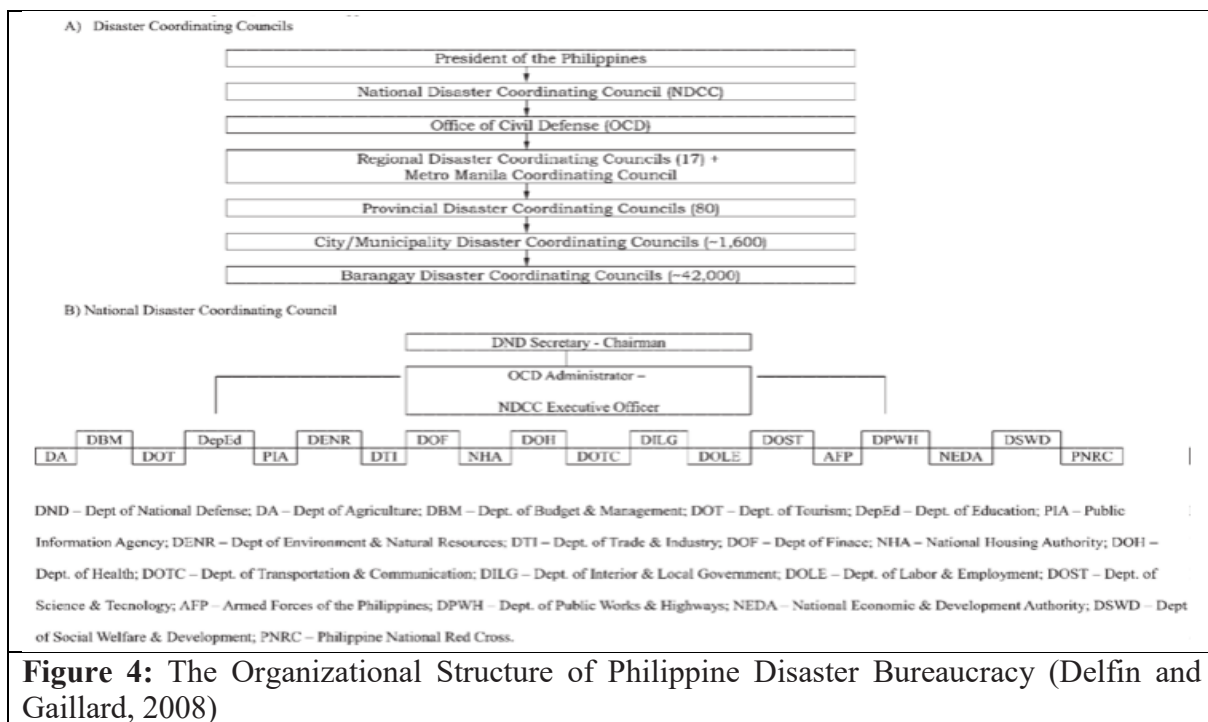
Figure 4: The Organizational Structure of Philippine Disaster Bureaucracy (Delfin and Gaillard, 2008)

Criticism National Disaster Coordinating Council
Even though the high frequency of natural disasters has resulted in high levels of preparedness in the Philippines, the NDCC was criticized for its response-oriented approach (Comes *et al.*, 2015; Benson, 2009; Juan *et al.*, 2010; Bankoff, 1999). There was a clear emphasis on post-disaster relief and short-term preparedness (Juan *et al.*, 2010). This focus seems to result from the fact that the Department of National Defense was far removed from core sustainable development and poverty reduction responsibilities and decision-making (Benson, 2009). Thus, the institutional setting of the Filipino disaster management made it extremely difficult to focus on underlying causes of vulnerability (Delfin and Gaillard, 2008). Furthermore, Benson (2009) noted that disaster risk had largely been ignored in detailed economic planning, economic forecasting and the annual budgetary planning processes of the different departments. Most of the departments failed to implement permanent disaster-related units within their own organization, which resulted in low prioritization of NDCC issues (Delfin and Gaillard, 2008). In addition, the funding structure of disaster expenditures set out in the 1991 LGC depicted the bias towards immediate response rather than long-term risk-reduction (Delfin and Gaillard, 2008). Moreover, the information on disaster risk provided by the NDCC was often lacking and the measurement of the socioeconomic impact of disasters was inadequate (Delfin and Gaillard, 2008). This leads to lack of coordination among stakeholders involved in disaster risk reduction

(Delfin and Gaillard, 2008). NDCC has been condemned for its inability to coordinate inter-agency and inter-organizational relief efforts since they were unable to prevent the misappropriation of funds (Bankoff, 1999). While the NDCC did have a network of organizations that could be activated in emergency situations all the way down to the barangay level it failed to have contingency plans or operational procedures beyond handing out relief goods (Bankoff, 1999).

The Philippines Risk Reduction and Management Act (RA10121)
In response to this criticism, the Philippines continued to innovate its disaster management structure. In 2010, the Philippines Disaster Risk Reduction and Management Act (PDRRMA) passed Congress. This act shifted the focus from response to preparedness in the Philippines (LSE, 2010; Comes *et al.*, 2015). The PDRRMA required the introduction of a Disaster Risk Reduction and Management Office in every province, city, municipality and barangay (LSE, 2010). Furthermore, the PDRRMA supports the utilization of the calamity fund in support of disaster risk reduction, mitigation, prevention and preparedness activities (LSE, 2010). On a national level, the PDRRMA assigned the role of coordination to the National Disaster Risk Reduction and Management Council (NDRRMC) (Comes *et al.,* 2015). The PDRRMA demanded a comprehensive, all-hazard, multi-sector, inter-agency and community-based approach to disaster risk management through the drafting of a national disaster management plan (LSE, 2010). These demands have been formalized in the National Disaster Risk Reduction and Management Plan 2011-2028 (NDRRMP) (NDRRMC, 2011). The NDRRMP highlights the need for institutionalizing policies from national down to a local level (NDRRMC, 2011). This encompasses four thematic areas, namely:
    (1) Disaster prevention and mitigation.
Disaster prevention avoids negative impacts through the construction of dams and embankments to alleviate flood risks, land-use regulations (NDRRMC, 2011). Disaster mitigation focuses on implementing measures of hazard-resilient construction and on improving environmental policies and public awareness (NDRRMC, 2011).
    (2) Disaster preparedness
Disaster Preparedness aims to build the capacities needed to efficiently manage all types of emergencies and achieve an orderly transition from response to sustained recovery (NDRRMC, 2011). It includes contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evaluation and public information and the associated training and field exercises (NDRRMC, 2011).
    (3) Disaster response
Disaster Response focuses on providing public assistance during or immediately after a disaster in order to reduce negative health impacts, save lives, ensure public safety and meet basic needs of the people that are affected by a disaster (NDRRMC, 2011).
    (4) Disaster rehabilitation and recovery
Disaster rehabilitation focuses on ensuring the normal level of functioning by rebuilding livelihood and damaged infrastructure. Recovery focuses on the restoration and improvement of facilities and livelihood of disaster-affected communities through a focus on "building back better" (NDRRMC, 2011).

Impact of Typhoon Haiyan on Disaster Management
While the PDRRMA and the NDRRMP depict great improvements and the incorporation of the NDCC criticism in disaster management structure in the Philippines, typhoon Haiyan drew attention to the weaknesses and flaws of the plan and its implementation. Typhoon Haiyan made landfall at Guiuan, Eastern Samar, and Tolosa on Leyte Island on 8th of November in 2013 (Mas, 2015). Typhoon Haiyan had wind speed over 300 kph and was classified under signal 4

of PAGASA warning system (Mas, 2015; Tabel, 2017). The most destructive aspect of the typhoon was the unanticipated storm surge. This resulted in 6300 fatalities, 28,689 injured people and 1061 missing people (Mas, 2015). The NDRRMC indicated that a total of 3,424,593 families were affected and that 1,140,332 houses were entirely or partially collapsed (Mas, 2015). To gain a deeper understanding of the implementation of the NDRRMP and the impact of typhoon Haiyan on disaster management in the Philippines all four thematic areas are shortly investigated.

(1) Disaster prevention and mitigation.

The largest problem which typhoon Haiyan highlighted was that local hazard maps underestimated the potential hazards due to a storm surge (Esteban *et al.*, 2015). This resulted in the identification of evacuation centers in places that were located in areas overwhelmed by storm surges (Esteban *et al.*, 2015; Lagmay *et al.,* 2015). Furthermore, the building zone laws related to building in high-risk areas, such as the Tacloban coastline, were not enforced properly (Esteban *et al*., 2015). This depicts that not only having the right management plan of "building back better" is important but also the implementation and enforcement of the NDRRMP is important for disaster prevention and mitigation (Esteban *et al.*, 2015).

(2) Disaster preparedness

Several steps outlined in the NDRRMP were undertaken to make the coastal areas prepared for typhoon Haiyan. Already on the 5th of November the NDRRMC issued alerts to the public and local government, these included advisories on possible flash floods and storm surges (Santiago *et al.*, 2016). The NDRRMC also pushed for pre-emptive evacuation of almost 800.000 people living in danger zones (Santiago et al., 2016). Furthermore, food packs, equipment, and response teams at a national and regional level were pre-positioned (Santiago et al., 2016). Even though the storm surges were predicted and broadcasted via media and social media the government was unable to bring the severity of the storm surges across to the local communities (Lagmay *et al.,* 2015). This depicts the key lesson of not only warning population about the danger but the need to accurately depict the nature of the hazard (Esteban *et al.*, 2015). Not only the problems with communication prevented many people from seeking safe shelters, it also seems that there was a lack of shelters available in the area (Comes *et al.,* 2015). Typhoon Haiyan depicted the need for improved warning and action (Langmay et al., 2015). The warning must be understandable to people from all walks of life to convey the severity of the hazard (Blanco, 2015). The government is working with PAGASA and linguists to develop clearer and understandable terms for hazard warnings (Salazar, 2015). Furthermore, this has resulted in an alteration of the PAGASA early warning system, introducing a 5th storm warning level (CNN, 2015). Moreover, to improve action, Operation L!STO protocols were developed and implemented in 2015 (LGA, 2015).

(3) Disaster response

After the typhoon Haiyan, the Philippines' government launched the largest logistical operations in the country to provide relief to the affected areas (Ratha and Mahapatra, 2014). However, their efforts were heavily criticized for the slow distribution of relief goods and the slow identification of bodies by the foreign press (Blanco, 2015; Santiago *et al.,* 2016). The extensive media coverage triggered a massive influx of foreign aid to the point that the Department Of Finance had to request relief partners to suspend the arrival of additional foreign medical teams (Santiago et al., 2016). This has inspired the Philippine government to set up the Foreign Aid Transparency Hub (FAiTH) to track foreign aid and to minimize corruption (Santiago et al., 2016).

(4) Disaster rehabilitation and recovery

While direct relief given during Haiyan depicts the struggles of the Philippine government there have been several rehabilitation and recovery efforts. To limit corruption and increase

transparency the Electronic Monitoring Platform Accountability and Transparency Hub for Yolanda was set up (Salazar, 2015).

Typhoon Haiyan was the first natural disaster that tested the capacity of the NDRRMC and the NDRRMP. It depicted the inability of the Philippines to respond to a massive disaster (Salazar, 2015). Two key lessons were the need for an independent national disaster body to allow better cooperation among stakeholders and the need to develop capacities at the local government level, for example through implementation of L!sto protocols (Salazar, 2015).
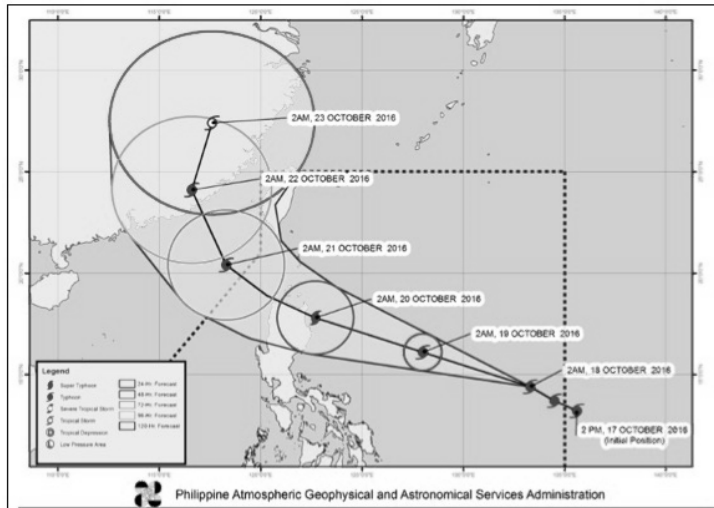
Figure 5: Typhoon Track Lawin (international name Haima) (Philippinesreport, 2016)

TYPHOON LAWIN
Typhoon Lawin (international name Haima) made landfall on October 19th, 2016. This super typhoon was the first to be classified under the newly introduced category 5, with sustained winds of 225kph, and gustiness of 315kph (UNOCHA, 2016; Tabel, 2017; Figure 5) This section looks at the impact of typhoon Lawin and the implementation of the four themes of the NDRRMP linking it to the research undertaken in this booklet in Cabagan and Santa Maria.

Impact
Even though the fourteen deaths during typhoon Lawin is very minimal compared to deaths during typhoon Haiyan, the typhoon did have widespread impact especially on the people living in Cagayan and Isabella province (UNOCHA, 2016). While the NDRRMC presentation indicated the total costs of P657,8 million, the Department of Agriculture has released a report which demonstrates that the total costs for agricultural damage alone have risen to P10,2 billion (Tabel, 2017; Simeon, 2016). These new findings seems to be more in line with the findings of Gino Hermenet and Precious Guitilen, Marc van der Meide and King Pagaran and John Cristofer Ramiscal and Anna van Delft and Reyward Managuelod and Teun Bolsisus, who in their research calculate damage on vegetables, peanuts, mango, corn, rice and livestock in the Cabagan, Santa Maria area. The NDRRMC also indicated over 118 flooded barangays and damaged infrastructure (Tabel, 2017). The research conducted by Vincent van Delft and Lexter Ortiz indicates the impact of the Magat Dam regulation on small farmers living in low-lying areas. The NDRRMC presentation in Manila only indicated 1327 damaged houses while UNOCHA indicates a total of 186.000 houses damaged or destroyed (Tabel, 2017; UNOCHA, 2016). This depicts that even though there is a comprehensive disaster management plan in the Philippines, the various units still struggles with effective information dissemination.

Implementation NDRRMP

(1) Disaster Prevention and Mitigation:

In order to avoid a full blown disaster similar to typhoon Haiyan the L!sto Disaster Preparedness Manual for Mayors was developed and implemented in 2015. This has stimulated all municipalities to create an LDRRMC, PDRRMO and a community of disaster volunteers (LGA, 2015a). Furthermore, it has led to the preparation of hazard risks and includes social vulnerability assessments (LGA, 2015a). To ensure competencies of all personnel involved in preparedness and relief efforts targeted training are conducted (LGA, 2015a). Finally, there are measures taken to ensure that local governments have the right supplies for communication, security, and humanitarian aid (LGA, 2015a).

(2) Disaster Preparedness

L!sto also has special manuals for the short-term preparation for a typhoon. They identify different alert levels based on the distance from the diameter of the typhoon track. (LGA, 2015b). All alert level includes three states: general preparation actions, response action and monitor action (LGA, 2015b). Two days prior to landfall preparation started by providing information to all municipalities through e-mails and text blasts and the Listo protocols were activated (Tabel, 2017). On the 18th of October supplies and teams were prepositioned and pre-emptive evacuations in affected areas took place (Tabel, 2017). The research conducted by Eileen Binac and Coco Tas, and Andy Mulato and Ashley van der Zee indicates that most people relied upon the TV as the medium of communication. Andy and Ashley rightfully question the usefulness of sending out text blasts, as many of their respondents did not own a cellphone. Furthermore, they question if the TV is the best medium as this is vulnerable to a power outage. However, research by Anneroos Dijkstra and Jesreal Tuliao depicts that most people actually prefer to be warned via TV broadcasts.

(3) Disaster Response

Two days after typhoon Lawin made landfall the province of Cagayan, Isabela, Abra, Benguet, Lalinga, Ifugao, Ilocos Sur and La Union declared the state of calamity (Dullana, 2016; UNOCHA, 2016). This is a condition involving mass casualty and/or major damage to property as a result of the occurrence of a national hazard and allows access to special disaster response funds (Congress of Philippines, 2010). According to the Department of Social Welfare and Development (DSWD) by 23rd of October 2016 P23 million worth of relief assistance had been provided to the affected families (NDRRMC, 2016). The Department of Health ensured that there were DOH medical teams on duty 24/7 and ensured the presence of assorted drugs, medicines and medical supplies in the different regions (NDRRMC, 2016). NGOs and the Red Cross also donated sleeping kids, jerry cans and water treatment stations (UNOCHA, 2016). While aid had to be evenly distributed among affected families, the results from the conducted research by Ashley Mae Marcos and Jemima Meijers and John Alingod and Cannell van Dien depicts that respondents received different amounts of goods and that they received this at different times.

(4) Disaster rehabilitation and recovery

In order to enable recovery of the affected households, the DWSD provides Emergency Shelter Assistance (ESA). They release P5,000 for a damaged house or P25,000 for a destroyed house upon confirmation of the status of the house (UNOCHA, 2016). While this sounds good in theory research results from John Alingold and Canell van Dien, Rey Martin Melad and Gosia Suroz and Alvin Ramos and Lars Nees depict the miscommunication and mismanagement between the government and the people. A few uncertainties include the total amount that should be received, why some have received money while others have not yet received anything and the discrepancies between the official numbers of the Local Government Units and the interviewed people. This demonstrated the need for improved streamlining of disaster response and recovery and the need for clearer communication between the different actors involved. For

example, through the expansion of Operation L!sto protocols to also include response, rehabilitation and recovery stages.

CONCLUSION

In order to deal with the increased intensity and frequency of typhoons as a result of climate change, effective disaster management is needed. While the Philippines has developed an advanced disaster management framework over the past decades there are still lessons to be learned from each typhoon. The current disaster management framework has incorporated several criticisms but structural alterations still seem desirable. Especially the creation of an independent body, which is not tied to the Department of Defense, could enable more cooperation between stakeholders and allow for clearer communication prior and after a natural hazard. Both typhoon Haiyan and typhoon Lawin depict the need for better coordination and communication during relief efforts and recovery programs. The research conducted in this booklet also gives some good recommendations that could be implemented based upon the preparedness, impact, and recovery efforts undertaken in Cabagan and Santa Maria prior and after typhoon Lawin. Above all, this booklet seems to invite more research to be conducted to streamline and empower LGU's prevention, preparedness, relief and recovery efforts, since they are at the forefront of disaster management in the Philippines.

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AN UNFORGIVING STORM: HOW PEOPLE PREPARED FOR AND EXPERIENCED SUPER TYPHOON HAIMA IN SANTA MARIA, ISABELA

Aileen Mae Binag and Coco Anna Tas

INTRODUCTION

"The Philippines is prone to regular occurrences of natural disasters." (Tabel 2017)

With an annual frequency of approximately 20 typhoons per year (Tabel 2017), the Philippines attracts national and international concern and attention on the topic typhoon preparedness and impact. With a growing population, coupled with the threat of climate change destabilizing the frequency and strength of natural disasters (Soriano 2017), it will require the combined effort of local and global communities to minimize their potential harm and damage. The extent of the damage acquired by individuals is dependent upon their vulnerability, or rather it is the conditions that reduce people's ability to prepare for, withstand or respond to a hazard (Soriano 2017), that determine the damage of a natural disaster on the survivors. The effects of a super typhoon can be felt through various mediums: on human life, from loss of life to sustained trauma (Lee et al. 2004); damage to property, agriculture and other livelihood businesses (OCHA 2016); and it may also effect natural ecosystems and the various species that inhabit these havens of biodiversity. A major disaster leaves an imprint on the minds of the survivors (Lee et al. 2004). Preparedness is the first key to lessen the potentially negative impact to humans. Accurate warning systems from different government agencies, play a vital role in preventing devastating loss to communities. Therefore, reliable and successful communication channels before, during, and after natural disasters are of paramount importance (Takahashi et al. 2015). Tropical typhoons bring strong winds and heavy rains that often cause flooding to other areas, devastating the livelihoods (agriculture and livestock) of the residents in these vulnerable areas. Furthermore, typhoons can lead to an increase in illness, disease and injury. Leptospirosis, fungal infections, flu, cough, fever, and colds have been reported as common diseases that increase in occurrence after a typhoon (Lai et al. 2003). Preparedness plans stress the importance of reestablishing full use of medical services in afflicted communities.

Having experienced a devastating super typhoon Yolanda (international name: Haiyan) in November of 2013, with a casualty count of approximately 6,300 individuals, the Philippine government instated Republic Act 10121 that introduced the use of category 5 typhoon signal, which refers to typhoons with sustained wind speeds exceeding 220 km per hour (Tabel 2017). Given the high number of typhoons that visit the Philippines every year, government agencies are working for the resilience and sustainable development on both a local community level, as well as a national state level. Ill preparation and lack of communication may lead to severe damage and dramatic disruptions to the affected, vulnerable areas.

On the 19th of October 2016, super typhoon Lawin (international name: Haima) made landfall in Peñablanca, in the Cagayan province at 11pm as a category 5 typhoon, with sustained winds of 225km/h, and gustiness of 315km/h (OCHA 2016). The typhoon visited a total of eight regions, leaving significant damage in its wake (Tabel 2017). Over 200,000 people were displaced in Regions I, II, III and the Cordillera Administrative Region, especially affecting the farmers and fisher folks by damaging their livelihoods (OCHA 2016). Although this was one of the strongest typhoons to hit the Philippines in recent times, the 14 total reported casualties are relatively low for such a strong typhoon. It is important to consider the wider impact that a typhoon such as Lawin may have on the resiliency and development of small urban and rural

communities. The preparatory steps that are taken on a local and individual scale comprised of "intuitive judgements through which people assess the potential impacts and consequences of a hazard and choose appropriate behavioral responses." (Birkholz et al. 2014). This research focuses on the preparedness measures that are being instituted and encountered on a local scale, as well as the immediate impact that was felt by the local people of the municipality of Santa Maria. The intention of our research is to investigate how people prepare for a typhoon, and improve on the possible shortcomings that were experienced on their property and health.
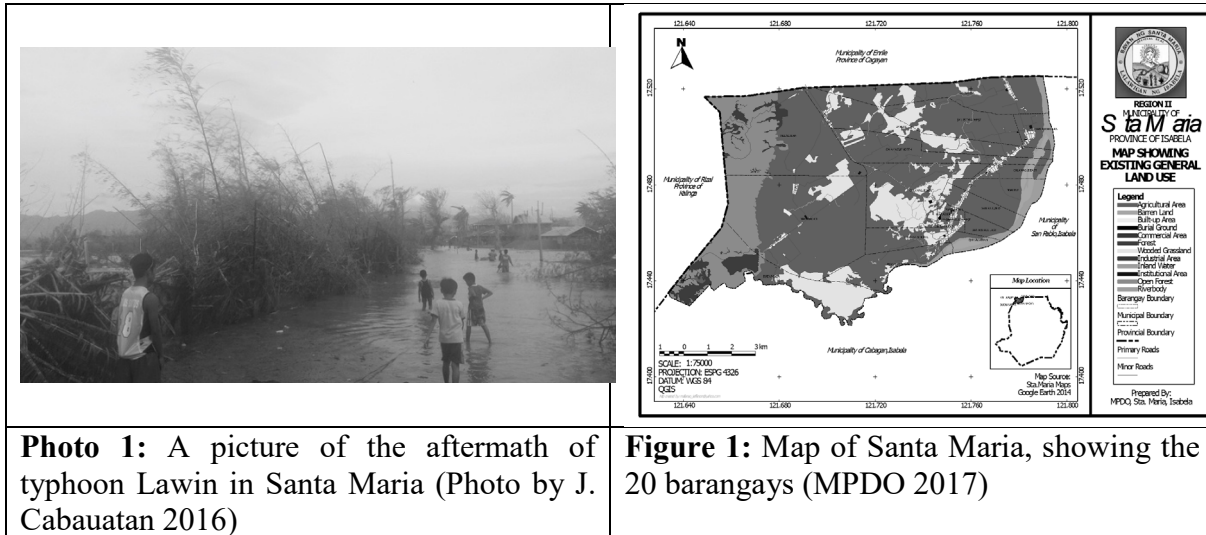
| **Photo 1:** A picture of the aftermath of typhoon Lawin in Santa Maria (Photo by J. Cabauatan 2016) | **Figure 1:** Map of Santa Maria, showing the 20 barangays (MPDO 2017) |

Background of Santa Maria
Santa Maria is the fourth municipality in the province of Isabela, situated in the north-east of Isabela. It has a total population of 25,382 (MPDO 2015), and is composed of 20 barangays, of which 5 are flood-prone areas. The Cagayan River runs along the eastern part of Santa Maria, and often overflows with high rainfall. This threatens the lives of those who live near the river, and results in serious damage to agricultural livelihoods of small-scale farmers that utilize the low-lying lands for growing rice, corn and sugar cane.

RESEARCH QUESTION

In this research project we focused our efforts around one main question: how do people prepare for a natural disaster, and what was the impact of super typhoon Lawin on the lives of the residents of Santa Maria? To examine this question, the following sub-questions were studied:
- What steps do people take to prepare for a typhoon and do they think it sufficient?
- What are the mediums through which people are warned of an approaching typhoon?
- What were the impacts of typhoon Lawin on the physical and psychological health of individuals?

METHODOLOGY

The main body of our research was collected from 20 informants in the municipality of Santa Maria, Isabela. The nature of our research question required us to sample from a primary and secondary target audience: members of both urban and rural households comprised the primary target audience, while the municipal and barangay officials composed the secondary target audience. Our data collection method from the primary target audience consisted of a mixed methods approach, in which informants were approached to participate in a semi structured

questionnaire and interview (appendix A). The questionnaire was structured to collect quantifiable data through dummy variable answers, while also creating the opportunity to collect qualitative data through the interview. Interviews were conducted with all the 20 respondents, and depending on the inclination of each respondent ranged between 30 and 60 minutes. The sampling method that we used for selecting our respondents comprised mainly of randomly selecting houses, relying on availability sampling when there was no resident in the randomly selected home. Once the data was collected it was transcribed, making graphs and a table through excel with the quantitative data. Question 12 of the questionnaire was constructed with the help of an informal checklist for diagnosing Post Traumatic Stress Disorder (PTSD) (National Centre for PTSD 2013). This allowed us to create a scale with an approximation of the possible trauma sustained by each respondent. This scale was created by attaching a 1 to each answer of the nine sub-questions (12a to 12i) of the questionnaire (appendix A), where the respondent replied with a 'yes'. The informants that reported to have only one night of disturbed sleep were listed as having no sleeplessness symptoms. The individual score of each respondent was then calculated by adding all the positive answers together to create a value out of 9, which was the highest possible score. From there the individual values were computed into percentage values.

The key informants that we interviewed included the barangay captains, where we conducted our research, and various local government units (the Municipal Disaster Risk Reduction Management Office (MDRRMO), the Municipal Health Unit (MHU), the Department of Social Welfare and Development (DSWD), and the Municipal Office). We approached each of theses key informants with a topic list, to better understand the situation in Santa Maria, in light of typhoon Lawin (appendix B).

RESULTS

Between the immediate impact of typhoon Lawin and the following month, the MHU stated that they received around 30 patients suffering from lacerations caused by galvanized iron (GI) sheets. The MHU recorded an increase in patients suffering from respiratory complaints, cough and flu in this period. The MHU recorded no reports of fungal infections or trauma during the aftermath of typhoon Lawin.

Mannuel Pagauitan, officer of the local MDRRMO, reported a total 1,283 houses in Santa Maria that were severely damaged and that the total cost for Santa Maria was estimated at 28 million pesos. On the day that typhoon Lawin was predicted to arrive in Santa Maria, a total of 150 families from flood-prone areas were forcibly evacuated to higher locations, while a further 75 families voluntarily sought shelter in the designated evacuation center.

Table 1. Figures collected from barangay captains of local government units, displaying demographics and property damage sustained due to typhoon Lawin

Barangay	Households	Total Damage	Partial Damage	No Damage	Families evacuated
Mozzozzin Sur	420	46	287	87	5
Mozzozzin Norte	359	50	182	127	20
San Rafael East	248	31	79	138	4
San Rafael West	400	76	34	290	7
Quinagabian	367	65	50	252	100
Buenavista	228	80	70	78	3
Poblacion 1	323	66	104	153	0

Comparing the population size, number of families evacuated and the number of properties partially and totally damaged in the seven selected barangays, revealed a disproportionately high number of families evacuated in Quinagabian when compared to the other six selected barangays (Table 1). This data was collected from the barangay captains where we conducted our research, while the incomplete information of Mozzozzin Sur and Norte was substituted from an official governmental documentation displayed at the municipal office of Mayor Hilario G. Pagauitan. Mozzozzin Sur and Norte both suffered high partial property damage in their barangay, while San Rafael West and Quinagabian had much lower numbers for partially damaged properties within their area, but relatively higher numbers of totally damaged properties in their area (Figure 2). Buenavista reported the highest number of totally damaged homes while also holding the lowest number of households (Figure 2). Therefore, Buenavista holds a proportionally high percentage of the homes in the barangay as totally damaged. Of the seven barangays where we conducted our research, five were prone to flooding, Buenavista and Poblacion 1 being the exception.

1) Mozzozzin Sur
2) Mozzozzin Norte
3) San Rafael East
4) San Rafael West
5) Quinagabian
6) Buenavista
7) Poblacion 1
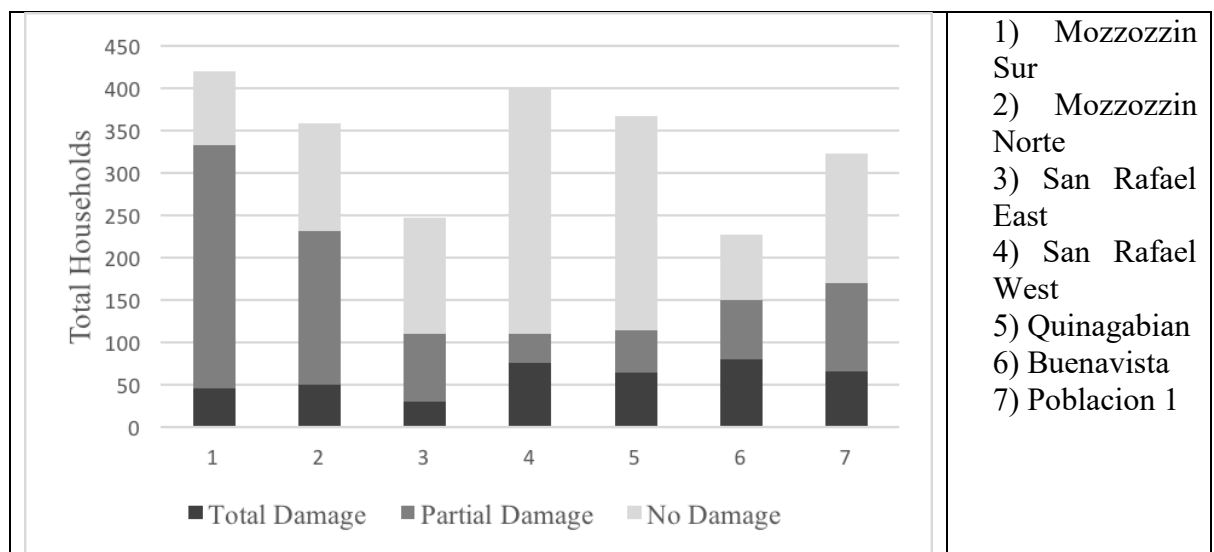
Figure 2: Distribution of the varying degrees of damage sustained to properties of the total households in the seven barangays where our research was conducted.

Out of the 20 respondents that were interviewed, 16 were female. The age of the respondents ranged between 25 and 80, with an average age of 50 years. 95% of our respondents were Ybanag, and the occupations of our respondents included: laborer, farmer, store owner, with 50% were house wives. Out of the 20 respondents, 35% evacuated by their own initiative to the homes of neighbors or extended family.

When receiving warnings prior to the arrival of typhoon Lawin, three quarters of the respondents reported the television as their medium of communication, while use of the radio and being informed in person by a community member, was each reported only once (Figure 3). During our research, 50 percent of our respondents answered with more than one medium. Receiving warnings through governmental representatives (police, barangay officials, etc.) was reported by 60 percent of the respondents. When asked for their preferred medium of communication for warning of an approaching typhoon, 80 percent of the respondents listed television as their first choice (Figure 4). As a second preference, being informed through radio or through a governmental official held 35 percent each. Thirty percent of the respondents wanted to be informed through a governmental representative as their third preference. It is important to note that while collecting data on this specific question, some respondents were unwilling to provide more than one or two preferences.

Figure 3. Percentage distribution on the medium through which respondents received warnings of typhoon Lawin. The graph displays the total count.	**Figure 4.** Percentage distribution of the preferred method of warning for future occurrence of a super typhoon, listed with gradations from 1st to 3rd preference.
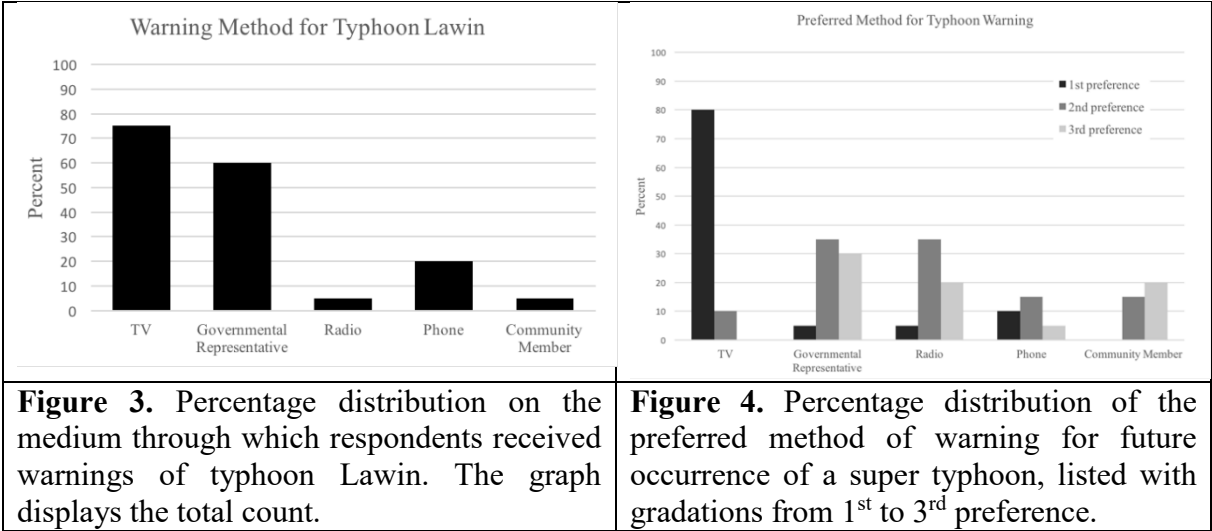
Half of the respondents that we interviewed reported feeling prepared for typhoon Lawin, with 25 percent feeling poorly prepared and a further 25 percent feeling well prepared (Figure 5). Inquiry into the property damage that each respondent felt that they had sustained because of typhoon Lawin showed that 75 percent of the respondents' homes were partially damaged (Figure 6). Properties that were totally damaged was reported by 15 percent of our respondents, and 10 percent said that their property had sustained no damage from typhoon Lawin.
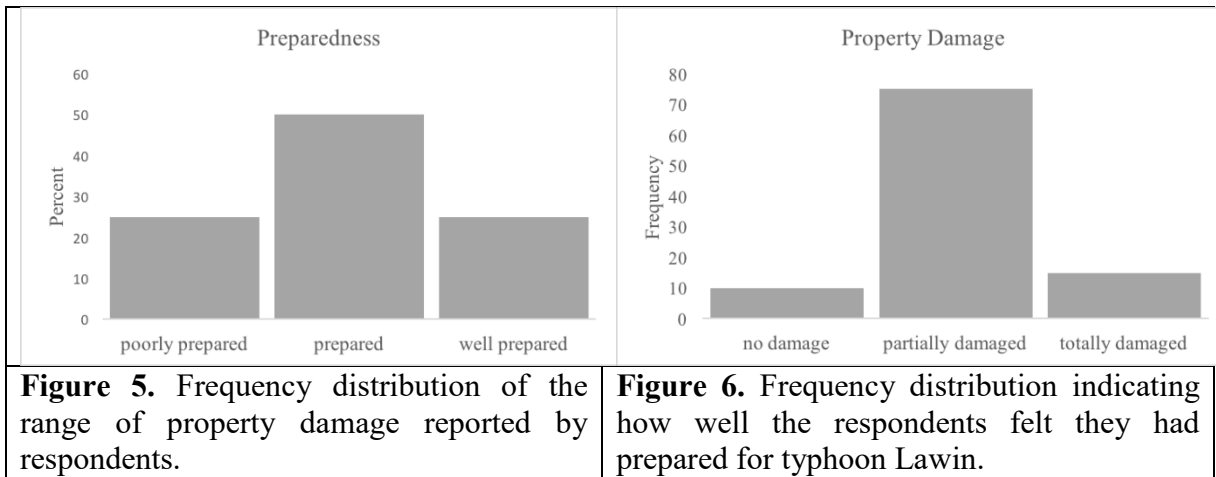
Figure 5. Frequency distribution of the range of property damage reported by respondents.	**Figure 6.** Frequency distribution indicating how well the respondents felt they had prepared for typhoon Lawin.

Plotting how well prepared respondents felt against the impact of the typhoon on their property, yielded a slight but perceptible trend. However, with the slope of the correlation equation at 0.0918 this trend is almost insignificant. There were respondents who reported feeling well prepared prior to the typhoon and sustaining total damage to their home. The same is reported for those who indicated that they felt prepared before typhoon Lawin struck.
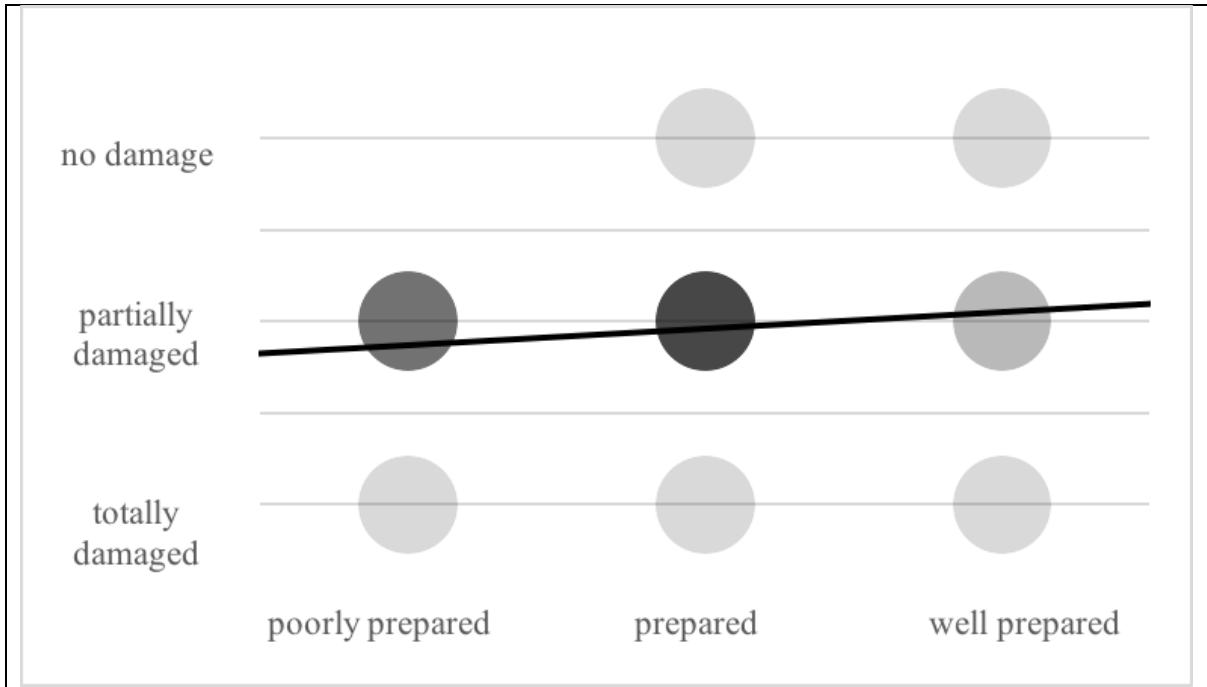
Figure 7: Graph showing how well prepared people felt for typhoon Lawin as the explanatory variable, and the reported degree of property damage sustained as the dependent variable. This figure does not display a causal relationship.

More than half (65%) of our respondents reported no health impacts in the month following typhoon Lawin, while the remaining 35 percent reported illness or injury (Figure 9): 20 percent suffered from fever, while ailments of cold, injury and trauma were equally distributed amongst the remaining 15 percent. Just over half of our respondents (65%) indicated that their family members suffered from an assortment of health issues, including: fever, cough, colds, flu, diarrhea, athlete's foot, and injuries from glass and exposed construction materials. Just under half (40%) of our respondents reported a total score of trauma between 60 and 70 percent, revealing a right skewed distribution (Figure 9). This shows that many of our respondents

reported suffering from several of the specified symptoms of trauma, such as flashbacks, reoccurring dreams, and un-clarity of memory of the event (refer to appendix B, question 12 for the specific questions). Just over half of the respondents (55%) suffered from extended periods of sleeplessness, in which their normal sleep patterns were disturbed because of typhoon Lawin. It took between 3 months and 30 days before normal sleep patterns were restored, with an average length of 2 weeks. From our inquiry at the MHU at Elvin U. Masigan Integrated Memorial Hospital, it was reported that there is no permanent facility to tackle the trauma that residents of Santa Maria may acquire as a result of surviving a super typhoon like Lawin.
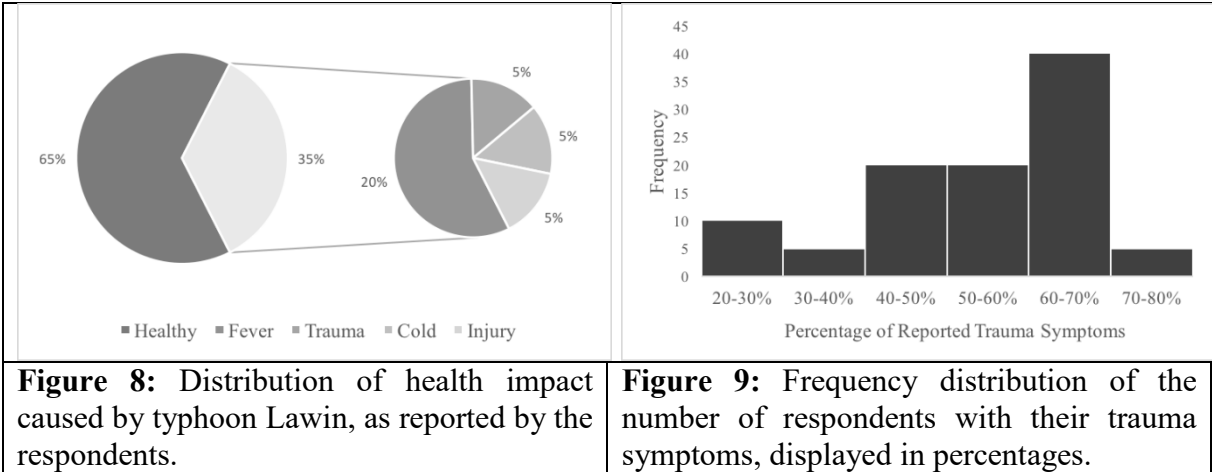
Figure 8: Distribution of health impact caused by typhoon Lawin, as reported by the respondents.	**Figure 9:** Frequency distribution of the number of respondents with their trauma symptoms, displayed in percentages.

DISCUSSION/CONCLUSION/RECOMMENDATION

Preparedness and Damage
When our respondents indicated that they had prepared (or prepared well) for the typhoon, they also expressed surprise at the strength of the storm, 55 percent reporting that it was the strongest typhoon they had experienced. It is possible that the reported level of preparedness was relative to previous experience of past typhoons. Preparations included tying down their roofs with rope, using nails for reinforcement, and securing their windows. We found that a possible reason for reporting well prepared or prepared, was due in part to the constraints that limited them, such as time and resources. Perhaps with an earlier warning of an approaching typhoon, as well as access to resilient construction materials tools for preparing their homes, the damage may be minimized. Preparations were taken by most of the respondents who owned livestock, moving them to higher elevations, yet still casualties were sustained, from exposure to the cold temperatures, drowning, etc. A further recommendation would be to establish trainings and workshops for the MDRRMO volunteers of Santa Maria, specifically focusing on the vulnerable, disaster prone areas. This would distribute valuable information on disaster risk reduction steps, providing concrete suggestions to improve peoples' preparedness prior to the arrival of a typhoon.

Warning System
Television is the most preferable method of warning of an approaching typhoon (Figure 4). This is possibly because the warning is broadcast on TV, up to two days prior to typhoon Lawin's arrival, thereby providing more time to prepare. Our data indicates that many people did receive warnings from their governmental representatives (Figure 3). Warning residents in person is very important as it minimizes the possibility that individuals are left uninformed of an approaching typhoon. The MDRRMO was newly established in Santa Maria, existing for only a few months prior to typhoon Lawin, and as such there were no established volunteer

organizations yet in place. This corroborated with data collected from the barangay captains, who reported that their barangay did not have risk reduction volunteers residing within their community. Another finding was that when respondents were advised to evacuate by governmental officials, many did not heed the warning - preferring to stay in their homes. Thirty five percent evacuated to a neighbor's house when their home sustained serious damage, and their roofs were being torn away "like paper." Considering how people were warned of Lawin, we recommend investing in information dissemination through local governmental representatives and MDRRMO volunteers. Although television was the most preferred method for receiving warnings on an approaching typhoon, we found that receiving a warning from a governmental representative is the second most preferred method of communication, in combination with the radio (Figure 4). From our field work we discovered that not all respondents received a warning from governmental representatives prior to typhoon Lawin, indicating that there is still room for improvement. As some residents may not have access to a television, and it is also an unreliable source due to its dependence on electricity, it is important to continue and strengthen a reliable medium through which every individual would be warned of an approaching typhoon.

Health Impacts

Some of our respondents, as well as their families, experienced respiratory complaints, because of typhoon Lawin. This is possibly because they spent the night during the typhoon wet and awake, weakening their immune systems. Furthermore, many respondents explained how they let their wet clothes dry while still wearing them the next day because all their belongings were completely wet. Health complaints that were caused by the typhoon and experienced by the extended family of our respondents, included fever and injuries. When investigating the impacts of typhoon Lawin on the respondents emotional and psychological health, many reported experiencing symptoms listed in our questionnaire (refer to results). All our respondents suffered from various forms of stress and trauma because of typhoon Lawin, some more than others, reporting a range of reported symptoms between 20–80 percent. We would recommend providing a stress debriefing session immediately after the occurrence of a typhoon, as is advised in the national Disaster Preparedness Manual (Operation Listo p.36).

