



# Collective Climate Action

COMMUNITY RESPONSES TO FLOODING IN THABAUNG TOWNSHIP IN THE AYEYARWADY DELTA, MYANMAR



Source: Si Thu Htun, 2019

Marijn Kers

MASTER THESIS | INTERNATIONAL DEVELOPMENT STUDIES

# COLLECTIVE CLIMATE ACTION

A bottom-up approach to the impact and consequences of flooding on the livelihoods and the collective response of communities to deal with flooding, in Thabaung township in the Ayeyarwady division of Myanmar.

**Author:** Marijn Kers

**Contact:** [kersmarijn@gmail.com](mailto:kersmarijn@gmail.com)

**Date:** June 2021

**Supervisor:** Prof. Dr. Annelies Zoomers

**Thesis Msc. International Development**

**Department of Human Geography**

**Faculty of Geosciences**

**Utrecht University**

**The Netherlands**

## ACKNOWLEDGEMENTS

The support and guidance I have received over the course of two years, from the start to finish of the research has meant a lot. Along the way, the learning curve has been steep and the process somewhat longer than expected. I am grateful for the opportunities that made the research possible, and the hospitality of the research participants who are key in this thesis.

In particular, I would like to thank my supervisor, prof. dr. Annelies Zoomers, for asking the right questions, guiding me in the right direction and support throughout the process. Secondly, I would like to thank U Win Myo Thu and Sonia Leonard of ALARM Myanmar, for their time, knowledge and encouragement. Thank you, Si Thu Htun of ALARM Myanmar, and Stephen Saw for being the most helpful interpreters during the fieldwork.

Most of all, I am grateful for Team Myanmar. My research partner Sarah Kalin, and Georgina Duke and Sanne Gerritse, for always being there. With each our own perspectives and knowledge, we were an impeccable team in managing the (cultural) landscape of Myanmar. Your support, open-mindedness, and being there for each other in times of hardship and joy, made me fully believe in our own capabilities. I am really grateful to have had you all by my side.

In addition I would like to thank Stefanie de Boer, Gert Dokter, Vera Hollander, Anna Verkuil and my family for their support.

## ABSTRACT

Extreme weather events are occurring more frequently, influenced by climate change. One of the most vulnerable countries to climate change is Myanmar, in Southeast Asia. Adaptation to climate change is important for the socio-economic developments of the country.

The political climate in Myanmar is dynamic, and has shifted from military rule to a quasi-civilian government over the course of ten years. The increasing level and amount of flooding has been pressuring Myanmar for the last twenty years, especially in the Ayeyarwady delta. Devastating natural disasters as cyclone Nargis (2008) and Komen (2015) have highlighted the capabilities of communities themselves, in organizing a response. Literature emphasizes the importance of social capital and collective action, in adapting to a changing climate. As communities in the Ayeyarwady delta are increasingly exposed to natural hazards, how does it affect their livelihoods and community? This master thesis is a bottom-up approach to researching the subject of collective action in relation to climate change. It will give insights on how communities deal with the direct and indirect consequences of flooding, when exposed over an extended period of time. The fieldwork is conducted in March 2019, and is reflective of that time period.