Photo 2: Photo of one of our respondents in Buena Vista. The house behind her was completely blown away and her granddaughter was 1 week old when she survived typhoon Lawin

Limitations
The high female distribution of our respondents may have influenced our results. It is possible that men and women have a different perception of how well-prepared they were for typhoon Lawin. For example, of the 25 percent respondents that reported that they felt well prepared, 10 percent of them were men. As men constituted 20 percent of the respondents, this is high concentration of men in the category 'well prepared'. The possible reason for this over representation of women in our research may be due to interviews being conducted when the men were often at work.

The fact that neither researchers were trained nor qualified psychologists may have influenced our attempt at gauging a level of trauma for our respondents. Furthermore, the questions directed towards uncovering the impact of the typhoon on the individual's personal psychology were intentionally limited to a small number, to avoid unethical malpractice due to inexperience within this field of specialty.

To conclude, more research in the field is always needed, as situations change and new attempts at tackling issues are attempted. With more time and resources, it is possible that we could have investigated further into the topic of disaster preparedness and impact.

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APPENDICES
Appendix A - Questionnaire
<u>Basic Info</u>
Name: _____ Age: ___ Male ☐☐Female ☐ Number of children: __
Ethnicity: _____ Occupation/Livelihood: _____
Civil status: _____
Indication of basic education achieved. (tick box)

ELEMENTARY							HIGH SCHOOL				COLLEGE				
0	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5

<u>Preparedness</u>
1) How did you experience the Typhoon?
2) What did you do to prepare for Typhoon Lawin?
   (a) Secure roofs and windows
   (b) Stockpile food (how much, how long before)
   (c) Moving livestock to a higher ground
   (d) Were you evacuated (voluntarily/involuntarily)
      i) Were you informed of evacuation procedures?
   (e) Did you ever experience such a strong typhoon?
      i) Where did you learn what a signal 5 typhoon means?
3) How were you warned of the impending arrival of typhoon Lawin?
(a) social media; (b) phone (call or text message); (c) TV; (d) Radio; (e,i) community member/neighbour; (e,ii) governmental representative; (f) Other?
4) By what kind of medium would you have preferred to be informed? List in order of preference
(a) social media; (b) phone (call or text message); (c) TV; (d) Radio; (e,i) community member/neighbour; (e,ii) governmental representative; (f) Other?
5) How well do you think you were prepared for Typhoon Lawin?
   (a) Well prepared, prepared, poorly prepared
6) How did the typhoon impact your property?
   (a) Partially damage or completely damaged.
   (b) Roof
   (c) Window
7) How did the typhoon impact your livelihood? (a) Agriculture; (b) Livestock; (c) Store; (d) Other?
8) What were the causes? (a) Flooding; (b) Landslides; (c) Wind; (d) Other
9) What personal Ill-health did you or your family experience immediately after, till 30 days after the typhoon?
10) What did you do feel during Typhoon Lawin?
   a) Stress   ☐yes ☐no
   b) Fear   ☐yes ☐no
   c) Anger   ☐yes ☐no
   d) Loss of Sleep   ☐yes ☐no
   e) Speech difficulty ☐yes ☐no

f) Have you experienced sudden flash backs of the time during typhoon Lawin?
   ☐yes   ☐no

g) Have you experienced dreams of the event?   ☐yes   ☐no

h) Do you have difficulty remembering the experience, and 'important' parts of that night?   ☐yes   ☐no

i) Have you been participating and communicating less in the community since typhoon Lawin?   ☐yes   ☐no

Appendix B – Topic List for Local Governmental Units and Barangay Captains

Santa Maria municipality
2) Population and number of Barangays
3) Do you have a ground map?

Municipal Health unit
4) Do you know how many people suffered from illnesses/disease or injuries 30 days after the typhoon?

DSWD
5) Did you experience an increase in people with trauma after the typhoon?
   a) Are there any programs carried out to deal with trauma?
6) How many people participated in stress briefing sessions after typhoon Lawin?

MDRRMO
7) Do you have a volunteer program for Disaster Risk and Reduction Management?
8) What form of information dissemination did you use for warning people of the arrival of Typhoon Lawin?
9) Was an evacuation centre organised?
   a) How many people were evacuated (forcibly/voluntarily)?

Barangay Captain
10) Were there people who suffered from disease, injury or stress after typhoon Lawin?
11) Do you think that there was an increase in disease, illness and/or injury because of Typhoon Lawin?
12) Were there families who were evacuated?

PREPAREDNESS AND EMOTIONAL IMPACTS OF TYPHOON LAWIN ON HOUSEHOLDS IN URBAN CABAGAN, ISABELA

Andy Mulato and Ashley van der Zee

INTRODUCTION

The Philippines is a vulnerable area when it comes to typhoons. This vulnerability can be defined as "sets of conditions that reduces people's ability to prepare for, withstand or respond to hazard (Soriano 2017)." Annually, the Philippines experience an average of 20 typhoons, of which seven are destructive, causing damages to housing and infrastructure. The typical characteristics of a typhoon include "strong winds, heavy rains, storm surges, damaged buildings, roads, irrigation, and other infrastructure (Perla Vissoro 2017)." For us, this suggests that the people in the Philippines have gotten 'used' to typhoons.

The focus area is three barangays within urban Cabagan. These barangays include: Casibarag Norte, Catabayungan, and Cubag. These three barangays are among the biggest barangays of urban Cabagan. This makes it a good area to conduct interviews because there will be more people available. We also find it important to focus on these barangays because of the different types of housing that can be found here, allowing for more diversity. These barangays are all located far away from the riverside, but they still did experience floods due to heavy rainfall.

On the 19th of October 2016, these barangays were struck by a devastation nationally named typhoon Lawin with the international name Haima (Tabel 2017). Super typhoon Lawin can be considered a 'disaster,' which is defined as "a serious disruption of the functioning of a community or society involving widespread human material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (DILG 2015)." Although the Philippines is known as a vulnerable area to typhoons, it was not until after super typhoon Haiyan hit in 2013 that a category 5 typhoon warning signal was introduced (Milman 2015). This typhoon is the only other recent strong typhoon the Philippines has experienced. Haiyan hit the Philippines on November 8, 2013 in Tacloban and was the first typhoon of its enormous size in the Philippines (Milman 2015). When compared to super typhoon Lawin, they are quite similar in size and speed (Tabel 2017). After typhoon Haiyan, however, there was much more devastation and mostly many more casualties, leaving many with a large emotional impact (Milman 2015). The main difference therefore, is the amount of casualties because Haiyan caused 6,300 casualties and super typhoon Lawin caused 14 casualties in CAR (OCHA 2016). However, just because the casualties caused by typhoon Lawin was low, does not mean that there was no mental impact.

Most importantly, the mental impact of natural disasters can have a long-lasting effect and can be a very traumatizing experience for some (Chung and Kim 2010). Additionally, destructions will be caused on top of the fear. These destructions can include damage to houses, property, and even loss of livestock for farmers, which occurred during super typhoon Lawin (Tabel 2017). Due to this, it is important to examine the effect of super typhoon Lawin on the people who experienced it, especially because it was the strongest typhoon to have ever hit Cabagan, Isabela. On top of this, Kokai et. al. 2015 also stresses the fact that there is a lack of information regarding the impact on mental health caused by disasters. Due to this, we believe that it is important to examine the mental impact of typhoon Lawin on the people of Cabagan. Our initial hypothesis is that the better-prepared people are, the lesser the emotional impact of the typhoon will be. This is because they will be more aware of the impact and potential losses they will face.

RESEARCH QUESTION

Main research question
How did preparedness affect the emotional impact of typhoon Lawin on households in urban Cabagan?

Sub-Questions
- How do households receive the warning signals?
- What did households do to prepare for typhoon Lawin?
- What was the material impact of typhoon Lawin on households?
- What was the emotional impact of typhoon Lawin on people?

METHODS

Time Schedule

Day	Activities
January 18th – Wednesday	1. Visit the barangay official of Casibarag Norte to be allowed to interview 2. Conducted 10 interviews
January 19th - Thursday	1. Visit the barangay official of barangay Catabayungan to be allowed to interview 2. Conducted 9 interviews
January 20th - Friday	1. Visit the barangay official of barangay Cubag to be allowed to interview 2. Conducted 9 interviews
January 21st - Saturday	Went to internet café to look for articles and start putting data into an excel sheet
January 22nd – Sunday	Free day
January 23rd - Monday	Went to internet café to continue putting data in excel sheet and review articles
January 24th – Tuesday	Continued work on report and making graphs/tables
January 25th – Wednesday	1. Work on report 2. Make corrections
January 26th - Thursday	Finish report

After we gained access through the barangay officials, we started the proxy random sampling to get to our respondents. Proxy random sampling means that we started in a random street and picked the first house to conduct the interview. From here we counted 4 houses to get to our next respondents house. If they were not present or available we counted 4 houses again to get to our next respondents house. Before starting the interview, we always made sure that the household head was present so we could interview him/her. We asked the person who answered the door who the household head was and whether or not he/she was present. The household head can be male or female and is typically the parent/head of the family. He is the one who makes the main decisions for the family. If he/she was not present, we would continue on to the next respondent's house. During the interviews we used a questionnaire, which contained 19 questions asking about warning signals, how they prepared, if they felt prepared, and on emotional impacts.

Furthermore, to help with question 3, we had drawings of the destructions caused by different typhoon categories. We placed each drawing on the floor so the respondents would get familiar with each of the drawings and we then pointed out a specific drawing and would ask them to

tell us which typhoon category the drawing was depicting. We repeated this with two more drawings. This method was chosen because we felt that it was necessary for the respondents to be able to distinguish between the differing categories instead of solely relying on their own experiences. This is mainly because if we just show them one random drawing without any basis, the respondents will most probably get confused on what the drawing implies. This is because the destruction of a category 1 could look similar to the destruction of a category 2 typhoon. So, if we just let them rely on their experiences, their interpretation of the signal warnings could be misled. With their answers we were able to establish whether or not they were aware of the PAGASA warning signals. Since it is quite difficult to fully assess the psychological impact due to the fact that we are not psychologists, we asked specific questions about their state of mind after the super typhoon. We asked questions about whether or not they experienced fear, loss of sleep, and flashbacks of the event. The answer to these questions often led to more qualitative data and stories about their experiences, which allowed us to determine whether or not there was an emotional impact.

RESULTS

From all the people we interviewed, most respondents were above 40, with only 5 below the age of 40 of which the youngest was a female of 29. This is due to the fact that we mainly focused on the household head. Most respondents were female, with only a total of 5 males.

Table 1: Number of people interviewed per barangay

	Casibarag Norte	**Catabayungan**	**Cubag**	Total
Male	1 (20%)	4 (80%)	0 (0%)	5 (18%)
Female	9 (39%)	5 (22%)	9 (39%)	23 (82%)
Total	10 (36%)	9 (32%)	9 (32%)	28 (100%)

From our respondents, 86 percent stated they heard about the typhoon through TV. From the other 14 percent, seven percent heard it from the barangay officials and the other seven percent through friends. After this we wanted to find out how the people would actually like to be warned about an oncoming typhoon. From the answers it became clear that the main preference was through TV, followed by barangay officials and radio (Figure 1).
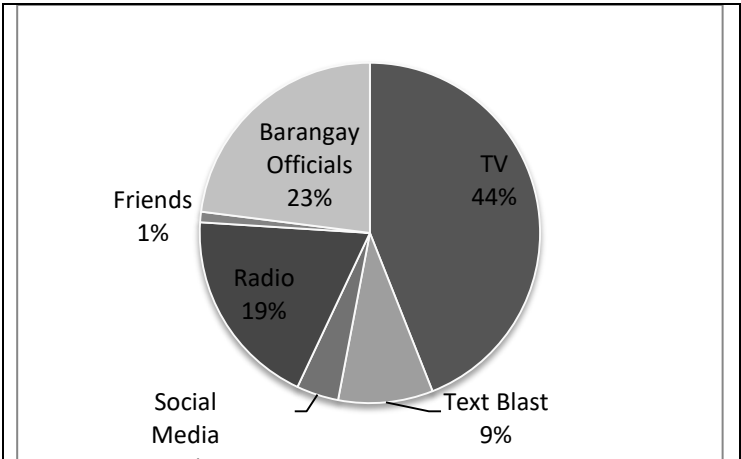
Figure 1: Preference of Receiving Warning Signal

From our respondents, 54 percent are aware of the PAGASA warning signals and 46 percent are unaware of the PAGASA warning signals. This unawareness means that they were unable

to categorize between the drawings they were shown; they were unable to correctly answer for three of the drawings.

Out of our 28 respondents, 68 percent said yes, they did expect to lose some of their belongings while the other 32 percent said no and did not expect to lose any of their belongings (Figure 3). This was then compared with the actual preparations. The main things our respondents did to prepare for the typhoon was buy extra food and tie the roof. The category "other" includes buying candles, LPG, radio, and putting down the plant pots.
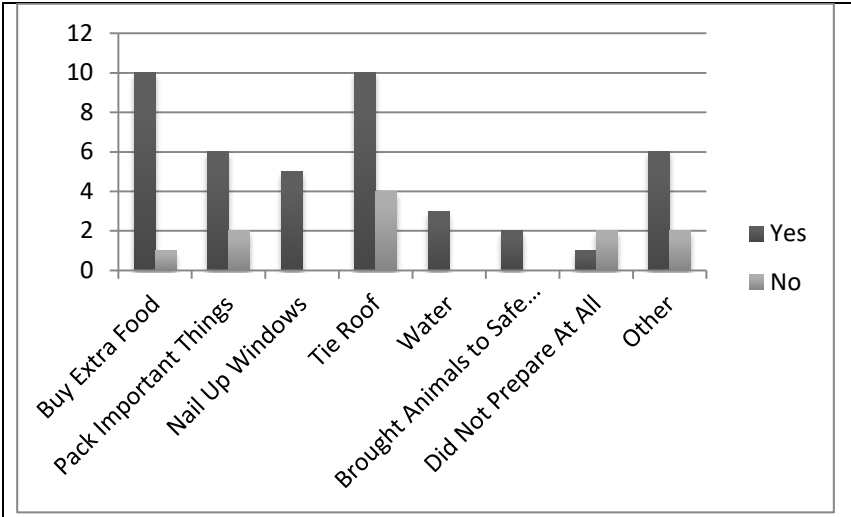
Figure 2: Expectations vs. Preparations of respondents in Casibarag Norte, Catabayungan, and Cubag

Using a scale of preparedness, we asked our respondents to rate their feeling of preparedness before super typhoon Lawin hit. This scale ranges from 1-4, 1 being not prepared at all and four being well prepared. From the 28 respondents, 36 percent felt well prepared (4), 18 percent felt semi-prepared (3), 14 percent felt less prepared (2), and 32 percent did not feel prepared at all (1). For the comparison with losses we solely used category 1 and named it not prepared along with category 4 and named it well prepared. We then compared the feeling of preparedness with the actual losses that our respondents had after super typhoon Lawin (Figure 3).
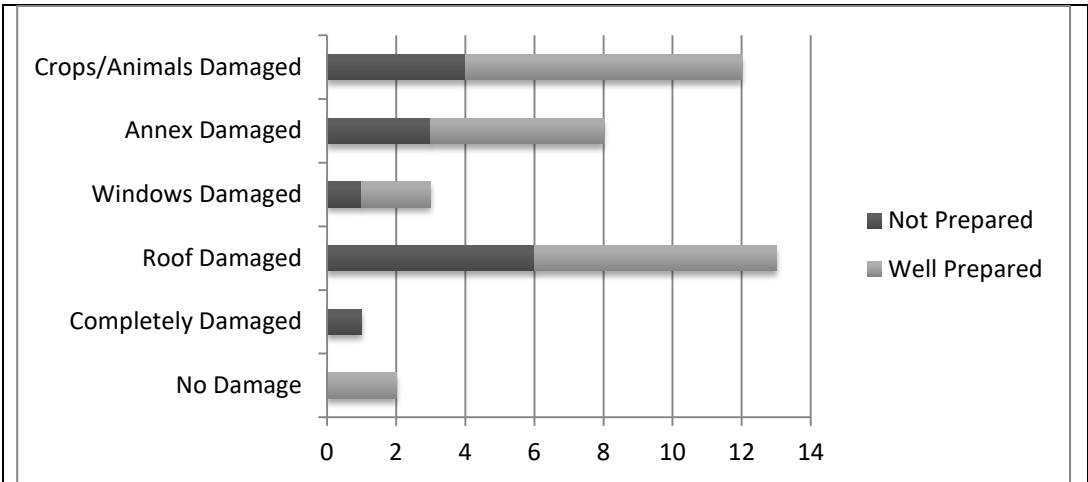
Figure 3: Preparedness vs. Losses of respondents in Casibarag Norte, Catabayungan, and Cubag

The last thing we asked our respondents was whether or not they experienced fear, loss of sleep or flashbacks. We then compared this again with the scale of feeling of preparedness. Here it becomes clear that each category experienced fear, loss of sleep, and flashbacks (Figure 4).
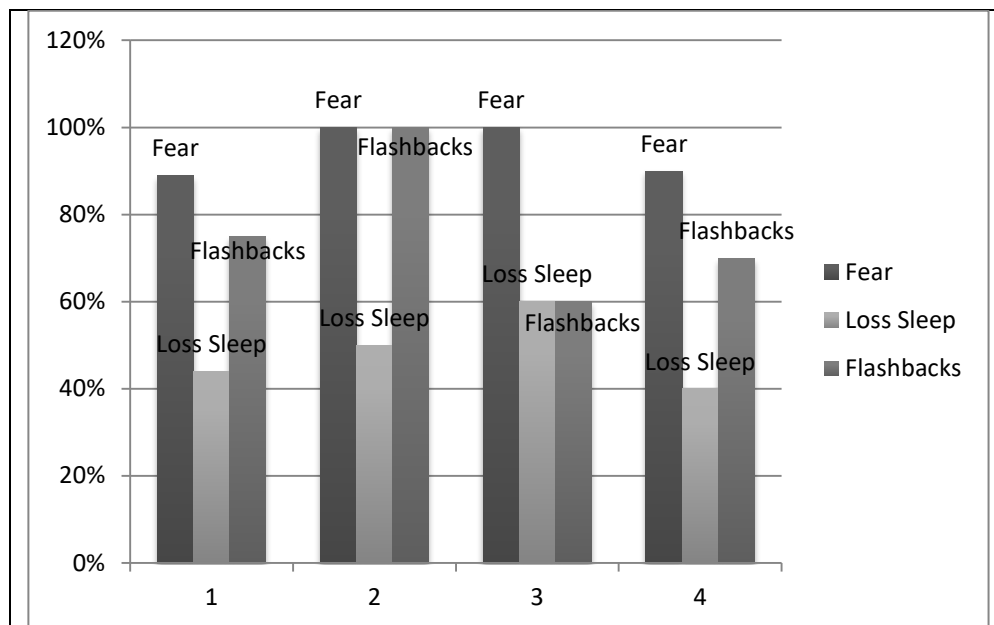
Figure 4: Feeling of Preparedness vs. Emotional Symptoms of respondents in Casibarag Norte, Catabayungan, and Cubag

DISCUSSION/CONCLUSION/RECOMMENDATIONS

How did households receive the warning signals?
From our respondents, 86 percent received the warning of super typhoon Lawin through TV. Although some did hear it through multiple mediums, the first medium was still the TV. Despite the fact that Mr. Tabel of NDRRMC stated that they sent out text blasts with a warning of the oncoming typhoon, majority of our respondents do not own a cellphone and were therefore unable to receive the text blast. Therefore, only 9% of our respondents preferred to receive the warning through text blasts. This implies that household heads do not feel that the new system of text blasts implemented by the NDRRMC is necessary. For our respondents, the TV felt most reliable because it is what first provides them with the warning. Whereas the barangay officials and the text blasts sent out the information much later. However, we think that it is questionable whether or not TV is actually the best medium because it is vulnerable to power outages. This means that if people rely on the TV for information and there is a power outage, these people will be unable to receive the warnings and other necessary information. Therefore we believe that radio would be a better option because the signal would not be affected by a typhoon. When looking at the results, radio was also the third preferred option (Figure 1).

Aside from receiving the warning signals, it is also important for people to actually be aware of what the warning signal signifies. We believe that this is important because typhoon Lawin was the first category 5 typhoon to hit Cabagan after the idea of a category 5 was first introduced in 2013. It was introduced due to the devastation caused by typhoon Haiyan (Tabel 2017). This is when we asked our respondents to categorize the drawings of the PAGASA description of the warning signals ranging from typhoon category 1-5. We found out that only 54 percent of our respondents were aware of what the categories actually signify. We believe that the fact that 46 percent of our respondents are unaware signifies that it would decrease the chance of

being able to prepare fully for the oncoming super typhoon because they are unaware of the possible destructions. This also signifies that there is a need for people to get more educated about the warning signals sent out by PAGASA.

What did households do to prepare for typhoon Lawin?
We believe that it was important to first look at whether or not people expected to lose some of their belongings. We believe that if people expect to lose their belongings then they would be more inclined to prepare better in order to lessen their losses. If people did not expect to lose their belongings, they would most probably do less to prepare for the oncoming super typhoon. Our results proved this to be right because the people that did expect to lose their belongings actually did prepare more. Out of the 28 respondents, 68 percent did expect to lose their belongings while 32 percent did not. The main preparations for the house included tying the roof, buying extra food, and packing important things. The respondents who did not expect to lose their belongings prepared much less, of which seven percent (n=2) did not prepare at all. From the people who did expect to lose their belongings, five percent (n=1) did not prepare at all (Figure 2). However, this respondent stated that he was prepared at all times because his house was built typhoon resilient, which is why he did not feel the need to prepare anything extra.

What was the material impact of typhoon Lawin on households?
The main material loss our respondents faced was a partially damaged roof. Fifty seven percent of our respondents noted that they had partially lost their roof. Next to this 21 percent experienced damaged windows. However, what we wanted to see is whether or not there is a difference between the damages of people who felt well prepared and people who did not feel prepared at all. From our 28 respondents 36 percent felt well prepared and 32 percent did not feel prepared at all. From the not prepared category, only 11 percent had a concrete house and 89% had a mixed (wooden/concrete with GI sheet roofing) house. From the well-prepared category, 80 percent had a concrete house and 20 percent had a mixed house. From the well-prepared category, 20 percent (n=2) did not experience any damages at all, both of these houses were fully concrete (Figure 3). The only fully damaged house we encountered was from a respondent who categorized herself as not prepared at all. This specific respondent was a widow and elderly and only packed important things as preparation, but did not actually prepare her house for the oncoming super typhoon and therefore felt very unprepared.

The main thing we noticed is that the people who felt more prepared, meaning they put their feeling of preparedness on a scale of 4, actually experienced more losses. From the well-prepared category more crops, windows, and annexes were damaged. When the damages to the roofing are compared, an equal amount of roofs are found damaged between the well-prepared category and the not prepared category (Figure 3). A possible explanation for the roofing is that we unfortunately did not differentiate between a completely concrete house and a concrete house with GI roofing. This means that the concrete houses with GI roofing were more vulnerable to losing the roofing because we believe that GI roofing is not the most typhoon resilient. For the well-prepared category that actually experienced the most material losses, a possible explanation could be that they maybe had more to lose compared to those who did not feel prepared at all. We believe this also because the people in the well-prepared category mainly had a concrete house along with a farm along the riverside, whereas the people in the not prepared category mainly owned a mixed house and were vendors.

What was the emotional impact of typhoon Lawin on people?

Typhoon Lawin was the first category 5 super typhoon to hit Cabagan, Isabela. All our respondents stated that this typhoon was the strongest typhoon they had experienced since childhood. However, there were only 14 casualties, of which none were in Cabagan (OCHA 2016). This means that none of the people we interviewed in the Centro Cabagan experienced loss of family members or acquaintances. Due to this, we believe that the mental impact was much less for typhoon Lawin. However, it is still important to focus on the emotional impact because it was the strongest typhoon our respondents had ever experienced and they did still experience many material losses.

From our respondents, 93 percent stated that they experienced a great deal of fear. Throughout all categories from feeling not prepared to well prepared, the feeling of fear was distributed equally high with a 100 percent of fear for the respondents in the 2 and 3 categories (Figure 4). This shows that it does not mean that the more prepared people are, the less fear they experience. Along with this, all categories experienced loss of sleep after the typhoon. However, there are no large differences between the categories. From our respondents who did experience loss of sleep it was mainly for a minimum of 3 days and a maximum of 1 week. On top of this, all the respondents who experienced loss of sleep also mentioned they had a loss of appetite for an entire week. This loss of appetite is a great indicator of the emotional impact the typhoon had because they still feel the impact and fear during the typhoon (Chung and Kim 2010). Respondents throughout all categories experienced flashbacks with the average amount of flashbacks being 3 times. However, they mainly got flashbacks when looking at the material damage. The flashbacks experienced by respondents from category 1 and 2 are greater than from the respondents in category 3 and 4. However, the amount of flashbacks between respondents from category 1 and 4 is quite similar (Figure 4). This could be due to the fact that the respondents in category 4 actually lost more of their material things in comparison to the respondents from category 1 (Figure 3).

How did preparedness affect the emotional impacts of typhoon Lawin on households in urban Cabagan?

Based on our results, our initial hypothesis that the better-prepared people are, the lesser the emotional impact of the typhoon will be is refuted. The results show that the level of preparedness does not necessarily affect the emotional impact. We found that the respondents in category 4 actually had more material losses and experienced the same amount of fear as the respondents in category 1. We did see, however, that the people that expected to lose their belongings did prepare better for the typhoon (Figure 2). This means that the expectation does show whether or not people are better prepared for the typhoon, but the preparedness cannot show that the mental impact will be less. This is mainly because the losses are not necessarily less when people are more prepared, which is also what is shown in our results (Figure 3).

More importantly, we believe that the emotional impact on our respondents was not great due to their religious beliefs. We asked our respondents whether or not they would do anything differently to prepare for a similar typhoon. The answers we commonly received had to do with religion. The majority of our respondents clearly stated that the typhoon is "God's will" and that they cannot do anything about it, so they accept the fact that typhoons are a natural occurrence. The respondents stated that for preparation they would pray more and have more faith rather than have more physical preparations for the house. This shows that praying is a part of preparation for the people in urban Cabagan. Furthermore, it is a form of mental resilience (Wilkinson 2015). This means that through prayer and keeping faith, our respondents were able to reduce the emotional impact of the super typhoon.

Lastly, our respondents did not experience any losses of family members. This is why we often heard from our respondents that they were mainly happy because everyone was still alive and they only had material losses. Of course the material losses are impactful on the emotional impact as well. This is also what Wilkinson states in her article, that material is needed to help recover, while prayer provides for the strength. This shows that the material losses do have an impact because it disrupts the daily life. We do also believe that casualties would have greatly increased the mental impact. Therefore, the emotional impact was not as big as we were expecting, but there is still evidence of emotional impact caused by super typhoon Lawin. However, preparedness and emotional impact are not explicitly related.

Limitations

We only considered the household heads, meaning we mainly had elderly respondents. Moreover, the sample size was quite small, which makes it more difficult to make definite conclusions and comparisons. For the questionnaire, we forgot to include a question about loss of appetite, which would have been beneficial because it is an indicator for mental impact. We also forgot to fully differentiate between fully concrete houses from concrete houses with GI roofing. Most importantly, we did not take into account religion as a factor during the interviews. It was only after we conducted all interviews that we noticed that religion actually plays a large role for mental resilience.

Recommendations for further studies

We highly recommend to research more on the role of religion when it comes to the emotional impact of disasters. It would therefore also be interesting to ask the people during the interview if they attended church more often after the typhoon or if they prayed more or anything related to increase or decrease in faith. It would also be interesting to ask the respondents if they feel stress debriefings would be necessary. This would give a further indication on the emotional impact.

Recommendations for Authorities

We recommend to have standardized roofing such as tegula tile. Although we realize that this is expensive, we believe it is more expensive to keep providing for new GI sheets after every disaster considering the labor cost as well. Therefore, we think it might be better to invest in typhoon resilient roofing. From all our respondents, roofing was the main damage that the people experienced. We believe that GI sheets are not the most typhoon resilient. Considering the fact that the Philippines is hit by an average of 20 typhoons per year, roofing would be an important factor to make resilient. Furthermore, for the respondents that harvested crops their land was mainly situated close to the riverbanks. For this reason they experienced losses due to floods. We therefore recommend the government to construct barriers to block the floods from the agricultural fields as a way of prevention of losses.

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APPENDICES

Appendix A: Questionnaire

Personal information
Location:_____ Name:_____ Age:____
Sex: male   female   Date: _____Ethnicity: ____
Profession: _____ Number of children: _____
Type of house: Concrete   Wood   Mix
Education:

None	Primary						Secondary				Tertiary						Graduate	
	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	6	Masters	Doctors

1. How did you hear about typhoon Lawin?
  ☐☐Blast texts
  ☐☐Social Media
  ☐☐Barangay officials,
  ☐☐Friends
  ☐☐Radio
  ☐☐TV
2. How do you prefer to get a warning for a typhoon? Please categorize from 1 – 5.

(Options: blast text, social media, barangay official, radio, TV, friend/neighbor)

    1.

    2.

    3.

3. Are you aware of the PAGASA warning signals?

    ☐☐Yes   → Pictures

    ☐☐No

4. How well do you think the PAGASA warning signal works?

    Not well at all 1 ------ 2 ------ 3 ----- 4 Very well

5. How did you prepare?

    ☐☐Buy extra food

    ☐☐Pack important things

    ☐☐Nail up wood on windows

    ☐☐Put gravel on roof

    ☐☐Tie roof

    ☐☐Other, please specify:

6. How well do you think you were prepared for the typhoon?

    Not well at all 1 ------ 2 ------ 3 ----- 4 Very well

7. Did you expect to lose some of your belongings/properties?

    ☐☐☐No

    ☐☐☐Yes, please specify:

8. What were your losses?

    a.   House – which parts?

      ☐☐Not destroyed

      ☐☐Roof

☐   ☐☐Windows

      ☐☐Walls

      ☐☐Completely destroyed

      ☐☐Other

    b. Were any other of your belongings damaged?

    ☐☐No

    ☐☐Yes, Crops - please specify:

    ☐☐Yes, other - please specify:

9. Did you expect assistance?

    ☐☐No

    ☐☐Yes, please specify:

10. Did you receive assistance?

    ☐☐No → Proceed to question 12

    ☐☐Yes

11. What did you receive? (Relief goods)

    ☐☐Rice: Kg =

    ☐☐Canned Goods: Pieces =

    ☐☐Noodles: Pieces =

    ☐☐Coffee: Sachet =

    ☐☐GI Sheets =

    ☐   Other, namely:

    ☐☐Nothing

    a. From who?

    b. How many times?

12. Has the typhoon caused you (yes/no)☐

Fear   ☐ yes ☐no

Loss of Sleep   ☐ yes ☐no

13. Do you sometimes still think about typhoon Lawin?

         ☐☐Yes

         ☐☐No

14. Have you experienced dreams of the event?

         ☐☐Yes

         ☐☐No

15. Did you behave differently than you normally do after typhoon Lawin?

         ☐☐Yes

         ☐☐No

16. Do you feel like you were able to accept the losses?

         ☐☐Yes

         ☐☐No

17. Do you feel that you are more prepared now for a similar typhoon?

         Not well at all 1 ------ 2 ------ 3 ----- 4 Very well

18. What will you do differently to prepare for a next typhoon?

19. Would you like to share any additional stories about your experience during typhoon Lawin?

Appendix B: Drawings for Differentiating Typhoon Categories
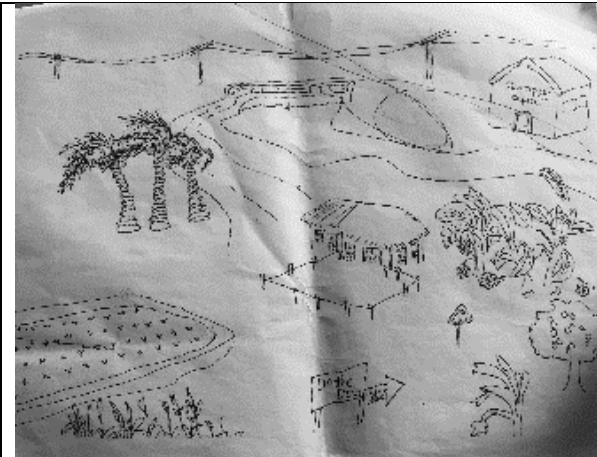
Drawing 1: Typhoon Category 1	**Drawing 2:** Typhoon Category 2
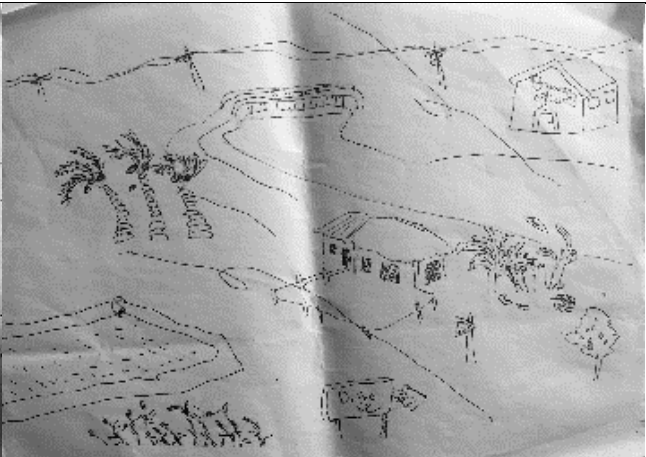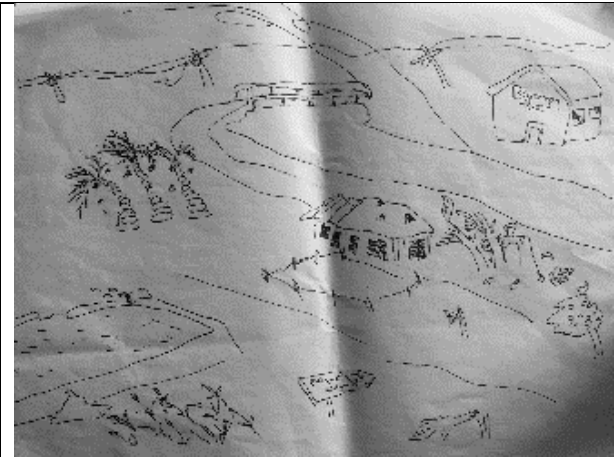
Drawing 3: Typhoon Category 3	**Drawing 4:** Typhoon Category 3
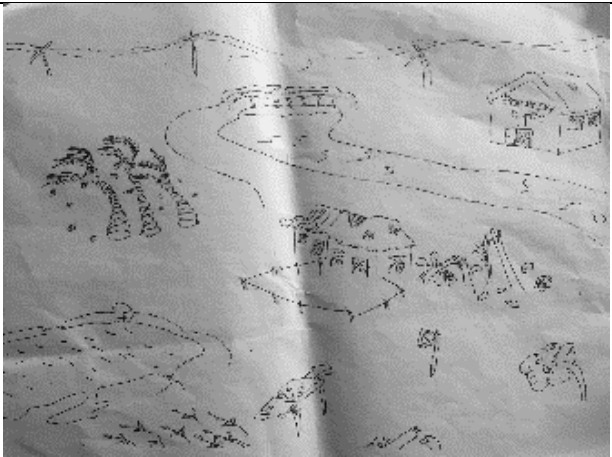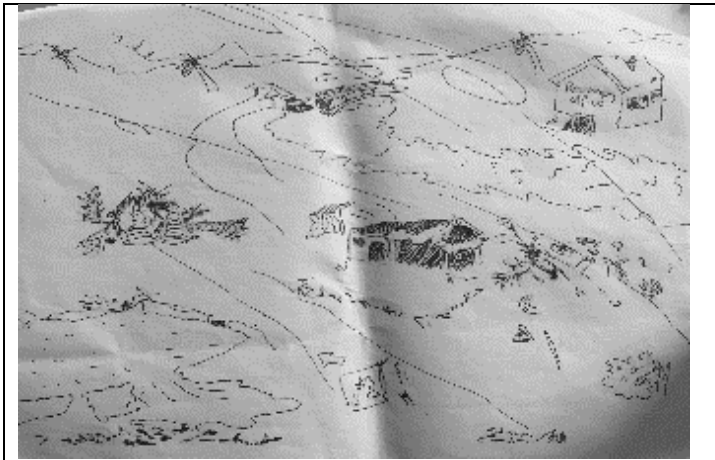
Drawing 5: Typhoon category 5

HOW PEOPLE FROM RURAL CABAGAN PREFER TO BE WARNED FOR TYPHOONS

Anneroos Dijkstra and Jesrael D. Tuliao

INTRODUCTION

On October 19, 2016, typhoon Lawin (internationally known as Haima) hit the Philippines and caused a massive destruction. The typhoon had a large impact on the lives of many people. However, it is interesting to note that, except for the material damage, the government reported zero casualties. This could possibly be considered as a major improvement, compared to the prior disastrous typhoon Yolanda (internationally called Haiyan) that hit the country in 2013. Yolanda was given the highest warning signal that existed at that time.

As Tina Comes (2015) stated, this event showed that the early warning system (EWS) at the time was inadequate due to various reasons (Comes et al. 2015). After Yolanda, the government decided to add a signal number 5 to the warning system. However there is still little scientific knowledge about the effectiveness of the measurements that are taken by the government and how they contribute to an actual improvement of the warning system. Also, little is known the preferences of people themselves, concerning the various different channels used to inform people about typhoons. While the effective warning of people can prevent many deaths and injuries, improving EWS can be of significant social relevance.

Therefore, in this research we focused on the different problems and probable solutions concerning the usage of particular media, such as text messages, radio, television and personal warnings by barangay officials or community members. We looked at issues of exclusiveness (not everyone may have a social media account or even a mobile phone to receive text messages) or the dependency from the national warning system on services from private companies such as Facebook or Twitter.

As was shown by Bruno Takahashi, social media can prove to be an important medium to communicate during disasters (Takahashi et al. 2015: 392-393). However, as was mentioned by Mirca Madianou (2015), the warning system can also cause social inequality (Madianou 2015: 3-4). For example, with regard to social status, geographical location, education and gender, Madianou (2015) found that the rural regions, compared to the more urbanized regions in the Philippines, usually have less access and capacity when it comes to social media due to a lack of signal (Madianou 2015: 3). We like to make a small contribution to the scientific field with a study in which we also focus on age.

As Miguel Esteban (2015) showed, it is useful to first assess the perception of your respondents and what they think about the risks and meaning of the different warnings that can be given (Esteban et al. 2015: 40). We used a similar approach, in which we pay attention to individual interpretations of the EWS as well as the overall picture in terms of reach and usage. Finally, we will discuss our results and provide some recommendations, which can be valuable for the government or local respondents in learning how to increase their ability to prepare for disasters.

RESEARCH QUESTIONS

Our final research question is as follows: How do people in rural Cabagan prefer to be warned for typhoons and does this differ among age groups?
We developed the following sub questions that helped us to answer our main question.
-How do people from rural Cabagan interpret the current warning signals for typhoons?
-By what kind of media do people from rural Cabagan prefer to be warned for typhoons?
-Are there differences between age groups in the way people want to be warned for typhoons and what kind of differences would this be?

METHODS

The activities we have undertaken during the field research are displayed the underlying time schedule.

Date	Location	activities
Wed 18-1-2017	Barangay Pilig Abaho	Morning: Conducted 4 interviews Afternoon: Conducted interview with Mayor and ask for list of households for each *rural* barangay (dswd)
Thu 19-1-2017	Barangay Masipi West	Morning: Conducted 4 interviews. Afternoon: 15 surveys
Fri 20-1-2017	Barangay Masipi East CCVPED	Morning: We visited a school (Alfreda National High School Anex) conducting 1 interview and 16 surveys Afternoon: Transcribed data
Sat 21-1-2017	Barangay Pilig Alto Carina Computer Shop (Cabagancentro, Isabrela)	Morning: Conducted 2 interviews (including the interview with the barangay captain) 10 surveys Afternoon: Transcribed data
Sun 22-1-2017	CCVPED	Free time Evening:transcribed interviews plusquestionnaires.
Mo 23-1-2017	CCVPED	Writing for the report
Tue 24-1-2017	CCVPED	Writing for the report

In this study, we used a mixed methods approach, in which we simultaneously administered questionnaires consisting of 5 closed questions and complemented this with semi-structured interviews. We conducted a total of 41 surveys and 11 semi structured interviews with respondents, two interviews with officials and one interview with a high school teacher. The surveys contained 5 closed questions in Tagalog language and were handed out. The interviews with residents were open ended and were conducted face to face. The interviews with officials were more oriented towards the perspective of the government on the warning system.

We intended to do random sampling to get a stratified sample of different age categories, but the household lists with data on age did not mention individual names. Therefore, we decided to do availability sampling by asking every third house. The surveys were handed out and filled in by the people themselves. Only in a view cases in which respondents were unable to fill in the survey (due to illiteracy or physical disabilities) we conducted it orally.

In addition to the 41 surveys, we also conducted 11 interviews with other residents. These qualitative interviews were obtained via a combination of snowball sampling, to have an equalized representation of youth as well as elderly persons. Therefore, we went to a high school and asked there if there was someone whom we could interview. To find elderly, we asked people in the neighborhood if they knew a senior citizen to interview. The questions in the semi-structured interviews were asked in a combination of English and Tagalog, by which the English questions where for a larger part translated in Tagalog. The interviews with the Mayor, Barangay captain and high schoolteacher were conducted in English.

Both methods were equally important for our final results, as the questionnaires gave a broader view while the interviews clarified the answers given in the surveys.

We also made use of 5 drawings during the interviews with residents in which the effects of a typhoon with the strength of signal 1-5 was displayed by showing some landmarks (like destroyed banana-trees or broken windows (see Figure 3 in appendices). These were intended as probing questions to discover how people thought about and differentiated between the warning signals. The group of Ashley and Andy also made use of these, but in a slightly different manner.

RESULTS

As is shown in the graph below (Figure 1) women are slightly over represented in our sample (with 26 women against 16 men). However, age seemed more evenly distributed with a larger part of middle-aged people (Figure 2). This was probably due to the way in which we defined youth (0-21), middle-aged (21-60) and elderly (60+) in which the second group thus consisted of a larger range. The meanage of our sample was 42.

Figure 1. Gender division. 1=female   2= male
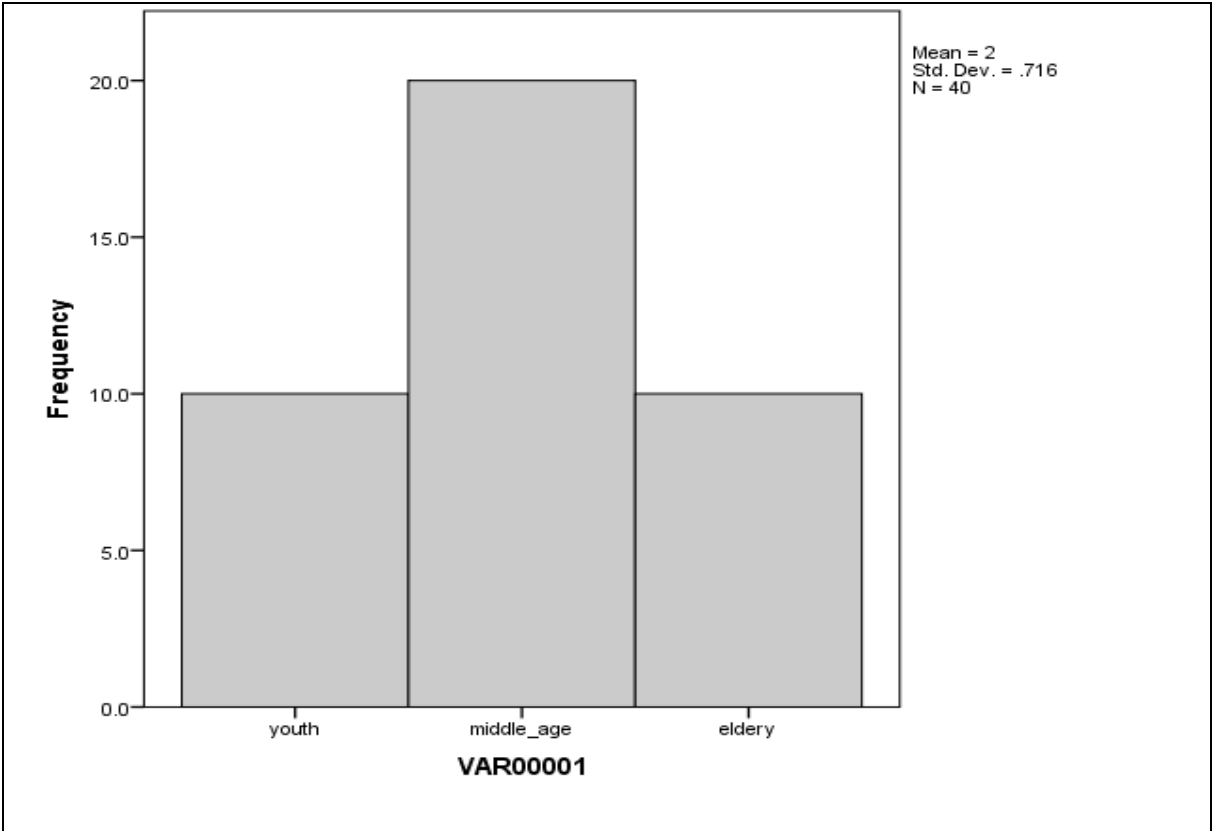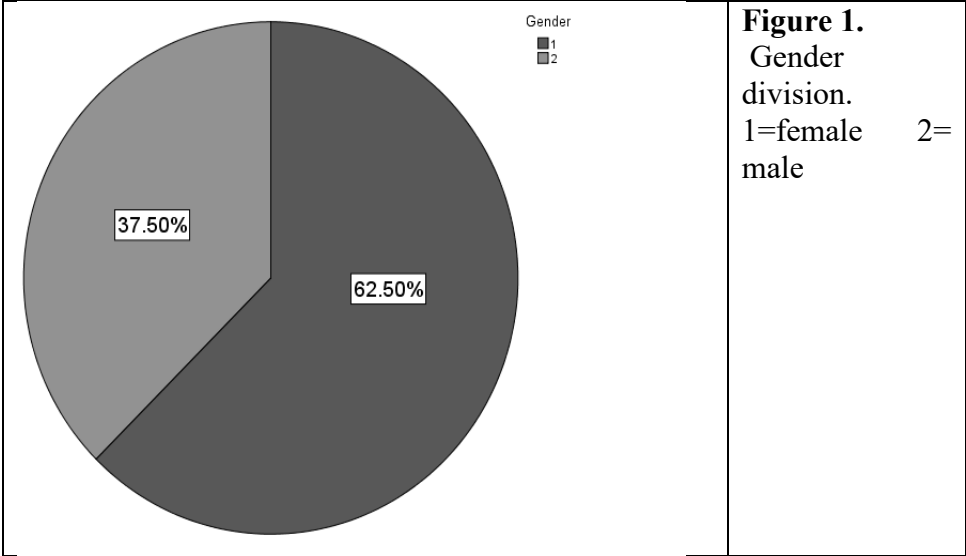
Figure 2. Age division.

From the conversations that were evoked by the drawings, we discovered that 2 younger persons, as well as 4 middle aged and 2 elderly were generally well informed about the

differences between the signals. They mostly perceived the differences in terms of the damages that could be expected to the crops and the house by each signal.

In the table below, the preferences of various age groups are displayed (Table 1). Through this it becomes visible that the largest group, consisting of 22 respondents, preferred television as first medium to be warned with. This finding was in line with the findings of the group of Coco and Aileen. However, we observed that elderly were somewhat more in favor of a personal warning, when compared with the youth. On the other hand, a 47 year old woman told us that she preferred to see the news directly herself on TV, because she believed the primary source for the barangay captains that warned her is also television.

| | | VAR00001 | | |
		youth Count	middle_age Count	eldery Count
Q4_firstPrefered_Medium	Social_media	1	0	1
	Textmessage	0	0	0
	TV	7	12	3
	Radio	2	3	1
	Personal_Barangayofficial	0	2	2
	Personal_Community	0	3	2

Table 1. Choices for first prefered medium to be warned for typhoons.

Also, in general, elderly people turned out less likely to leave their house for evacuation. We found, just as the group of Ruby Joseph and Hainsee, that people (especially elderly) were more willingly to evacuate after typhoon Lawin, because they have seen what signal 5 can mean and how stong a supertyphoon can be.

Younger people where more directed towards social media and TV as an effective and preferable tool for the government to inform people about one respondent. From the interview with the high school teacher, we heard that there were a lot of young people who used social media like Facebook, Twitter and Instagram to share information with their friends and thus where familiar with these platforms. She said that the use of social media can have its advantages because it is seen as a more advanced and developed technology, which enables people to stay update in the quickest way possible.

The Mayor also stated that social media had additional value because Facebook was freely accessible for people, which makes it easier to use regardless of your social status. He highlighted that the government puts considerable effort to be open for feedback from citizens to improve the quality of the EWS.

Furthermore, we found a correlation between the variable age and the likelihood that someone would think that the government should make increased use of social media to warn people [Kendall''s tau=0.312 with a significance of 0.02]. This means that the older people are, the more likely it is that they do not want the government to make more use of social media. This was also supported by our qualitative data, in which most elderly people did not know how to use social media and therefore considered it as a less effective tool to warn people.

In the semi-structured interviews, we saw that there were some exceptions when it came to senior citizens who did say that they thought of social media as a medium that should be used more often. This was because they saw how useful it was for their children. When we ran a statistical analyses of the variables: number of children and opinion towards social media, we saw indeed that there was a significant correlation between the amount of children someone had and if he or she thought that social media should be used more [Kendall''s tau=0.365 with a significance of 0.01].

DISCUSSION

Based on the results shown in the previous paragraphs, we will provide an answer on our researchquestion and some recommendations to overcome the biggest challenges. As was shown in the previous chapter, the largest group (54%) of our respondents turned out to prefer TV to be warned by typhoons. This was the highest among the youth, middle-aged and elderly. There were differences in the preferences of people with regard to age. Elderly people were somewhat more likely to prefer a personal warning compared to the youth, but the differences were very small.

As became clear from the results, social media can be a good tool to warn people. However, it became clear that in time of disasters it prove to be difficult to use social media, due to a lack of signal. We observed that an increased usage of social media can meet several other problems. Firstly, not all people are equitably reached by the current warning system due to various reasons. A large amount of people relied on solely one medium because they did not possess a TV, radio or other instrument that is used to inform people. But it is not only for economic reasons that some are more vulnerable than others. A larger proportion of the elderly people we spoke had to cope with disabilities that may put them in extra danger. For example people who had a high blood pressure or where unable to watch Television because of visual incapability's. This means that some people are less included in the warning system than others, which makes them more vulnerable. As was shown by Madianou (2015), it is important to prioritize these marginal groups (Madianou 2015: 8). However, The problems that we identified above, may possibly be solved by improving the infrastructures of communication channels as well as mapping the less accessible people before a new disaster will happen.

When we talked with the students we discovered that social media was indeed popular, but not all students agreed that social media is the best tool. A third year college student said to us that she preferred a personal warning, because that was maybe not the quickest, but surely the most accurate information.
The barangay captain whom we interviewed also stated that a personal warning can prove crucial During times of disasters, while certain people can be hard-headed and will not leave their house easily. In this case, only a personal message can convince them of the severity of the situation. As Muhibuddin Usama (2014) showed, a strong social cohesion can be effective and important to be better able to also warn the elderly (Muhibuddin 2014: 184). It is important to know to which extent social media can be used to reach people that would otherwise not be reached, without excluding other people at the same time.

An interesting notion that became apparent from the semi-structured interviews was that 4 elderly did not use social media themselves, but that they were more likely to view it as a positive tool to warn people when their children or grandchildren where made use of it.
Secondly, there is a slight difference in how the warning system is interpreted by youth and elderly and how it stimulates people to prepare or take action. Most respondents agreed that the

information that was given by the government before Lawin stroke, was truthful and accurate. But, contrary to younger people, the elderly seemed to rely more heavily on prior experiences with typhoons in constructing the meaning of the warning system. However, this can be dangerous when the situation is worse than before. As most respondents said, Lawin was the strongest typhoon they had ever experienced.

So, social media can be a good complementary warning tool, but we would recommend to make sure there is also a non-electrical warning system in place at all times. Furthermore, from this results, it also becomes clear that one should try to avoid to rely too heavily on one medium when informing people about typhoons.

Besides, we discovered that religion can play a profound role in the interpretation of warning signals given prior to and during a disaster. As Greg Bankoff (2004) showed religion can also be an important aspect in the way people construct their vision on disasters and how to be warned for these events (Bankoff 2004: 91). We had not thought of this in advance, but through the interviews it became clear that the interpretation of the warning system was indeed linked to religious ideas, especially for some elderly people. Therefore, we conducted two extra interviews with residents in which we went more into depth about the religious aspects of their experiences with typhoons. One of our respondents said that she knew people in the neighborhood who did not evacuate before typhoon Lawin because they thought that god would protect their house and it was in his hands if they would survive or not. However, she herself said that she did not agree with this interpretation. She thought that the orders to evacuate could be seen a sign of god, a tool by which he warned them and helped them to be safe. As Bankoff (2004) stated, religious messages can contribute to the understanding and thereby eventually the reactions of people on natural disasters (Bankoff 2004: 99). Furthermore, some respondents mentioned that it was true that the government was the intermediate that warned people, but that in the end, it was god who was responsible for the zero casualties while it was in his control.

LIMITATIONS

Unfortunately, we met several limitations during our studies. Firstly, it proved harder than expected to make sure that the surveys where fulfilled without interference of family members, which could affect the opinion of our respondents. Secondly, the way in which we defined the youth, middle-aged and elderly was somewhat arbitrary. To make our results reliable, we used Kendal's Tau & Spearmans rho, which are measurements that can be used for small sample sizes (30 respondents or more).

Lastly, while most interviews where translated, there will always be some misunderstandings. Also, we had a relatively small sample size for a survey.

CONCLUSION

In general, we can conclude that the warning system was interpreted by residents in a way that was sufficient to be effective in conceiving the main message. However, we observed some challenges that still have to be overcome and in which there is still space for improvement. At the one hand there can be made technical improvements to increase the reach of signal during typhoons. Also, it would be wise to always have a non-electrical warning system in place during disasters.

On the other hand, it is important for the government and other institutions to not become too reliant on one medium, as the preferences among people in rural Cabagan vary with regard to age and social status. Thus, we saw that there are some differences in the preferences when one takes into account the variety among ages. The difference in preferences are most likely due to the (in)availability of a certain medium, a lack of access to particular media on certain occasions, physical disabilities and a different perception of typhoons based on prior experiences. However, the differences do not necessarily have to be problematic, as long as one takes into consideration the challenges that come with it and find effective ways to cope with these issues. This means that one should keep improving and finding new ways to effectively reach all people, including the most vulnerable. How the religious aspect that seems plays a role in the interpretation of warning signs is an element that can be interesting for further research.

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APPENDICES

Name:_____

Address:_____

Age:_____ Birth date:_____ Gender: Female/Male

Civil status:_____No. of children:_____

Ethnicity:_____

Highest level of education:

Pick one:

Elementary	1	2	3	4	5	6
Secondary	1	2	3	4		
College	1	2	3	4		

1.How where you warned about typhoon Lawin? (**more options possible**)

__Textmessage

__Television

__Radio

__Personal warning by barangay official

__Social media

__Other, namely…….

2. What social media do you use?

__Facebook

__Twitter

__Other social media

__I do not use social media

3. Do you think the government should make more use of social media in warning for typhoons?

__yes

__no

4. By what kind of medium would you prefer to be informed with? (**Arrange them by 1=prefered most and 6=least prefered**)

__Social media

__Textmessage

__Television

__Radio

__Personal warning by barangay official

__Personal warning by community member

5.What do you think of the current warning system? (**please pick only one**)

Not effective   1   2   3   4   Effective

Questions for semi-structured interviews with residents

Can you tell us something about what happened prior to and during typhoon Lawin?

Do you know that there is a signal number 5 and what do you think it means?

When do you think that a signal number 5 is given?

What do you think about the current warning system?

By which medium do you prefer to be warned about typhoons and why?

What are the differences between signal 1,2,3,4 and 5?
How did you know this?
How did you felt when signal number 5 was given?
What do you think you will feel if there will be a signal number 5 given again?

Questions for Barangay officials:
What kind of media do you use to warn people about typhoons?
What kind of media do you think is most effective to warn people and why?
Was there a specific lesson you have learned from prior experiences with warning people for typhoons?
What would you do different the next time you have to warn people to for a typhoon?
How do you think the warning system can be improved?

Questions for the municipal official
What do you think of social media as a tool to inform people about typhoons?
Would the government like to make more use of social media and why?
Which medium that the government uses is the most effective to reach people when it comes to warnings and why?

Questionnaire Tagalog
I. Personal profile
BuongPangalan : _____
Tirahan : _____
PetsangKapanganakan :_____ Edad: ___ Kasarian: __Babae __Lalake
Civil Status:_____ Bilang ng Anak:_____
PangkatEtniko:_____
PinakaMataas na Edukasyon na Natapos:

Elementarya	1	2	3	4	5	6
Secondarya	1	2	3	4		
Kolehiyo	1	2	3	4		

1.Paano kanabigyan ng babalapatungkolsabagyong Lawin? (**pumili ng kahitilan**)
__Textmessage
__Telebisyon
__Radyo
__Personal nabinigyangbabala ng barangay official
__Social media
__Iba pa, anoito?…….

2. Anong social media angginagamitmo?
__Facebook
__Twitter
__Iba pang social media
3. Sa tinginmo, anggobyernoba ay mas dapatgamitinang social media sapagbibigaybabalatungkolsabagyo?
__Oo
__Hindi

4. Sa paanongparaanmonaismabigyan ng babalapatungkolsabagyo? (**Ayusinmulasa 1 bilangpinakanais at 6 bilangnaislang**)

__Social media

__Textmessage

__Telebisyon

__Radyo

__Personal nabigyan ng babala ng barangay official

__Personal nabigyan ng babala ng mgakasamasakomunidad

5. Anosatinginmoangkasalukuyangsistemanatinsapagbibigay ng babalapatungkolsabagyo?(**pumililang ng isa**)

Hindi Epektibo   1   2   3   4   Epektibo

Figure 3. One of the drawings on warning signals. In the picture signal number 4 is displayed

TYPHOON PREPAREDNESS AMONG SMALL SCALE FARMERS IN SANTA MARIA

Hansi Jane Garcia, Joseph Sanuco and Ruby van't Hof

INTRODUCTION

General Background
For a long time disaster management had a reactive approach with an emphasis on the period after a natural disaster, but since the 1970s this has changed. Big actors as the United Nations realized the significance of the management of the period before a disaster happens and this came to a more risk reduction oriented approach (Sanyal & Routray 2016: 103). In the Philippines this is fully integrated in the National Disaster Risk Reduction Management Plan (NDRRMP) where the aim is to strengthen the country in its disaster prevention and mitigation; disaster preparedness; disaster response; disaster rehabilitation and recovery between the year 2011 and 2028.

The Philippines is very vulnerable when it comes to natural disasters. Yearly the country is hit by 15 to 20 typhoons which has given the country the opportunity to learn from every one and improve its disaster risk reduction management through the years. Where typhoon Yolanda (international name Haiyan) took around 6,300 lives, 28,688 injured and 1,062 missing in November 2013, super-typhoon Lawin (international name Haima) took 'only' 14 lives and 0 injured and missing in October 2016 (DILG 2017).

Typhoon preparedness is critical in disaster management and can not only be found on the national level, but is integrated in the regional, municipal and barangay level in the Philippines. The duty of every local government is to institutionalize policies and plans, provide evacuation centers, inform the people and prepare for the aftermath (LISTO 2015).

But not only the government plays a role in the pre-disaster period, it is also the communities that play an important role. Social capital is a key element in preparing for a typhoon since people helping each other is more effective than individuals preparing just for themselves. Social capital is described by Sanyal and Routray (2016) as 'aspects of social structure, which are of value to social actors as resources that can be mobilized in pursuits of their interests' after analyzing the different perspectives of the concept by social scientists as Pierre Bourdieu, James Coleman and Robert Putman (102).

Especially in relatively remote, low income areas in the Philippines social capital can be a critical aspect in typhoon preparedness since they do not all have the necessary tools in both informational and material belongings. It can also help greatly in realizing the danger of the coming typhoon. Jibiki et al. (2015) explain how warnings are most effective when people can personalize the message and recognize they will be personally affected by the coming threat and social capital – people making each other conscious of the threat – can increase this personalization of the warnings (25).

Introduction of the Case Study
This research will be focusing on the typhoon preparedness among small scale farmers in the municipality of Santa Maria with an emphasis on the super-typhoon Lawin in October 2016. Santa Maria is a relatively remote, low income municipality containing 20 barangays in northern Luzon where the agricultural sector is one of the most important sectors. Most of the farmers live near the Cagayan River and, thus, live in a flood prone area; when most of the

typhoons hit the area, the farmers experience floods as well. This makes the farmers and the local agricultural sector very vulnerable. For this research, 19 farmers from four low-lying barangays were interviewed: Mozzozzin Norte; Mozzozzin Sur; San Rafael East and San Rafael West.

Purpose of this Study
Since the farmers represent the local agricultural sector, it is important to know how they experience and cope with natural disasters such as typhoons to get an insight on how the local agricultural sector as a whole copes with natural disasters. The whole process contains the preparedness phase, the impact phase, the response phase and the recovery phase and this research is focusing on the preparedness phase. Not much research has been done on natural disaster preparedness among farmers and since the agricultural sector is an important sector it is necessary to learn more from this and create awareness for the threat natural disasters can have on the food security.

RESEARCH QUESTION

How were small scale farmers in Santa Maria warned for super-typhoon Lawin and how did they prepare themselves?

Sub questions
  - When were the farmers warned for Super typhoon Lawin?
  - How were the farmers warned for Super typhoon Lawin?
  - How did the farmers prepare for Super typhoon Lawin?

METHODS

For this research we have done fieldwork from January 18 to January 23, 2017 in four low-lying barangays in the municipality of Santa Maria in northern Luzon. We used the method of semi-structured interviews as our main method for gathering the data. In total we have conducted 25 interviews; 19 interviews with small scale farmers; four interviews with barangay captains; one interview with a spokesperson of the Municipal Disaster Risk Reduction Management Office (MDRRMO) and one interview with a spokesperson of the Municipal Agricultural Office (MAO) of Santa Maria.

The four chosen barangays are Mozzozzin Norte, Mozzozzin Sur, San Rafael East and San Rafael West – all located in the lower part - *Lower Vega* - of the municipality. In every barangay we interviewed five farmers except for Mozzozzin Sur, here we interviewed four farmers. The semi-structured interview for the farmers consisted of 24 questions and these interviews have been the most important for answering our research question. The interviews with the other respondents were for background information of the barangays, municipality and the disaster risk reduction management of the municipality.
For this research we have used availability sampling.

Time Schedule

Date		Activities
Wed 18/1	Morning	Visit mayor for permission research Interview spokesperson MDRRMO
	Afternoon	Visit barangay captain of Mozzozzin Sur for permission research Visit barangay captain of Mozzozzin Norte for permission research Five interviews with respondents in Mozzozzin Norte
Thu 19/1	Morning	Four interviews with respondents in Mozzozzin Sur
	Afternoon	Visit barangay captain of San Rafael West for permission research Visit barangay captain of San Rafael East for permission research Five interviews with respondents in San Rafael East
Fri 20/1	Morning	Five interviews with respondents in San Rafael West
	Afternoon	Start encoding data
Sat 21/1	Morning	Internet café Encoding data
	Afternoon	
Sun 22/1	FREE	
Mon 23/1	Morning	Visit Municipal Agricultural Office (MAO) of Santa Maria
	Afternoon	Encoding data Start reporting

RESULTS

Profile of respondents
The 19 respondents were randomly selected - based on the availability of the people - from four barangays; five in Mozzozzin Norte; four in Mozzozzin Sur; five in San Rafael East and five in San Rafael West. We have interviewed 12 females and seven males all between the age of 33 and 70 years, but the majority of the respondents (89.5%) were above 45 years. Eighteen out of the 19 respondents grow corn, where eight intercropped corn with peanuts, and one grows rice. Of the 19 interviewed farmers, 15 raised livestock which varies in numbers – one to 33 – and livestock raised include cattles, pigs and horses while poultry consists of chicken, doves and ducks. All respondents are small scale farmers with a total land area ranging from 0.5 ha to 4 ha where 13 out of the 19 farmers have a total land area of 1 or less than a hectare.

When and how were the farmers warned for super-typhoon Lawin?
All respondents were warned a typhoon was coming at least two days before super-typhoon Lawin made landfall. One respondent was informed five days before landfall, thirteen respondents three days before landfall and five respondents two days before landfall (Table 1). When we asked how they were informed all the respondents told us they had heard it on the television. A day before landfall they were also informed by the police patrol of the municipality of Santa Maria. The police patrol spread the word with a megaphone travelling through all the barangays telling people to be careful, prepare as good as possible and evacuate if necessary as Manuel G. Pagauitan of the MDRRMO had told us in an interview and all the respondents could acknowledge this. Therefore, all respondents knew the coming typhoon would be a strong typhoon and when we asked how their reaction was when they realized the coming typhoon would be strong they all admitted they were more worried than normally – some were even crying of fear.

How did the farmers prepare for super-typhoon Lawin?
In the interviews we divided the question about how the farmers prepared for super-typhoon Lawin in three different sections: How did they prepare their house; what did they do with their livestock and how did they prepare their farm?

When it comes to the preparation of their houses, almost all respondents had similar answers. Sixteen out of the 19 respondents told us they secured their roof – many of them with a rope – and all the things prone to damage and/or flood (Table 2). This includes covering clothes and appliances with plastic bags and tighten furniture to the walls and the ceiling. Other answers given were transfer things such as clothes and furniture to the upper part of the house or the house of neighbors, secure and prepare enough food and one person did not prepare at all.
Of the 19 respondents, seven evacuated for the typhoon, where four evacuated to the municipal gymnasium and three went to family and/or neighbors. When we asked the respondents what they would do differently in preparation for a next super-typhoon, 10 mentioned they would definitely evacuate.

In total, 15 of the interviewed farmers had livestock as mentioned above. There were mentioned two different ways in order to prepare their livestock for the typhoon. Almost 75% of the farmers evacuated their livestock to the upper part of Santa Maria and around 25% secured the roofs of the stock houses to keep the animals as safe as possible (Table 3). In the end, 'only' six rabbits have not survived the typhoon.

While asking the respondents if they could do anything with their farm to prepare for the coming typhoon we realized there is not much you can do. Where we heard maybe three times all you can do is pray to God, one person mentioned she immediately harvested her crops – since the corn luckily was in the maturity stage already – but nothing else can be done to prepare for a typhoon. With that, the farmers all live in a flood prone area and 16 farms got flooded. Of the flooded farms 11 farmers had not harvested yet and these farmers lost all their harvest, while five farmers were lucky they had already harvested their crops (Figure 1). Three farms were not flooded and the farmers did not lose their harvest as well since they also already harvested their crops (Figure 2).

DISCUSSION

Discussion and Conclusion
In order to answer our research question we have to divide our answer in three sections; when were the farmers warned; how were the farmers warned and how did the farmers prepare?
When it comes to when the farmers were warned the answers ranged between two and five days before landfall of the typhoon - where one respondent heard a typhoon was coming five days before landfall, 13 heard it three days before landfall and five heard it two days before.
All the respondents were informed by television. The unison in this answer may lie in the age of our respondents. Only two respondents were under 45 years and the rest between 45 and 70 years. Our assumption is that if we had interviewed younger farmers we would have got more varying answers including social media since younger people use social media more often than the older generation. Furthermore, all respondents were informed by the police patrol the day before super-typhoon Lawin made landfall who told everyone a big storm was coming and so everyone had to prepare as good as possible and had to evacuate if necessary.
When it comes to the preparation of their house for the coming typhoon all respondents except for one did a wide range of activities to prevent the damage as much as possible. Sixteen out of the nineteen respondents mentioned they secured their roof and all the things prone to damage

– such as appliances, clothes and furniture. Also securing and preparing enough food and transfer things to safer places were mentioned. However, we assume not all activities among the preparation of the typhoon were given exactly by all the respondents. We think for example it is odd that only six out of the 19 respondents prepared enough food since food would be one of the primary needs in the case of a natural disaster. Our assumption is that there is information missing and for this reason we cannot conclude the way our respondents prepared for the coming typhoon with certainty.

What we can conclude with some certainty is that there are respondents that have underestimated super-typhoon Lawin. Where seven people evacuated for super-typhoon Lawin, 10 people mentioned they will definitely evacuate for the next super-typhoon. The interesting thing here is that five out of those 10 respondents did not evacuate with super-typhoon Lawin. This tells us they experienced Lawin worse than they were expecting since they otherwise would have evacuated for this typhoon.

There were two things the 15 respondents did with their livestock when they heard a typhoon was coming. Eleven respondents evacuated their livestock to the upper part of Santa Maria. Four respondents secured the stock houses of the animals as good as possible. This seems both as good preparations since 'only' six animals – rabbits – died of the 123 animals the respondents had in total.

Preparing your farm for a typhoon is a different story. Our conclusion is that there is not much one can do and that is problematic. Since the chosen barangays for the research are all located in the lower part of Santa Maria near the Cagayan River, all farmers live in a flood prone area so when super-typhoon hit Santa Maria 16 out of the 19 farms were flooded. Out of the data, we can conclude two different scenarios for the flooded farms. One can be lucky and have already harvested her or his farm and does not lose her or his harvest or one will have crops still in the vegetative or flowering stage and will lose everything. When we asked if there is something the farmers could do to save their crops, we were told all the farmers can do is pray to God.

There were three farms that were not flooded, but since all three farmers already harvested their crops we cannot say if the crops of a farm that is not flooded has more – or less - chance to survive than the crops of a flooded farm.

When it comes to when and how the interviewed farmers of the four barangays of Santa Maria were warned for super-typhoon Lawin we can conclude they all knew it at least two days before landfall by television which gave them enough time to prepare for the typhoon. They also were warned by the police patrol and all knew a strong typhoon was coming. We think the role social capital had in this matter increased the awareness of the threat that was coming their way. The fact that they were also personally warned by people they perceived as people of their own community – apart from the general message that was given on television - may have had influence on how the people perceived the coming typhoon. We have had multiple respondents who told us how they realized the threat that was coming to them because the police told them they had to be careful, prepare good and evacuate if necessary. Our assumption is that the people personalized the warning more – and, thus, were more aware they would be personally affected – after hearing the message of the police than after hearing about the typhoon on the television. We can conclude the farmers have difficulties when it comes to preparing for typhoons. It seems they have created a certain routine in preparing their house and securing their livestock. With that they noted that they know what to do for a next super-typhoon. The problematic part is

their farm. There is not much they can do to prepare their farm what makes it more a matter of luck – or in their case faith – if they have already harvested before a typhoon hits or not. This makes the farmers extremely vulnerable. For the farmers this means they can lose all of their income at once – and sometimes multiple times a year.

Additionally, the farmer's vulnerability means that the local agricultural sector is vulnerable. When you widen this perspective and look at the farmers of the Philippines in general who are regularly hit by natural disaster, this can become a big problem for the national agricultural sector. In a country as the Philippines, where the agriculture is the backbone of the society, this problem can be a nationwide problem and can make the country even more vulnerable next to its climatic vulnerability, this makes the country economically vulnerable.

Recommendations
Currently, the local government already has the task of warning the people of Santa Maria when a typhoon is coming – in the case of super-typhoon Lawin this was the day before landfall – and this is received with appreciation of the residents. Since the farms are really vulnerable to typhoons and floods coming with typhoons and there is not much farmers can do it would be of value if the farmers were approached earlier than the day before landfall by for example the local government to warn them when another strong typhoon is coming. In this way the farmers are aware in time there is a serious threat coming to them and their farms and so they can have the option to harvest their crops before the typhoon hits – when their crops is in the maturity stage – to avoid the loss of their harvest. This does of course only apply to the crops that are ready to harvest and will not save all harvest, but it may save at least some harvest since some farmers may harvest immediately after the warning instead of a few days later.
The reason we recommend this way of personal warning is because we have noticed personal warnings are taken more seriously than general information given on, for example, the television.

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APPENDICES

Tables
Table 1. When were the farmers informed for super-typhoon Lawin?

Category	*Number*
5 days before landfall	1 (5.3%)
3 days before landfall	13 (68.4%)
2 days before landfall	5 (26.3%)

Table 2. What did people do to prepare their house for super-typhoon Lawin?

Category	*Number*
Secure/tighten roof	16 (84.2%)
Transfer things to the upperpart of the house	3 (15.8%)
Secure all the things prone to damage/flood*	16 (84.2%)
Secure/prepare food	6 (31.6%)
Transfer things to neighbors	1 (5.3%)
No preparation	1 (5.3%)
*Including appliances, clothes and furniture.	

Table 3. What did the farmers do with their livestock?

Category	*Number*
Evacuate to upper part of Santa Maria	11 (73.3%)
Secure roof of stock house	4 (26.7%)

Figures
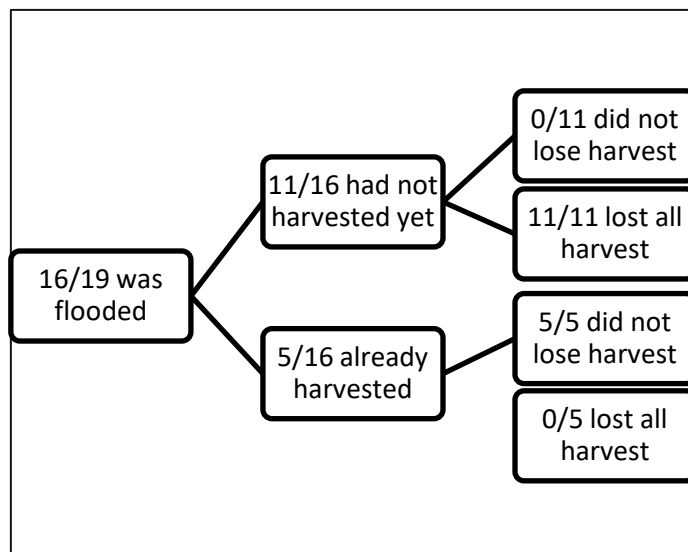
Figure 1. What happened with the harvest of the flooded farms?
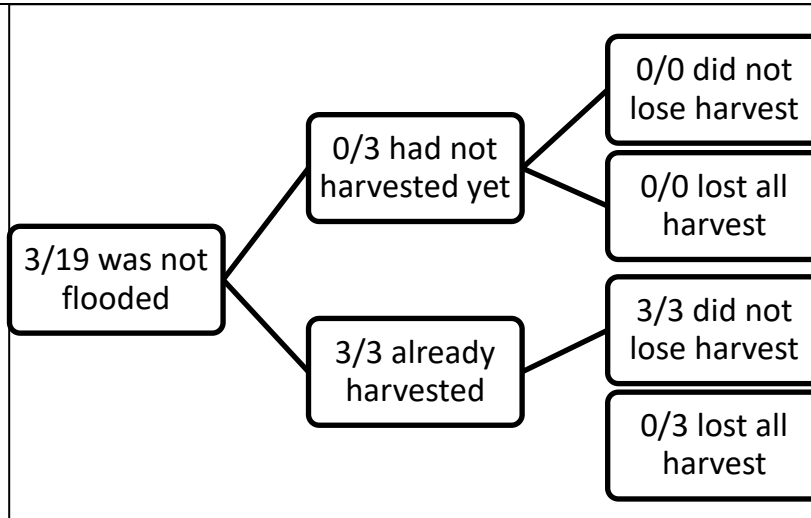
Figure 2. What happened with the harvest of the farms which were not flooded?

Questionnaire

Personal information/Background

1. What is your name?
2. How old are you?
3. What is the sex of the respondent?
4. Are you married?
5. Do you have children?
6. What kind of crop do you cultivate?
7. Do you have livestock?
8. What is the total land area of your farm?
9. How long have you been a farmer?

Lawin: warning

10. When did you hear that a typhoon was coming?
11. How did you hear that a typhoon was coming?
12. What kind of information was given?
13. Did you already know it would be a strong typhoon?

14. Were you informed the same way as with former typhoons?

Lawin: preparation

15. What did you do to prepare your house for the typhoon?
16. Did you evacuate?
17. What was the damage to your house?
18. Was there something you could do to prepare your farm for the typhoon?
19. Was your house and/or land flooded?
20. What did you do with you livestock to prepare for the typhoon?

Typhoons general

21. What was your reaction when you heard Lawin was a super-typhoon?
22. a. How do you prepare for a category 1 typhoon?
    b. How do you prepare for a category 2 typhoon?
    c. How do you prepare for a category 3 typhoon?
    d. How do you prepare for a category 5 typhoon?
23. a. What kind of damage do you usually have after a category 1 typhoon?
    b. What kind of damage do you usually have after a category 2 typhoon?
    c. What kind of damage do you usually have after a category 3 typhoon?
    d. What kind of damage do you usually have after a category 5 typhoon?
24. Do you think you will prepare different for the next typhoon after experiencing super-typhoon Lawin?

THE IMPACT OF TYPHOON HAIMA/LAWIN ON CORN FARMERS IN CABAGAN AND SANTA MARIA, ISABELA PHILIPPINES

Marc van der Meide and King Pagaran

"It will take many years for the farmers to recover from typhoon Lawin and it will get harder for them because of climate change"
- Josephine G. Bautista, MAO, Santa Maria

INTRODUCTION

The Philippines is an agricultural land and many of its citizens are dependent on farming and rearing animals to support their family and provide their financial needs (Fajardo 1993; Persoon *et al.* 2009). But because of its geographical location, the Philippines is prone to many catastrophes like earthquakes, typhoons and landslides. The Philippines is visited by a quarter of all typhoons, approximately 20 every year, because typhoons usually develop in the western part of the northern Pacific Ocean (Cinco, et al. 2006; Huigen and Jens 1997). The northern island Luzon is subject to most of the tropical cyclones that occur (Bankoff 2003).

Last October 19, 2016, the Philippines suffered from super typhoon Lawin. It had a diameter of 800 km, maximum winds of 225 kph, gustiness of 315 kph and its maximum speed was 26 kph (Tabel 2017). This typhoon devastated the crops and animals in the northern Luzon like the province of Isabela (Masigan 2017). Two of the towns in Isabela that were greatly affected are Cabagan and Santa Maria (Sta. Maria). The local farmers from these towns suffered from a great loss to their farm that was destroyed by typhoon Lawin.

Corn is second to rice as the most important crop in the Philippines, with one-third of Filipino farmers, or 1.8 million, depending on corn as their major source of livelihood. White corn is the most important substitute staple in periods of rice shortage, especially for people in rural areas. Yellow corn is the primary source of feed for the Philippines' animal industry, and is being increasingly used by the manufacturing sector. So the production of corn is greatly affected in times of natural calamities (Gerpacio 2004).

It is important to understand the impact of typhoons to know how societies can better cope with them. Because typhoons are very destructive to people most especially to the farmers that are very dependent on the local climate in order for them to have good yield to finance their needs. It is also important to know how we are going to lessen the impact of typhoons that may occur in the future.

This report will investigate the economic impact of typhoon Lawin on corn farmers in Cabagan and Santa Maria. For future recovery actions, the damage of typhoon Lawin needs to be assessed. Besides one comprehensive study (Huigen and Jens 1997) on the impact of typhoon Harurot in 2003 on farmers in San Mariano (Isabela, the Philippines) there has not been much attention of the scientific world on the impact of typhoons on farmers. This research will focus on corn farmers in Cabagan and Sta. Maria. This knowledge may later be used to improve the resilience to typhoons of the farmers in Isabela (Soriano 2017).

Only the direct economic impact on the farmer's land is measured in this report. This means other factors such as indirect effects and secondary effects (UNDRO 1979) are neglected. These

effects include losses from permanently damaged land, lack of services (irrigation, suppliers and traders unable to reach farmer), ecological changes or problems with paying back loans.

Research location

The research location was divided into three areas: Cabagan urban; Cabagan rural and Sta. Maria. Both towns lie along the Cagayan river on the opposite sides of a bridge. Cabagan is the larger of the two.

Cabagan Urban consists of 9 different *barangays* (the smallest unit of government in the Philippines, comparable to a neighborhood or village in size). In Cubag, Ngarag, Anao, Catabayungan, Ugad, Casibarag Norte and Sur, agriculture is the main livelihood. They farm crops such as vegetables, rice, and corn. For the farmers in Cubag, Ngarag and Anao, their land is just near the Cagayan river and they have a problem when the water rises, resulting in floods and soil erosion. It is in Luquilu and Centro where you can find the mall, grocery stores, the Municipal hall and other establishments. In Luquilu and Centro are less farmers because many of the citizens living here are government employees.

In Cabagan rural, the *barangay* Masipi East and West are composed of upland and lowland farmers. The soil types are clay soil that suits for growing rice and loamy soil for corn and other crops. Corn is the main upland crop and rice, the main lowland crop. There are also some crops being grown in this area like vegetables (e.g. eggplant, *pechay* (local vegetable), squash) cassava, banana, coconut, and fruit trees such as mangoes, guyabano and avocado. Besides this, livestock, poultry and fishes are being reared by farmers to sell or for their own consumption. Carabao is the most important livestock for the farmers because this serves as their helper on the farm particularly in plowing, harrowing and for transporting of their harvested crops.
Barangay Pilig Abajo is a plain area with a sandy loam type of soil that is suitable for growing corn and tobacco. Most of the people here are upland farmers and corn is their main crop. This *barangay* is located near the river side, which makes them a flood prone area during rainy seasons or typhoons. Ducks and chickens are the main poultry here, which are for own consumption only. Cow is the most important livestock for the farmers here because it is used to warm climates and able to withstand the heat for a longer period of time. Unlike the carabao which cannot withstand heat for a long time.

Angancasilian and Garita are lowland *barangays* located near the Isabela State University; farmers here plant corn and rice. Most of the farmers prefer to plant rice because of the irrigation system, especially in Garita.

Sta. Maria is a small town. People living here are mostly farmers and they are very dependent on farming as their source of living. The most common crops that are being grown by farmers are: rice, corn, peanuts, sugarcane and vegetables. And some people are rearing animals like cattle/cows, water buffalo, pigs, and goats. When natural calamities like typhoons hit Sta. Maria, the most greatly affected are the famers wherein their crops are being destroyed and flooded, most especially to those fields that are located near the Cagayan River. Our research focused on those low-lying *barangays* or the so-called "Lower Vega" where the *barangays* here are prone to floods like Mozzozzin Norte, Mozzozzin Sur, San Rafael East, San Rafael West, and San Buenavista.

RESEARCH QUESTIONS

The main research question that this research aimed to answer was: What was the impact of typhoon Lawin on corn farmers in Cabagan and Santa Maria?
1. How did typhoon Lawin damage corn?
2. What was the financial cost of the damage?
3. Are farmers afraid of coming typhoons?

METHODS

The interviews were conducted with four groups of two students. Each group visited a different area (two in rural Cabagan). All groups used the same questionnaire and interviewed farmers with different kinds of crops. By interviewing in this way, more farmers could be interviewed and data was gathered from a large area. The four groups divided the different crops and animals into four categories: rice, corn, livestock, poultry and other plants (peanut, tobacco, mango, banana and vegetables). This report is about the impact on the corn farmers.

The respondents are farmers that come from a large variety of *barangays* and the total amount of respondents is 80 (Figure 1), with a maximum of one respondent per household taking whoever was available. From the 80 respondents, 62 farm corn (Figure 2). The terms respondent and farmer are used interchangeably in this report. The interview consisted of personal information, the productivity of the land before and after typhoon Lawin and questions about how the farmers experienced the typhoon (Appendix 1). The interviews were conducted in the local dialect with the help of the Filipino students. The data was put into an excel spreadsheet afterwards, this file was used as a database for all four of the groups. This database is available upon request at ISU Cabagan and the Mabuwaya foundation.
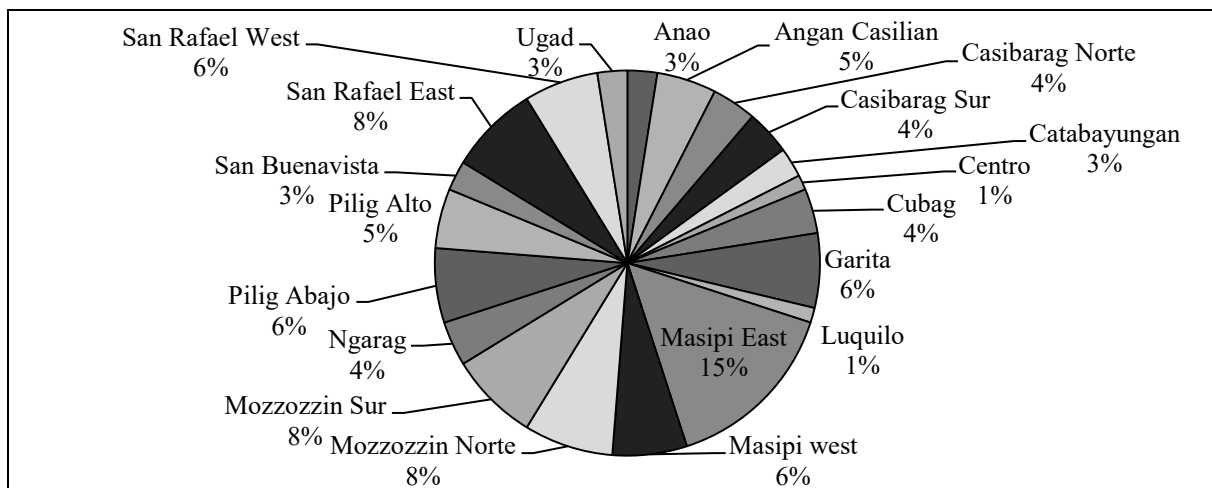
Figure 1: Percentage of all respondents per *barangay* in the research in alphabetical order. (n = 80)
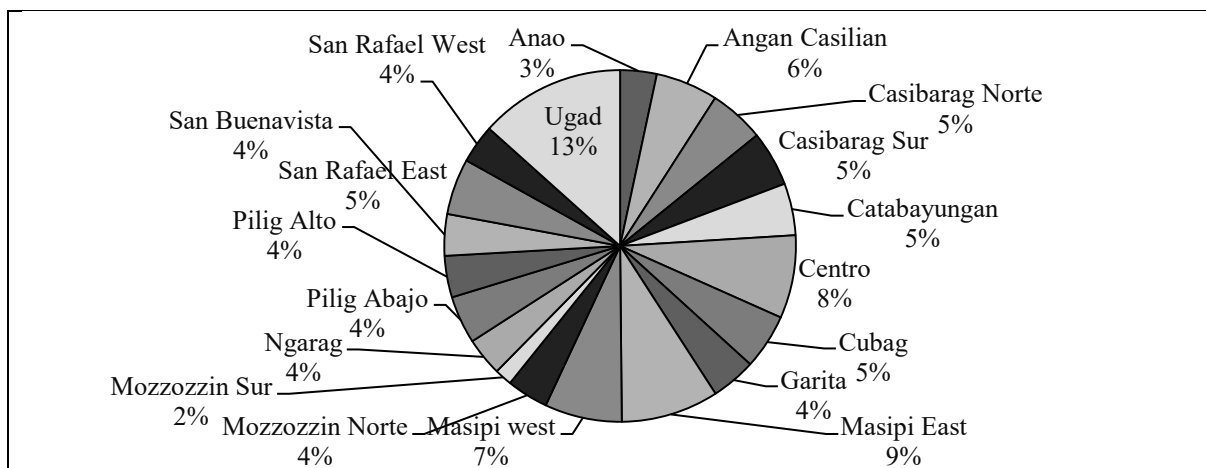
Figure 2: Percentage of corn farming respondents per *barangay* in alphabetical order. (n = 62)

The respondents in Sta. Maria were found by first contacting the local *barangay* captain, from where we could find farmers. After the first interview, we would ask the farmer if he knew other people that were also farming, thus using the snowball method. The other three groups also used the snowball method for gathering respondents.

The main goal of the interview was to assess the damage to their crop and have the farmers share their story about typhoon Lawin. Because this research takes place months after the typhoon, the damage cannot be assessed first hand and needs to be gathered through interviewing the farmers as they best know what happened to them.

Measuring the impact of typhoon Lawin is done by seeing per *barangay* how much of the corn harvest was lost as a percentage. The normal yield is then compared to the yield after the typhoon. As the farmers who have lost everything still have an investment in their crop, the total financial cost is then calculated (Figure 5). Finally, the farmers were asked several questions regarding how they deal with the aftermath of the typhoon and their stance towards the possibility of more typhoons hitting the area.

Besides interviewing respondents, we also visited the Municipal Agricultural Office (MAO) in Sta. Maria and received general information on their response to typhoon Lawin.
The interviews were done for several days. The data was then processed on the following days. Finally, this report and a presentation were made (Table 1).

Table 1: The schedule

Date	Activity	Location
January 18, 2017	• Meeting with the Mayor of Sta. Maria and *barangay* Captain of Mozzozzin Norte and Mozzozzin Sur for courtesy call • Start of interviews for our 6 farmers	• Municipal Hall of Sta. Maria • Mozzozzin Norte and Mozzozzin Sur
January 19, 2017	• In the morning, we interview 6 farmers • In the afternoon, we met with the *barangay* Captain of San Rafael	• Mozzozzin Sur • San Rafael East and San Rafael West

	East and San Rafael West, and we interviewed 6 farmers in San Rafael East	
January 20, 2017	• In the morning, we went to San Rafael West to interview 4 farmers	• San Rafael West
January 21, 2017	• In the morning, we went to the internet Café to start encoding our data and we continued it in the afternoon in CCVPED	• Karina Internet Café • CCVPED
January 22, 2017	• Rest Day	
January 23, 2017	• We went to Municipal Agricultural Office and we interviewed 2 mango Farmers	• Sta. Maria Municipal Hall, MAO • San Buenavista
January 24, 2017	• Anneroos and Marc discussed basic Excel and Statistics and we continued to worked with our report	• CCVPED
January 25, 2017	• We went to the Internet Café to work on our report	• Karina Internet Café
January 26, 2017	• We stayed at the CCVPED and worked on the report and presentation	• CCVPED
January 27, 2017	• Presentation day	• CCVPED

RESULTS

Comparison of yields per barangay

The damage of typhoon Lawin on the corn farmers ranged between 3% and 55% of the normal harvest per *barangay* (Figure 3). The damage was usually that the fields flooded or that the strong winds had blown the corn down. Three farmers reported that up to half of their land was lost in a landslide, resulting in a permanent loss of land. This damage is not further considered in this report. In total, 28% of the harvest of the respondents was lost.

PERCENTAGE OF HARVEST LOST

■ % of harvest survived   ■ % of harvest lost

28% 38% 48% 7% 55% 16% 53% 5% 3% 31% 22%

ALL, ANAO, ANGAN CASILIAN, CASIBARAG..., CASIBARAG SUR, CATABAYUNGAN, CENTRO, CUBAG, GARITA, MASIPI EAST, MASIPI WEST, MOZZOZZIN..., MOZZOZZIN SUR, NGARAG, PILIG ABAJO, PILIG ALTO, SAN BUENAVISTA, SAN RAFAEL EAST, SAN RAFAEL..., UGAD
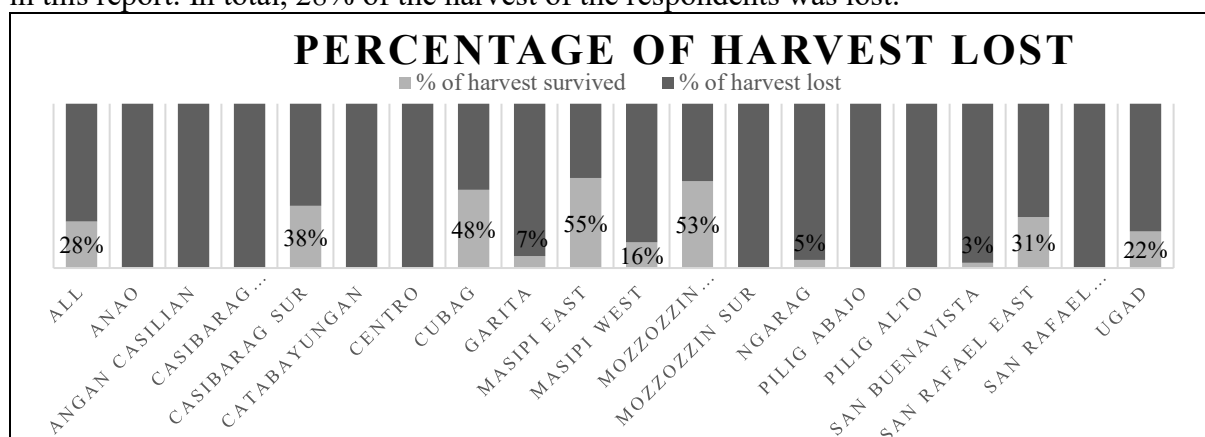
Figure 3: Percentage of the harvest lost in each *barangay*, if no percentage is shown, 100% was destroyed.

Corn harvested before and after Lawin
The farmers that lost most of their harvest are located primarily in low lying areas along the Cagayan river. Although all areas were suffered from the typhoon, some areas were hit harder than others. The damage per *barangay* was divided by the amount of interviewed farmers in the *barangay* (Figure 4). The highest normal average yield per farmer is 270 *cavans* (a bag of processed crop, 50 kg for rice and corn, 35 kg for peanuts) in Angancasilian, the greatest average yield after Lawin was 113 *cavans* in Masipi East.

AVERAGE YIELDS BEFORE AND AFTER LAWIN PER FARMER

■ Average normal harvest per farmer (cavan)   ■ Average harvest per farmer after Lawin (cavan)

Figure 4: The yields before and after typhoon Lawin per *barangay* in *cavan*, the number of respondents per *barangay* is shown in brackets.
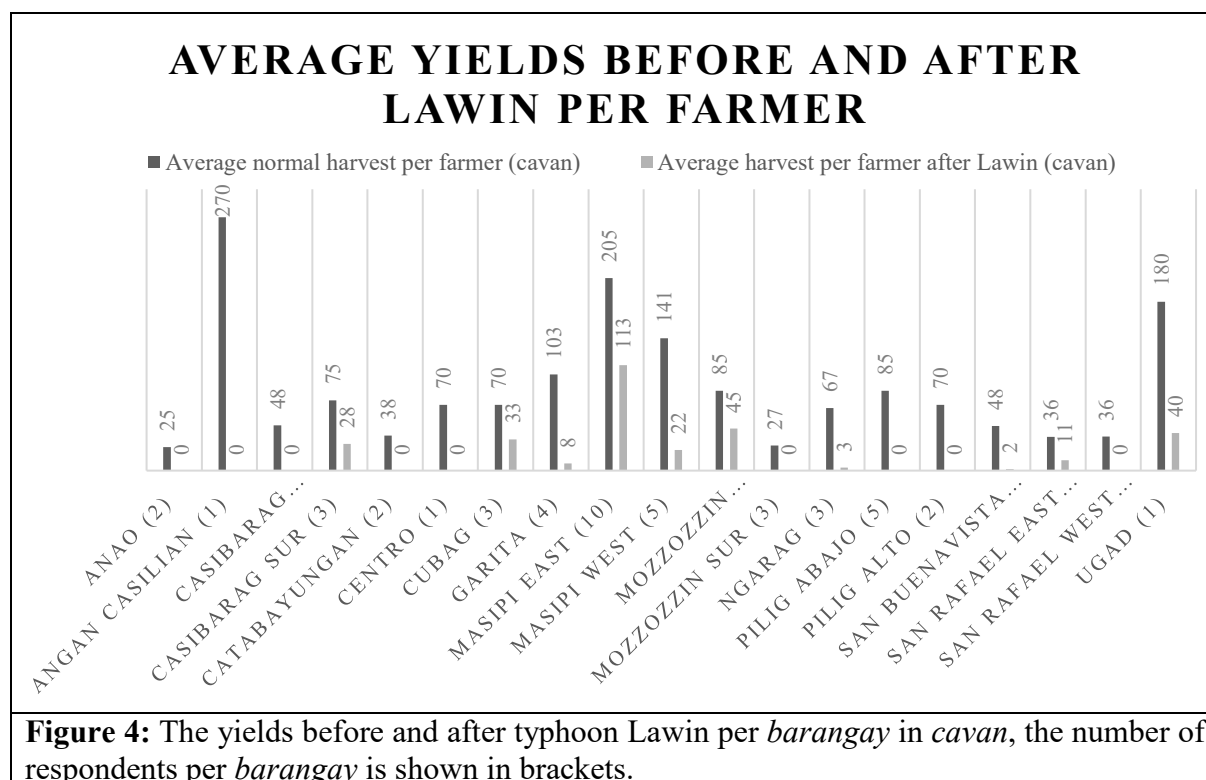
Financial losses
With the physical impact on the yield known, the loss to the farmers can be calculated. This is done by multiplying the lost yield by the normal sell price per *cavan*, which was gathered from the questionnaire, the average sell price is 621 PHP (n = 62, std. dev = 172). From this amount, the expenses for the land are subtracted, the average expenses are 22452 PHP/Ha (n = 62, std. dev = 16873). The respondents have been divided into groups by lost income (Figure 5). The average loss per respondent and the total losses have also been calculated (Table 2).

Table 2: Summary of the losses of the respondents, all values in PHP. (n = 62)

	Average loss from typhoon per farmer	*Std. dev*	*Normal average profit/Ha*	*Std. dev*	*Total loss*
Yellow corn	39,940	46,826	20,094	27,345	2,476,306
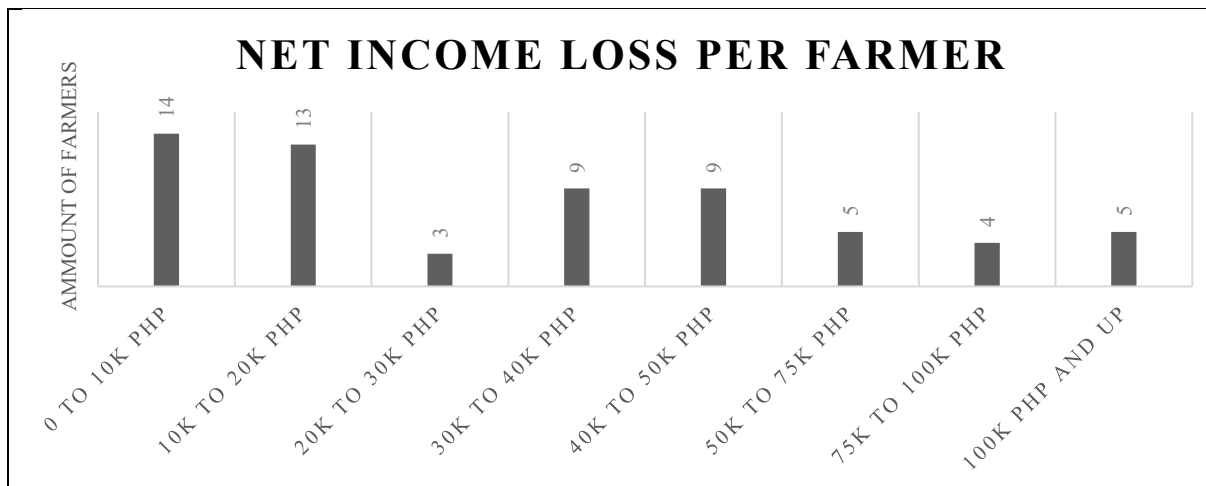
Figure 5: Net income loss per farmer, shown divided into ranges

Summary of the open questions
The snowball method proved very effective in Sta. Maria and other research areas. This section shows a summary of the results gathered from the open questions of the interview (Appendix 1)

Does the typhoon affect the coming cropping?
Out of 80 respondents, 25 had already harvested and some had not yet planted before typhoon Lawin hit the region. It should be noted that many farmers in Pilig Alto mentioned that they do not farm corn in the winter season because the risk of floodings is greater. There is no number known of how many farmers already harvested because of the typhoon or because of other reasons. The rest of our respondents mentioned that typhoon Lawin affected the next coming planting season. These are the effects of the typhoon to the coming cropping: 19 farmers mentioned they cannot pay back their last loans so they will loan again from a financer for the next planting season; 13 farmers mentioned that the planting of corn will be delayed because of the debris of trees carried by the strong winds and floods, and the soil is still wet which may cause rotting on the corn seeds; 1 famer mentioned that because of the floods, some pests showed in the fields like worms; 1 farmer will sell some part of his lands to finance the coming planting season and 2 farmers mentioned that it is hard for them to find a financer.

What are the advantages of the crops you choose?
The respondents answered that the advantages of the crops they choose are: 22 farmers answered that it is suitable for the land; 4 farmers answered that planting of corn is easy; 3 farmers answered that it is the crop they are prioritizing; 11 farmers answered that the inputs are cheaper and more profitable than other crops; 4 farmers answered that the corn does not need an irrigation as rice has.

Did the Typhoon give any disadvantages? (e.g. salvaged logs)
Out of 80 respondents, 42 did not receive any advantages from the Typhoon and 3 of the respondents told us that the typhoon gave them a lesson such as they need to prepare ahead of time while 16 farmers used wood for cooking that came from the branches of the trees and the trees themselves, 5 farmers used it to rebuild their house and 1 farmer sold the wood he found on the land.

What does it mean to you that you lost your harvest?

There are 46 respondents who answered that they are sad, worried and angry because they cannot pay back their loans, they will have more debt, they will expend a lot of money to plant again and to rebuild their house, and thinking of how they will recover. One respondent was very positive he said that they need to accept their loss because they cannot predict the weather, 2 respondents said that staying calm and relaxed is the best they could do because worrying and being nervous may cause a heart attack and even death, and 2 respondents said that the most important thing is they survived and no one was hurt or worse. None of the respondents mentioned any reason to permanently stop farming as their way of life.

Are you afraid that the next Typhoon will harm you?

All of our respondents are afraid of the next typhoon that may harm them again because of the following reasons: (1) their houses and crops will be damaged again and expend more money to start again and to recover; (2) it may cause fear and trauma for their family; (3) they are worried for the security of their families; (4) and afraid of losing their harvest again because it might again erode and be washed away by the Cagayan river and may cause permanent loss of land.

Response of Municipal Agricultural Office of Sta. Maria

The Municipal Agricultural Office gave seed assistance that came from the Department of Agriculture to the farmers affected by typhoon Lawin but the allocation was not enough to satisfy the needs of all the farmers affected by this typhoon. The MAO sent representatives to the farmers to visually assess the damage to the farms. This information was then passed along to the head of the MAO. She analyzed the data and made a report. Also, they are promoting the Integrated Cropping System like Multi-cropping and Intercropping rather than mono-cropping because these two Integrated Cropping System are more profitable and more practical to implement to avoid great loss in the yield during natural disasters.

DISCUSSION

The corn was primarily damaged by floodings and the strong winds, 28% of the total corn harvest of the respondents survived the typhoon. The average loss per respondent is 39,940 PHP and the total loss to the respondents was 2,476,306 PHP. All farmers that were interviewed fear for more typhoons but have accepted it as the reality of farming in the Philippines. The impact on the corn farmers was extensive both materially and emotionally.It should be noted that the data gathered only shows the damage to respondents and should not extrapolated to the entire population of Cabagan and Sta. Maria.

Of the corn farming respondents, 25 already harvested before the typhoon. There is no number known of how many farmers already harvested because of the typhoon or because of other reasons. Upon watching the news on Television about the coming typhoon (Lawin) and with the help of the Municipal Disaster and Risk Reduction Management Office (MDRRMO) of Sta. Maria and Cabagan to announce the landfall of typhoon Lawin on the Municipality having a typhoon Warning Signal # 5, some farmers were already aware and warned of the possibilities that there was lot of damage expected. To avoid this expected damage, some of our respondents decided to harvest their crops ahead of time before the typhoon made landfall.

None from our respondents mentioned that they will shift from other crops or to stop farming because it is what they used to do and the crops that they are growing are suitable for the land. Also, some farmers have a positive mindset about the damages brought by this typhoon because they said that they cannot predict the weather so they must accept it. They are also mentioning

that farming is like gambling: there's a time we will be having a great yield and there's also a time we will lose some of our yield. Some farmers may not have attained a high level of education so it is hard for them to find another job to sustain their financial needs.

One recommendation for future research would be to ask farmers their educational attainment. Having a higher level of education may increase the resilience of individual farmers as they can better maximize the yields and profits of the fields that they have. Having this ability will ensure that the farmers can save (more) money and use it in case of calamity.

ACKNOWLEDGEMENTSS

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APPENDIX 1

Questionnaire
Name:
Age:
Gender:
Occupation/livelihood:
Ethnicity:

- Could you tell your story about the Typhoon?

- What did you have before typhoon Lawin?

- How big is your _____ field?

Draw map

- Did you have livestock ___YES or ___NO?
  - If yes, what kind?   How many?

- Did you have poultry ___YES or ___NO?
  - If yes, what kind?   How many?

- How much did you invest in _____?
  - Fertilizer _____
  - Labor _____
  - Seeds_____
  - Other_____
  - Total _____

- How much of your _____field did you lost after typhoon Lawin? *(map)*
  - How many Cavan could you still sell?
  - How much money did you get for this

- How many animals/poultry died?

- Does the typhoon affect the coming cropping?

- What are the advantages of the crops you chose?

- Did the Typhoon give any advantages (e.g. salvaged logs)

- What does it mean to you that you lost your harvest?

- Are you afraid that the next typhoon will harm you?

IMPACT OF TYPHOON LAWIN ON RICE FARMERS IN CABAGAN AND SANTA MARIA

Jhon Cristofer Ramiscal and Anna van Delft

INTRODUCTION

The lives of the Filipinos are very much influenced by the geographical location of the country. The country experiences a lot of natural disasters such as earthquakes, floods, droughts and typhoons (Visoro 2016, pers. comm.). In fact, the country has an estimate of 20 typhoons a year (Cinci, T.A., et al. 2006: Huigen & Jens 2006). Most of the time, it is not just the typhoon which causes the disaster, but the landslides, storm surges, and floods cause most losses in life and property. A typhoon is a tropical cyclone with very strong winds, which have to be over 118 kilometers per hour (Huigen & Jens 2006: 2116). A super typhoon has strong winds which have to be over 190 kilometers per hour (Bricker et al 2013: 805). According to a data analysis made by Bankoff (2003), Northern Luzon receives by far the most typhoons, and also the highest number of remarkable typhoons (Bankoff 2003 in Huigens & Jens 2006). On the 19th of October 2016, Cagayan Valley was hit by super typhoon Lawin (international name Haima). In the area of Cabagan and the neighbouring municipalities, the typhoon made a lot of impact on the livelihood of the people living there.

The Philippines is an agricultural land and so many citizens of the Philippines are farmers (Fajardo F. B. 1993; Persoon et al 2009). They are depending on farming and rearing animals to support themselves, their families, and their financial needs. Also farmers are one of the most vulnerable people when a typhoon hits because a typhoon can destroy their lands and have great damages on their occupation or livelihood. Typhoon Lawin devastated the crops and animals in north Luzon (Masigan L. 2017). One of the main crops in the Philippines is rice. Rice is the world's leading food crop and nowhere is this more obvious than in Southeast Asia. Here it is the chief food of roughly 80% of the population, and it is planted on 56% of the arable land. Overall, the land planted to rice more than equals the land planted to all other crops combined (Huke & Huke 1990: 10).

Most rice farmers are depending on irrigation systems although some do not use an irrigation system. The alternative solution for this is to build their own *deep-well*. Some farmers do not have the capital to build their own, that's why they need to rent a *deep-well* for them to be able to have enough water for their own rice fields. There are also two ways of planting rice, first is the broadcast/direct seeding method, second is the transplanting method. Broadcast or direct seeding is a method of which you broadcast the incubated seed directly to the prepared rice paddy while transplant method is to transfer the rice seedlings from the seed bed to the rice paddy that is ready for planting. If farmers have enough water (irrigation systems, deep well, or rain season), fertilizer and other nutrients needed to grow rice, they can harvest more or less 100 *cavans* per hectare.

Together with three other groups, we researched the effects of typhoon Lawin on farmers in Cabagan and Santa Maria. Our research will focus on rice farmers. We conducted our research in three areas, namely: Santa Maria, Cabagan urban, and Cabagan rural.

Sta. Maria is a small town of Isabela province composed of 20 *barangays*. People living here are mostly farmers and they are very dependent on farming as their source of living. The most common crops that are being grown by farmers are: rice, corn, peanuts, sugarcane, and

vegetables. And some people are rearing animals like cattle, *carabao*, and pigs. When natural disasters hit Sta. Maria, the most affected are the farmers whose crops were destroyed and flooded, especially the ones with their fields located near the Cagayan River. This research is focused on those low lying *barangays* called ``Lower Vega`` like Mozzozzin Norte and Sur, San Rafael East and West and San Buenavista, which are always prone to floods.

Cabagan Urban consists of nine different barangays: Cubag, Ngarag, Anao, Catabayungan, Ugad, Casibarag Mozzozzin Norte and Mozzozzin Sur. In this town, agriculture is the main livelihood. They farm crops such as vegetables, rice, and corn. For the farmers in the barangays, Cubag, Ngarag and Anao, their land was just near the Cagayan River and therefore, they are vulnerable to flooding and soil erosions. Commercial buildings, square park, mall, grocery stores, the municipal hall of Cabagan and other establishments are located in Luquilu and Centro. In Luquilu and Centro, there are less farmers than in the other barangays because many of the citizens living here are government employees and the others have their own businesses.

In Cabagan Rural, barangays Masipi East and West are composed of upland and lowland farmers. The type of soil is clay, which is suitable for growing rice and loamy soil, for corn and other crops. Corn is the main crop which is grown in the upland and rice is the main crop which is grown in the lowlands. In both areas, there are also some other crops like vegetables (eggplant, pechay, squash, etc.), cassava, banana, coconut, and fruit trees such as mangoes, guyabano and avocado. Chickens, ducks and fishes are being raised by farmers to sell or to use for their own consumption. Carabao is the most important livestock for the farmers because it serves as the helper on the farm particularly in plowing, harrowing and for transporting their harvested crops. Barangay Pilig Abajo is a plain area with a sandy loam type of soil that is suitable for growing corn and tobacco. Most of the people here are upland farmers and corn is their main crop. This barangay is located near the river side, which makes it a flood prone area during rainy season or typhoons. Ducks and chickens are the main poultry here, which is also mostly for own consumption. Cow is the most important livestock for the farmers here because it is used to warm weather therefore able to withstand the heat for a longer period of time, unlike the carabao which cannot withstand heat for a long time.

Angancasilian and Garita compose the lowland barangays of rural Cabagan. Farmers here are planting corn and rice, which are the main crops in this area. Most farmers here prefer to plant rice because of the lowland location and also because of the presence of an irrigation system.

RESEARCH QUESTIONS

The research question we chose for our research is: *What was the impact of Typhoon Lawin on farmers in Cabagan and Santa Maria?* To answer this question, we used several other questions.
4. *What was the financial cost of the damage for rice farmers?*
5. *How many hectares of farming land was lost for rice farmers?*
    - *Did the typhoon affect the coming cropping?*
6. *How did typhoon Lawin damage the rice fields?*
    - *What are the advantages of farming rice?*
7. *Did farmers experience any advantages of the typhoon?*
8. *Are farmers afraid of the coming typhoons?*

METHODS

Time schedule

Day	Activities
18/01	-We went to the *barangay* captain of Masipi East to ask permission to conduct our research on their area. -We interviewed five respondents in Masipi East -Meeting with our group in the evening: talked about our findings and research methods
19/01	-We went to the *barangay* captain of Pilig Abajo to ask permission to conduct our research in their area. -We interviewed four respondents in Pilig Abajo -Meeting with our group in the evening: Talked about our findings, research methods and started making categories
20/01	- We visited the National Irrigation Administration (NIA) to get more information about the damages on the irrigation systems. - We went to the *barangay* captain of Angancasilian to ask permission to conduct -We interviewed four respondents.
21/01	-We went to the *barangay* captain of Garita, to ask permission to conduct research in their area. -We interviewed five respondents.
22/01	**FREE DAY**
23/01	-We had a meeting with all four groups to divide the subgroups. -Together with the group who also focuses on rural Cabagan, we conducted three more interviews with our focus on vegetables and fruit trees.
24/01	-We spent the whole day putting all our results in excel and looked for literature
25-01	-We made graphs out of our excel document and started writing our report
26-01	-We spent the whole day writing and finishing our report and in the afternoon, we prepared the research presentation.

Methodology

As we mentioned above, we worked together with three other groups for our research. We all focused on the same topic and research questions but we conducted the research in different areas. One group conducted their interviews in Santa Maria; one group conducted their interviews in central Cabagan; and two groups conducted their interviews in rural Cabagan. We chose to work together because we only had a week to do research and now were able to do more interviews and therefore make our research stronger. After all four groups conducted our interviews, we divided our findings into four subcategories based on different kinds of farming and so that every group can write their own proposal. The four categories are: corn farmers, rice farmers, livestock farmers, and vegetables and fruit tree farmers.

To answer our main question and sub questions, we made a questionnaire to use during the semi-structured interviews. Before we conducted the interviews in a *barangay* we went to the *barangay* captain to ask permission for doing research in their respective *barangays*. We then tried to get our respondent using random-sampling, but more often we used snowball-sampling and availability-sampling because these last two sampling methods were faster. During our research we all made use of a questionnaire in which we would answer our research question

(appendix) to do semi-structured interviews among the different farmers in rural Cabagan, urban Cabagan and Santa Maria. All data served as a basis for the different groups. As a subgroup, we conducted 20 interviews in rural Cabagan in different *barangays* (Table 1). We also went to the National Irrigation Administration (NIA) and the other three groups went to the Municipal Agricultural Office (MAO) in both Cabagan and Santa Maria.

Table 1: Number of respondents per *barangay*

Barangay	Masipi East	Pilig Alto	Angan Casilian	Garita
Number of respondents	7 respondents	4 respondents	4 respondents	5 respondents

RESULTS

The total number of respondents (all farmers) for all four groups together is 78 and the number of *barangays* we all visited is 19 (Figure 1). Of these 78 respondents, 39 are farming rice. These respondents can be found in 12 of the 19 *barangays* (Figure 2).
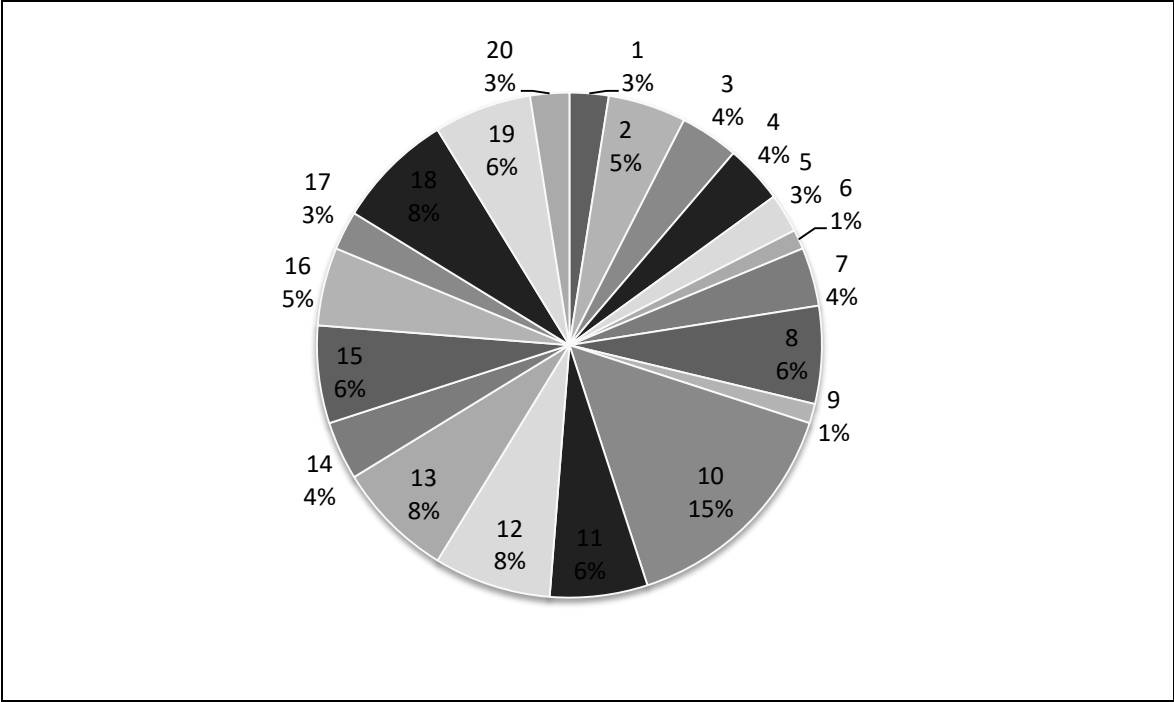
Figure 1: Percentage of total respondents per *barangay* (all groups together).
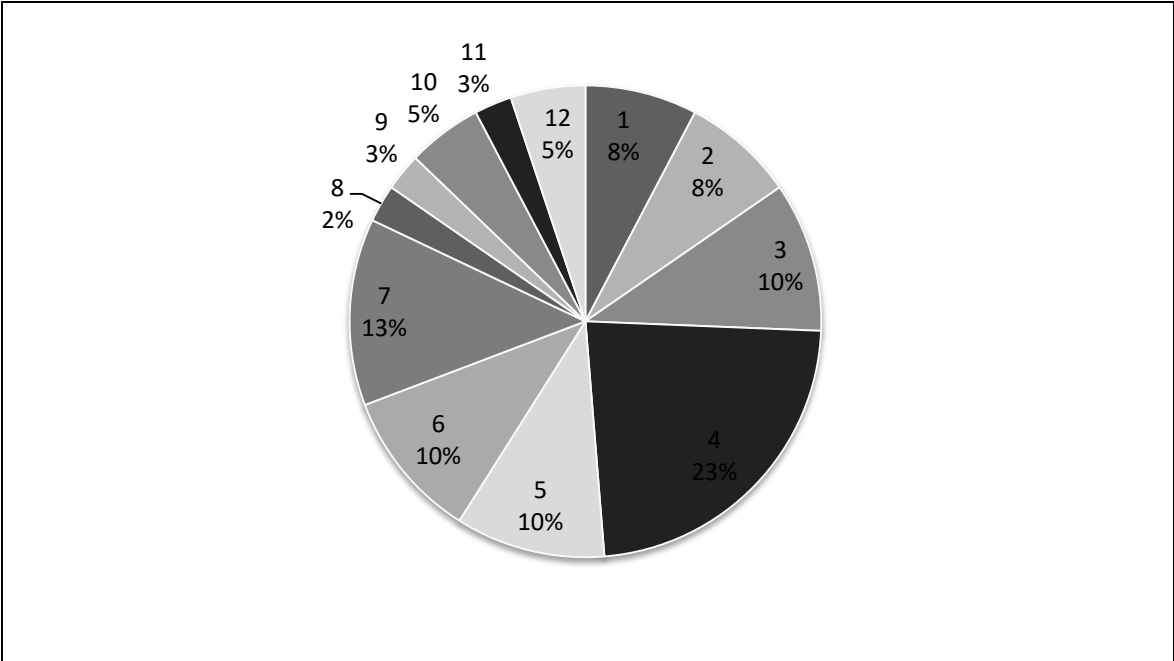
Figure 2: Percentage of rice farming respondents per *barangay*

Of the 39 respondents we had, only 5 respondents didn't experience any losses of income due to the typhoon. Most of our respondents lost between 20,000 PHP and 40,000 PHP on their rice crops because of the typhoon Lawin (Figure 3). The average of harvest in rice lost per *barangay* is more than 60 percent (Figure 4). After we focused on the disadvantages of typhoon Lawin on farmers, we also looked if there were any advantages of the typhoon. In the graph we show all our respondents, not only the rice farmers (Figure 5).
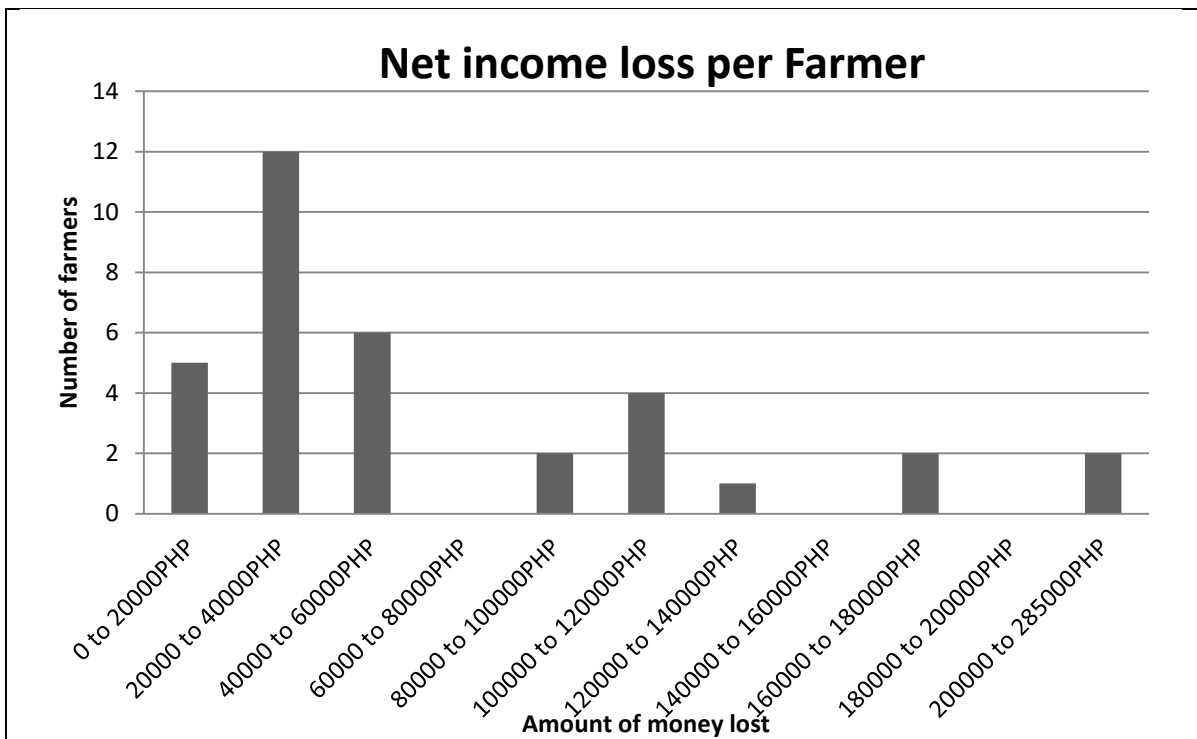
Figure 3: income loss rice farmers (n=33)
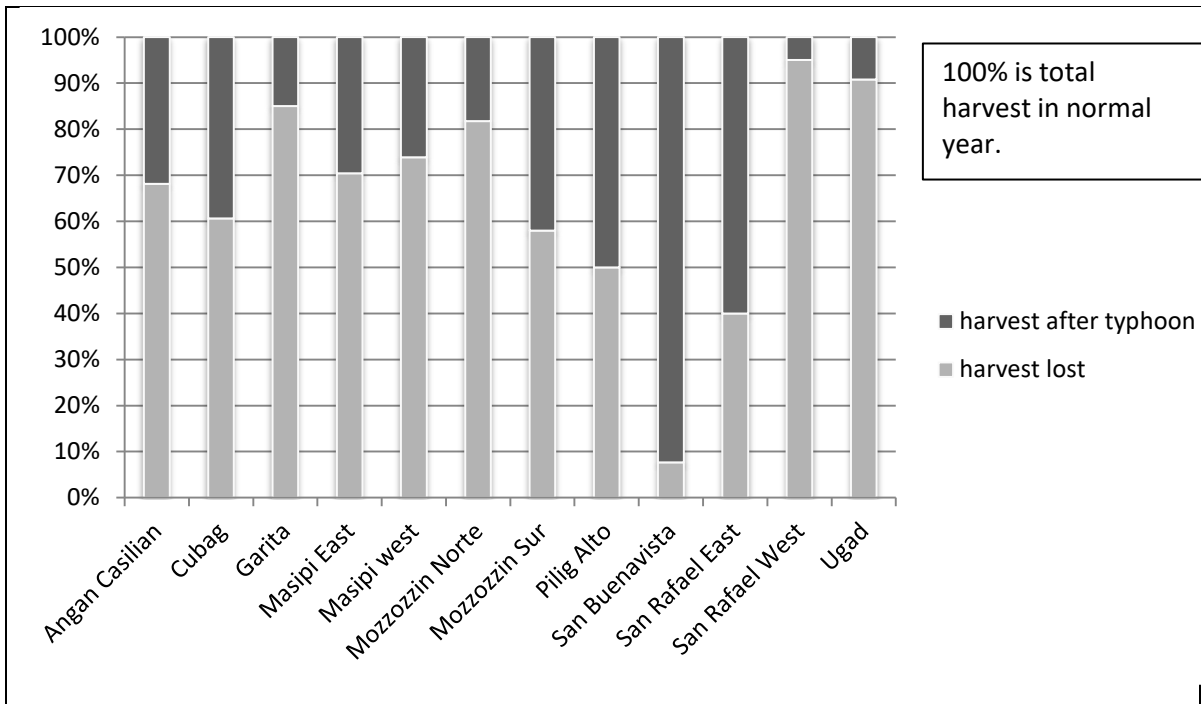
Figure 4: percentage total harvest lost (n=39)
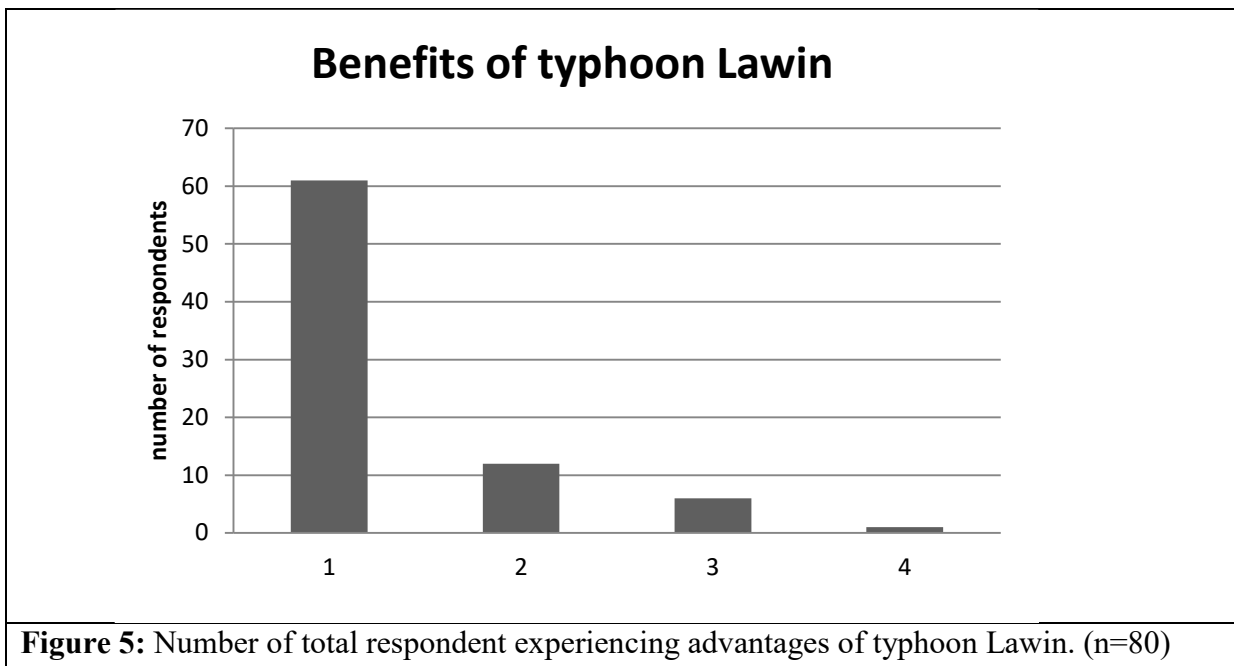
Figure 5: Number of total respondent experiencing advantages of typhoon Lawin. (n=80)

DISCUSSION

Answers to open question

Before the landfall of the typhoon, everyone was preparing as much as possible. When the typhoon hit the communities, everyone experienced fear. Roofs were blown away, rain went inside their houses and everyone stayed awake the whole night. Everyone experienced damages to their houses but also almost all of the farmers we interviewed experienced losses to their crops.

Does the typhoon affect the coming cropping?
There were a lot of similarities in the answers to this question. Most of the respondents said that typhoon Lawin did really affect their coming cropping, because almost all their rice crops were devastated and some of them didn't get any *cavan* from it. Because of this, most farmers are in debt now and they don't know how to start again. As an answer to this question one of our respondent says; "Of course it does. Next to the direct impacts of typhoon Lawin which devastated our rice fields, we also experienced that long period of drought season. Because of this, we are not able to pay our debts. It's a two-hits-bankrupt." (From interview with Nestor Quilang).

What are the advantages of the crop you chose?
Some of our respondents are planting rice because of the location of their fields. Lowland is more suitable for rice than for other crops. Most respondents said that planting rice is much better than planting other crops because you don't have to invest a big amount of money for the inputs compared to other crops. As an answer to this question one of our respondents said, "Rice is a stable food, you can at least plant rice twice a year, and has a lower cost or investment compared to the other crops. But still there are problems with farming rice. We don't have a well and now after the typhoon the irrigation system is not working so are planting cycle is delayed which costs us a lot of money." (From interview with Jose Gannaban)

Are you afraid that the next typhoon will harm you?
Almost all our respondents react the same way on this question. Not only their crops were devastated by typhoon Lawin but they also experienced damages to their houses. They feel a little bit traumatised and are scared that they will experience another typhoon

Discussion

Out of all our respondents, most rice farmers can be found in Masipi East, Masipi West, and Garita (Figures 1 & 2). Everyone of our respondents in these *barangays* had a rice field or worked on the rice field of someone else.

To summarize the results a total of 63 percent of harvest is lost for rice (Figure 4) and most of the rice farmers lost a big amount of money (Figure 3). The six missing respondents in Figure 3 are respondents who didn't lose any rice after typhoon Lawin (Figure 3). These farmers already harvested their rice field before the typhoon made landfall. The respondent who had the biggest losses in rice lost 285000 PHP compared to a normal year (Figure 3). This is because he has a big land so the losses are much higher compared to the respondents with a smaller land. Also we have to keep in mind that these are only the losses for the rice fields, many farmers were farming corn of vegetables next to rice.

The big losses in rice among farmers is not only caused by the direct impact of the typhoon. According to Maria Teresa Viernes, who is the irrigation Development officer of the NIA an average of 50% of the losses in Cabagan in rice is also caused by the failing irrigation system.

After Lawin, the irrigation system in Cabagan did not work anymore. Due to the heavy rainfall, the Pinacanauan River which is supposed to fill the main irrigation canal took a different route (Viernes 2017, pers. comm.). Also the canal was filled with sand and stones so the water couldn't flow anymore. As for today they fixed the route of the river back towards the canal by digging. But the whole irrigation system is not yet fixed and can't be used by a lot of rice

farmers in the area (Viernes 2017, pers. comm.). The failing of the irrigation system causes droughts on the rice field of several farmers. So three months after the landfall of the typhoon some farmers still experience droughts on their rice fields. The result of this is that for some farmers the planting cycle for rice was delayed. Some farmers still planted rice without using the irrigation systems and were dependent on the December rains, these farmers didn't have another source of livelihood so they didn't have a choice to wait until the irrigation system is fixed. When the rains didn't came these farmers also lost some of their rice. We can link the damages in the rice crops due to the failing of the irrigation system to Huigens & Jens (2006).

They say that social processes and underlying causes is what makes people vulnerable, it's not just the disaster itself. Also the context of the disaster of a typhoon is not only physical, but institutional, political and social as well, and a disaster is also caused by its context and not only part of it (Huigens & Jens 2006: 2117). The failing of the irrigation system is an underlying cause and the wanting to have a irrigation system to use for your rice field is a social process.

Also relying on certain systems makes a farmer more vulnerable towards a disaster such as a typhoon. Disasters are not only physical environmental phenomena's but more characteristics of societies (Olivier-Smith 1994 in Bankoff 2008: 41). The impact of the typhoon is very big because it damages the things people rely on. Farmers rely on their farmland, so when a typhoons hits their area the typhoon damages their whole livelihood. We saw this as well when we asked the respondents about the effects of the typhoon on the next cropping. Most farmers are in debt now and do not know how to go back to their livelihood because they don't have enough money to buy inputs.

When we look at the impact of typhoon Lawin, we also have to ask if the typhoon brought any advantages for the farmers (Figure 5). Even though some people did get any logs to use on their property, or found a lot of wood to use for cooking, it doesn't nearly cover the disadvantage of typhoon Lawin (Figure 5). An advantage of the typhoon which we didn't put in our research is that after this typhoon people are more aware of the impact of a super typhoon on their lands. This we found out by asking if our respondents were afraid for the next typhoon.

Limitations
One should keep in mind that the data we gathered only shows the information we got from the respondents. Our database is too small to be used to say something for the entire population.

Conclusion
To conclude, the average of our respondents in Cabagan and Santa Maria lost 63% of their rice harvest due to typhoon Lawin. Most of these were caused by the direct impacts of the typhoon, such as strong winds and floods. But some of these were also caused by the irrigation system that was damaged after the typhoon so some farmers had to depend on the rain only. Hence, a bulk of the harvest was also lost because of droughts. So far the irrigation system has not yet everywhere been repaired in the area.

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APPENDIX

Questionnaire
Name:
Age:
Gender:
Occupation/livelihood:
Ethnicity:

- Could you tell your story about the Typhoon?

- What did you have on your farm before typhoon Lawin?

- How big is your _____ field?

Draw map

- Did you have livestock ___YES or ___NO ?
  - If yes, what kind?   How many?

- Did you have poultry ___YES or ___NO ?
  - If yes, what kind?   How many?

- How much did you invest in _____?
  - Fertilizer _____
  - Labor _____

- - Seeds_____
  - Other_____
  - Total _____

- How much of your _____field did you lost after typhoon Lawin? *(map)*
  - How many Cavan could you still sell?
  - How much money did you get for this

- How many animals/poultry died?

- Does the typhoon affect the coming cropping?

- What are the advantages of the crops you chose?

- Did the Typhoon give any advantages (e.g. salvaged logs)

- What does it mean to you that you lost your harvest?

- Are you afraid that the next typhoon will harm you?

We used two tables with all the different crops before and after the typhoon to fill in.

IMPACT ON THE LIVESTOCK AND POULTRY IN CABAGAN AND SANTA MARIA

Reyward Managuelod and Teun Bolsius

INTRODUCTION

Way back October 19, 2016, Typhoon Lawin struck the northern part of Luzon, particularly in the municipality of Cabagan, and left massive damages. Looking at the agricultural damages, millions of PHP were lost, especially on the part of livestock and poultry. Some animals drowned due to storm surge or flash floods, some died due to extreme colds and some died due to flying objects (EC-JRC/ECHO 2016), but some of the livestock and poultry of the farmers luckily survived the typhoon, because they were able to secure them before the typhoon struck. Particularly the so called marginal farmers were the victims of this natural disaster, whereas the medium and large farmers had other means than farming to convene resources to support their families. Small farmers did not have this opportunity and a great proportion of these farmers lost their total wealth that consisted of their home, their farm and sometimes forgotten, parts of their livestock. The total agricultural, financial damage caused by Lawin is estimated at 212 million USD (UNOCHA 2016). However, this is a total estimation.

Most of the farmers are small farmers which means their livelihood or the source of their income is depending on farming exclusively, so if a catastrophe like typhoon Lawin will hit their farm area, it will cause a big loss on harvest and maybe their animals and it will be a big problem for them, because they have nothing else than farming to rely on. For marginal farmers, these animals are not always sold, but are held for their own consumption, thus playing a significant part of the diet of a farmer's family. The following animals are commonly held on a Filipino small scale farm.

The animals
Most of the farmers raise livestock and poultry in their backyards (*backyard farming*). Some of the animals, like chicken and ducks in particular are confined in an area like the backyard and food is provided for them adlibitumly (continuous feeding), or sometimes they are released in an open area to find food for themselves. For other livestock such as carabaos, cows, goats and horses are constrained in a grassland area.

The *carabao* is known to be the most hardworking animal and the Philippines' national animal, typically, Filipino farmers used the Asian water buffalo for drafting purposes particularly in rice fields and corn fields such as plowing and harrowing. This is also the most important livestock among the others for them. The *cow* is known for its ability to withstand high temperature, that is why some of the farmers especially those living on the upland areas, were also using cows as the alternative of *carabao* in working on the fields. *Horses* were once part of the means of transportation way back 1900s, but because of technology many transportation vehicles came out and overpowered the roles of the horses in terms of transportation but if you will visit the municipality of cabagan you can witness that *calesa* is used as mode of transportation around the *centro* of cabagan and serves as an extra livelihood for the farmers.

Horses are also used to transport heavy loads from their farm. *Pigs* are raised for their meat and breeding purposes some of the farmers have a maximum of 3 pigs in their backyards just in case when they need meats for some occasions such as *fiestas* they will no longer buy from the market. The *goat* is a small ruminant animal, which means they have four compartment of stomach. They are raised for milk, hair, skin, and meat purposes. But goats are seldom seen as

of this days because they are not being patronized by the Filipino farmers. Most of the farmers in Cabagan are raising *chicken*. Sometimes they sell it or for their own consumption. there are two main purposes of raising chicken; either for its egg or meat purposes.

Ducks can also be seen in a lot of households in the barangays of cabagan. They are raised for its egg and meat purposes.

So far, a small scale assessment has not been done. This small research is done on the livestock of farmers. A lot of small scale farmers own a certain amount of animals on their farm or by their home.

Research areas

The research location was divided into three areas; Cabagan urban; Cabagan rural and Sta. Maria. Both towns lie along the Cagayan river on the opposite sides of a bridge. Cabagan is the largest of the two.

Cabagan Urban consists of 9 different *barangays* (the smallest unit of government in the Philippines, comparable to a neighborhood in size). In Cubag, Ngarag, Anao, Catabayungan, Ugad, Casibarag Norte and Sur, agriculture is the main livelihood. They farm crops such as vegetables, rice, and corn. For the farmers in the *barangays*, Cubag, Ngarag and Anao, their land was just near the Cagayan river and they have a problem when the water rises, resulting in floods and soil erosion. In Luquilo and Centro the mall, grocery stores, the Municipal hall and other establishments are located. In Luquilo and Centro are less farmers because many of the citizens living here are Government employees.

In Cabagan rural, the *barangay* Masipi East and West are composed of upland and lowland farmers. The soil types are clay soil that suits for growing rice and loamy soil for corn and other crops. Corn is the main upland crop and rice the main lowland crop. There are also some crops being grown in this area like vegetables (e.g. eggplant, *pechay*, squash) cassava, banana, coconut, and fruit trees such as mangoes, guyabano and avocado. Besides this, livestock, poultry, ducks and fishes are being reared by farmers to sell or for their own consumption. Carabao is the most important livestock for the farmers because this serves as their helper on the farm particularly in plowing, harrowing and for transporting of their harvested crops.

The *barangays* Pilig Abajo and Pilig Alto are plain areas with a sandy loam type of soil that is suitable for growing corn and tobacco, most of the people here are upland farmers and corn is their main crop. This *barangay* is located near the river side, which makes them a flood prone area during rain seasons or typhoons. Ducks and chicken are the main poultry here, which is for own consumption only. Cow is the most important livestock for the farmers here because it is used to warm climates and able to withstand the heat for a longer period of time. Unlike the carabao which cannot withstand heat for a long time.

Angancasilian and Garita are lowland *barangays* located near the Isabela State University; farmers here plant corn and rice. Most of the farmers prefer to plant rice because of the irrigation system, especially in Garita. The planting cycle for rice this year was delayed because of typhoon Lawin, but some rice farmers were able to plant their last cropping and they only depend on December rain. That is why they harvested less *cavans* (a bag of processed crop, 50kg for rice and corn a 35kg for peanut) of rice compared to before.

Sta. Maria is a small town. People living here are mostly farmers and they are very dependent on farming as their source of living. The most common crops that are being grown by farmers are; rice, corn, peanuts, sugarcane and vegetables. And some people are rearing animals like cattle/cows, *carabao* (Water Buffalo), pigs, and goats. When natural calamities like typhoons hit Sta. Maria, the most greatly affected are the famers wherein their crops are being destroyed and flooded, most especially to those fields that are located near the Cagayan River. Our research focused on those low lying *barangays* or the so-called "Lower Vega" where the *barangays* here are prone to floods. These are the *barangays* Mozzozzin Norte, Mozzozzin Sur, San Rafael East, San Rafael West, and San Buenavista.

RESEARCH QUESTIONS

1. How did the typhoon Lawin impacted the farmers in Cabagan?

10. How did the typhoon damage their livestock?

11. What are the (financial) costs of the typhoon for the farmers?

12. How will the impact of typhoon Lawin affect their future?

METHODS

Interviews

To collect insights and informations on impact of Typhoon Lawin on the farmers of the municipality of Cabagan, we used interviews as our main inquiry method. A total of 80 upland and lowland farmers plus one municipal official and a middlewoman were interviewed about the Impact of Typhoon Lawin to them particularly on financial aspects/losses by us in combination with three partner groups who were also investigating the impact of the typhoon Lawin on the farmers of this area. Furthermore, the MAO gave a list of 56 people about reported dead animals.
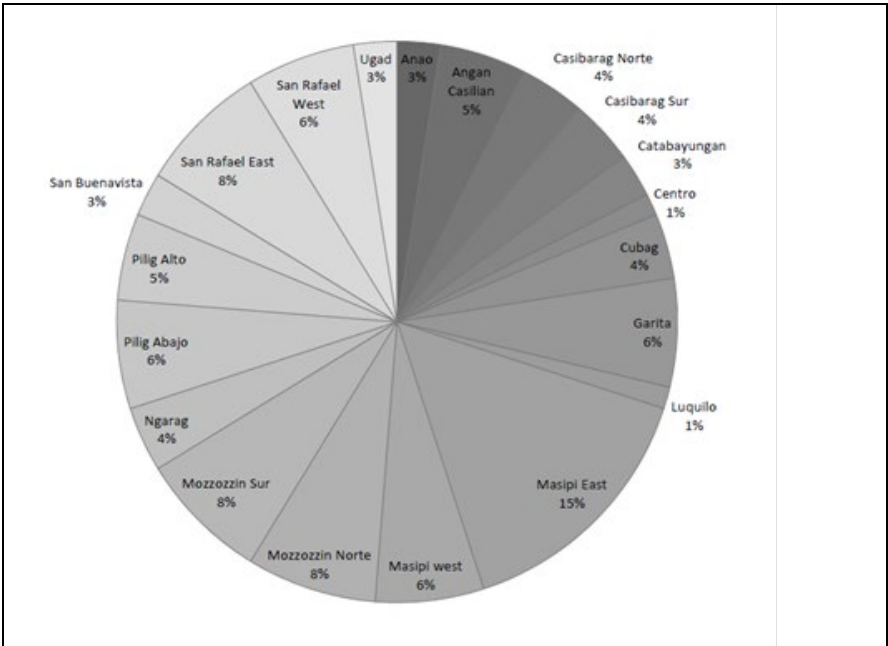
Figure 1: distribution of respondents by barangay

The interviews are semi-structured, based on prepared questionnaires which composed of both qualitative and quantitative questions and additional questions related to the received answers. We used availability sampling and snowball sampling. The questions were first constructed in English, but for the actual interviews a translation was done by one of the researchers both in Ilocano and Ybanag

depending on the ethnic background of the interviewee. For the municipal official another questionnaire was used but also related to the questions being asked to the farmers.

Site investigation

To validate the gathered data, we visited some of the farm lands that were affected by the typhoon. In these areas, plants like mango trees, coconut trees and avocado trees were uprooted.

The agricultural lands where crops are grown did not show a lot of damage, because the lands were already harvested and prepared for a new crops season and/or already grown by adult crops.

Time table

Date	Activities	Place/Location
01-17-2017 Tuesday	Preparation and presentation of our proposal.	CCVPED Cabagan
01-18-2017 Wednesday	Start of the research study, we visited Barangay Masipi east and conducted five interviews.	Baragay Masipi East
01-19-2017 Thursday	2nd day of the research study, we visited Barangay Masipi West and conducted five interviews.	Barangay Masipi West
01-20-2017 Friday	3rd day of the research study, we visited Barangay Pilig Abajo and conducted five interviews.	Barangay Pilig Abajo
01-21-2017 Saturday	4th day of the research study, Am: we visited the office of the MAO. Pm: internet cafe	Cabagan Municipal hall
01-22-2017 Sunday	Free Day	
01-23-2017 Monday	5th day of the research study, we got back to Barangay Masipi East to conduct five more interviews.	Barangay Masipi East
01-24-2017 Tuesday	6th day of the research study, went to Computer cafe.	Centro Cabagan
01-25-2017 Wednesday	7th day we stayed all day in study room.	CCVPED Cabagan
01-26-2017 Thursday	8th day, finalization of research report and presentation.	CCVPED Cabagan

RESULTS

Carabaos, cows & goats
The very most of these animals survived the typhoon. Only four dead carabaos were reported to the MAO (2016). The carabaos of the interviewees survived. This is out a total of 25 carabaos. Only one was injured. One carabao was for sale, but this was not for its meat. The farmers wanted to sell their carabao because they needed to pay for medicine for their epileptic child. Regarding to the Phillipine Statistics Authority, a carabao costs between 35,500 and

60,000 PHP (PSA, 2017). The interviewees had a total of 61 cows. Two of them did not survive the typhoon. The MAO reported twelve dead cows. Out of 27 interviewees with cows, a total of eight gave a value to their cow. They all answered the question to the value of their animal on 25,000 PHP.

Only two respondents had goats. One of the respondents had 5 goats, of which two died. And the other has 9 goats, none of them died. The MAO reported another 37 dead goats. A farm goat has a value of about 113 PHP/kg in 2014 (PSA, 2017)

Pigs

The ten respondents had a total of 63 pigs of which 10 died. The MAO reported another 60 dead pigs. Thirty dead pigs were owned by one person. The selling price of an average pig is 8566 (n=9. Std dev= 4123). All of the farmer that were interviewed responded with yes if their pigs were kept, so that they can sell their meat later.

Figure 2: The number of pigs a farmer had before Lawin and the number of pigs that died because of Lawin.

Chicken

Out of 72 respondents 66 of them raised chicken. Only ten of the chicken owners kept their chicken, so that they can be sold. That being said, they always kept their chicken for own consumption too. Most of the farmers reported dead chicken to us. Out of 1247 chicken almost half (613) died. The MAO reported another 66 dead chicken. This is a great impact.

The average value of a chicken is 228 PHP *(n=18, std dev.=46).* There are 26 respondents who did not report any dead chicken. The highest number of dead chicken is 108. This gives a great range, so no good average money loss can be concluded. What can be concluded is that almost two-third of the interviewees lost food
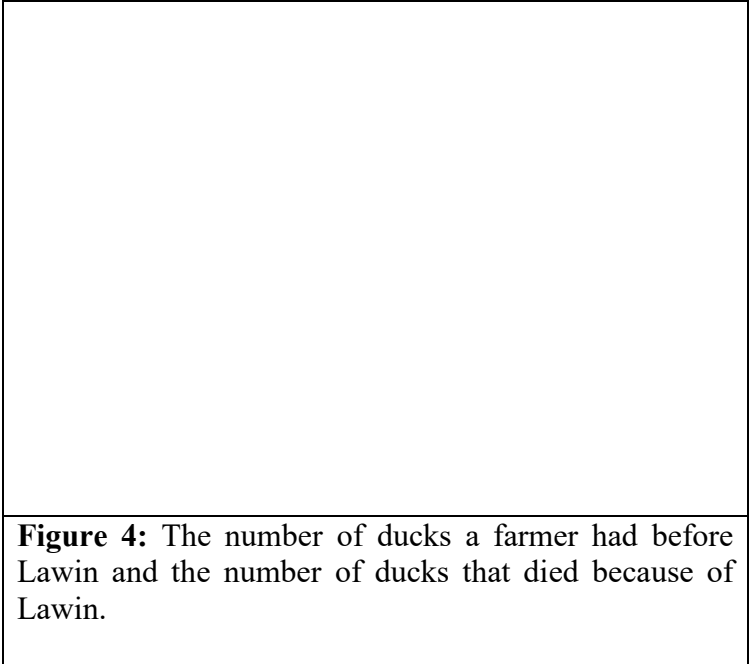
Figure 4: The number of ducks a farmer had before Lawin and the number of ducks that died because of Lawin.

Ducks

Ducks, however kept for the same reasons as chicken. Are less common than the other bird.

Ducks also took a relatively hard hit. Out of 151 ducks, 50 of them died due to Lawin. The price per kilo of a duck is about 100 PHP (PSA 2017). A duck weighs about 1-3 kilos. 94% of the owners of ducks (n=17) keep them for their own consumption. These traits combined, contribute to the fact that ducks are very comparable to chicken for Filipino farmers.

DISCUSSION/CONCLUSION

There are lots of factors to consider on how typhoon Lawin damaged the farmers' livestock. The first factor is the massive floods that drowned their animals due to the heavy rain brought by the typhoon. The second factor is the flying and falling objects, for example GI sheets, trees and electric posts, which is perilous for the animals if they are directly hit by those objects due to strong winds. Lastly, the extreme cold weather during the typhoon that leads to the death of some animals, especially to those animals with low tolerance of coldness like chicken, ducks, goats, pigs and other small animals in general.

Most of these animals that survived during the typhoon Lawin are large animals. The tolerance and capability of their bodies to extreme coldness, winds, and rain is high. They can also swim, when it comes to flash floods, which is a very important factor for their survival. Compared to small animals like pigs, poultry, goats and sheep, that can easily get killed due to their low tolerance to coldness, winds, and rain, large animals survive these circumstances. Losses of these large animals have a big impact especially to the farmers, because aside from its high cost, they have also lost helpers on their farm.

Financially speaking, the costs of typhoon Lawin differed greatly between farmers. The damages of the typhoon seem to be equally distributed amongst the *barangays*. If you look at the information the MAO distributed, one can see that *barangay* Tallag has a high casualty rate amongst animals. However, looking at our own information, this could simply be because that *barangay* did a more thorough inventory of damages than other *barangays among animals seems*. Absolutely, even though not a lot of carabaos died, the costs were the highest for that animal, simply because they are the most expensive ones. A carabao can cost between 35,500 and 60,000 PHP-. Furthermore, it is an essential tool of a farmer. One interviewee, Mr. Mauricio

Ortega, expressed that losing a carabao is like "chopping off your left arm." If you do not have a carabao, you have to hire a labourer with a carabao. These labourers cost 300 PHP instead of the normal labourer price of 150 PHP a day. Other values of animals are given in the result section. A farmer will, a lot of times, lose more than only an animal if it dies. A carabao could be the pride of a farmer. For other animals it is not only their meat that makes it profitable. Losing a cow will cost a farmer 25,000 directly

Not to forget the value of the milk of the cow he loses. Poultry also gives eggs besides their meat. Only pigs are the animals only held for their meat. On horses there is not a lot to say, because the information on horses was minimal (2 respondents who combined own three horses). There is also not a lot to say about fish pen. Some were not in use and others were yet to be inquired by the owners.

If you look even more indirectly to the costs of a farmer, it is not only about their money. It is about eating healthy as well. Almost all farmers held poultry, and the most of them raised them for their own and their family's consumption. Provided that a lot of farmers are not wealthy, death of their poultry could mean that they cannot have meat in their diet, because it is a relatively expensive food source. Meat provides important nutrients such as iron, a lack of it causes anemia (lack of red blood cells), proteins for growth and vitamins for the immune system.

Children who are poor are 3.5 times more likely to be underweight, than wealthy children (WHO, 2014). This has not only to do with the fact that wealthy children eat more calories, but also with the fact that a poorer family does not eat important nutrients that are present in other nutrient sources, such as vegetables and of course meat. Poor families tend to eat more cereals, such as rice, and less meat and vegetables than wealthy families (WHO, 2014) However, eating only rice does not cover the totality of nutrients needed in a diet. Therefore, a disaster such as typhoon can cause more people to become unhealthy, due to the fact that people become poorer by, for example, losing their harvest, thereby their income and also very important, their poultry, which is a major, relatively cheap, meat source for them.

In the end, providing the farmer a tool to prevent income shocks, like typhoon Lawin, to keep their diets healthy is an important action to undertake. An unhealthy farmer is a less efficient farmer, which in turn, will make them even unhealthier and even less profitable. It is important to let farmers have a good diet. This can be done by simply giving them money for food, or it can be done by providing security for their animals, which they use as tools on their land and which helps them on their way to a healthier diet. A better inquiry of the damages done to the farmers is a good start. The MAO and we have gathered different information and only if there is a complete picture of the wealth situation of farmers, help can be provided. The government, or, even better, the farmers themselves can, for example, set up some sort of insurance funding, where they can request help in times of disaster, such as in the aftermath of a typhoon.

ACKNOWLEDGEMENTSS

The researchers would like to take this opportunity to acknowledge all the persons behind the success and undertaking of this study.

A special mention to the municipal mayor of Cabagan Hon. Christopher Mamauag for the warm welcome and for allowing us to conduct our research inside his town.

And to the Barangay Captains of Barangay Masipi East and West, and Barangay Pilig Abajo who were burdened just to accommodate and permitted us to conduct our research within their Barangay.

And of course to our dear respondents, who were always willing to be interviewed and shared information regarding their experiences on the recent Typhoon Lawin. Particularly, the impact of the typhoon to their agricultural crops and livestock.

To our family, friends and teachers for supporting and inspiring us until the end of this study.

And last, but not least, above all to our Almighty God for his guidance and for leading us to the success of this research study.

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Appendix 1

Questionnaire
Name:
Age:
Gender:
Occupation/livelihood:
Ethnicity:

1. Could you tell your story about the Typhoon?

2. What did you have before typhoon Lawin?

3. How big is your _____ field?

Drawmap

4. Did you have livestock ___YES or ___NO ?
   a. If yes, what kind?   Howmany?

5. Did you have poultry ___YES or ___NO ?
   a. If yes, what kind?   Howmany?

6. How much did you invest in _____?
   a. Fertilizer _____
   b. Labor _____
   c. Seeds_____
   d. Other_____
   e. Total: _____

7. How much of your _____field did you lost after typhoon Lawin? *(map)*
   a. How many Cavan could you still sell?
   b. How much money did you get for this

8. How many animals/poultry died?

9. Does the typhoon affect the coming cropping?

10. What are the advantages of the crops you chose?

11. Did the Typhoon give any advantages (e.g. salvaged logs)

12. What does it mean to you that you lost your harvest?

13. Are you afraid that the next typhoon will harm you?

FLOODS IN STA. MARIA AND CABAGAN AND THE REGULATION OF IT BY THE MAGAT DAM

Vincent van Delft and Lexter A. Ortiz

INTRODUCTION

In this research, we will try to determine the impact of floods before and during super typhoon Lawin (International name Haima) in October 2016. Our study area will be the barangays beside the Cagayan river, Isabela, which are prone to floods. These barangays are located in the municipalities of Cabagan and Sta. Maria in the province of Isabela. Because these barangays are located on low land next to the river, they get flooded easily. So these areas will be hit first by floods due to a typhoon. On top of that, a lot of inhabitants of this barangays work on the land next to their houses, which is often located in the bedding of the Cagayan river, which makes flooding of their land even easier. We will focus on the impact of floods on the people living in the barangays.

The municipalities of Cabagan and Sta. Maria are located downstream of the Magat dam in the Cagayan River. In the days before, during and after a typhoon, this Magat dam tries to regulate the discharge in the Cagayan river to prevent floods partially. This is done by releasing water before landfall, which means that during and after a typhoon more water can be stored in the lake of Magat dam. Because our study area is located downstream the Magat dam, it is affected by this regulation. The advantage of this regulation is that the discharge during peak moments will be lower and so the area affected by floods will be smaller. The downside of the regulation is that people living and working in the downstream area of the dam are affected earlier by floods than without the regulation. Besides the impact of floods on people, we will also focus on the impact of this regulation on the floods.

Out of rumors we have heard that a lot of people disagree to this regulation. Because we think it is good to research on the social aspect of this regulation either, we decided to try to find the general opinion of the people.

Besides determining the impact of floods and the impact of the regulation by the Magat dam, we will search for possible technical solutions which can prevent floods besides the river. There are several solutions which can be used for flood control. You can think on building more dams, building dikes, embankments and several more. A special focus in this part of the study will be on solutions applied in the Netherlands. The Netherlands have had a lot of floods in the past and have nowadays one of the best infrastructure to prevent floods, from both the sea as from the rivers. A lot can be learned from the Dutch about the possible solutions and which problems occur with them. Of course, you can not apply the solutions in exactly the same way in the province of Isabela, but it can give a good view on the possible solutions.

To sum up, we divide our research into four parts:
- The impact of floods on flooded areas
- The impact of the regulation by the Magat dam
- The general opinion of people about the regulation
- The possible solutions for flood prevention

RESEARCH QUESTION

Because our research will be on the impact of floods and the effect of the regulation by the Magat dam, our research question will be:

What is the effect of floods and the regulation of it by the Magat dam in Cabagan and Sta. Maria?

To be able to answer this question, we divided the research in four areas of study, already given in the introduction. The four sub-questions are:
1. What is the impact of floods in the flooded areas?
2. What is the effect of the regulation by the Magat dam on floods?
3. What is the general opinion of people on the regulation by the Magat dam?
4. What are the possible solutions for flood prevention?
The last sub-question will be discussed in an additional paragraph to this report, called the Solutions.

METHODS

For the data needed in this research, we mainly focused on doing interviews with people living in the barangays in our study area which are prone to floods. In the map is shown where the barangays are located and how prone they are to floods. At location 1 in the map we have conducted interviews in Mozzozzin Norte, Mozzozzin Sur and San Rafael west. The barangay at location 2 is Pillig Abajo and at location 3 are the barangays of San Bernardo, Tallag and Aggub.

As shown, all the barangays are located in or next to areas which are very prone to floods, except for the barangay of Aggub which was affected by a flush flood during typhoon Lawin, which is the reason we picked these barangays.

To gather information from the barangays, we used random sampling questionnaires with both open ended and multiple choice questions. In our proposal we interviewed 2 groups of people: people living and working in the river bedding and people living and working in higher area, to get the difference in the impact in floods caused by the typhoon and floods caused by the regulation.

On the first day of the research, it appeared that people are only farming in the river bedding, but living in the higher areas. So we interviewed this group of people because we got both impacts from
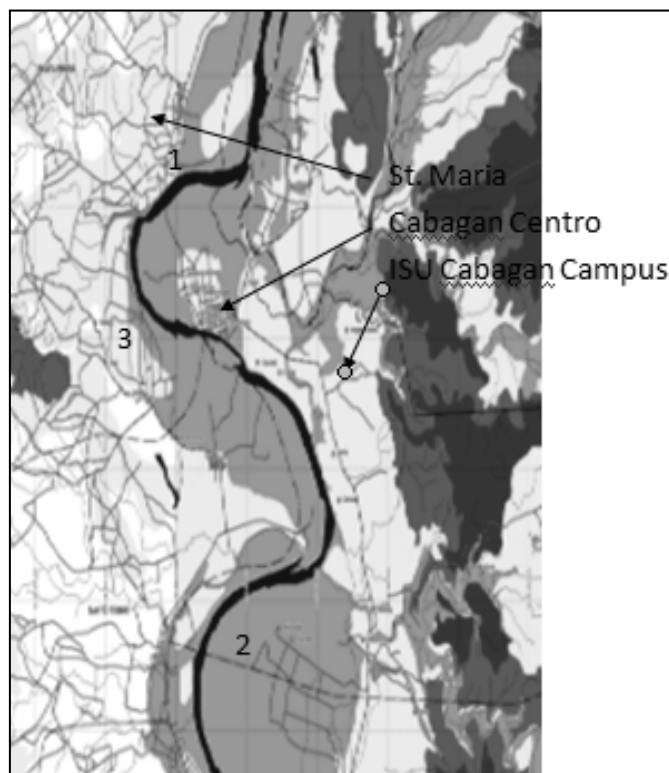
Figure 1 Flood and landslide hazard map of Cabagan and Sta. Maria (PDRRMC Isabela, 2013)
Legend:
Blue parts: High flood risk
Light yellow parts: Low to moderate flood risk
Other parts: No flood risk or landslide risk

them. In total, we conducted 21, of which 16 respondents lived and/or worked in the river bedding. Five correspondents lived or worked in higher flooded areas, of which 3 were affected by a flush flood.

For the information from the MDRRMO, we went to the municipal halls of both municipalities to interview the officials working there. It turned out that the official of the MDRRMO of Sta. Maria didn't have much information, which means that the only useful information came from the MDRRMO of Cabagan.

The table below shows a time-schedule of our activities during our research.

Table 1: Time-scheme of our research

Date	What	Location
Wednesday 18 January	AM: Visit Mayor and MDRRMO of Sta. Maria PM: Doing interviews and observing the affected areas	Municipal hall of Sta. Maria Affected areas in Sta. Maria
Thursday 19 January	Doing interviews and observing the affected areas	Affected areas in Sta. Maria
Friday 20 January	AM: Reporting PM: visit MDRRMO	Internet-café Municipal hall of Cabagan
Saturday 21 January	Doing interviews and observing the affected areas	Affected areas in Cabagan
Sunday 22 January	Rest Day	-
Monday 23 January	PM: reporting	Internet cafe
Tuesday 24 January	Doing interviews and observing in the areas	Affected areas in Cabagan
Wednesday 25 January	Reporting	Internet-cafe
Thursday 26 January	Reporting / preparing presentation	Internet-cafe
Friday 27 January	Present report	CCVPED

RESULTS

We started our field work in each municipality with a visit to the MDRRMO. The official in the office in Sta. Maria told us that only areas close to the river where flooded, and especially non-planted agricultural fields. Out of the interviews we conducted in the barangays, we knew that the damage was larger than the official told us. However, he was right about which area was flooded. The official of the MDRRMO of Cabagan was able to give us more information.

For example, the rainfall of typhoon Lawin was an equivalent of three months of rain in normal conditions in three days' time. This huge amount of rain gave a large discharge in the Cagayan river causing floods in 14 barangays (out of 26), affecting mostly corn- and rice fields. At some places, the floods lasted for almost 1 week (MDRRMO Official 2017, pers. comm.). The official also told us that he thinks that the flood control by the Magat dam is perfect, because the area which is flooded decreases.

During the research, we found three kinds of floods: Floods before landfall of the typhoon, floods after landfall (those two are different because of their causes) and a flush flood. The last

one is a flood caused by logs and agricultural waste in a creek or river. Those logs or waste can get stuck somewhere in the river, and so a natural dam can occur.

This dam holds up the water from upstream the creek or river, causing a rising level in the river. If the water reaches a certain level, the water pressure becomes too high and the dam will break, releasing all the water at once causing floods downstream. We visited the barangay of Tallag which was affected by a flush flood. The impact was large in that barangay, because the flood came completely unexpected and floods don't occur there normally (it was the first flood in the lifetime of a 52-year-old barangy official). This means that the people were unprepared for floods and didn't protect their properties against it. The fact that the flood occurred when people where sleeping, at 3 AM, makes the impact of it even larger.

For the impact of the normal or expected floods, we interviewed the people living and working close to the river. At day 1 of our research it already appeared that people are only working in the river bedding, instead of also living there, which was our assumption.

People are living in the river area, but then on the higher part, which isn't easily flooded. Instead, their farms in the river bedding get flooded easily. Most people are working in the area, in all cases on a farm in the river bedding. Most times, farmers are farming corn in the river bedding. Once corn gets flooded, the harvest will be lost. On the people working in this area, this gives also economic problems, because they lose their crops which should be their income.

Once lost, they have to get loans from the bank or to quit their job. Besides economic problems, also a social problem occurs. Like one respondent admits, farmers are nervous when flood is coming. On top of the problems already given, floods, or high river discharges, cause on more problem: Landslides. Due to heavy water streams, the river bedding gets eroded. At the side of deep part of the river bedding, this is causing landslides. Because of the landslides the high part of the river bedding, where the farms are, gets smaller (Picture 1).

Except for the impact to farm fields and people affected by the flush flood, floods doesn't damage houses much (houses are mostly damaged by the typhoon winds).People prepare their house and belongings in it well when they know a typhoon is coming. Besides preparation, houses are most times situated in the higher parts of the barangay's. This doesn't mean that the houses weren't flooded, but the water wasn't high enough to cause substantial damage. For example, one house was still flooded by a water level of 2 meter!

We asked all 16 correspondents to their opinion about living and working in the river bedding, and all of them think it's

Picture 1 Landslides at the river site (Photo of Vincent van Delft, January 2017)

better to move to higher land. The reasons for their opinion are the problems described earlier. On top of that, one correspondent added that the weather is getting more extreme, meaning that there are more and higher floods in the wet season, and more droughts in the dry season, leading to a lower yield of their fields. For this reason, it's interesting to know why people are still working in this area. It appears that economics and available land are the two most important reasons (Figure 2). For most farmers, these two are basically the same, because they have to

earn money, and this land is the only they can pay. This also appears from the fact that farmers who want to leave, cannot afford it. We asked the farmers if they're thinking of leaving and 6 said they're thinking of it.

One of them is thinking about it, but 4 others cannot afford it, 1 other cannot find available land. On top of that, farmers who said they don't want to leave, may not be able to leave because they cannot afford it either and haven't told us that. Besides the economic reason, the appearance of ancestors in the areas has is also a reason of working in the area. The fertility of the land isn't a significant reason.

For the effect of the regulation, we asked the 6 respondents who already lived in the area before construction of the dam 1982, what the difference is between flood without regulation and floods with regulation. All 6 answered that the floods have a lower elevation than the floods before 1982. One farmer said that the floods have decreased by 1 to 2 meters. The downside of the regulation is that floods already occur before landfall of a typhoon. Out of 16 correspondents, 9 of them were affected by floods before landfall. Also the amount of days that floods are lasting is longer. It has to be said that these effect is mainly concentrated in the river bedding, in the farm fields.

Among these huge disadvantages, there are also some advantages of floods for the farmers. For example, after floods, the lands are still very wet, which is good for new crops. Another, extraordinaire advantage is that farmers found out that there was fish swimming in the floods. One respondent told us some actually went fishing on their land.
To answer the third sub-question of our research, we interviewed 18 respondents about their opinion on the flood control by the Magat dam. Ten of them agreed with the regulation because the Magat dam had big contribution to them. They said that before construction of the dam, the elevation floods in their areas were much higher, up to three meters at the houses. Besides the lower flood elevation, now they are also warned by the officials of the Magat dam. Before the flood they weren't warned for floods at all. There farmers are warned by a text message send by the officials of the dam. Out of 8 farmers who we asked about the message, 6 received it.

Depending on the farmers who you ask, the message comes 1 to 3 days before the flood occurs. Due to this warning, people are ready for floods because they can prepare their properties and belongings before the flood will reach their live or work space. Another contribution of the dam which satisfies the farmers is the irrigation control during dry seasons. During dry season, the Magat dam distributes water to the Cagayan River which the farmers downstream of the dam can use for their crops. Among these good contributions and regulations of the Magat dam, we cannot avoid the fact that there are also people who disagree with the regulation of the Magat dam. There are eight respondents who disagree with the regulation. They blame the Magat dam for causing the floods in their areas. Once flooded, the farmers lose their crops and blame the Magat dam for their loss. Two of the eight farmers added that the regulation by the dam isn't always helping, but sometimes it is helping.

DISCUSION

For our first sub-question (what is the impact of floods in flooded areas?), we found that the domestic damage due to the floods was minimal. All respondents said that they had only little damage to their houses and moved their belongings to higher areas. Most people had damaged houses, but they said this was caused by the typhoon itself and not by the flood. Although we are not sure, there is a possibility that there was damage due to the floods, but that people see

it as damage due to the typhoon. However, the farmers were hit hard by the typhoon, because most of them lost their crops in the flood. Those who didn't lose their crops harvested it already before the typhoon and floods were coming. You can question if it is good to farm during the wet season, because it is very likely that a flood, and loss of the crops, will occur. On the other hand, rain season lasts from May to November, while January to April are very dry on average. So people will have to farm in wet season, to protect their crops from droughts either. This makes it for farmers very hard to time their planting and harvesting of crops well. Probably the best solution to solve the impact of floods is moving to areas which are less prone to flooding.

But here an economical problem occurs. Out of 6 respondents who were willing to leave, 5 cannot afford it and 1 doesn't know yet if he can afford it. After all, the problem of floods concentrates around farmers, which is probably causing economic troubles and problems in their families.

The effect of the regulation by the Magat dam (the second sub-question) is mainly that the elevation of the flood is lower, like 6 respondents told us. This means that the flooded areas are smaller and that less people experience the impact of the flood. One respondent even said that the floods decreased with 1 to 2 meters. It was our hypothesis that the floods will become lower, but so much lower wasn't our expectation. From the data provided by Dr. Balderama, we have calculated that the catchment area upstream the dam is 21% (Balderama 2016) of the total catchment area of the Cagayan river upstream Cabagan. With an estimated rainfall of 300mm, it is theoretically possible the Magat dam stored all this water (we don't know if they did so or not), and the flood decrease of 1 to 2 meters sounds reasonable. Besides the fact that the flooded area is reduced, the disadvantage is that the floods last longer. This seems to be negative, but since they only last longer on farm fields, the damage is minimal. It is true that the crops are lost in the floods by the regulation, but without the regulation, floods would occur later and the crops will be destroyed also. So in general, the effect of the regulation is positive because the impact stays the same, but in a smaller area.

The third sub-question was about the opinion of the people about the regulation. Out of 18 respondents, 10 agree with it and 8 disagree with it. Arguments of the farmers for the regulation are: the flood is lower, now they are warned for a flood and the regulation helps for irrigation in the dry season. The arguments against are: floods are due to the regulation and that it doesn't always helps them, although it helps sometimes. The first and the third argument for the regulation we already expected before the research, but more farmers agreed to it than we thought will be. The argument of the respondents we don't agree that the regulation causes the floods, we cannot agree fully on because we clearly see it is decreasing the total area which is flooded. However, somehow they're right about it, because the regulation cause floods which lasted longer. To come back to the sub-question, we can say that there isn't a general opinion, because it's around 50-50 who agree and who do not.

SOLUTION

In this paragraph we'll discuss a few possible solutions to prevent floods in the future. Because of lack of time and information, we'll only be able discuss the quality of the solutions and won't quantify the effect of the solution. To give a clear overview of each solution, we'll summarize all (dis)advantages of each solution in the table at the end of the paragraph.

The first solution is increasing the volume of the summer bed. The summer bed is found in the middle part of the river where there is always water, also during dry seasons. The increase of

this part can be done by deepening the part, but also by removing the unused sand banks at the side and in the middle of the river. To increase the volume by removing the sand banks, request dredging every once in a time, because the sand banks will come back after a while. This brings permanent costs, which is making this solution less attractive. Another disadvantage is that the slopes in the river are getting steeper, which makes the river bed more prone to landslides. It is an option to make the upper part of the river bed deeper as well. But because there is a lot of farm land in this part of the Cagayan river, it won't be an option.

The next solution we will discuss is building dikes next to the river. This will not only increase the maximum discharge because the river gets more volume, the stream in the water will be faster what also increase the discharge. However, there are a lot of disadvantages. First, it is costly, both economical as environmental, to build dikes in every area which is prone to floods. Second, if an area gets flooded after all, it will be more difficult to get the water out of the area than normal because of the dike. Third, unless the dike and its foundation are made of concrete, there will leak water thru the dike, which is difficult to get it away.Last, there will occur soil subsidence in the long term because the river won't reach the land anymore and so on won't deposit soil anymore. In the Netherlands, a country with a lot of dikes, this is an increasing problem. In combination with the rising sea level, this problem can become critical for the Netherlands in the next century. This is a problem which will be less in Cagayan valley, but it will occur. A combination of the first two solutions can be possible, by using the dredge from the river bed for building the dike.

For the third solution we'll look at new flood control infrastructure in the Netherlands. The Dutch government started a few years ago a program called 'room for the river' (Rijkswaterstaat). In this program a lot of land is made available for floods to prevent floods at important locations. They constructed overflow channels, which increase the volume of the rivers during extreme high discharges. Furthermore, they removed dikes in a polder to store water in that polder when it's necessary. All the infrastructure and farms in the polder is made flood-proof. This solution can be applied in Cagayan valley, but it will be expensive and will have a huge impact on the area. The main advantage will be that the floods and water can be controlled.

The last solution we'll discuss is to build more dams like the Magat dam. This will increase the capacity to store water and so the discharge in the river can decrease. Other advantages are the increase in irrigation control and the generation of hydro-power. A disadvantage is the costs of construction and operation of the dams. Another disadvantage is that more water will be released in the days before the heavy rainfall, causing bigger floods downstream. This can be solved with a permanent low level in the lakes behind the dams, but that will decrease the advantage of the irrigation control and hydro-power generation. That will mean that operation of the dams will become more expensive. Last, this solution will have a huge impact because of the new lakes behind the dam.

Table 2: Possible solutions and their (dis)advantages

Solution	Advantages	Disadvantages
Increasing the volume of the river bed	- Higher volume of the summer bed	- Permanent dredging - Prone to more landslides
Dikes	- Discharge even higher due to faster streams	- High costs - Difficult to get flood water away

		- Leakage - Soil subsidence
Room for the river	- Water and floods can be controlled better	- Huge impact on the area - Expensive
More dams	- Less discharge during peak moments - Irrigation control - Hydro-power	- Expensive - More floods in the days before the rainfall - Huge impact on the area of the dam

ACKNOWLEDGMENTS

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APPENDIX I

Questionnaire civilians in the river bedding of Cagayan river bedding at Cabagan and Sta. Maria
We're two students from ISU, who are studying the impact of floods and the release of water from the Magat dam in the days before a typhoon. Because you live in an area which is prone to a flood caused by this regulation, we would like to ask you questions about the impact you've experienced during typhoon Lawin last October.

Name:
Age:
Gender:
Ethnicity:
Occupation:
Civil status:
1. What is your purpose in the area?
   A. Living and Work
   B. Living
   C. Work
2. We're you affected by a flood in the days before typhoon Lawin?
   A. Yes
   B. No
   C. No, not at all
3. What was damaged by the flood?
   A. Your house
   B. Your workplace
   C. Your farm
   D. Your animals
   E. Others:….
4. Is there a difference between floods due to typhoons and floods due to heavy rainfall
5. How many days / hours before the first flood were you warned?
   A. Within more than 2 days
   B. Within 2 days
   C. Within 24 hours
   D. Within 12 hours
   E. Within 6 hours
   F. Not at all (if F, go to question 7)
   G. Else:….
6. In what way were you warned for the flood?
7. Do you think that this regulation of the Magat dam is good?
   A. Yes
   B. No
8. Can you explain why (the answer of question 7)?
9. Was your own property / house affected by the flood before landfall of the typhoon?
   A. Yes
   B. No
10. How many days did the flood lasted?
    A. Less than a day
    B. 1 day
    C. 2 days
    D. 3 days

  E. 4 days

  F. 5 days or more

11. Can you draw a map with where the floods occurred?

12. What is the reason that you live in the river bedding?

  A. Economics

  B. Vulnerable ground

  C. Grew up there

  D. Because there is land

  E. Other:….

13. Do you think living or working in the river bedding is a problem?

  A. Yes

  B. No

14. Can you explain?

15. Do you think living outside the river bedding protects you more against floods?

16. Do you know other people who were affected by the flood?

APPENDIX II

Questionnaire civilians of the higher flooded areas by the Cagayan river at Cabagan and Sta. Maria.

We're two students from ISU, who are studying the impact of floods and the release of water from the Magat dam in the days before a typhoon. Because you live in an area which is prone to floods, we would like to ask you questions about the impact you've experienced during typhoon Lawin last October.

Name:

Age:

Gender:

Ethnicity:

Occupation:

Civil status:

 1. What is your purpose in the area?

  D. Living and Work

  E. Living

  F. Work

 2. We're you affected by a flood in the days before typhoon Lawin?

  D. Yes

  E. No, only during and after landfall of the typhoon

  F. No, not at all

 3. What was damaged by the flood?

  F. Your house

  G. Your workplace

  H. Your farm

  I. Your animals

  J. Others:….

 4. How many days / hours before the first flood were you warned?

  H. Within more than 2 days

  I. Within 2 days

  J. Within 24 hours

  K. Within 12 hours

    L. Within 6 hours

    M. Not at all (if F, go to question 6)

    N. Else:….

5. In what way were you warned for the flood?
6. Do you think that this regulation of the Magat dam is good?

    C. Yes

    D. No

7. Can you explain why (the answer of question 6)?
8. How many days did the flood lasted?

    G. Less than a day

    H. 1 day

    I.   2 days

    J.   3 days

    K. 4 days

    L. 5 days or more

9. Can you draw a map with where the floods occurred?
10. Do you think living or working in the river bedding is a problem?

    C. Yes

    D. No

11. Can you explain?
12. Do you know other people who were affected by the flood?

SHORT AND LONG-TERM GOVERNMENT SUPPORT AFTER TYPHOON LAWIN IN RURAL CABAGAN

John Braguldo Alingod and Lily Cannell van Dien

INTRODUCTION

The Philippines is a country that is often struck by disasters such as strong typhoons. The strongest typhoon to ever hit the country was Typhoon Lawin that made landfall in northern Luzon in the 19th of October 2016. This was also the first time that the new warning signal 5 was issued. Because of the numerous typhoons that hit the country every year (around 20), the government has a very extensive protocol on how to deal with typhoons in three stages: preparedness, impact and response (Tabel 2017).

The Philippine government operates in five political units. The highest unit being the national government, followed by regional, provincial, municipal and barangay (Mendez-Servitillo 2017). The municipal government is the first to respond in the different barangays when a typhoon hits the country. We are conducting a small research focusing on the municipal government, which will give us the opportunity to interview different government agencies and acquire more accurate information regarding the response after typhoon Lawin.

This research will focus on the response stage of the municipal government. We will mainly look at how the government responds to a disaster and in what way they provide support to the people that are affected. We will divide the support in two categories. Short and long-term support. Short term support consists of relief packages that are provided in the direct aftermath of the typhoon. These packages can include food, water, materials for shelter and sometimes first-aid kits. The Local Government Unit (LGU) claims that it provided 14,981 relief packs in the 26 barangays (Baccay 2017). These relief packs each contained 2 gantas of rice (approximately 5 kg), 4 noodles and 4 sardines (Patricio 2017). In addition to the relief packs from the LGU, the Department of Social Welfare and Development (DSWD) also says it provided 3,500 relief boxes worth 400 pesos each. The boxes contained 6kg of rice, 5 coffee and 9 canned goods (Patricio 2017). Long-term support focusses more on aid that is provided when the direct threat of the typhoon is over. Examples of long-term support include financial aid programs such as Emergency Shelter Assistance (ESA) for rebuilding houses, seeds for replanting crops and the livelihood program. The ESA is a program that provides limited financial or material assistance to families whose houses are partially or completely damaged.

The financial aid per household ranges from 10,000 to 30,000 Pesos (DREAMB 2016).
The National Disaster Risk Reduction Management Council (NDRRMC) and the Municipal Disaster Risk Reduction Management Office (MDRRMO) have provided a lot of information regarding the response after natural disasters such as typhoons (Baccay 2017 and Tabell 2017).

In the research, we aim to validate this information and see in what way the government is providing short-term and long-term support to the people of rural Cabagan.

The research is conducted in the municipality of Cabagan. Thisis a municipality in the province of Isabela in the Philippines. According to the 2015 census, it has a population of 50,174 people and is composed of 26 barangays (http://provinceofisabela.ph). Most of the barangays are considered rural. Rural barangays in Cabagan can be divided into lowland and highland barangays. Some of the barangays in lowland areas such as Pilig Alto and Pilig Abajo are very

prone to flooding after typhoons. In this research, we will focus on four rural barangays: Pilig Alto, Pilig Abajo, Masipi East and Angancasillan.

RESEARCH QUESTIONS

The main question of our research is: *In what way does the municipal government provide short and long-term support to the people in rural Cabagan after typhoon Lawin.* This question will be answered using the following sub-questions:

- What did the municipality provide after typhoon Lawin in terms of short-term and long-term support?
- How many people in the Rural Barangays in Cabagan received short-term municipal support and how many people received long-term support?
- How long did it take the municipality to provide short-term and long-term support after typhoon Lawin?
- What do the people expect from the municipal government in terms of short-term and long-term support?

METHODS

Date	*Activity*	*Location*
January 13th	Finalizing draft questionnaire Working on introduction and methods	CCVPED
January 14-16th	Fieldwork trial	Dunoy
January 17th	Preparation and presentation proposal	CCVPED
January 18th	3 interviews with local people in Pilig Abajo. Interview with the barangay captain of Pilig Abajo and interview with DSWD	Rural Cabagan Centro Cabagan
January 19th	Conducting 5 interviews with local people in Pilig Alto	Rural Cabagan
January 20th	Conducting 5 interviews with local people in Masipi East + Barangay captain	Rural Cabagan
January 21st	Conducting 5 interviews with local people in Angancasillan	Rural Cabagan
January 22nd	Work on report and data from interviews	CCVPED
January 23rd	Conducting interviews	CCVPED
January 24	Extra interviews with the barangay captains from Pilig Alto and Angancasillan	Rural Cabagan
January 25-26	Reporting	CCVPED
January 27	Presentation of results	CCVPED

The main method of this research is conducting interviews. In total, we have conducted 23 interviews with different agents that play an important role in the response phase after a typhoon.

We started off by conducting interviews with a government official from the Department of Social Welfare and Development (DSWD). Here we gathered data on the different types of support that were provided to the barangays and the individual recipients right after typhoon Lawin. Since the DSWD and the Local Government Unit (LGU) were closely collaborating on the response after typhoon Lawin, we decided to not visit the LGU.

We chose the following four barangays as the focus of our research: Pilig Alto, Pilig Abajo, Angancasillan and Masipi East. In Pilig Abajo, we conducted 3 interviews with the local inhabitants. In the other barangays, we conducted 5 interviews. We selected our respondents by every time choosing the fifth house in a row starting from the house of the barangay captain. This way the research will not be biased in terms of results. The main target group of this research are families that were affected by typhoon Lawin. The interviews consist of closed and open questions sometimes with multiple choice answers to clarify the content.

We also conducted interviews with the barangay captains of the four barangays we visited. The main focus of these interviews was to find out what type of relief they received from the government, how long it took before they received the support and in what way they distribute this support among their people.

Another part of our research consists of literature research to back up and clarify some of our findings.

RESULTS

After conducting all the interviews, we collected a lot of information. The results will be presented in three categories. These categories represent the different agents involved in the response after a typhoon. First of all, the information from the LGU and the DSWD will be summarized. Secondly, we will focus on the information from the different barangay captains. Lastly, we will present the main results from the interviews with our 18 respondents.

Local Government Unit/DSWD
The DSWD and the LGU have combined forces in the relief operations after typhoon Lawin. The LGUs distributed approximately 14,500 relief packs to all the 26 barangays. Additionally, the DSWD provided around 3,500 relief boxes to all the people with a partially or completely damaged house. All the staff and volunteers in both agencies are involved in packing and distributing the relief goods. The LGU also provided 8,000 pieces of Galvanized Iron (GI) sheets and 250 rolls(100m/roll) of laminated sacks. The DSWD is also providing Emergency Shelter Assistance (ESA) giving 5,000 pesos to all houses that were damaged during typhoon Lawin. The Barangay Health Workers (BHW) assess the damages in each barangay to see who will receive the ESA. There are 1,538 partially damaged houses and 781 totally damaged houses in the whole municipality of Cabagan according to the list submitted by the BHW. They prioritize indigent people in this program.

Barangays
In the interviews with the barangay Captains, we collected information on how many days it took before they received support from the municipal government in terms of relief goods and how many boxes they received from the DSWD and GI sheets from the LGU (Table 1). The information on the amount of relief was provided in the presentation of the MDRRMO (Baccay 2017). There were only two out of the four barangays that provided extra relief goods from the barangay calamity fund (Table 1).

All the barangays received relief packs from the LGU. The contents of the relief packs are different for all the barangays. There are some similarities between Pilig Alto. Pilig Abajo and Masipi east regarding the amount of rice and canned goods (Table 2).

We grouped the answers of all our respondents to question number six (appendix 1) into seven categories. Every bar should be looked at individually considering the respondents were allowed to give multiple answers and every bar shows the percentage of the total respondents that gave the same answer (Figure 1).

Table 1: Information from the interviews with barangay captains summarized

	No days before received relief goods	*Amount of relief packs from the LGU*	*Amount of relief packs DSWD*	*GI sheets from the LGU*	*Relief goods from barangay*
Pilig Alto	2 days	409	420	516	Yes
Pilig Abajo	3 days	N/A	151	560	No
Masipi East	5 days	562	100	No GI sheets	No
Angancasillan	1-2 weeks	333	136	220	Yes

Table 2: Clarification of the contents of the relief packs provided by the LGU per barangay.

Pilig Alto	*Pilig Abajo*	*Masipi East*	*Angancasillan*
3 kg rice	3kg rice	3kg rice	5kg rice
8 canned goods	8 canned goods	8 canned goods	2 canned goods
4 noodles	2 noodles	5 noodles	3 noodles
6 coffee	1 coffee	4 coffee	
2 cups of sugar			

Legend:

1 No comment
2 Quick in responding
3 Fair in giving support
4 Providing enough relief goods
5 Support for rebuilding houses
6 Other long term support
7 Visiting after a typhoon
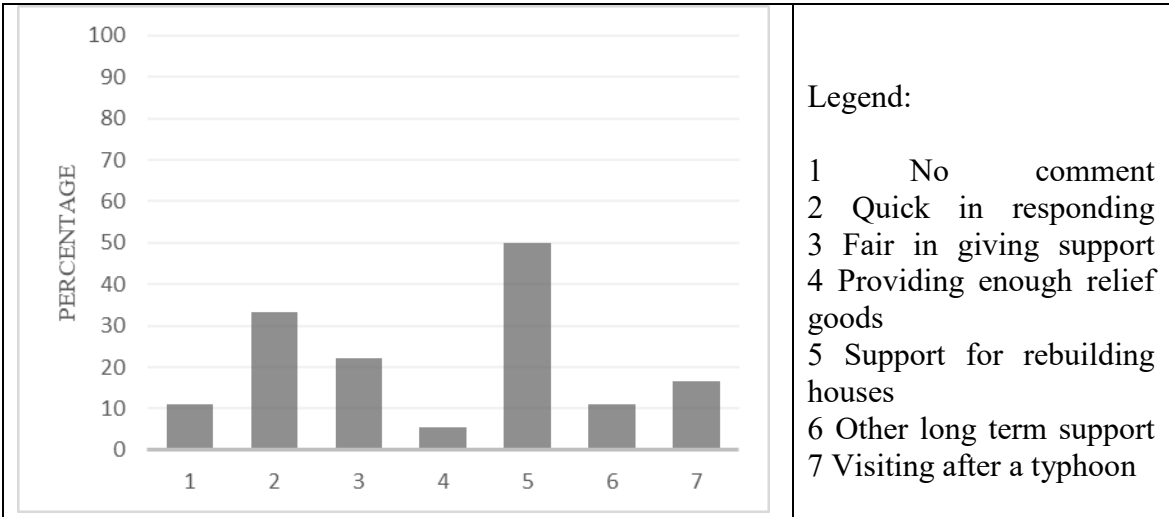
Figure 1: Answers to question 6 - What should the government provide after typhoon?

All the 18 respondents from the different barangays received relief goods. Seventeen of the respondents received relief goods from the LGU. There was only one respondent that did not receive any relief goods from the LGU but received relief goods from the Barangay as well as the DSWD. Five respondents received relief goods from the DSWD as well as from the LGU.

Three respondents received relief goods from the Barangay Captain as well as the LGU (Figure 2)
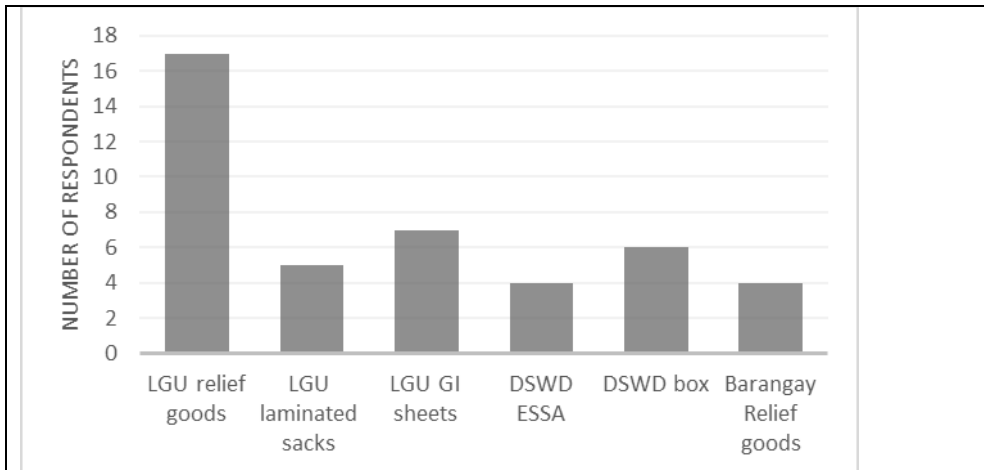
Figure 2: All the different types of support received by the respondents.

According to the MDRRMO, all goods were distributed in 3 to 5 days after the typhoon (Baccay 2017). The barangay captains provided us with the information that they received the relief goods between 2 and 7 days after typhoon Lawin. Our respondents in the different barangays received relief goods in a time period ranging from 3 to 30 days. The majority of the respondents received the relief goods 7 days after typhoon Lawin (Figure 3). The intensity of the color of the dot shows the amount of respondents with the same answer.
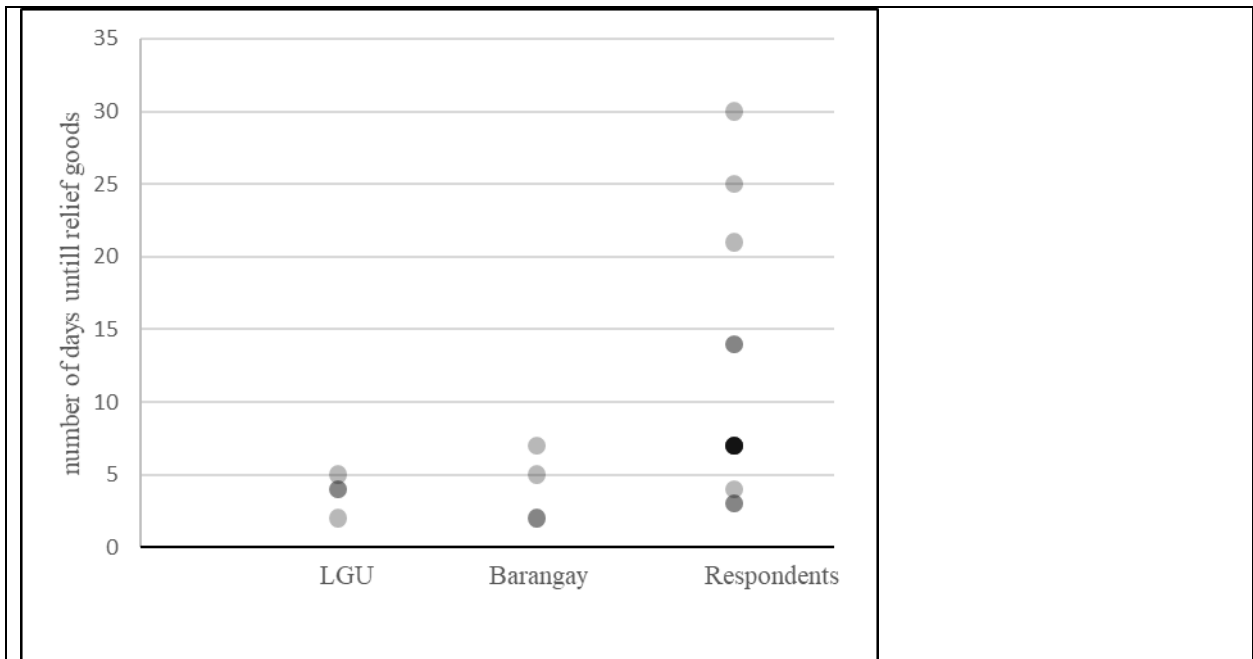
Figure 3: The time period in which the relief goods were distributed and received.

The houses of five respondents were fully damaged. Ten of the respondents had a partially damaged roof. One respondent has a fully damaged roof. There was only one respondent that did not have any damage in their house (Figure 4). The respondents were able to choose multiple categories. There were 3 respondents with a partially damaged roof and damaged walls. One respondent had a partially damaged roof and damaged windows.

Figure 4: Damages to houses

Legend:

1 roof fully damaged
2 roof partially damaged
3 windows damaged
4 walls damaged
5 house fully damaged
6 no damage
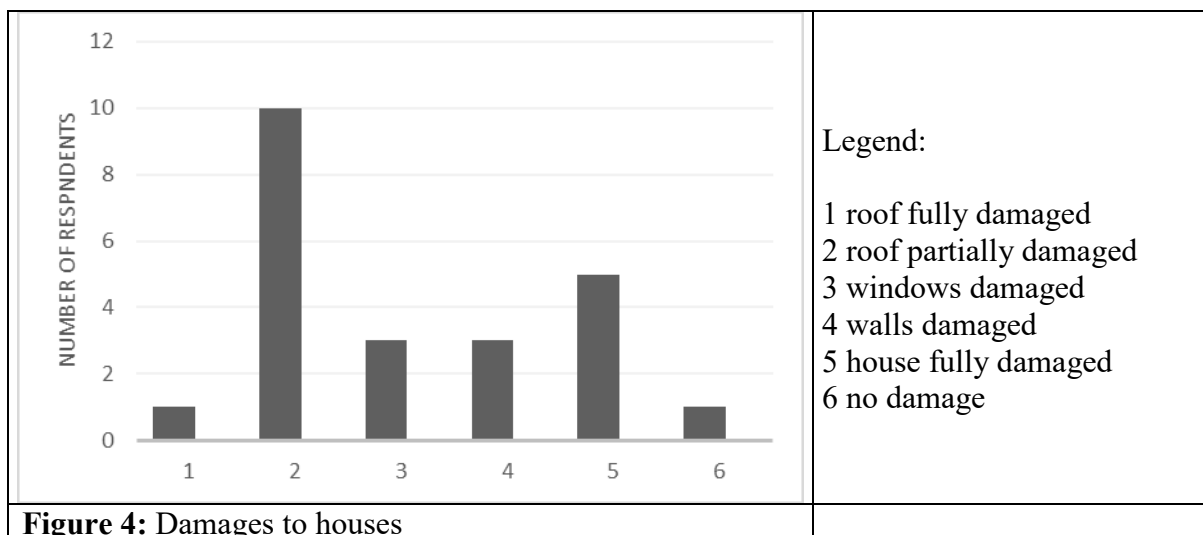
Out of the 5 completely damaged houses, only respondent number 3, 6, and 13 have received the ESA fund so far, these funds were received in December and January. Respondents 4 and 16 are still waiting to receive the fund. 5 out of the 10 respondents with a partially or completely damaged roof have not received any long term support such as GI sheets or the ESA fund for rebuilding houses. Respondent 5, 11 and 14 have not received any support even though their house was damaged but respondent 5 is still waiting for the ESA (table 3).

Table 3: Support provided according to the type of damage of houses per respondent.

	Laminated sacks (LGU)	*DSWD relief box*	*ESA (DSWD)*	*GI sheets (LGU)*	*Nothing*
Roof fully damaged	1				
Roof partially damaged	2	2, 10, 12	10	8, 15	5, 14
Windows damaged				7	
Walls damaged				17, 18	11
House fully damaged	3, 4, 13	3, 4 13, 16	3, 6, 13	3	
No damage					9

We compared the type of damage to the houses after typhoon Lawin and the support provided by the government for every respondent. All the numbers represent a respondent (1-18). The number of the respondent is inserted in the cell that represents the type of support they received. If the respondent received multiple types of support their number is mentioned in multiple cells in the table (table 3).

The relief goods provided by the LGU lasted from 2 up to 21 days. 12 out of the 18 respondents lasted between 2-3 days with their relief goods. There seems to be no correlation between the size of the family and the number of days before the relief goods were consumed.

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DISCUSSION/CONCLUSION/RECOMMENDATION

In this research we aim to answer the main research question: In what way does the municipal government provide long term and short term support to the people of rural Cabagan after typhoon Lawin?

The LGU and DSWD provided short term support in terms of relief goods and laminated sacks. The barangays also provided relief goods where the LGU and DSWD could not provide enough. The long term support includes GI sheets from the LGU and ESA financial support provided by the DSWD.

The exact amount of distributed relief packs was provided by the LGU for three of the four barangays. There was no information on the exact number of relief packs for Pilig Abajo but the Barangay Captain told us that there were enough relief packs for all the family heads in the barangay. The relief packs provided by the LGU contained a different amount of items than the relief packs received by the different barangays (Table 2). The data from our interviews also shows that the quantity of the food items in the relief packs are different from the information we received from the barangay captains and the LGU. This shows that there is a discrepancy in the information from the LGU, barangay captains and the people. We also see these differences in the time of distribution of the relief goods. This varies for each barangay and every individual respondent in the barangays. The differences in the time of receiving relief goods varies from 2 days up to 30 days after typhoon Lawin (Figure 3). This is a very large range especially because relief goods are distributed to provide the basic needs of the people right after a typhoon. There could be several explanations for the time difference in distributing support.

The interviewed respondents might not remember correctly the time it took to receive relief goods. In the case of Pilig Alto the barangay captain explained the barangay was difficult to reach because of the flooding. Most barangays have already received GI sheets from the LGU except for Masipi East. This because the sheets were out of stock and they are difficult to transport because there are no available vehicles (Laguinday 2017).

When we asked our respondents what they expect from the government after a typhoon the top three answers were: Support for rebuilding their houses, a quick response after the typhoon and a fair distribution of support. Typhoon Lawin was a signal 5 typhoon that destroyed many houses and sources of income. Because of this, most of our respondents needed the support of the government in rebuilding their houses. Sixteen of our respondents had damages to the main part of the house especially the roof. Only four have received ESA from the DWSD and another seven have received GI sheets for their roofs. The earliest GI sheets were received in November and the earliest distribution of ESA was in December. This means that people had to wait at least a month before they received support for rebuilding their houses. Up to now there are still people that did not receive any support or are still waiting to receive support. The ESA program is a long process because the submitted request has to be checked by the municipal and provincial DSWD before granting the financial aid. Next to this there is a lot of miscommunication between the government and the people regarding the amount of financial assistance by the DSWD. On the website of the DSWD it states that the ESA provides 10,000 pesos for partially damaged houses and 30,000 pesos for people with fully damaged houses (DREAMB 2016).

In our interview with the municipal DSWD we were told that the DSWD is giving 5,000 pesos for those with partially or completely damaged houses (Patricio 2017). Respondents expressed

uncertainty as to whether they will receive more financial assistance. Some of them, however, have borrowed money from relatives and friends because they are expecting to receive more.

From the results of our research we can conclude that there is miscommunication between the people and the DSWD regarding the ESA. Many of our respondents were confused and not well informed on the amount of the ESA and the time it will take before they receive the promised cash. In order to improve the communication between the typhoon survivors and the DSWD, we would like to recommend for the assessor of the damage to provide the owner of the house with clear information. This information can include questions such as what qualifies as partially and completely damaged, how much financial assistance will be received, how long it will take before they will receive the financial assistance. We would like to make the same recommendation to the barangay officials regarding the miscommunication on assessing the houses for GI sheets.

We also gathered information on the distribution of relief goods in different barangays. Five out of 16 respondents received the relief goods in a time period of 14 to 30 days. Relief goods are supposed to provide the basic needs of the people right after a natural disaster such as typhoon Lawin. Therefore, we would like to pose the question whether the relief goods are really necessary with this period of time. We would like to recommend not only a shift in focus from short-term relief goods to long-term support, but also a shift in prioritizing long-term support in terms of spending the calamity fund.

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Appendix 1. Questionnaire local people of rural Cabagan.
Number: occupation:
name: ethnicity:
age: family members:
gender: role in household:

1. What was your initial reaction after typhoon Lawin?
2. Did you receive any support after the typhoon?
       What was in there?
              a. relief packs
                    1. Rice
                    2. Noodles
                    3. Canned goods
                    4. Water
              b. medical kit
              c. tarpaulins
              d. materials for house
              e. financial support
              f. other
       How much?
       Who was it from?
3. For how long did the support last?
4. How long did it take before you received the support (short term and long term)?
5. Was your house damaged during typhoon Lawin?
              a. roof fully damaged
              b. roof partially damaged
              c. windows damaged
              d. walls damaged
              e. house fully damaged
6. What role do you think the government should have after a natural disaster like a typhoon?
7. Where there any needs not provided by the government (short term and long term)?
8. What would you like to see improved in the provided aid?
9. Do you know of anyone that did not receive anything?
10. How is your situation now?

Appendix 2. Questionnaire for the LGU and the DSWD
Name:
Agency:
Position:
1. In what way did you support the people of your municipality right after typhoon Lawin (can you name the items)?
2. How long did it take to respond after typhoon Lawin (hours/days)?
3. How many people were provided with relief goods in the aftermath of typhoon Lawin?
4. Do you think the provided amount of relief goods is enough for a family to recover from typhoon Lawin?
5. Do you also have programs for long-term recovery after typhoon Lawin (if yes, what kind of programs)?
6. How many people received this kind of support (is there a list)?
7. What are the qualifications for people in order to receive this kind of support?

8. Can you provide us with information on damages for these Barangays.

Appendix 3. Questionnaire Barangay captains.
Barangay:
Name:
Function:
1. When did you receive support from the municipal government after typhoon Lawin?
2. What kind of support did you receive?
3. How do you distribute the support within the Barangay?
4. Was the support you received from the municipal government enough to provide everyone in your Barangay?
5. Were there any complaints from the people of your Barangay, regarding the support provided after typhoon Lawin?

Key informants:
Barangay captains:
Reginaldo Paquirigan Bagain (Pilig Abajo)
Rodolfo Laguinday (Masipi East)
Alfredo Macapallag (Angancasillan)
Randy Balabbo (Pilig Alto)
Milagros G. Patricio (Municipal social welfare and development officer)

ASSESSMENT ON RESILIENCE OF HOUSEHOLDERS TOWARDS POSSIBLE SUPER TYPHOONS: THE ADAPTATION STRATEGIES RELINKED TO REBUILDING DAMAGED HOUSES IN STA. MARIA, ISABELA

Yassine Hattay & **Leana S. Galicia**

INTRODUCTION

The uncertainties of the academic sector about the possibilities of an increasing intensification and multiplication of natural disasters in relation to Climate Change (CC) needs more studies due to its harmful impact on the vulnerable groups as the case of super Typhoon in the southeast Asian countries (Soriano 2017). Climate Change is a global concern that needs an enriched understanding to protect the lives of billions of people and sustain the growth of the economy. Therefore, it is important to make research with structural approach to assert the impact of natural disaster and to evaluate their effects on the vulnerable population. This is necessary because these vulnerable groups are the first subject to natural disasters and basically, Philippines is considered as one of these susceptible groups (Elliot et al. 2015).

Last 19 October 2016, the highest Storm Warning Signal (SWS) in the history of the Philippines was raised in Regions I, II, III, IV-A, V, CAR and NCR reaching SWS No. 5 and was named 'Haima' ('*Lawin*' as local name). This typhoon was able to have a diameter of 800km with maximum winds of 225kph and speed of 26kph which remained in the Philippine Area of Responsibility (PAR) for almost 96 hours (4days) making it one of the super typhoons that hit the country resulting to damages to houses and properties, impacts on livelihood, education, health and lives *(Figure 1)* of the affected Filipinos with an estimated damage cost of 657.8M pesos (Tabel 2017, pers. comm).
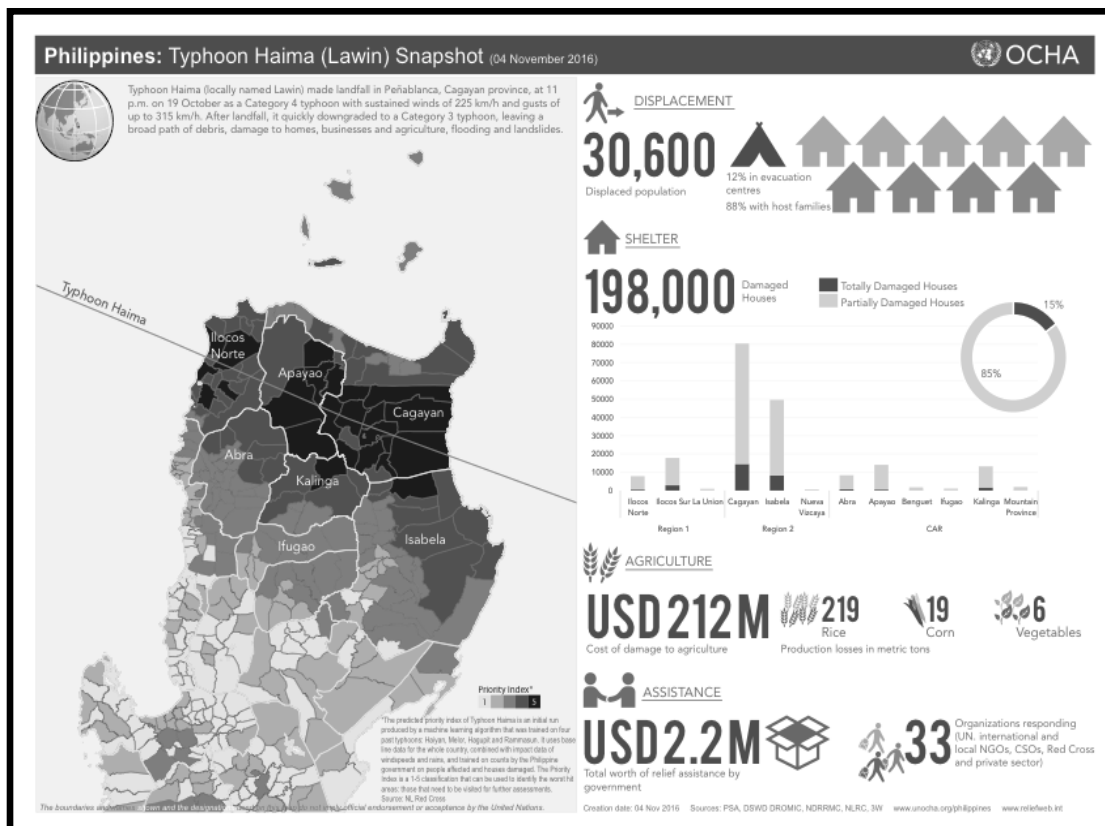

Figure 1: Typhoon Haima (Lawin) impact on the population, shelters and agriculture

Conscious of the fact that the province of Isabela in Region-II (Cagayan Valley) is located at the north-eastern part of the Philippines and is highly prone to typhoons formed in the Pacific Ocean, the largest ocean in the planet which is seen in the eastern board of the country, this reality makes the people living in the province more exposed to threats and risks relinked to typhoons. From these threats brought by typhoons and their vulnerable situation, it is a must to put them as priority groups in terms of affectedness on hazards (Tabel 2017, pers. comm*.).*

To have an in-depth understanding of how the typhoon affected the lives of the survivors, the conduct of our research study in the municipality of Santa Maria, Isabela is due to the fact that this municipality has been always one of the most vulnerable areas in the province and even in the region *(*Maggay 2017, pers. comm*.).* For a brief background, the fourth class municipality of Sta. Maria is located in the first district of Isabela, north-west part of the province, having a total land area of 140.00 km^2 (54.05 sq. mi) comprising of twenty (20) politically subdivided barangays with a total population of 25,382 and a density of 180/km^2 (470/sq. mi) (PSA 2015).

Due to the extreme natural disasters enhanced through anthropogenic activities, the adaptation in rebuilding damaged houses is a necessity for the people of Sta. Maria. In this research, we assess the damages on houses thus the individual strategies in anticipating possible devastation due to destructive typhoons. For a complete comprehension on the recovery process after an extreme natural disaster such as 'Lawin', there is basically a need to determine how to increase the capacity building of the communities and decrease their vulnerability to extreme effects of hazards. The main purpose of this research is to study the adaptation strategies and level of resiliency of householders in the rural communities of Santa Maria through assessing their reconstruction manners and activities after the Super Typhoon 'Lawin' thru knowing how they adapt their building units.

RESEARCH QUESTIONS

Main: How survivors of typhoon 'Lawin' in rural areas of Sta. Maria adapt their houses to be more resilient to next possible Super typhoons?

In order to consolidate the information that we want to gather, we subdivided the main question into three sub-questions:

– What adaptive strategies and alternatives did they use in rebuilding their houses?
– Why are they adapting their house for short term/long term?
– How do they think of their resilience to next possible super typhoons?

METHODOLOGY

This research will try to determine how the inhabitants in the rural areas of Sta. Maria have experienced the effects of the Typhoon Lawin on their buildings and in which manners they have adapt their building to be more resistant. In order to do so, we will use a combination of quantitative and qualitative methods including observational method to generate data about first, the real impact on the buildings/houses *(Appendix A.1);* second*,* the assessment of government to the damages *(Appendix A.2);* third, how they repaired and adapted their buildings to future natural disasters *(Appendix A.3) a*nd lastly, the assessment of their level of resilience toward next typhoons *(Appendix A.4).*

Data Resources

We will interview randomly selected 20 householders from the area of Sta. Maria with at least two respondents from each of the six identified barangays. The gathered data are in the form of testimonies/life stories of the respondents that can help with the specification of the research questions. We will use semi-structured and open and close questions to generate quantitative and replicable data through motivating them to share their experiences during the wrath of typhoon 'Lawin'. We will also assess the structure of the house and try to compare it from the previous structure of their house to the repaired/new house after the typhoon.

Collective Data Gathering

The first method of data gathering will be through an open interview with the government agencies and barangay officials where we, the researchers will come in group to randomly ask questions to the interviewee. In this case, it would be advantageous in consuming time and effort not only on the researchers but also for the interviewee.

Interviews and Conceptualization

The next method is by conducting an interview to the householders which we randomly selected through approaching their household with a target of at least five interviews each day; we will also base some results on the secondary data about the adaptation behavior in the reconstructing and reparation of residential houses after a disaster. These data are used as supportive information to compare to the collected data in the field. This inductive research process will help in demarcating with concepts that are suitable to the context of the locality of Sta. Maria. After the process of conceptualization, we go further with the operationalization of the applicable concepts to analyze the questionnaires for our research.

The research questions will be elaborated into bulleted sub-questions to easily modify the results afterwards and it will be written in English language. Knowing that one of us cannot understand the Filipino language and the vernacular of the people in Sta. Maria (Ybanag & Iloco), the interview will go on a process of discussion-translation-note-taking but at some point, there will be respondents who could understand and directly speak in English language so the process will probably change into discussion and note-taking.

Table 1. Field Study Time Schedule

Day	Date	Activity	Location
Wednesday	18-01-17	Travel from ISU Cabagan (ISUC) to Sta. Maria, Isabela A.M.: Courtesy call to the Office of the Municipal Mayor; Interview with the Municipal Disaster Risk Reduction Management (MDRRM) Officer P.M.: 2 Interviews (Mozzozzin Sur) 1 Interview (Mozzozzin Norte)	ISUC- Poblacion Sta. Maria; Poblacion- Mozzozzin Sur; Mozzozzin Sur-Mozzozzin Norte; Return to ISUC.
Thursday	19-01-17	A.M.: 3 Interviews (Mozzozzin Norte) P.M.: 3 Interviews (San Rafael West)	ISUC-Mozzozzin Norte, Sta. Maria; Brgy. Mozzozzin Norte-San Rafael West; Return to ISUC
Friday	20-01-17	A.M.: 4Interviews (San Rafael East) P.M.: 4Interviews (Buenavista)	ISUC-San Rafael East, Sta. Maria; San Rafael East-

			Buenavista; Return to ISU Cabagan.
Saturday	21-01-17	A.M.: 3Interviews (Quinagabian) P.M.: Karina's Internet Cafe	ISUC-Quinagabian, Sta. Maria; Quinagabian-Centro, Cabagan; Return to ISU Cabagan.
Sunday	22-01-17	Free Day	
Monday	23-01-17	A.M.: Interview with the MSWD Office personnel P.M.: Tabulating the gathered data	ISUC-Poblacion, Sta. Maria; Poblacion- Return to ISU Cabagan.
Tuesday	24-01-17	Analyze the tabulated data	CCVPED-ISU Cabagan, Isabela
Wednesday	18-01-17	Travel from CCVPED-ISU Cabagan to Sta. Maria, Isabela A.M.: Courtesy call to the Office of the Municipal Mayor; Interview with the Municipal Disaster Risk Reduction Management (MDRRM) Officer P.M.: 2 Interviews in Mozzozzin Sur; 1 Interview in Mozzozzin Norte	CCVPED-ISU Garita Heights, Cabagan-Poblacion, Sta. Maria; Brgy. Poblacion-Brgy. Mozzozzin Sur;Mozzozzin Sur-Mozzozzin Norte; Return to ISU Cabagan
Thursday	19-01-17	A.M.: 3 Interviews in Brgy. Mozzozzin Norte P.M.: 3 Interviews in San Rafael West	CCVPED-ISU Garita Heights, Cabagan-Brgy. Mozzozzin, Sta. Maria; Brgy. Mozzozzin-Brgy. San Rafael West, Sta. Maria; Return to ISU Cabagan.
Friday	20-01-17	A.M.: 4 Interviews in Brgy. San Rafael East P.M.: 4 Interviews in Brgy. Buenavista	CCVPED-ISU Garita Heights, Cabagan-Brgy. San Rafael East, Sta. Maria; Brgy. San Rafael East-Brgy. Buenavista, Sta. Maria; Return to ISU Cabagan.
Saturday	21-01-17	A.M.: 3 Interviews in Brgy. Quinagabian P.M.: Search for literature in Karina's Internet Cafe	CCVPED-ISU Garita Heights, Cabagan-Brgy. Quinagabian, Sta. Maria; Brgy. Quinagabian-Centro, Cabagan; Return to ISU Cabagan.
Monday	23-01-17	A.M.: Appointment/Interview with the MSWD Office personnel P.M.: Tabulating the gathered data	CCVPED-ISU Garita Heights, Cabagan-Brgy. Poblacion, Sta. Maria; Brgy. Poblacion- Return to ISU Cabagan.
Tuesday	24-01-17	Analyze the tabulated data	CCVPED-ISU Cabagan

RESULTS

On the 18th of January, we directly approached the office of the Municipal Mayor of Sta. Maria, Hon. Hilario G. Pagauitan and we were welcomed by some of his staff before he arrived 15 minutes later. Mr. Merlijn van Weerd and Ms. Tess Balbas of Mabuwaya Foundation accompanied us to his office and they introduced the Water Course and its rationale. We, the Water Course students, also introduced ourselves to the Mayor. After the introduction, Mr. van Weerd and Ms. Balbas were able to get the permit for conducting the research within the 20 barangays of Sta. Maria. Mayor Pagauitan even asked his documentary staff Mr. Julius Collin "JC" M. Cabauatan to initially accompany us to the target barangays.

The next thing we did was to interview the Municipal Disaster Risk Reduction Management (MDRRM) Officer of Sta. Maria, Mr. Manuel G. Pagauitan, in the municipal gym were his temporary office is located. According to him, the municipality of Sta. Maria has a population of 24,000 (MDRRMO 2016). Among this population, 50% (12,000) suffered losses by the typhoon and 25% of these losses are recorded as totally damaged houses. The estimated cost of total damages in the buildings and infrastructures in the entire municipality is 28 Million pesos.

Due to limited field study time, we only identified six (6) affected barangays namely: Mozzozzin Sur, Mozzozzin Norte, San Rafael West, San Rafael East, Buenavista and Quinagabian. These barangays used to experience flooding right after typhoons and/or when the water from the Cagayan River rises due to the releasing activity of Magat Dam in Ramon, Isabela and this occurrence of flood has long been considered as additional risk to the vulnerable people. Due to this, most of the houses in the affected barangays are 2-storey houses. Although, only a few of them are able to construct a small/improvised boat in case of emergency circumstances which rarely happens.

Figure 2: Map of Barangays of Sta. Maria placed in the Police Station

The field study started with a meeting with the Barangay Captain of the target community. After informing him about the purpose of our research and how we will do it, we asked his permission for us to conduct interviews within his jurisdiction and then we proceeded on making random selection of respondents by skipping every fourth house from the last respondent and also by availability sampling method.

In our overall assessment of the livelihood of our respondents, we noted that 30% are part-time farmers (irregular farm helpers with Php150-250/day); 30% are full-time laborers (construction workers, gasoline-man, water delivery-man with Php200-300/day); 15% are part-time laborers (laundering, carpentry, stay-out helpers with Php150-200/day); 15% Public utility driving (tricycle, jeepney & kalesa with Php200-250/day); and 10% are full-time farmers (owner & tenants with 300-350/day) and all of these people clearly stated that their daily income is inadequate to provide their needs and build a fully concrete house.

Sub-question I. Adaptive Strategies and Alternatives Used in Rebuilding Houses

Among the respondents, when asked about how they repaired their houses and what kinds of materials were used *(Appendices B.3.a&c)* majority answered they repaired and are still repairing their houses according to funds available and accessible materials. In these respects, most of the respondents who were living in houses made of semi-concrete, bamboo and wood were only capable of repairing some of the damages in their houses as they only rely on utilizing the available bamboos, woods and roof sheets which they collected right after typhoon 'Lawin' and most of them are also dependent on the 3mx6m tarpaulin distributed by the Municipal Social Welfare and Development (MSWD) a week after the typhoon. Some were able to buy new materials for the repair of their houses but these materials are the same kind with what have been destroyed by typhoon 'Lawin'. And few of them haven't started any repair yet as they are still earning money to finance the reconstruction, so for the mean time, they are still residing with their families and/or relatives' house and share with the expenses among themselves.

When asked about how they funded themselves in the immediate repair of their houses *(Appendices B.3.b)*, some of the respondents borrowed money from their insurance company and relatives and bosses and the mode of payment is monthly with minimal interest but only for those who are full-time laborers and farmers. For those part-time laborers and farmers, they say that they can only use those available materials with them and wait until they could earn enough money which definitely takes too long and it might be impossible for them to repair their house before June 2017, on which for the people, stronger typhoons are expected to hit the region.

Sub-Question II. Short Term and Long Term Adaptation

Basically, from assessing what kind of repair they had done and from looking at their houses after the typhoon 'Lawin', we can immediately determine which is adapted for long term or short term *(Appendix B.3.d)*. In the perception of people and from their experiences, long term adaptation is when a damaged semi-concrete, bamboo and/or wooden house becomes either fully concrete using the more expensive and 'original' (as people say) quality of materials; short term, if the house has just been repaired through using the usual kind of materials being bought within the locality or recycled and collected around the neighborhood or along the river.

Shelter after Typhoon Lawin
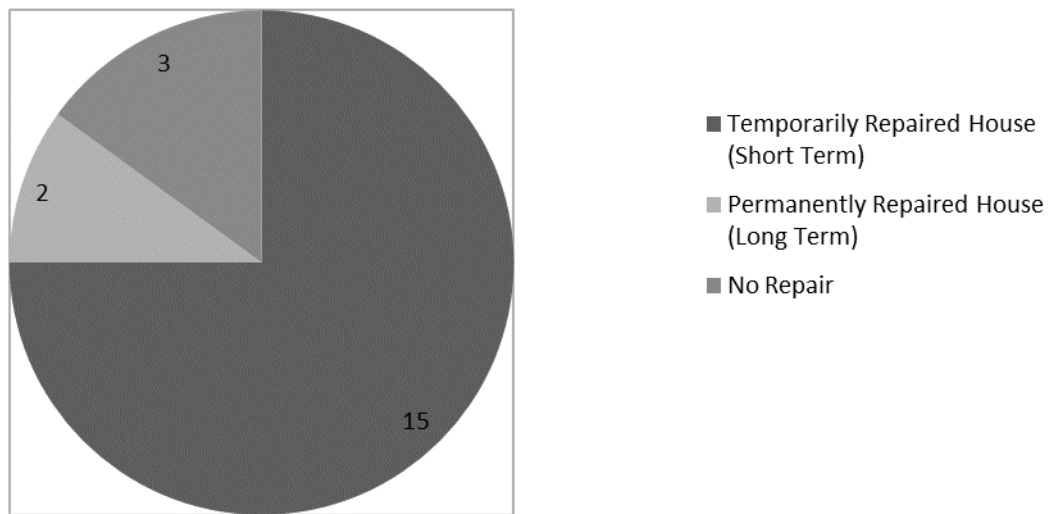
Figure 4. Rebuilding Houses Adaptive to Short Term or Long Term Period

When the respondents were asked why they choose not to adapt their houses in longer term (*Appendix B.3.c)*, we gathered several causes: a.) Very limited budget and resources; b.) Unstable jobs; c.) No idea of building a resilient house; and d.) the beliefs that no matter how strong your house is, no one can withstand a strong super typhoon. And when we asked them if they ever thought of transferring into a safer place which means free from flooding and free from frequent occurrence of typhoon (if they know such place) *(appendix B.4.e)*, majority of the respondents said that they are willing to transfer but they just cannot leave their current house as their livelihood (like farming) and their properties (like pieces of land) are in the area and it is pressing to adjust in a new place again.

Sub-question III. Individual Perception of their Resiliency

To define resilience, it is the ability to become strong again after something bad happens; it is the capacity of a strained body to recover or adjust easily to a misfortune or change (Merriam-Webster Dictionary 2017). In the sense of disaster concurrency in the Philippines, resilience is the amount of change a system can undergo and still retain the same function and structure while retaining options to develop in desired directions *(Berkes et al. 2003, Holling, 1973, Nelson et al. 2007)*.

When we evaluated the resiliency of the respondents to future strong typhoons, it appeared that most of them are still not resilient enough *(Appendix B.4.a)*. Our assessment is based from considering the present strength of their houses and what preparations are they planning to have in case another super typhoon with SWS No. 5 which will be publicized two days before its landfall with the same speed (at least 225kph) in the same area where 'Lawin' hit *(Appendix B.4.c)*.
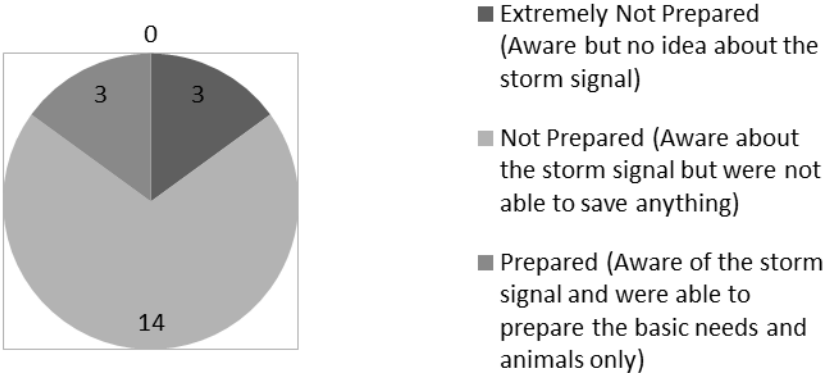
Figure 5. Level of Preparedness as one of the Basis in Assessing Resiliency
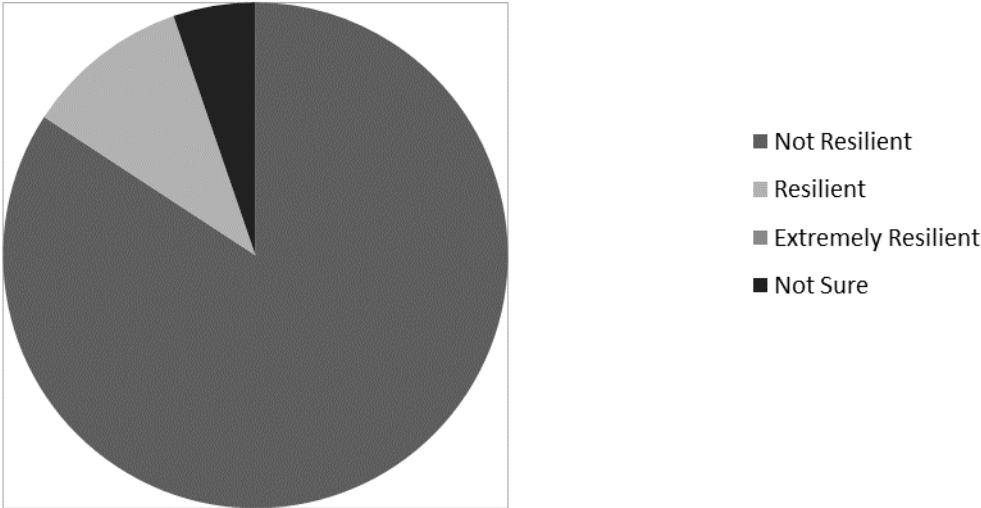
Figure 6. Level of Resiliency of the Respondents

For the people, a resilient house must be a fully-concrete house with 2-storey level to withstand the strong winds brought by the typhoons/super typhoons and also to survive the frequent flooding brought by the increase in Cagayan River's water level. For them, to construct a fully-concrete house, it will need a large fund which definitely takes time and extreme effort before they could earn it *(Appendix B.4.a)*.

When we asked more about their future preparations if another super typhoon comes *(Appendix B.4.c)*, most of them answered they will not prioritize their houses as they believe that life, food, water and clothes are more important than preparing the house and properties; several of them said that their preparation will be dependent on the accessible savings and funds and they believe that if another strong disaster comes, they will just immediately secure themselves in a safer house or else conduct a pre-emptive evacuation a day before the landfall mentioning their belief that God will protect them.

On the other hand, thinking that the concept of cooperativism might help the community's resiliency, we asked an idea from the people about people's organization *(Appendix B.4.c)*, most of them answered that it is good if they can have an organized group so they can help each other in terms of crisis but for them it is also very impossible to work in group considering that most of the people in the community are busy finding part-time jobs and works.

In addition, from our interview with the MSWD personnel *(Appendix D&E.)* we determined that the government has been trying to assist the marginalized sector of the municipality of Sta. Maria. That is, the indigent families or the 'poorest of the poor' *(A.N. Maggay Pers. com.)* as this group is being recognized as the most vulnerable stakeholders. Furthermore, after the distribution of assistance to the survivors, there were direct and indirect verbal complains from the people to their office regarding inequality and inequity in the dissemination of assistance. But for the MSWD personnel, they only follow guidelines on the assessment and allocation of assistance from the regional DSWD office that's why they cannot address all the concerns of the people, thus considering the fact that they lack manpower and facilities, though they also tried helping them to their extent.

DISCUSSION

With our emphasis on the concepts of adjustment to typhoons and the changes adaptive to reconstruction of buildings by householders in the municipality of Sta. Maria, we were able to evaluate the resiliency of the people towards possible forthcoming strong typhoons.

Through the in-depth study, we also identified the main factors affecting the weak resilience of the affected population namely: a.) Very limited funds and resources due to irregularities on jobs and livelihoods and rapid commodity price increase after the occurrence of natural hazards; b.) Miscommunication due to lack of education caused by inadequate community involvement and organization; c.) Miscommunication caused by human resource problem in the responsible agency; and d.) People's beliefs and expectations overpower the reality*(Appendix B)*.

Due to the supposition that an incremental and difficult adaptive process is the case in this municipality in the reconstruction of completely and/or partially damaged houses, we formulated an interpretation that people are very much willing to adapt their homes into a long term period but due to circumstances like unavailability of funds and resources and with the factors affecting their resilience mentioned above, they were only able to settle in short term adaptation.

For us, the researchers, after knowing the level of resiliency and adaptation strategies of the people, though there have been no proof of more frequent super typhoons and that there is still a need to study more about the possibilities of the repeated occurrence of stronger typhoons in the tropics, it would be very interesting to include in our study the search on different ways on

how to make a resilient house depending upon an existing budget and resources of the householder. It would also be very helpful to know the adaptive strategies of people in some areas of the country who are resilient enough in terms of withstanding the impacts of strong natural hazards.

RECOMMENDATIONS

The people of Sta. Maria have already experienced the rage of a signal number 5 super typhoon and suffered loss on damages not only in houses but also in properties. With this, it is recommended for the people to have a committed interest of learning the ways on how to build a resistant house and how to make themselves resilient towards imminent strong super typhoons regardless of the negative factors that they think hinder them.

For the government sector, it is perhaps better if one of their focused projects is to empower the people on disaster resiliency through conducting massive and monitored regular trainings and seminars for the vulnerable communities and educate them about proper preparedness measures, be it ahead of time or immediate. It is also necessary for the sake of all the stakeholders to have a firm and supervised assessment on damages every after hazard, managed allocation of funds for assistance executed with spirit of equality and equity and well-communication amongst all.

AKNOWLEDGEMENT

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APPENDICES

Appendix A. Guiding Topics
1. Impacts of typhoon 'Lawin' on Houses
2. Assessments of government on damages to houses
3. Adaptation strategies towards future typhoons
4. Level of resiliency of the people

Appendix B. Sample Semi-Structure Interview Schedule & Open-Close Questions

Demographics: Name: Age: Gender: No. of Householders:
             Livelihood: Ave. Income/Day: Type of House Structure:

Topic 1: Impacts of Typhoon 'Lawin' on Houses
  a. What damages did they have?
  b. What is the estimated cost of total damages?
Topic 2: Assessments of Government on Damages to Houses
  a. To what level of damage do they belong?
  b. What assistance did they get?
  c. From whom did they get the assistance?
Topic 3: Adaptation strategies towards future typhoons
  a. What reparation strategy did they have?
  b. How did they fund the reparation?
  c. What materials/quality of materials was used?
  d. Why did they adapt their house for long term or short term?
Topic 4: Level of resiliency of the people
  a. In their own perception, are they resilient enough to withstand future strong super typhoons?
  b. What structure of house is resilient for them?
  c. Did they ever think of organizing or joining people's organization?
  d. What are their future preparations in case another super typhoon comes?
  e. What are their expectations about the occurrence of typhoons?
  f. If they will be given a chance to transfer in a safer place (if they know such place), will they transfer? Why/why not?

Appendix C. Respondents
    (We, the researchers agreed with the respondents to keep their profile confidential so we will be using the initial letter of their first name plus the spelled-out last name with the noted demographics).

Address (Add.) Abbreviation:
            Mozzozzin Sur – MS   Mozzozzin Norte – MN
            San Rafael West – SRW   San Rafael East – SRE
            Buenavista – B   Quinagabian – Q

Add.	Name	Age	Sex	No. of House-holders	Livelihood	Ave. Income /Day	Type of House Structure
MS	J. D.	33	M	3	Part-Time Farming	200	Bamboo/wood
MS	M. M.	64	F	9	Part-Time Farming	250	Concrete-Bamboo/wood

MN	R. C.	62	M	6	Part-Time Farming	150	Concrete-Bamboo/wood
MN	E. M.	48	F	5	Part-Time Laborer	150	Bamboo/wood
MN	J. R.	39	F	7	Full-Time Laborer	250	Fully Concrete
MN	G. A.	39	F	5	Full-Time Laborer	300	Bamboo/wood
SRW	G. B.	28	F	4	Full-Time Laborer	200	Bamboo/wood
SRW	I. A.	32	F	12	Part-Time Laborer	200	Concrete-Bamboo/wood
SRW	R. R.	25	F	4	Part-Time Farming	150	Concrete-Bamboo/wood
SRE	S. M.	50	M	5	PUV Driver	250	Fully Concrete
SRE	N. G.	62	F	8	Full-Time Laborer	250	Concrete-Bamboo/wood
SRE	D. D.	35	F	3	Part-Time Farming	200	Fully Concrete
SRE	J. M.	24	M	13	PUV Driver	200	Bamboo/wood
B	L. G.	55	F	5	Part-Time Farming	150	Bamboo/wood
B	G. B.	46	M	6	Full-Time Farming	300	Fully Concrete
B	J. G.	51	F	5	Full-Time Laborer	300	Bamboo/wood
B	R. G.	31	M	3	PUV Driver	250	Fully Concrete
Q	V. O.	34	F	4	Full-Time Farming	350	Fully Concrete
Q	M. C.	28	F	5	Part-Time Laborer	150	Concrete-Bamboo/wood
Q	E. A.	47	F	4	Full-Time Laborer	200	Bamboo/wood

Appendix D. Municipal Social Welfare and Development (MSWD) Office Personnel
1.   Ava Angelica S. Taguba – Municipal Link Officer
2.   Marivic Corpuz Camarao – Municipal Link Officer
3.   Rowena Ana R. Maggay – Planning and Development Officer II

Appendix E. Open & Close Questions to MSWD Personnel
1. How did they prepare before typhoon Lawin?
2. What happened during the typhoon?
3. How did they respond after the typhoon?
4. How about their assessments and validation on damaged houses?
5. What assistance did they give regarding rebuilding damaged houses?
6. Did they receive complains from people regarding the assistance given to them?
7. How did they react on the complaints?
8. In their perception, what are the factors causing their effective and/or ineffective   services?

FROM TYPHOON LAWIN AFTERMATH TO NEW WAYS OF IMPROVING RESILIENCE IN URBAN CABAGAN

Ashley Mae Malsi Marcos and Jemima Johanna Cárdenas Meijers

INTRODUCTION

The Philippines is located at the Pacific ring of fire, therefore being prone to natural disasters like earthquakes and volcanic eruptions. These phenomena, however, are not the only ones occurring in and around the Philippines. Typhoons have yearly been disturbing the country and damaging its infrastructure and buildings, while challenging the organizational and political structure of the country. Experiencing this kind of phenomenon can be really tough for a person to deal with, both in a physical and emotional way. In order for a society to improve their response to the wrath of a typhoon, it is important to always be well prepared by reacting both immediately and efficiently. Most importantly, it is crucial to become more and more resilient over time, so that whatever nature gives, the Philippines can bounce back, strengthened, and become successful again.

Last October 19, 2016 super typhoon Lawin hit Cabagan, Isabela. It is one of the strongest typhoons that hit the municipality, causing the people to be shocked about the damages done by its wrath. Cabagan is a first class municipality in the province of Isabela consisting of a total of 26 barangays. For this research, we those to focus on three urban barangays were we also conducted our interviews, namely the barangays Catabayungan, Casibarag Norte and Luquilu. During the interviews, we have acquired data on the distribution of aid to families after typhoon Lawin. Our purpose is to understand the logistics of this process, from the planned relief by the local government to the actual distribution and consumption of the goods by the citizens of Cabagan. With this, we aspire to find new ways of improving resiliency in the area of immediate assistance after a typhoon. In order to gain a clear understanding of this process we have divided our research into three focus areas. The municipality of Cabagan being the first one, we will be analyzing the way in which they provided aid to its citizens. Similarly, we have done research on three barangays as the second actors and gained information about their efforts to support the people within their community. Finally, we will be visiting the citizens themselves. Having them as a third actor, we will have the chance to hear their personal experiences in the typhoon aftermath regarding the received goods and their opinions on governmental aid. This way we can combine the theory of the governmental entities with the practical matters all the way down to the individuals themselves, gaining a clear overview of the logistics of aid-provision in Cabagan, Isabela.

Looking into these three areas, we first acquired information while visiting the National Disaster Risk Reduction Management Council (NDRRMC) in Manila, where we learned about the Disaster Preparedness Manual that each mayor of a municipality receives. In this manual, the word resilience is defined as follows: 'The ability of a system, community, or society exposed to hazards to resist, absorb, accommodate and recover from the effects of the hazards in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions' (Local Government Academy 2015: 21). Although this seems to be a clear description, the term resiliency covers a lot of areas, from the preparedness for a disaster to the psychological wellbeing of citizens after the disaster (Hechanova *et al.* 2016: 1). One part of resiliency is the immediate aid from the government to its citizens. Examples of what the Local Government Unit (LGU) does after a disaster are rescue activities, damage assessment to infrastructure and agriculture, and a relief operation (Baccay 2017). In

this report we will be focusing on the latter by analyzing the logistics of the aid in order to find ways to improve its efficiency, thus the resilience of the immediate aid after a disaster like a typhoon.

RESEARCH QUESTIONS

Main question
To what extent did the planned aid of the municipality of Cabagan correspond with the actual aid provided to the citizens of the barangay Catabayungan, Luquilu, Casibarag Norte in the aftermath of typhoon Lawin?
Sub questions
1. What is the aid provided after the typhoon according to both the local government and written documents?
2. What aid was provided to the citizens according to the respondents themselves?
3. What is the opinion of the respondents regarding the role of the government after a natural disaster?

METHODS

Time schedule:

Day	*Date*	*Activity*	*Location*
Wednesday	18/01/2017	Research on municipality	ISU Cabagan
Thursday	19/01/2017	Research on municipality and interview municipality officials and barangay captains and individuals Luquilu	ISU and Cabagan centro
Friday	20/01/2017	Interviews in Catabayungan.	Cabagan urban
Saturday	21/01/2017	Interviews in Casibarag Norte.	ISU Cabagan
Sunday	22/01/2017	Free	ISU Cabagan
Monday	23/01/2017	Write essay	ISU Cabagan
Tuesday	24/01/2017	Write essay	ISU Cabagan
Wednesday	25/01/2017	Write essay	ISU Cabagan
Thursday	26/01/2017	Finalize essay	ISU Cabagan

Our research consists of two main methods, namely literature-based research and interviews. The target respondents for the interviews are local government officials and individuals of the barangays Catabayungan, Luquilu, and Casibarag Norte. In order to gain valuable results, we have interviewed a total of 12 citizens and the three captains of the barangays concerned. Finally, we interviewed two municipality officials; Sir Alvin Baccay, the Secretary of the Sanguniang Bayan (SB), and Sir Randy Pascua, Municipal Disaster Risk Reduction Management (MDRRM) officer. The respondents were chosen through random sampling,

which entailed randomly visiting a street in barangay and choosing every third house regardless of the appearance. This way we remained objective towards the choosing of our respondents. The literature-based research will provide knowledge on the municipality and their response to typhoon Lawin. Here, we will be focusing on the provision of aid, comparing the written documents with both the interviews conducted with the local government officials and the citizens of Cabagan.

RESULTS

After three days of interviews with respondents from the three barangays and local government officials we were confronted with the following three interesting results.

Theoretical aid
In order to analyze the practical matters of the provision of aid, we realized that it is crucial to understand the factual data. Firstly, we tried to understand the logistics of the distribution and found out that the municipality and the barangay officials are bound to work closely together in order for the process to run smoothly. The barangay captains keep a record of the family profiles of the citizens within their barangay and are entrusted with the task of keeping track of the changes that occur. This list of families is then passed unto the municipality, which is used to prepare the correct amount of relief packs after a disaster. Making sure that every family receives the right amount of aid. Consequently, the final relief packs are given to the barangay captains to be distributed to the families (Figure 1). However, this data is often either incomplete or not updated because of families moving houses and/or marriages, causing the Local Government Unit (LGU) to fill this gap with their 5% barangay calamity fund. This is important so that every family receives an equal amount of aid (Meman 2017. pers. comm.).
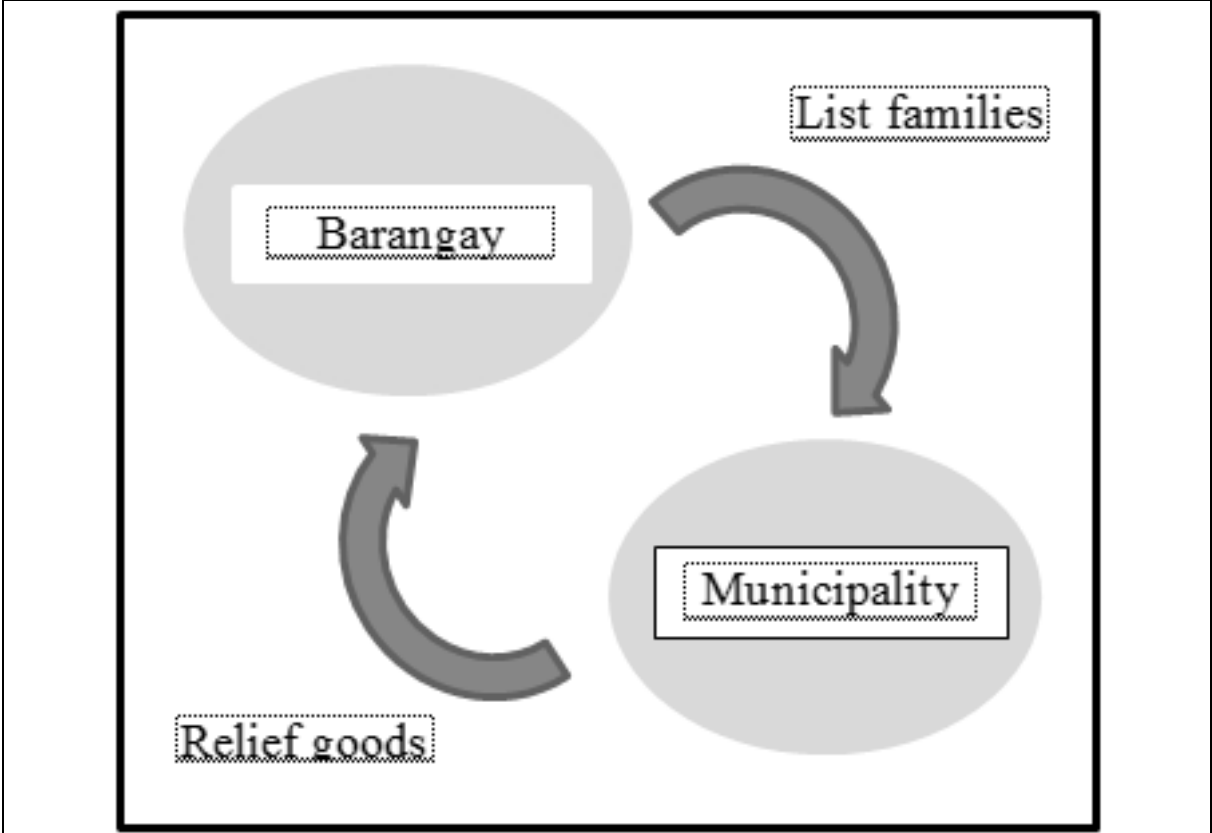

Figure 1: Logistics of the distribution of relief packs by the municipality

Another part of the factual data is the contents of the relief packs. Considering that the amounts given by the municipality officials and barangay captains differed, we are not able to state definite amounts of the distributed goods. The three basic contents, however, clearly appeared to be rice, sardines, and noodles.

Practical aid

We asked all the respondents about the aid they received after the typhoon. As described in the previous section, the aid provided by the municipality and which was distributed by the barangays were theoretically supposed to be equal, each head of the family receiving one pack of relief goods within a house. Thus, meaning that a house can consist of more than one head of the families. It appears that almost all of our respondents received different amounts of goods (Figure 2), while one respondent did not receive any relief goods.
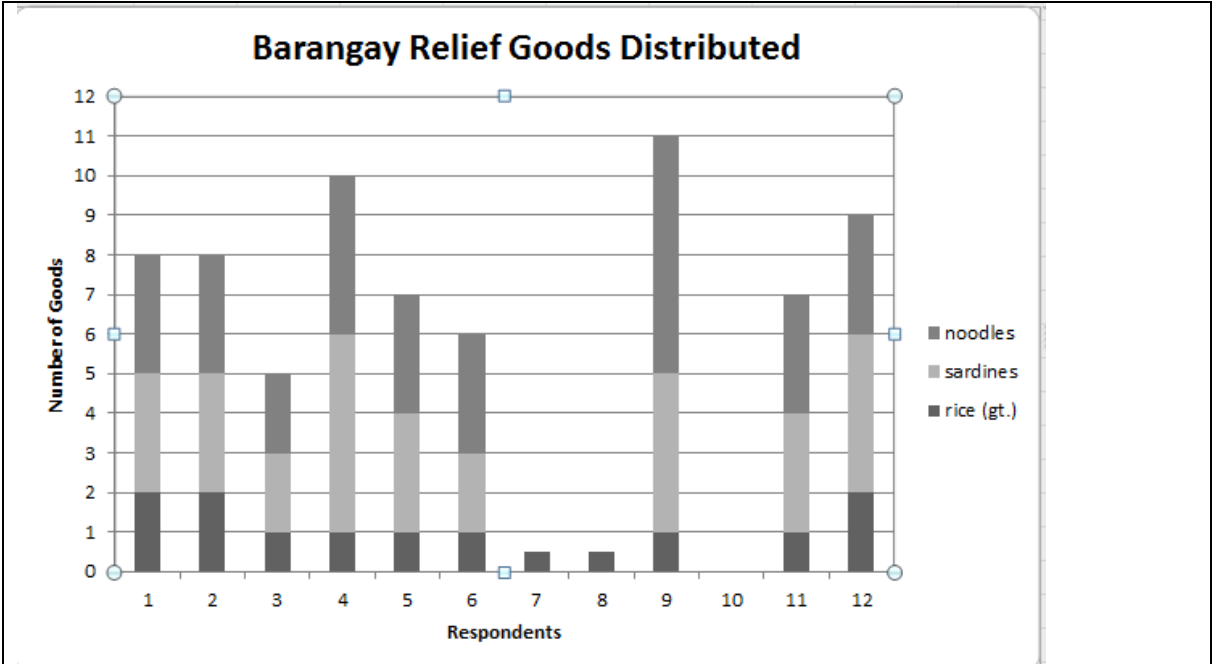
Figure 2: Amounts of the basic relief distributed among the respondents of the three barangays in Cabagan, Isabela

Furthermore, most respondents stated that they received relief packages from the barangay. This is not a surprise, since it was the task of the barangay to distribute the packs. However, this also says something about the citizens' understanding of the logistics. It turned out to be a bigger challenge to use this data confidently than we had initially anticipated because of the respondents' answers to the question from which they received aid (Table 1).

Barangay	Municipality	Provincial	DSWD	Others
12	3	2	8	5

Table 1: Total number of respondents who received aid according to the different levels of the government and organizations

This shows the unconscious confusion of the respondents as to whom the aid came from. When we asked the question whether information was given along with the relief pack it turned out that none of the respondents had received any clarification both about the relief pack and from whom they received it (Figure 3). As mentioned before, the Local Government Unit (LGU) was the one providing the equal amounts of relief materials for every head of the family.
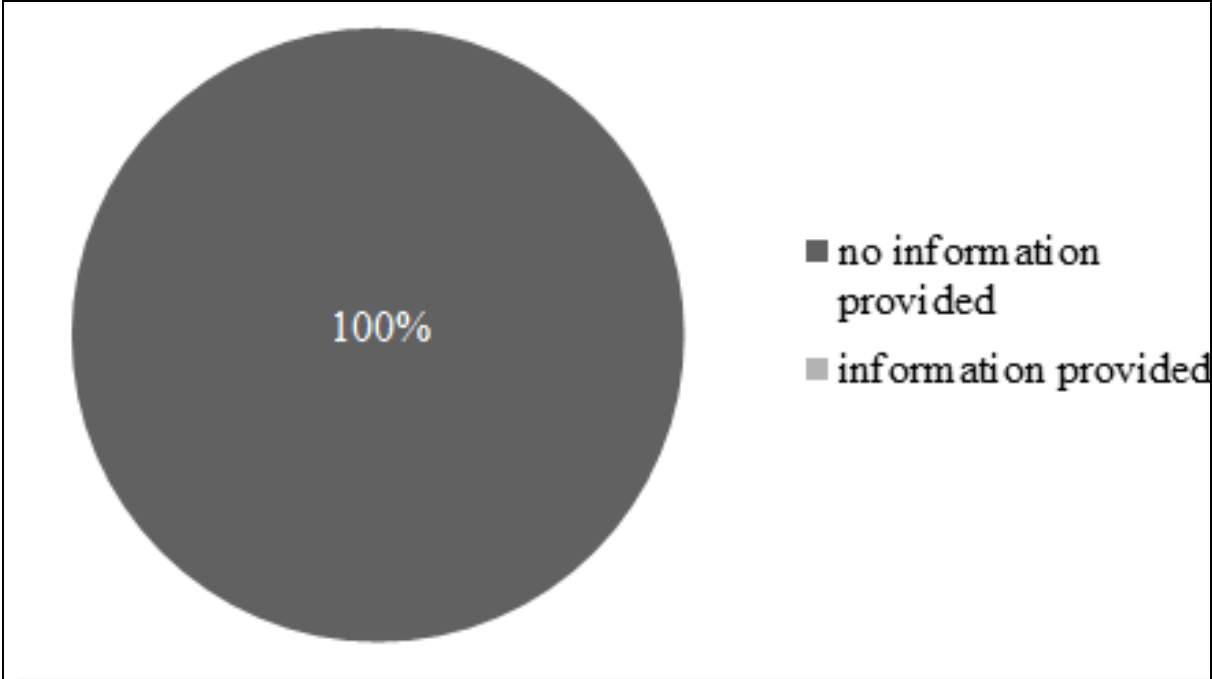
Figure 3: Information provided along with the relief packs

The respondents were also asked about the time it took for them to receive the relief goods. It is important to gather this information because the timespan of receiving the aid translates to the resiliency of the government to respond to a disaster. It appeared that of all the respondents, the shortest it took for the goods to arrive from the barangay was seven days and the longest 22 days. Consequently, we asked how many days it lasted before the received goods were consumed. The range of the consumption of the relief goods is between one to six days (Figure 4).
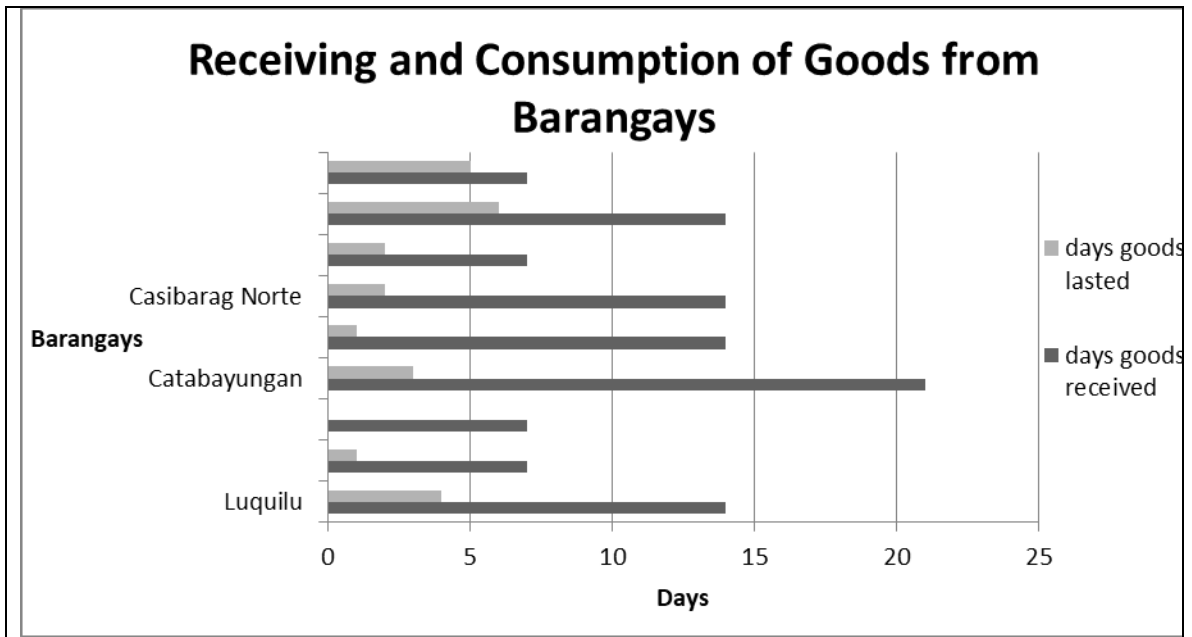
Figure 4: Total of nine respondents who received relief goods from their barangay and the time it took for them to receive the relief packs along with how many days they consumed it after typhoon Lawin.

Citizen's opinion on aid and role of government

After asking the questions about the received aid and the amounts provided by the government, we also found it interesting to find out about the citizen's opinions regarding the role of the government after a natural disaster like a typhoon. Among the 12 respondents, four of them wanted the government to give its citizens immediate assistance, for example, giving relief goods to the people. Other four individuals thought that the government should give monetary support. Other two individuals wished that the officials would be fair in making a list for distribution of goods. The remaining respondents talked about two different roles: the presence of official in assessing the damage and about using the calamity funds in a right way.

Figure 5: areas where the government can be improved as suggested by the total of respondents.

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It appears that the common opinion of the people about the role of the government after a natural disaster like typhoon is the giving of assistance and support to help them recover and rebuild the damages done by the typhoon (Figure 5).

DISCUSSIONS/CONCLUSIONS/RECOMMENDATIONS

What is the aid provided after the typhoon according to both the local government and written documents?
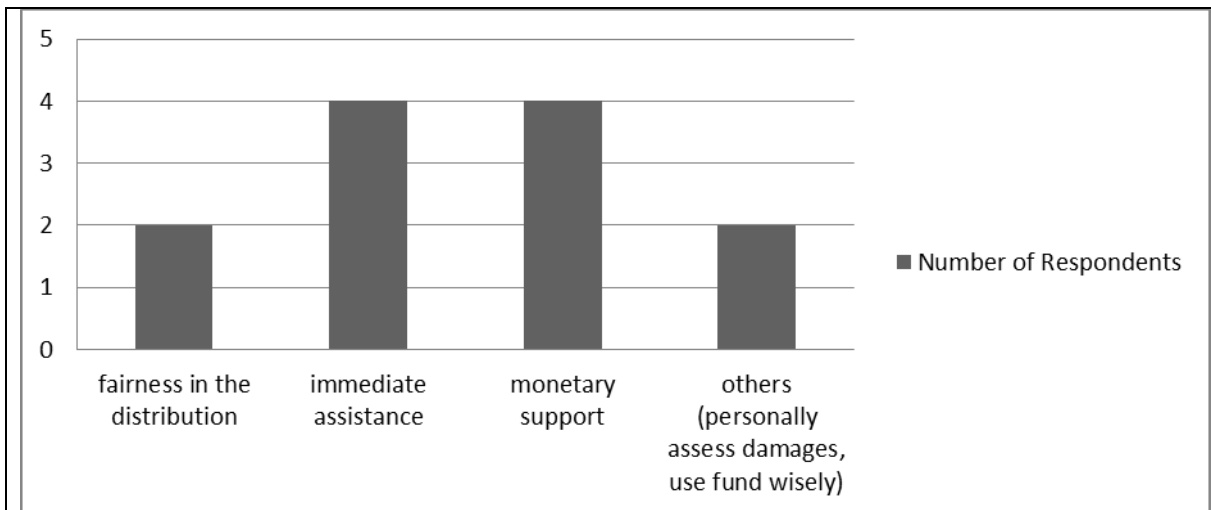The logistics as explained at the results shows that the general idea of the distribution of relief packs would theoretically work well. Barangay captains having the responsibility of providing information about the inhabitants and also the distribution shows a top-down approach on managing challenges like a typhoon. It shows a positive way of citizens and the local government working together. The challenges of this theoretical aid will be further discussed in the next sub question.

What aid was provided to the citizens according to the respondents themselves?
As mentioned before, the logistics work in a way that the barangay submits a list of the families to the Local Government Unit. This list will be used as a basis of how much relief packs a certain barangay will receive (Figure 1). Out of the data it is evident that there is a gap between the planned distribution of goods from government and the actual distribution that took place after the typhoon. As we have already pointed out in the results there were differences in the kind of goods within the relief packs and in the quantities received. Unfortunately, with the information that we gathered we were not able to identify the exact area in which the distribution failed to be successful. However, out of our data it has become clear that the communication during the distribution was insufficient. Therefore, we suggest the communication between the LGU, barangay and the people should be improved. One possible solution could be incorporating a clear document within the relief packs, stating the source of the goods.

Another crucial part of being resilient is the fast and effective distribution of relief goods to the citizens to the affected area. The minimum amount of days in which the relief was delivered to the respondents was seven days. Our opinion is that after such a period of time the relief packs are no longer a necessity. Therefore the relief packages can no longer be seen as immediate aid. In order for the government to be effective in providing emergency relief, the government should distribute foods and clean water for the victims one to two days after the typhoon. For example, in the typhoon Yolanda the houses were destroyed and the people lost everything so it is very important to provide food aid to the people as soon as possible or else there will be the danger that citizens will die of hunger and thirst. Knowing this, it has become clear that communication, coordination, and participation have become the keywords for improvement (Baccay 2017, pers. comm.).

What is the opinion of the respondents regarding the role of the government after a natural disaster?
In times of disaster like typhoon, the role of the government to respond to the needs of the people plays a vital role in improving the resiliency of the community itself. If the government is responsible enough to provide the needs of the people then there is a possibility that a community can immediately bounce back, become stronger and can face another trial. In this research we asked the opinion of the individuals regarding the role of the government after a natural disaster like typhoon and we got a five interesting opinions, namely: fairness of the

distribution, immediate assistance (short term), monetary support (long term), presence of officials in assessing the damages and the use of the calamity funds in a right way.

Fairness of the distribution
One of the interesting points of view of the respondents regarding the role of the government is the fairness in the distribution. Two of the respondents wanted the government to be strict in terms of distribution of goods. The reason for this was because there might be a scenario wherein the person making the list of the barangay just chose certain individuals who can receive such aid.

Immediate Assistance (short term)
In the role of the government after a typhoon, four respondents said that the authorities should give immediate assistance like foods. The reason they gave for this was that right after the typhoon they need to clean the house and the surroundings, which means they cannot go to work in the meantime. It is therefore really necessary that the government should provide immediate assistance.

Monetary Support (long term)
After the typhoon, there were lots of houses that were damaged. Most of the houses were partially damaged but there were also houses that were totally blown down. Four of our respondents said that the government should provide monetary support, especially those families whose house were wrecked by the typhoon. In order for them to repair and rebuild it, they need enough money to buy construction materials but unfortunately they were not able to get some money from the Department of Social Welfare and Development (DSWD). Three months after the typhoon they stated that they were not expecting assistance anymore.

Presence of the Officials in Assessing Damages
One of the respondents mentioned that the officials should be present in assessing the damaged houses, so that they can see the bigger picture of what really happened to a certain house. In this case, we can avoid issues about assessing the houses unfairly.

Using the Calamity fund in a right way
One of the respondents also said that the government should use the calamity fund in a right way because in a natural disaster like typhoon they cannot avoid to spend more money in the recovery and rehabilitation of the damages done by typhoon. The respondent wanted the officials to make a good planning for the expenditures of the calamity fund.

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APPENDICES\

Appendix 1: List of the respondents

Number	Name	Age	Gender	Barangay
1	Noel Gumiran	48	Male	Luquilu
2	Rosmito Paguigan	67	Male	Luquilu
3	Nida Buraga	45	Female	Luquilu
4	Mariano Fugaban Jr.	65	Male	Luquilu
5	Melinda Sia	39	Female	Catabayungan
6	Atanacio Mamauag	75	Male	Catabayungan
7	Lourdes Soriano	52	Female	Catabayungan
8	Mario Laggui	38	Male	Catabayungan
9	Eden Bagunu	17	Female	Casibarag Norte
10	Josephine Frogoso	33	Female	Casibarag Norte
11	Jose Gatan	66	Male	Casibarag Norte
12	Jocelyn Cabauatan	46	Female	Casibarag Norte

Appendix 2: Key informants
Sir Randy Pascua – MRRMO designate in research and planning
Sir Alvin Baccay – Secretary of Sangunian Bayan (SB)
Sir Arthur Masiddo – Barangay Captain Casibarag Norte
Sir Enrique C. Baquiran – Barangay Captain Luquilu
Sir Melchor Zipagan III – Barangay Captain Catabayungan
Ma'am Marivic Meman – Day Care Teacher

Appendix 3: Questionnaire Municipality officials/Barangay Captain
1. What kind of assistance does the local government provide?
2. What are the prerequisites for a Barangay to receive assistance?
3. Who are the actors in the distribution?
4. What are the logistics of the assistance, from preparing to distribution?
5. How do you assess the distribution?
6. How do you assess the damage?
7. How do you distinguish between partially and totally damaged?
8. How do you inform individuals of how much aid are they going to receive?
9. How can aid-provision be improved?

Appendix 4: Questionnaire Individuals

Name:

Age:

Gender:

Occupation:

Date:

1. What was your initial reaction after typhoon Lawin?
2. Did you receive any support after the typhoon?
   - What?
   - How Much?
   - Who was it from?
   - What information is provided along with the received aid?
3. How long did it take to receive aid?
4. For how long did the support last?
5. What role do you think the government should have after a natural disaster like a Typhoon?
6. Were there any needs not provided?
7. What would you like to see improved in the provided aid?
8. Do you know anyone that did not receive any aid?
9. How is your condition right now? (Regarding damages/aid/personal?)

A MULTI-SECTORAL ANALYSIS OF THE RESPONSES TO SUPER TYPHOON HAIMA IN SANTA MARIA

Alvin M. Ramos and Lars B. J. Nees

INTRODUCTION

The Philippines has an average of 114 million inhabitants. The country is divided into 18 regions, which are then divided into 81 provinces. The provinces are then again divided into over 1500 cities and municipalities, which then again are divided into 42036 barangays (Servitillo J., Ph. Gov. ppt. 2017). In the Philippines generally 20 typhoons make landfall annually (Cinco et al. 2006).

Super Typhoon Lawin was the 11th typhoon to make landfall during the Philippine annual typhoon season. (Wikipedia Typhoon Haima 2016). The typhoon made landfall on the 19th of October 2016. (ERCC daily map UN OCHA 2016). Super Typhoon Lawin reached wind speeds of up to 225 km/h, gustiness of 315 km/h and it was the first typhoon to be classified as a Category 5 typhoon. (NDRRMC ppt. 2017). It made landfall on the different provinces and municipalities of Cagayan Valley and the Ilocos Region namely, Peña Blanca, Isabela, and Apayao. (PAGASA Facebook. 2016).

A large number of families, buildings and agricultural fields were affected by Lawin. The municipality of Santa Maria was one of the many areas that was heavily affected by the typhoon. Sta. Maria is a 4th class municipality which is located in the 1st district of Isabela, in the Cagayan Valley (Wikiwand Sta. Maria). Sta. Maria has a population of 25,382 as of 2015 (NSO 2015). The municipality is divided into 20 barangays (Wikiwand Barangay) and it is about 65 kilometers away from Ilagan City, capital city of Isabela. The roads to Sta. Maria are half-cemented and half-graveled. (Prov. Isabela Municipalities).
After the typhoon left the Philippines on the 20th of October 2016 (UN OCHA 2016), the aftermath stirred up various agencies to extend assistance to the affected communities (UN OCHA 2016). Assistance came in the form of relief goods and/or encashment for damaged houses. The emergence of all these responses, from the different sectors of both governmental and non-governmental, brought about political issues on which we focused in this research.

RESEARCH QUESTIONS

Main Question:
What were the responses given and received by the different sectors in Sta. Maria, Isabela after super typhoon Lawin?
Sub-questions:
1. What was the percentage of people that received relief goods from the DSWD?

2. What was in the relief packs in the different barangays?

3. How many times did people receive relief packs?

4. How long did the relief packs last for different households?

5. How many people received encashment?

METHODS

For our research we used the triangulation approach. (Lisa A. Guion *et al*. 2006)
We interviewed 24 people from different barangays in Sta. Maria using different interview methods. These two methods were snowball sampling where we gathered extended information, experiences, and perspectives apart from what the respondents had and availability sampling where choosing our respondents was based on who was available at the time. Questionnaires were used in order to gather substantial information in Mozzozzin Sur, Mozzozzin Norte, and San Raphael West.

The people we interviewed where on different administrative levels within the municipality of Sta. Maria, as implementation of the triangulation approach. The three different administrative levels were the Local Government Unit (LGU) of Sta. Maria, Department of Social Welfare and Development (DSWD), barangay captain, and the villagers, all located in Sta. Maria. In order to get a good sample, we interviewed respondents in three different barangays and two different barangay captains. The three different barangays were Mozzozzin Norte, Mozzozzin Sur and San Raphael West. The barangay captains we interviewed were from San Raphael West and Mozzozzin Sur.

Table 1: Time table for our research project

Date	Activity
January 18	We spoke to the mayor of Sta. Maria, interviewed Manuel G. Pagauitan of the MDRRMO, interviewed the barangay captain and 10 respondents in barangay Mozzozzin Sur.
January 19	We interviewed the barangay captain and 8 other respondents in barangay San Raphael West and 5 respondents in barangay Mozzozzin Norte.
January 20	Went to the internet café to search for literature.
January 21	We created an idea of what our report was going to look like.
January 22	Free day.
January 23	Went to DSWD Sta. Maria, no one was present. We also had a meeting with Renee and Merlijn about our findings up until then.
January 24	We interviewed Consorcia A. Viernes of the DSWD Sta. Maria and got literature at the internet café. We began writing the report.
January 25	We continued writing the report
January 26	We finished the report and made the presentation
January 27	Presented our findings to the group and different stakeholders

RESULTS

Of the 24 respondents we interviewed, 24 of them were able to receive the consumable relief packs from the DSWD (Figure 1).
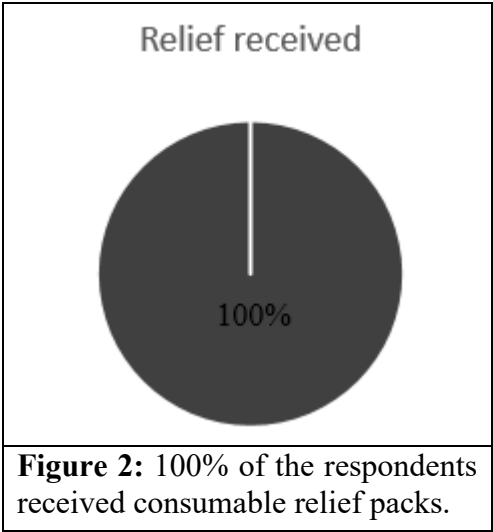
Figure 2: 100% of the respondents received consumable relief packs.

Over the course of the interviews, we got a general idea of what was in the consumable relief packs per barangay (Table 2).

Table 2: Quantified relief goods distributed to the different barangays of Sta. Maria

	Mozz. Sur	Mozz. Norte	San Raphael West
Rice	5	5 + 5	5 + 5
3in1 Coffee	3	6	6
Canned goods	6	4	8

Out of the 24 respondents that received consumable relief packs, 22 people were able to receive it once. Two out of the 24 respondents were able to receive consumable relief more than once by the DSWD, two times to be exact (Figure 2). Both of the barangay captains we interviewed also handed out additional consumable relief to the inhabitants of their respective barangays. The data we got by interviewing the DSWD of Sta. Maria claims that every household received relief at least 5 times. The people that are relatively rich should also have received relief about 5 times.
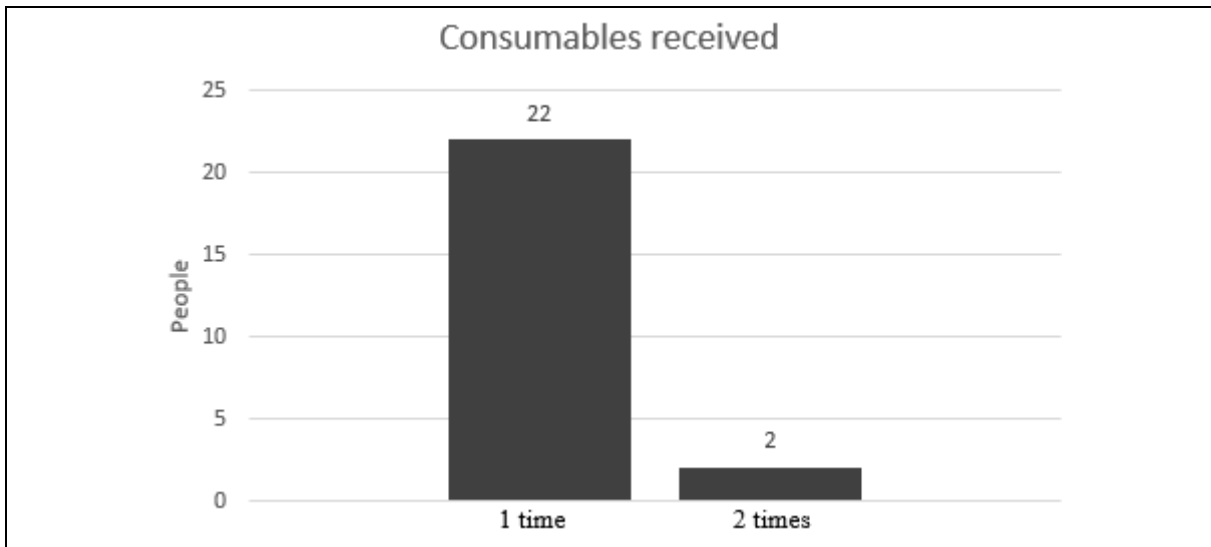
Figure 2: The amount of times respondents received consumable relief goods.

We asked the 24 respondents how long they could last with the aid they received. Out of the respondents, 17 told us they consumed their relief in less than a day. Three of the interviewees said that they lasted one week with the relief and four told us they could last longer than a week with the relief they received (Figure 3).
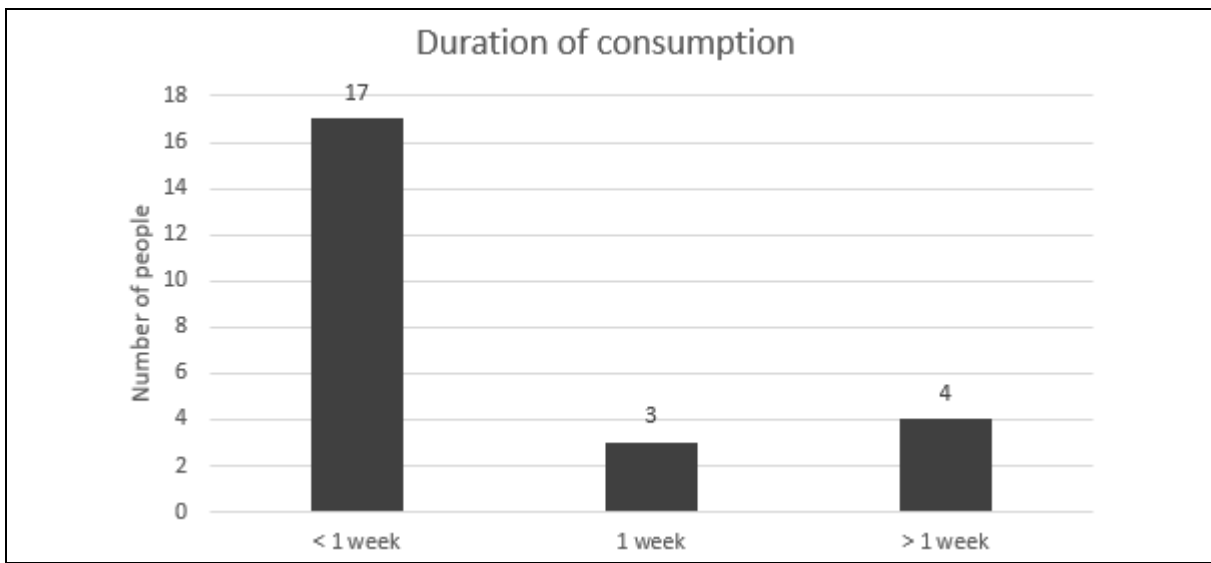
Figure 3: The duration of the consumption of received relief goods.

Encashment is another form of relief the people might receive after they are hit by a typhoon. One person we interviewed out of the 24 was able to receive the initial 5000Php (Figure 4). She received the encashment from the DSWD located in Tuguegarao. According to the DSWD of Sta. Maria, about 50% of the people that were applicable for the initial encashment have received 5000Php.

Figure 4: The number of respondents that received the initial encashment.

According to the respondents and the barangay captain we interviewed in Mozzozzin Sur, 14 people were able to receive the initial encashment so far (Figure 5). There were 333 houses in Mozzozzin 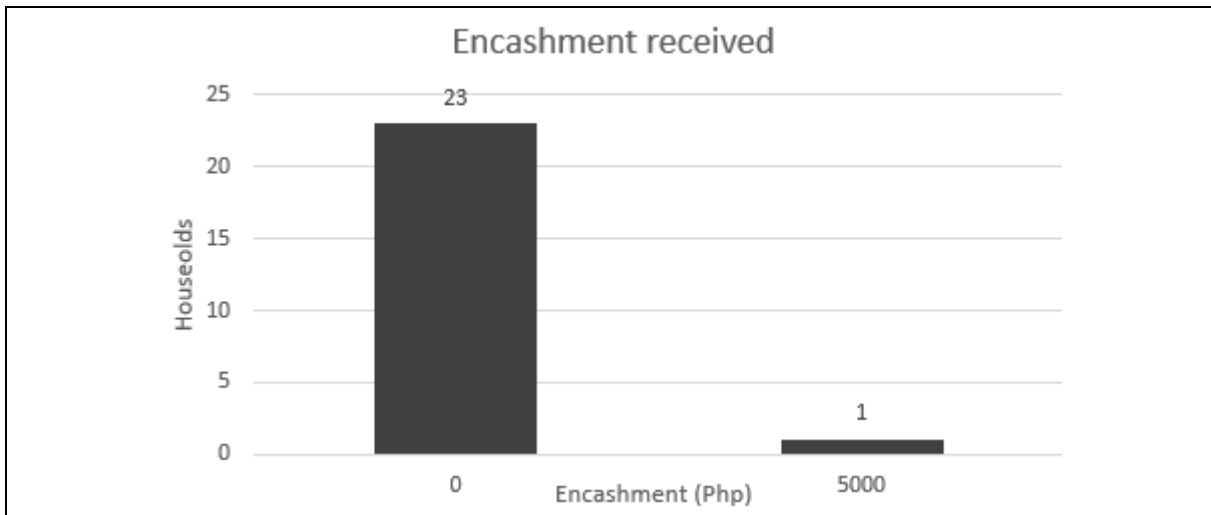Sur damaged, either partially or completely (DSWD - DOMR 2016). Those fourteen people also received two GI sheets from the DSWD.
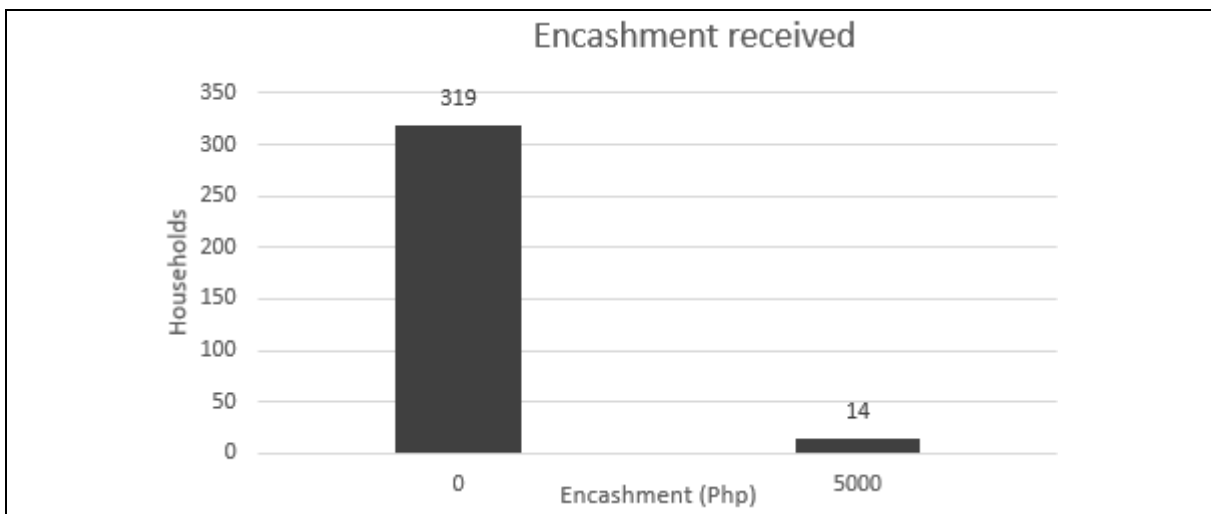
Figure 5: The number of households that received the initial encashment in Mozzozzin Sur.

DISCUSSION/CONCLUSION/RECOMMENDATIONS

The different administrative levels of Sta. Maria, from municipal level to the barangay level, were able to conduct different courses of actions to augment the immediate needs of the people. The municipal administrative level of Sta. Maria in collaboration with the DSWD was able to serve at least 627 families as of November 2016 (DSWD - DOMR 2016). Relief packs, both non-food and food assistance, were able to reach the community (Figure 1).

The assistance was donated by the different local government units of Isabela, as well as non-government organizations such as the Philippine Red Cross, Americare, and individuals like Senator Nancy Binay, and others (Consorcia A. Viernes 2016, pers. comm.). Relief goods were immediately distributed to the local citizens of Sta. Maria as suggested by their 'first in first out' principle. Cash assistance, on the other hand, was deposited to the Municipal's emergency

fund which was used to purchase cavans of rice to be given to the affected barangays of Sta. Maria.

Generally, a relief package that was distributed to the affected people of Sta. Maria contains at least 5 kg of rice, 3 pieces of coffee mix, and 4 pieces of assorted canned goods (Table 2). An actualization of the quantified amount of every commodity varies from place to place due to the amount that the DSWD received from the different LGUs, NGOs, and individuals and the set in principle of relief giving that the said local government unit adapted (Consorcia A. Viernes, pers. comm.). According to the MSWD officer, a quantified basis of 6 kg rice, 8 pieces of assorted canned goods, and 6 pieces of coffee mix were the commodities constituting a relief package from the DSWD.

Out of the respondents, there were not even a handful of people that received relief more than once by the DSWD (Figure 2). There is a significant difference between what the DSWD claimed to distribute and what the people told us they received. We have seen the numbers of relief the DSWD received and we believe they distributed everything following their 'first in first out' principle. However, recipients are uncertain of receiving the relief packs five times (Table 2). There might not have been a good information dissemination among the recipients of much they should have received. Improving the communication would somehow reduce the risk of altered information which causes confusion and the destructive criticisms from the survivors.

People that are in need for food after a typhoon should be able to last for as long as possible with it, in order for them to have the time to get back on track and be able to provide food for themselves again. Seventeen households could only last less than a week on the food they received (Figure 3). The four households that were able to last longer than a week with the relief were not reliant on the relief and could consume it whenever they deemed fit. Another factor which plays a major role in the consumer behaviour of the different households is the number of people per household. Filipinos quite often live in a multiple family household. The relief that is handed out is given per household and not per member that lives within a household. For example we interviewed a household consisting of 14 members, which obviously is not going to last as long as a household consisting of four members, with the same relief. Perhaps basing the relief on the number of members in a household will improve the lasting time of the relief after a typhoon.

During super typhoon Lawin, a lot of houses were destroyed in Sta. Maria. Another form of relief given during the aftermath of the typhoon was handing out initial encashment to the people whose house were either partially or totally damaged. The initial encashment was 5000Php for both partially and totally damaged houses. The plan for the partially damaged houses was to receive a total of 10,000Php and for the totally damaged houses to receive a total of 30,000Php if, otherwise, found validated by the regional DSWD office. Only one of our respondents received the initial 5000Php for her partially damaged house, however she did not receive it from the DSWD from Sta. Maria, she went to the DSWD of Tuguegarao and got it there (Figure 4). According to the DSWD of Sta. Maria, 50% of all the people that were applicable for the initial encashment received the money. The DSWD keeps receipts of every person that received the encashment and seemed sure of their case. What was striking to us was that in barangay Mozzozzin Sur multiple people claimed that 14 people received encashment and the GI sheets (Figure 5). Fourteen is quite a specific number and that was the only number we heard for all 10 of the respondents. Of course we have to consider the possibility for it to be a rumour, a rumour would probably spread fast through a barangay. Nonetheless, 14 out of a

333 damaged houses does not even come close to the 50% the DSWD of Sta. Maria claims it to be.

We believe relief is a crucial part during the aftermath of a typhoon either in the form of food, encashment or building materials since it is profitable enough to augmenting the survivors' basic needs after a devastating event such as the Super Typhoon Lawin. Even though there has been a concrete system of distributing relieve to the survivors in need, it might have been better if information was vividly disseminated among the affected families. Also, inventorying the building materials, such as the Galvanized Iron Sheets, used and/or distributed would have been good enough to prevent double distribution through receipts, it would be more profitable to have a modernized version to better access these information and to prevent perforation of data. In the beginning, relief packs were a great help to all the people in need of them. However, at some point the relief packs lose their function, which is to augment the urgent needs of food of the survivors. The people would have recovered to a point where basic commodities are already available and affordable in the markets or nearby convenient stores. It would be of greater help if the funds used in purchasing these relief packs are allocated to a more sustainable project intended for the survivors.

ACKNOWLEDGEMENTSS

We would like to extend our profound appreciation to Mayor Hon. Hillario G. Pagauitan of Sta. Maria for his warm welcome and support, all Brgy. Captains, whom we visited, for accommodating us during the interview and Madame Consorcia A. Viernes for providing to us data from the office of the Municipal Social Welfare and Development. We would also like to thank J.C. Cabauatan who made our meetings with the different administrative and/or organization leaders possible, all of our respondents of San Raphael West, Mozzozzin Sur and Norte who patiently shared their heart-whelming stories. Furthermore, we would like to express gratitude to the CCVPED Librarian for allowing us to access the library, Tita Onya who hosted us during our stay at the CCVPED Hostel, and to the Almighty God who showered us the strength we needed to make this research a success.

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APPENDICES

Appendix 1. Questionnaire

Personal Information

Name: Sex:
Age: Address:
Marital Status: Number in the Family:
Occupation/Livelihood:

*For individuals who are working in a Local Government Unit and/or Non-governmental Organizations

Name of the LGU/NGO you are working into:
Position: Years in Public Service:

SUPER TYPHOON INFORMATION
Community/Individual Level
1. What is your initial reaction towards the impact of Super Typhoon?
2. Did you receive any support after the typhoon?
   o **Yes**
   o **No**
3. To whom did you received it?
   o Local Government
   o DSWD
   o DOH
   o DAR
   o Philippine Red Cross
   o Other NGO's
     *Please Specify
4. What kind of aids did you received?

   (PLEASE PUT A CHECK BEFORE THE BOX IF YOU RECEIVED SUCH)
   ▪ Relief Packages
     What is it that inside the pack?
     ▪ Rice
     ▪ Noodles
     ▪ Milk

- Oil
- Water
- Etc._____
  (Please specify)

How many of these did you receive?

Relief	Quantity
Rice	Kl
Noodles	pcs.
Milk	sachets
Oil	Liter
Water	Liter
Etc._____	

(Please Specify)

- Encashment
  How much did you received?
  What purpose does this aid serve for?
- Medical Service

  What medical assistance did you receive?
  Did you receive medicine?
  What kind of medicine did you receive?

(PLEASE PUT A CHECK BEFORE THE BOX IF YOU RECEIVED SUCH)
- For headache
- For Diarrhea
- For lose bowel Movement
- For Stomach Ache
- Vitamins
- Building Materials
  What materials did they give you for rebuilding your house?

5. How long did it take for these aids to last?
6. How long did it take before you received the support?
7. Are you still expecting aid?
8. Was there any support that the Government was not able to give?
9. Do you know any of anyone that did not receive anything?
10. What roles do you think that the Local Municipality should have after a natural disaster like typhoon?
11. What is your situation now?

LGU and NGO Level
1. As an LGU/NGO, what is your initial reaction towards the impact of Super Typhoon Haima in Sta, Maria?
2. What course of actions did your office undertake after Super Typhoon Haima?
3. Did your office, under your leadership, give assistance to the different affected barangays of Sta. Maria?
   - **Yes**
   - **No**

   *If YES, proceed to the next questions
   a. What kind of assistance did you issue to the affected barangays of Sta. Maria?

(PLEASE PUT A CHECK BEFORE THE BOX IF YOU ISSUED THIS KIND OF ASSISSTANCE)

- Relief Packages
  What is inside the relief packages?
  - Rice
  - Noodles
  - Milk
  - Oil
  - Water
  - Etc._____
    (Please specify)

  How much of these are inside the relief pack?

Relief Item	Quantity
Rice	kl
Noodles	pcs.
Milk	sachets
Oil	Liter
Water	Liter
Etc._____	
(Please specify)	

Encashment
How much did you give per barangay?
What purpose does this aid serve for?

Medical Service
What medical assistance did you give per barangay?
Did you give medicine?
What kind of medicine did you give?
(PLEASE PUT A CHECK BEFORE THE BOX IF YOU RECEIVED SUCH)
- For headache
- For Diarrhea
- For lose bowel Movement
- For Stomach Ache
- Vitamins
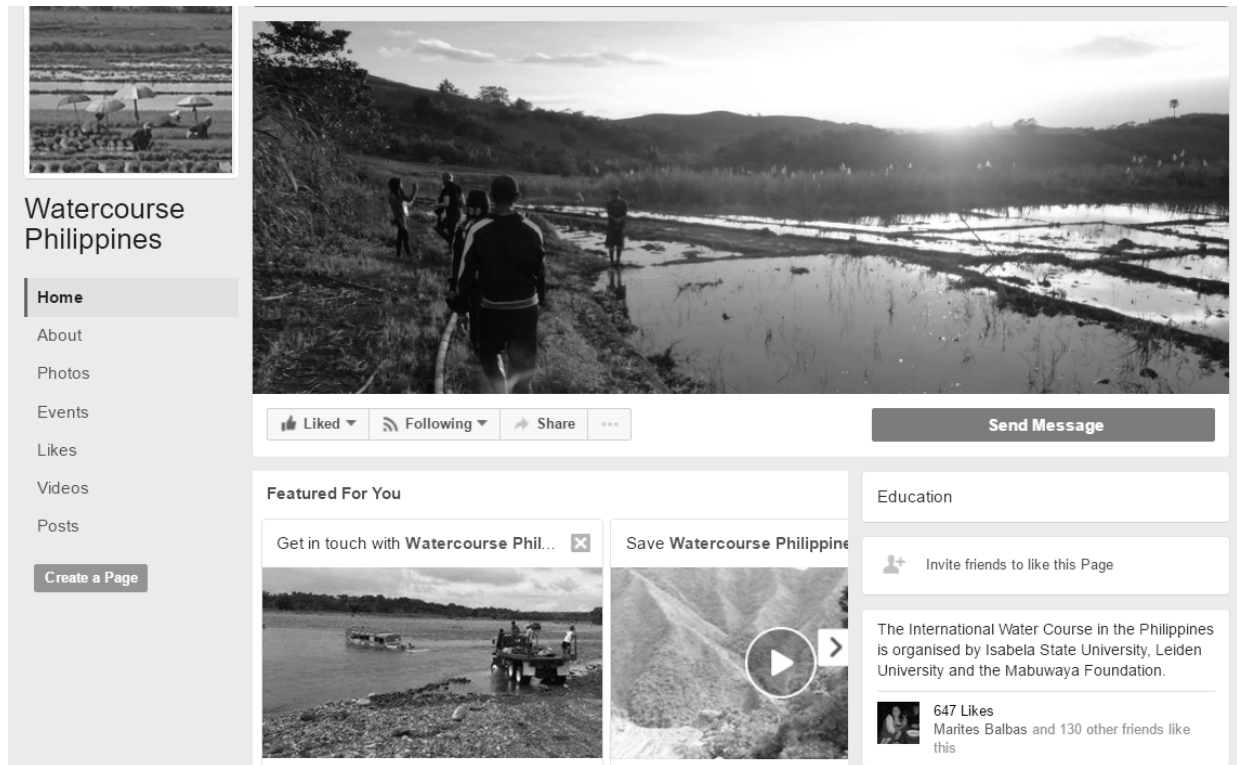
Building Materials
What materials did you give for thee rebuilding and reconstruction of their houses?

4. How long did the aid coming from your office last?
5. How long did it take your office to deliver every aids to the affected areas of. Sta. Maria?
6. What roles do you think that Local Government Unit/Non-Governmental Organizations should have after a natural disaster like typhoon?
7. Could you provide us with some data (quantitative) on the relief you sent?

Watercourse Philippines Facebook blog 2017

The Water Course 2017 has started! 30 new students (15 of Isabela State University and 15 of Leiden University) will study the impact of Typhoon Lawin on northern Isabela and will learn about natural disaster preparedness, impacts and responses.
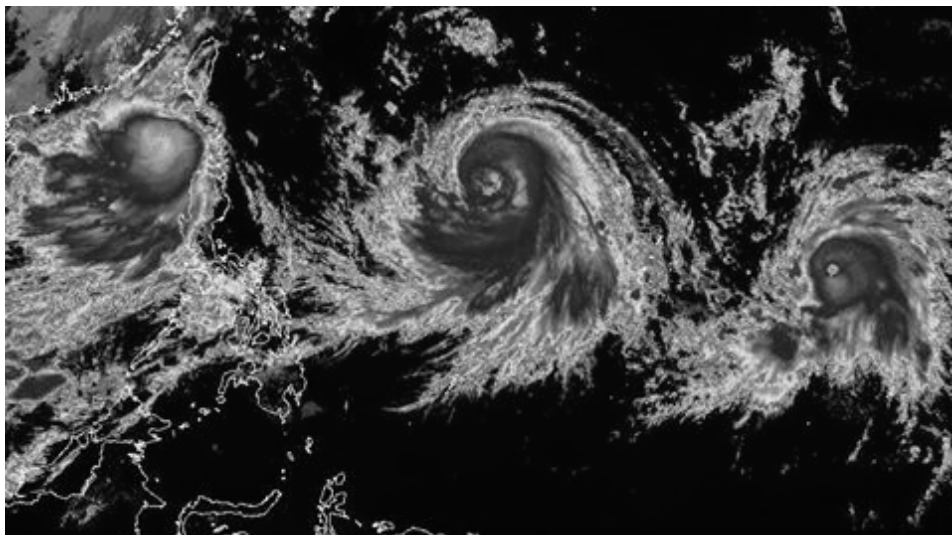
How Alvin and Jemima experienced a day of the International Water Management Course on January the fourth 2017.

A glimpse of yesterday: there is so much of the History that lies within the corners of Metro Manila up until to the old walls of Intramuros where early Filipinos poured out every bit of their effort and even their lives establishing these walls. Manila is a great avenue for everyone of us to experience the hidden beauty of the past that is underlying beneath those walls and statues of great people from the past.

Curious at what I would be seeing at "Intramuros" I stepped into the bus. Today our group of both Dutch and Filipino students and staff visited the old Spanish quarter and as a history student, I was definitely excited to see some tangible history instead of having to read it off a page. Being there was a bit unreal. It was like the Spanish had just shipped a piece of their country straight into the Philippines! It made me eager to do some more reading on the history of the country. Fun fact: the security guards were wearing sombreros!

What stuck out to me was the contrast of wealth and poverty at Intramuros. While drinking coconut water from a fresh coconut, I walked past streets where this contrast was very visible. Despite the poverty, most people we passed on the streets continued to smile and talk with us in a friendly manner. Two little girls in school uniforms laughingly shouted at us: "you are beautiful". What I already love about this country is that people seem to just want to exchange some friendly words with you.

Despite the mostly touristy day, I remain curious at how disaster prevention for al the Filipino people has evolved up until this day and am therefore excited for tomorrows events.

Stay tuned for tomorrow's post!

How Gosia and Leana experienced a day of the International Water Management Course on January the fifth 2017

Today we had an early start to head out to the Philippine Red Cross headquarters and the NGO Save the Children. At the Red Cross headquarters we learned about the methodology and organization in disaster risk reduction. The most intriguing part was visiting the operation center where the Red Cross operators showed us how they keep track of the typhoons and their Red Cross volunteers. Secondly, our bus took us to the NGO Save the Children. This organization specifically aims to advocate for the children and to normalize their lives by bringing them back to school as soon as possible after experiencing a trauma such as a destructive typhoon. We ended the evening at a Korean barbecue and enjoyed a meal cooked on our table in front of us with the popular mango shake drink to sip on. It was an eventful day that tired us all out, but definitely kept us interested and in awe of the work these organizations do to help the Philippine citizens.

Adversity enhances this tale we called 'life'.-Ever Garrison.. In so many times, typhoons have already measured how tough the Filipinos are. And like sticks in a bundle which isn't breakable, unity has been the secret tool of the Filipinos in getting over these adversities. Today, in our visit in the National Office of the Philippine Red Cross (PRC), a Non-Government Organization and an auxiliary to the Philippine Government, I realized that groups of individuals which we call 'Volunteers' play great roles in making the chains and links of the Filipino life stronger. What I liked most during our visit in the PRC is that, we were able to understand how these volunteers impose and execute their humanitarian movement programs and activities. It was also great that we were informed about the services they offer like disaster management, social, safety, blood services and health as well. I also appreciated the way they address the chaotic atmosphere in their Operation Room or also called 'War Room' where people call and seek for help from them during disaster moments and rescue operations.

Well aside from PRC, we were able to visit another Non-Government Organization which also devotes their services globally and this NGO is known as the Save the Children. We have learned a lot from that organization and like PRC, they have been devoting themselves into volunteerism for the affected families we call survivors and conduct other programs as well.

As a Filipino, I really appreciate how they touch the lives of every survivors and how they influence others also who has the heart to do volunteering activities. Somehow this visit made me realize how important it is to help others in times of their needs.

How Andy and Coco experienced a day of the International Water Management Course on January 6, 2017

A day in which we visited the government and the penultimate representative of the international community - the UN. It was an extraordinarily interesting experience to partake in a presentation and discussion with these two agencies. Essentially, at its core, both have an aim of protecting and caring for human life, and both emphasized the importance of collaboration. It was interesting to hear the government department that takes the lead during natural disasters, the National Disaster Risk Reduction and Management Council (NDRRMC), speak of their relationship and opinion of NGOs both local and international. He emphatically opposed a permanent presence of NGOs in the Philippines, conceding that some may at times contribute valuable actions and assets to the country. The head of office of the UN OCHA, explained the cause of this to be the result of typhoon Haiyan in 2013, local name Yolanda. When the government opened its doors to foreign aid because of the devastation caused by this super typhoon

The government seemed to indicate that they do not need the aid or help of foreign and national non-government organizations because they can provide it, yet from my (Andy's) own observations, there are still families who need more assistance. But I understand also that the government is trying to stand on its own right now and I am happy to know about it but I hope that they keep their word, and do their best to reach all those that need support and aid, especially the most vulnerable in our country.

Finishing the evening with an extravagant meal comprised of a wild variety of different international meals, it was a wonderful reflection of the different tastes and styles that make up this year's water course group.

How Ashley and Mae experienced a day of the International Water Management Course on January 7, 2017

We started our day off early, the Philippine students waking up at 5 and the Dutch at 6:30 to be able to leave with the bus at 7:30 to travel to Imugan. Along the way, we had a few pit stops for the comfort room and some stretching. For lunch, we stopped by a small area right before entering the mountains. Here there were a few options for lunch. After this, the journey continued into the mountains. The first stop in the mountains was at Nueva Vizcaya. Here we hiked a bit up a hill where we finally had amazing views of our surroundings. At this governmental facility, a monkey and a saltwater crocodile were kept in cages. Unfortunately we learned that not much can be done to release the crocodile due to the fact that the government can easily get a permit for the crocodile.
Then our journey continued a bit downhill before we were finally able to take the jeepys for the final stage of the journey to the Kalahan foundation. Most students actually got on top of the roofs of the jeepys. This has to be one of the best experiences because the view up into the mountains is absolutely breathtaking. Finally, after dinner we got two more lectures on indigenous people and how the system in the Philippines works. The Philippines is actually the frontrunner when it comes to the rights of Indigenous people.

Travel and set a glimpse of the world then you'll realise life is more wonderful than you have ever thought. We travelled for about eight hours but along the way we stopped about an hour to Balete Paz which is located on a slope so we made pictures. These pictures will serve us stored memories. The idea of going to Imugan is such a great idea. Because everyone is excited about it.
When we got there, the Ikalahan people were very kind and hospitable. And the environment is such a WOW, because it has many trees and species of trees and it is a tropical rain forest. We also got some brief presentations about these people, their culture, tradition, politics and how they manage the community and the responsibility to protect the watershed. And the last presentation for the day was about the indigenous people, especially the AGTAs. We were amazed and interested about the topic because we got to learn how they live, how the government helps them and how they actually survive during Typhoons and natural disasters. To sum it up, the day went so great for all of us because we got to enjoy the trip even when it was tiring. At the end of the day we learned many things that opened our eyes for what is really going on with the community of the indigenous people. And we look forward to what is going to happen tomorrow.

How Marc and Aileen experienced a day of the International Water Management Course on January 8, 2017

"Waking up in the morning with a freezing nose, taking bath in the very cold water is horrible"

Riding in the top of the Jeepney for the first time with an amazing view of nature is a great experience. At first, I did not completely understand what our trip to the boundaries between Pangasinan and Nueva Vizcaya is for? But we arrived and out of curiosity, I realized not only the climatic different but also their environmental situation that the two provinces have.

Well, walking about 30 minutes is really quite exhausting but it is really worth it! The group arrived at the site where an American tank was used during World War II. Pine trees are everywhere, making a cool atmosphere for the site; just like the European forest!

Afterward, the group did hiking again! But this time, the group went to a hidden treasure in this peaceful village of Imugan, the "Imugan falls". Well, water is terrible cold, but it wasn't a hindrance for the group to swim and enjoy. after a very relaxing getaway, we decided to walk around to meet people in the community. By the way, indigenous people here are usually called Ikalahan, which has this kind and hospitable attitude. This community, I think, is one of the communities that is organized and environmentally friendly.

How Jesrael and Vincent experienced a day of the International Water Management Course on January 9, 2017

Sitting on top of the Jeepneys and watching the mountains of the Imugan Valley covered by the clouds, we left the Ikalahan Foundation this morning. After a drive of three hours, we arrived at lower Magat Ecotourism Park. Over there we had a lecture about how they created the park from grassland and so prevented further degeneration of the area. After lunch, we visited the wildlife part of the park, which turned out to be less exciting because of the small cages of the animals.

We left again on our way with the bus where some talked about their research topics and some were making fun or sang songs. After a while, we arrived at Magat Dam, which generates power for the area and regulates irrigation after conversation about the dam we left for our final destination, Cabagan. At the end we enjoyed dinner, which was prepared by the HRM students.

How Ruby and Rey Martin experienced a day of the International Water Management Course on January 10, 2017

This morning is quite different than before, we are lucky to have a long time to sleep but we are suffering from water shortage. Then the group started looking for water to use for taking a bath. While waiting for some visitors we decided to make some fun by playing soccer. For us, Filipino, we find this game hard because we are not used of playing this game. When the orientation began, some of us felt nervous, especially those who have a major participation in the program.

After lunch, Merlijn gave a lecture about Typhoons since that is this years' topic. After a 15-minute break the group listened again to another lecture about the hydrometeorological hazard, and some of us got a bit tired.

The rest of the day was about having fun and getting to know each other even more since we did not really have lecture anymore. The Filipino students with Leana in charge gave the Dutch students a tour around the campus and we saw the remaining damage of Typhoon Haima had created. During dinner we had an amazing show of Filipino students with both traditional and modern dances, which was a great start for a very musical evening. After their own show they taught us one of their dances where everyone participated enthusiastically and the evening ended with hours of doing karaoke. It was already well known, for the Filipinos love to sing. But the moment the karaoke set in sight, the Dutch students were as enthusiastic. "Isang magandang araw" – it was a beautiful day.

How Anneroos and Reyward experienced a day of the International Water Management Course on January 11, 2017

Getting up early is nothing abnormal here in the Philippines. So… for me and John, that meant that a run around the campus of Isabela state university so that we could get some exercise. After that, a wonderful breakfast with a lot of tortang talong was served to us. Then it was time for the real work!

The first lecture was given by the secretary to the Sangguniang Bayan of Cabagan, in which he told us about how the government addresses disasters before, during and after it. Everyone seemed very interested, at least, that was what we concluded after all the questions asked to the municipal official. He showed us how the government achieved the goal of zero casualties, which means that there were no people harmed or killed due to typhoon Lawin last October. As we had heard earlier, this was quite an improvement compared to prior disasters. However, we as students came with various critical questions. We saw how important it can be to create a discussion that gives a space to pose suggestions that can lead to even more improvements. It was interesting for the Dutch students to compare the way in which answers were given by a official in a different culture.

The next lecture was given by Dr. Junel Soriano, Professor and Director of the Climate Change Center of Isabela state University, he stressed that Isabela was very strong in terms of preparedness during the devastation of Typhoon Lawin last year because the residents were very resilient and the local government prepared a lot prior to the Typhoon Lawin. He also talked about the rapid change of climate in the world and especially in the Philippines that we are facing at the moment. According to the professor, an even more stronger Typhoon than Typhoon Lawin can possibly hit the area of the Philippines in the future, because of this climate change. And the queries that came from us were also answered by him confidently.

Finally, ma´am Jovy's lecture about the Government structure of the Philippines from the local to the national concluded our program. We this was probably the clearest and definetly the shortest lecture we have experienced so far!

How Cannell and King experienced a day of the International Water Management Course on January 12, 2017

We started our day with a very interesting lecture by Perla Visoro. We held a small memorial for Andres B. Masipiquena who together with Perla was very active in the protection and conservation of the Sierra Madre forest.Afterwards we went to Magoli Tumauini a Barangay in which the people's organization is very active. It was very inspiring to hear more about how they manage the area and conserve their forests. They work together with local government and several NGO's on large scale rainforestation and reforestation projects. Even though typhoon Lawin had wiped away most of the trees they planted the past years they still did not see typhoon Lawin as a hindrance and were ready to continue their hard work with a positive attitude. The last excursion of the day was to Bintacan Ilagan City another Barangay that was heavily struck by typhoon Lawin. The bridge connecting other five Barangays was completely destroyed and the people had to use boats to cross the river. It was very impressive to see that even after such a big disaster as typhoon Lawin the people remained positive for the future and used all the logs that were carried by the river into their Barangay to rebuild their houses and to make charcoal to sell on the market. Today we learned that even when such a disaster happens, you have to look past all the damage and into the future and recovery.

How Yassine and Jesrael experienced a day of the International Water Management Course on January 13, 2017

During the travel, many Filipino counterpart students were telling me stories about how unique the sitio Dunoy is and the experience that we will have during our stay there. We will see one of the last endemic species of the region in their natural habitat. That rare species is the Philippine Crocodile that has survived and started to increase in number due to joined effort of Mabuwaya Foundation and the inhabitants of that area. When I heard that the rainforest and living species were in danger because of man-made activities, I started to remember one of the discussions we had in my Minor 'Sustainable Development' about the intrinsic value that we add, wanting to protect species because of the morality of saving the nature. If we want to protect endemic and rare species, while at the same time provide the inhabitants of this region with the opportunity to have a decent life, then there is the need to think about new solutions.

The previous day (13th of January) we have an informative lecture in which Rene explains the format of the field study that we will be conducting after this journey. The group started writing their proposal. This is quite difficult; this is why Merlijn en Rene set out a meeting with the three groups: preparedness, impact, and response/aftermath. Here we discussed the topics of the pairs.

How Lexter and Lars experienced a day of the International Water Management Course on January 14, 2017

Today we had to leave the campus of Cabagan at 7AM. With that, we were on our way to San Mariano. After a bus trip of 2.5 hours, we arrived at the Mabuwaya Foundation's rearing station. There we could get our first glimpse of the Philippine crocodile, the rarest species in the world. We had lunch there and after that, everyone could take a picture with the crocodiles. Those crocodiles were roughly five months old. It was a great experience to feel such majestic animals that would normally be extremely dangerous. We continued on two 6x6 trucks, they were fully loaded, and the both of us were standing on the back where we could fill our hearts with the beautiful landscape. We even crossed the river with the truck, which was quite the experience. When the truck couldn't carry us any further over the rocky and hilly terrain, the whole group had to hike the remaining way. Some more experienced than others, we followed the guide who would lead us to Dunoy, our final destination of the day. After almost 1.5 hours everyone reached Dunoy safely. By then it was already getting a bit dark, so we had to hurry to the lake in the crocodile sanctuary, where we were going to release two crocodiles. There were raised in the rearing station and were old enough to be set free. The first crocodile was released by our group and we had the opportunity to name the female crocodile any way we wanted. Everyone (all 29) agreed there was only one name we could give to her. We named her Dieneke, which is named after our 30th group member. The second crocodile was going to be released for Noortje, an intern who had been with the CCVPED for five months. She named the other female crocodile Mieke, after her best friend back in the Netherlands. Both crocodiles were now free to grow up into strong, big crocodiles.

After the release the group parted ways, one group went to the river to swim before it got too dark. There was a strong current but the water felt nice. The other group stayed at the lake until dark to see if they could witness more crocodiles. They counted a total of seven crocodiles in the lake, two of which were hatchlings. That was a very special sighting, because the foundation was not aware of the nest. On their way back to our campsite they also spotted one crocodile in the river, luckily everyone is still safe. The sky is clear; we can see a lot of stars. It has been a really tiresome day, but really adventurous and enjoyable.

How Teun and Christopher experienced a day of the International Water Management Course on January 15, 2017

The day started with a rainy morning with this kind of sound that calms my being. Wosh! What a beautiful prelude to start my day. Breakfast is ready and everyone seemed to enjoy this moment with nature. Coco and Aileen had the courage to volunteer to interview Nanay Ingga, the owner of the house where our tent were and which turned to be our functional hall. Learning at the same time, we watched and observed critically the two students as they went through their interview. Divided into categories, each team conducted their interview as well as they could, in the small village of Dunoy. We are very happy that we got the results we wanted to, though our team seemed to be a bit nervous at first.

A rest with nature is very much deserved by everyone. The moment that each team finished all their interviews, we headed on to the river near the Siera Madre and went for a swim. I can tell that the water there is nice and clear and cool too. I really enjoyed this trip so much! Oh, we really did try to look for Philippine crocs, for we heard that most of the time they reside in this area. Unfortunately, we could not see even one! Guess they hid themselves, shy as they are!

On the night of Saturday to Sunday I saw a boy in his yellow raincoat sitting in the room where I slept. At least, my malaria medicine let me think that. One thing is for sure: I will never use Lariam anymore. The next morning, a dive in the river really woke me up. It's a shame that the Nieuwe Rijn back in Leiden isn't as clean as the Catalangan river, otherwise I would take a dive in it every day. After practicing some interviews on the people at Dunoy, a German guy arrived. He told us about the work he did for the GIZ (Gesellschaft der Internationale Zusammenarbeit - in English: society of international cooperation). The jokes about his accent earlier that day about that made by some Dutch students (me) were long gone, because of his story. In short: great weekend, great food and still no mosquito bites.

How Jemima and Precious experienced a day of the International Water Management Course on January 16, 2017

We woke up and had to pack our stuff packed to leave Dunoy. One last time we would receive a nice breakfast: rice, fried fish and pinakbet (mixed vegetables). Of course a group picture had to be taken with our host family, the head of the family is called Victorino. After that we started back towards San Mariano. The hike back was very beautiful. Jemima liked jumping down the slippery mud and grabbed some clay on the way down to mold into a dice. Precious miraculously kept her slippers clean, a true Filipino talent.

Later we continued our trip on a bumpy truck all the way to Dunoy. We saw a stuck jeepney in the center of the river and we had to wait for it to be pulled out. In San Mariano we enjoyed a nice lunch and got to take a last look at the baby crocodiles.

The rest of the road towards ISU Cabagan we continued with our big bus. But first we stopped at a mall, famous North Star of Ilagan. How dirty we were though! When we arrived to the campus Precious was glad having survived the long trip. Jemima had the feeling of coming home; back at our familiar dorms. Ready to start the real fieldwork in the coming days!

How Hansy and Anna experienced a day of the International Water Management Course on January 17, 2017

Today was the first day back at CCVPED Hostel. After being far for a few days in the sierra madre everyone was happy to do their laundry. The bright color of all our washed laundry decorated the building. After breakfast we started the day with the presentation of Noortje, who is intern on Mabuwaya. The topic of her research was about a new captive breeding center for crocodilus mindorensis in San Mariano. We then had until four to finish our research proposal and presentation. It was fun to see all the presentation of our fellow student and friend and to hear the research they came up with. We all got really excited and little bit nervous to start our research the next day. After spending the whole day studying and listening to presentations we wanted to do something fun in the evening. We planned a movie night which started at 8:00PM and we all sang along with the songs of ALADIN. After that, everyone went to bed early because the day after was going to be a long day.

How Gino and King experienced a day of the International Water Management Course on January 18, 2017

On this day, I (King) woke up early because I am excited to conduct an interview with the farmers and also to meet the mayor of sta. Maria. It's kinda amusing to see a mayor whose office is in the Gymnasium, well we can't judge him though since our Municipality was not able to escape from the destruction that Super Typhoon Lawin caused us. Meeting the mayor is such great time. He threw jokes and told funny stories as well.

We went to the Barangay Mozzozzin Sur to meet their Captain who then welcomed us with warm smiles the moment we arrived there. It was such a good time knowing him. We immediately conducted our interview in that Barangay. People on this place were very open to tell their stories on how they manage to survive within Lawin's destructive activeities. But beyond all of these catastrophic event and heart breaking stories, people still managed to smile and keep on heading forward which I think is the is sweetest response people ever had in this Barangay.

Today we went out to do our first interviews in pairs. Today was definitely a day of firsts, because it was also my (Gino) first time on a tricycle. If you´re planning on ever doing that … it´s gonna be a bumpy ride.

As soon as we arrived in Cabagan, people started showing us their neighborhood. I think my partner and I we´re a little too formal in the beginning of the first interview, but we learned to relax a little bit and make it more like a regular chat. Not even one person refused to do an interview with us the entire day. People as friendly, polite and hospitable as in the Philippines are hard to find. That´s why it makes me even more sad to hear that basically every farmer we talked to has depths. After harvest the money of the yield is used in an attempt to pay off their depths, leaving only little profit to live from. However that's only the case if that harvest wasn't destroyed by a typhoon. Every day here is an amazing experience, but this day ended with a bitter-sweet taste.

How Coco and Alvin experienced a day of the International Water Management Course on January 19, 2017

(Thursday 19th January 2017 - Day two of our research in the field.) Accompanied by around 5 other pairs, we headed back into the municipality of Santa Maria, located on the other side of the Cagayan River from Cabagan Centro. The journey there was completed by tricycles, a nifty invention of motorcycle and side cart that held a carrying capacity of five people. Wedged on the back of the motorcycle I soaked up the morning activity along the edges of the road. Corn was being emptied out of large bags onto the side of the Tarmac Road, designated to spend the rest of the day basking in the sunshine. Old ladies were camped out in their front porch observing the world go by. With a smile and a wave, they wished me well along the way. My partner Aileen Mae Binag and I started our interviews in an urban baranagay (community) called Mozzozzin Sur and ended the day in a barangay called San Rafael West. The stories that were shared painted a night of fear and desperation, while the families were huddled in corners of their home, hearing the galvanized iron sheets ripped from the rafters and flying through the stormy winds. Each of our interviews takes between 30 and 50 minutes, and as we say our farewells I hold their hand and share my gratitude for their story. Their smiles come easy, and with a slightly flustered countenance they reciprocate appreciation for our visit and the opportunity to share their experience. Heading back to the home base we made a stop at the Mall that opened for the first time in Cabagan Centro, an extraordinary event of celebration and festivities, featuring the attendance of a local celebrity. This garnered excited screams and a desperate thronging by those present in their attempt to catch a glimpse. Quietly wrapping up the day at CCVPED on the ISU campus, there was the opportunity to watch a movie in the lecture hall, before everyone headed for bed and let the day slip away through their fingers.

I(Alvin) found myself confinded behind bars where I can't do anything but to wait until the day that aids are finally handed down not to me but to poor community of Sta. Maria who have been clamouring for assistance after the devastating effects brought about by the Super Typhoon Haima instead. I hated this feeling of not being able to help them but what is killing me most is the situation where they are not getting the help and support that they basically needed most.

The idea of helping shouldn't be these unequal and categorical. We shouldn't filter who to help and which family is to be ignored.

I, Alvin, and my research partner, Lars, may not be able to give them the assistance they needed but somehow at some point, we are hoping that our research will serve as an eye opener for those people whose eyes are sealed with all the enticing words of refracted reality;for them to see the true state of my fellow ISABELINOS.

How Andy and Gozia experienced a day of the International Water Management Course on January 20, 2017

The story of a teary widow woman melted my heart today. She narrated the happenings during typhoon Lawin, especially the moment that their house was blown away while she was still inside, and her escape to seek refuge. I (Andy) can't imagine how nervous, fearful and worried she was at that time. What shattered my heart the most is that she did not even receive any cash assistance for rebuilding their small wooden house. This unfair treatment to the poor lead me to a conclusion that reports are not always reliable. Reality is more often in the field and not always in the flowery speeches given by the authories upstage. I know that there are more stories out there and I am hoping that these will be heard.

On Friday the research partners continued their interviews at their chosen field work sites. My partner and I (Gozia and Rey Martin) experienced a lot of emotional interviews as residents of Cabagan Centro told us their stories of survival and hardship due to typhoon Lawin in October

of 2016. Many lost their homes and many lost their livelihoods. Slowly the water course is coming to an end and now the students are preparing their research reports. Much has been learned and the things we have learned through our interviews are sure to stick.

How Ashley and John experienced a day of the International Water Management Course on January 21, 2017

The day started at 6:30 am when the bell rang for breakfast. It was the fourth day for conducting interviews, but Andy and I (Ashley) had already conducted most of our interviews. We therefore decided to go to Internetcafe Karina to start looking for articles and to start putting some of our data into excel. In order to get from campus into the center we had to take a tricycle with other partners to avoid paying full price. With the other people, we decided to first go for lunch and go to the internetcafe afterwards. At the internetcafe we were luckily able to find some useful articles to use for our report. Once we arrived back at campus, we soon had dinner. After dinner we had our usual movie night!

Early morning, I (John) woke up to prepare for interview in the Barangay of Massipi East together with my partner Cannell. We were escorted by Arnold to that barangay. He knew that place well because he's from that barangay. We interviewed the Barangay Captain first to get some more information about the aftermath and support given by the government after the typhoon Lawin. They are really prepared for that. He explained every detail about what they did before and after the typhoon, and fortunately, he invited us for lunch. We started interviewing local people and we were saddened by all the stories we heard. Almost all of them suffered from that catastrophic event. Watching their houses and crops being destroyed and not being able to do anything to save it. But still a part of the people are still happy because there were no casualties. Hoping they will all recover and regain their life back to normal again.

How Jesrael and Marc experienced a day of the International Water Management Course on January 22, 2017

Yehhey Free day, yhap!! It's a free day for the group. Some of the group went to the Callao cave, some just remained in the hostel. I (Jesrael) with others went to church. I went to my mother church (CBCC) with Gino, Cannell, Jemima, Vincent, and John. Then, I went to our church in Balleng, St. Tomas Isabela. Oh, I had missed them very much, but above all I missed worshiping God with them and having felowship with them. My free day ended with enjoyment as well as giving the highest praise and worship to our Lord, God, and Savior Jesus-Christ. Truly a day well spent!

This Sunday was the first day that we had off! We went to the Calao caves, about one hour away from Cabagan by van. We left with ten people to the caves. We stopped at the new mall along the way, which just opened last week. In the mall we bought two breads, some Gouda cheese, chocolate spread and peanut butter for lunch, quite Dutch! The way to the caves was quite normal but suddenly the road changed from normal concrete to a dirt road and it went down at a very steep angle, which was fun to see. The caves themselves were beautiful and huge. The cave system consists of seven caverns, with holes in the 'ceiling' letting light inside. After the caves we went to a beach with a small boat. On the beach we had lunch on a stranded boat. After lunch some of us went swimming while the rest just hung out and rested a bit. Around three P.M. we went back to the campus but not before stopping at the ruins of an old church, it was really amazing to see! Finally, we went back to Cabagan and had a nice and quiet evening.

How Vincent and Rey Martin experienced a day of the International Water Management Course on January 23, 2017

In the morning, we left the campus to visit the local Fiesta of Cabagan in the Square Park. upon arrival, all the student, specially the dutch, were welcomed by the town Vice Mayor, who was one of the masters of ceremony at that time. We fell in line as we wait our turns for their famous Pancit Cabagan. After our meal, children from the Square asked to have a group photo of us (Dutch students) with them. With that, we have made those young people happy.

Walking through the streets of Cabagan Centro, we were able to go to the Municipal Police Department of Cabagan. We had so much fun in that place. The carnival next to that place was even a remarkable place for everyone of us as well. We even tried the Ferris wheel and the Viking. After all the fun and enjoyment, we started our research for the rest of the day.

How Lexter and Ruby experienced a day of the International Water Management Course on January 24, 2017

Waking up with a little bit cold weather is a challenge to do something in day, but we have to do our research. That's why I (Lexter) still go out with my counterpart (Vincent van Delft) and still continue to conduct interviews, while the other groups were already starting with their reports. Riding a boat is a quite a challenging experience, yet enjoyable. We had to cross the bridge, which was flooded and which is located at the Cagayan River. We had to go all that way just to reach the barangays of Cabagan on the other side of the river. The transportation there is minimal, therefore we decided to leave home early. Doing interviews there is hard because we wer running out of time and we had to go to three barangays in just four hours. This day was also nice because it was our first time we received a free lunch from someone while in doing our interview! We went home as early as 3pm because it would take us one and a half hours for transportation to get all the way back to the CCVPED.

For me (Ruby) the day was a bit different. My two partners and me had already interviewed everyone we wanted to interview. I decided to go to the Internet café to search for some literature for our research report, but that did not go as planned. I did not have Internet connection! After trying for an hour I went back to the campus and there I chilled the rest of the day with the others as well as reading some of the literature given to us by sir Merlijn.

How Anneroos experienced a day of the International Water Management Course on January 25, 2017

Yes, today was a special day. Because today, it is Jemima's 24th (!) birthday! However, she still looks and acts like a teenager from time to time and is still very busy with collecting sticks. Covered with party masks and weaponed with sweet treats we woke her up by singing a song. But, of course there was also some hard work that had to be done today. Most of the students were doing their last interviews and collecting their missing data. Others, just like me, went to the Internet cafe to work on the report and presentation. Yes guys, the last days before the deadline are the hardest. But as we start analyzing, my partner and me also felt awarded by the interesting correlations and conclusions that became apparent through the research. In the evening, there was again a delicious dish from which I forgot the name but from which I know that it contains lots of veggies (sorry Jess, I know that taste is subjective of course). Last but not least, Alvin from the kitchen brought some pulog? (Rice cakes, but please correct me if I am wrong) and Cannel provided some candles so that Jemima could make a wish. Maybe it had something to do with coming back to the Philippines one day?

How Cannell experienced a day of the International Water Management Course on January 26, 2017

Today was the last day of working on our reports before the final presentations. We spend all day finishing our report and preparing for the presentation. Even though it was a lot of work, it was also nice to see all our work come together and see our main results clearly in the graphs and illustrations. It also gave me a moment to look back on the results we accomplished even in such a small period of time. It has been a great experience doing fieldwork in a country where everyone is willing to share his or her story. Conducting interviews with locals in Rural Cabagan has really taught me a lot about the Filipino culture and the people.

How Jemima experienced a day of the International Water Management Course on January 27, 2017

The last day of our stay in Cabagan was here. Everyone prepared for our final presentation, where important university staff from ISU, Barangay captains, and even the mayor would be present! It was a long day of presentations, but when we all finished I think everybody felt so relieved! We received our course certificate and I felt so happy and proud to have been part of the course and the Filipino culture!

In the evening we had our goodbye party and our favorite party activity was pulled out once more: videoke! How much have we (Dutch students) learned to love this way of entertainment! One last time we received an amazing meal and there was even special pork: lechon! I felt so happy to be alive and grateful for the group of people that I really felt part of.
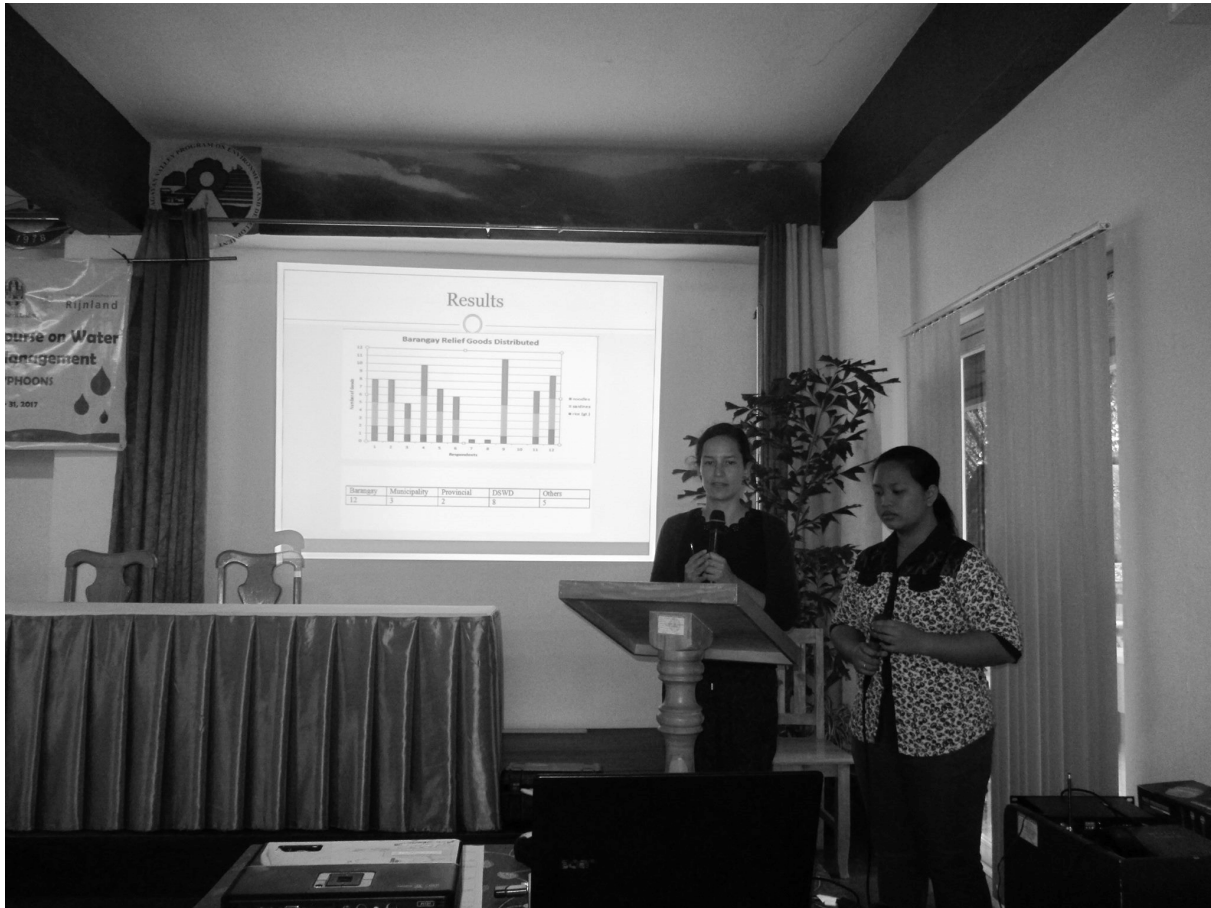
How Lars experienced a day of the International Water Management Course on January 28, 2017

After spending quite some days at the CCVPED building, it was finally time for us to leave Cabagan, Isabela. We had a long bus drive ahead of us to one of the most beautiful places in the Philippines: Banaue. On our way there, we stopped at the provincial festival called 'Bambanti festival' of Isabela. We got a good look at the beautiful boots that represented each municipality. The weather was cloudy and rainy, so it was not very crowded, and we quickly continued with our bus trip.

After seven and a half hours in a pretty quiet bus, we arrived at the Banaue Hotel and youth hostel. We stayed at the youth hostel, which opened not that long ago. There we could finally enjoy a nice hot shower. Everyone could then chose what they waned to do until dinner. We could take a swim in the outside pool, or head into town, which is what I did. It was a nice small town with some great wood carving shops. At dinner, the buffet we had was fantastic, there was something for everyone and so everybody ate a lot!

After dinner we watched a performance of the Ifugao traditional dance, which was a lot of fun. Thereafter, some people went into the pool (me included) while others enjoyed the Wi-Fi near the fire in the hotel lobby. It was a tiring day, but we arrived at a beautiful destination.

How Teun experienced a day of the International Water Management Course on January 29, 2017

Waking up in Banaue was amazing. First I woke early enough to see the sun set behind the mountains and then I had my first warm shower in three weeks time, after a dip in the pool of

course. After a nice hike through the vicinity of Banaue I started to understand why a lot of Filipinos could not stop looking at a bunch of white people in Cabagan, I had not seen so much European and American people in a while and they seemed so different. After a while I decided not to care any more and hiked on, on my flip flops, like a real Filipino. My second -to-last time I sat on top of a Jeepney was amazing too. The sun was shining, the wind blew through my hair and the view was spectacular. The road reached a dead end, so we had to walk the last 20 minutes, on my flip-flops of course. After crossing a lot of sweaty tourists, we made it to Batad. The stairway to heaven is real, I can say. And cannot wait for the sunset of tomorrow.

How Anna experienced a day of the International Water Management Course on January 30, 2017

For me, this day was amazing! The view from my room when we woke up was breathtaking. All the mountains and the Batad Rice Terraces were covered in clouds. We began the day drinking coffee in silence and appreciating the view. The next thing we heard was that we were going to help restore the rice terraces. With shovels, sticks, and bags we removed a very big pile of earth on one of the terraces which was caused by a land slide. Maybe it was because we all knew it was the last day of the course, but the team spirit was very much alive. We worked hard this morning, but we also very much enjoyed doing this work together, and felt satisfied after seeing the end result. Covered in mud we went back to have a tasty lunch. In the afternoon most of us decided to go for a walk to the waterfall. As we walked through the terraces the guide explained the irrigation system to us. Seeing the waterfall was spectacular and most of us rushed into the water to fight the strong currents.

The walk back, which was also supposed to be short, nearly killed me. All the steps we went down on the way to the waterfall, we had to walk back up again. I am happy and surprised we all made it back to the hostel. In the evening we played cards and stayed up late talking and appreciated each other's company for the last remaining hours of the course.

How Merlijn experienced a day of the international Water Management Course on January 31, 2017

And then, seemingly suddenly, it is over and it is time to say goodbye. A roller coaster month full of fun, emotions, a bit of hardship, but especially a multitude of experiences that no one who was part of the water course 2017 will ever forget. It was a wonderful month with a fantastic group of eager young students all ready to learn, to participate and to work together. This was the seventh water course I had the privilege to organise, and though all of them were great, the 2017 edition goes into the books as one of the most interesting and smoothest. The topic typhoons and specifically the preparations for, impact of and response to supertyphoon Lawin in northern Isabela was extremely relevant and interesting. We had a perfect preparation by visiting a government institution, an international NGO, a local NGO and a UN institution all working on natural disaster preparedness and response in Manila. Of course, the reality on the ground in northern Isabela was quite different from what we learned in Manila.

One of my most vivid memories of this course is the presentation by a representative of the municipal government of Cabagan about the local preparations for typhoon Lawin. The shivers down our spines when we saw the video images of the typhoon at its strongest, with the 250 km/hour howling wind and the incredible strength, so much stronger than you can even imagine. A classroom full of students on the tip of their chairs, everyone with an arm raised to ask questions. An almost electrified atmosphere with touchable energy. I had to come to the rescue of the poor presenter and save him from being devoured by a pack of students who by that time were already experts in disaster management and who would not accept easy answers. I cannot think of a greater reward than to witness 30 students completely immersed in the topic and all on board on the fast-moving learning train that the water course is.