INDEX

Acknowledgements ..... 2

Abstract ..... 3

Chapter 1: Introduction ..... 7

    §1.1 Research objectives ..... 9

Chapter 2: Theoretical and conceptual framework ..... 10

    §2.1 Climate change and natural disasters ..... 10

    §2.2 Defining collective action ..... 10

    §2.3 Conceptual framework ..... 12

Chapter 3: Research design ..... 13

    §3.1 Research question ..... 13

    §3.2 Selection of research sites ..... 13

    §3.3 Actor mapping ..... 14

    §3.4 Walkalong interviews ..... 15

    §3.5 Focus group discussions ..... 16

    §3.6 Data summary ..... 17

    §3.7 Limitations ..... 17

Chapter 4: Introducing Myanmar ..... 19

    §4.1 Controlled transition ..... 19

    §4.2 NLD Government and Rakhine crisis ..... 19

    §4.3 Development assistance ..... 20

    §4.4 Public administration and policy ..... 21

Environmental vulnerabilities in the Ayeyarwady delta ..... 22

    §4.5 Ayeyarwady river basin ..... 22

    §4.6 Nargis’ impact on the Ayeyarwady delta ..... 24

    §4.7 Monsoon season 2015 ..... 25

    §4.8 Foreign aid and discrimination ..... 27

Chapter 5: Findings and analysis ..... 28

    §5.1 Demographic composition Thabaung township ..... 28

Chapter 5: Impact of flooding on livelihoods ..... 31

    §5.2 Livelihoods ..... 31

    §5.3 Fishing tenure system ..... 31

    §5.4 Flood displacement ..... 33

§5.5 Farming.....	34
§5.6 Summer paddy cultivation and mechanization.....	36
§5.7 Monsoon paddy cultivation.....	36
§5.8 Late monsoon withdrawal and flooding.....	37
§5.9 Secondary sources of income.....	38
§5.10 Temporary migration.....	39
§5.11 Flooding affecting livelihoods.....	40
Chapter 6: Adjusting livelihoods.....	42
§6.1 Income diversification.....	42
§6.2 Flood displacement.....	42
§6.3 Temporary migration.....	44
§6.4 Debt.....	44
§6.5 Housing.....	45
§6.6 Cultural and religious events.....	48
Chapter 7: Community initiatives.....	49
§7.1 Individuality and leadership roles.....	49
§7.2 Motivations and collective needs.....	50
§7.3 Critique and lack of transparency.....	51
§7.4 The organization of committees.....	52
§7.5 Water committee.....	55
§7.6 Donors.....	56
§7.7 Death during flooding.....	57
§7.8 Neighbourhood support.....	57
§7.9 Collectively coping with flooding.....	58
Chapter 8: Discussion.....	59
§8.1 Embankment protection and dredging.....	59
§8.2 Adaptation strategies.....	60
§8.3 Increasing vulnerability for lower parts.....	60
Chapter 9: Conclusion.....	62
§9.1 Direct implications of flooding on livelihoods.....	62
§9.2 Indirect implications of flooding on livelihoods.....	63
§9.3 Adaptiveness of communities.....	63
§9.4 Moving forward.....	64
Bibliography.....	65
Appendix I: Interview Guides.....	69



RECENTLY CULTIVATED FIELDS IN THE SUMMER OF 2019, HPA YAR NI



Source: Marijn Kers

For quite some time, the term 'climate change', was challenged in its existence and implications. Now taken into account, addressing the impact of climate change on a global scale has been the focus of international agreements and policy development, such as the Sustainable Development Goals set in 2015. The decisions that are being made on this level, and on regional and national level, in an era of globalization, largely dictate what measurements are installed to increase climate change adaptation. The decisions that are being taken, are decided by intergovernmental bodies, individuals, groups within society, and governments on behalf of society. They determine the effectiveness of adaptation strategies (Adger, 2009).

In general, changing weather patterns affect regions differently, and may be less extreme in some countries than others. Regions which are notably more at risk of being affected by changing weather patterns, are developing countries. In particular, this is visible in Southeast Asia. On the Global Climate Risk Index, ranks Myanmar as second out of the 187 countries in vulnerability to climatic natural disasters (Displacement Solutions, 2018). Already prone to natural disasters as cyclones, earthquakes and drought, climate change exacerbates the vulnerability to extreme and unpredictable weather events of the country. The landscape holds a variety of climates. In Myanmar, the rising sea level has led to an increase in coastal erosion and salinization. Late monsoon onset is causing prolonged drought in the Dry Zone, and an increase in rainfall intensity during the monsoon season causes flooding downstream of the Ayeyarwady river. Add an increasing frequency of cyclones, tropical storms, and storm surges combined with a predicted 50 cm sea level rise by 2050, to the equation, leaves Myanmar extremely vulnerable down the line (Aung et al., 2017).

### ***Conflict and climate displacement***

Myanmar, or formerly known as Burma, was under military rule from 1962 until 2011, before it started opening up. Simultaneous to environmental challenges, it faces social and political challenges. Internal conflicts have been present in Myanmar for decades in ethnic states as Kachin, Shan, Chin, Kayin and Rakhine State. In the latter, crimes against humanity and for the International Court of Justice to decide, genocide have taken place in 2017 against its Rohingya population. Large numbers of the population has been displaced, because of conflict. Additionally, the devastating impact of natural disasters causes displacement. In 2008, when cyclone Nargis hit the Ayeyarwady delta, 140.000 people lost their lives, and 800.000 were displaced (South et al., 2011). The impact cyclone Nargis had on the country are still visible in the current climate. Myanmar lacks the preparedness for a natural disaster to the extent of the magnitude of Nargis. The likelihood of reoccurring extreme weather, slow-and sudden onset events, is high. As is the likelihood of communities being displaced as a result of that. The majority of the 54 million people that live in Myanmar, reside along the rivers of the country. The Ayeyarwady delta, is one of the most densely populated region of the country, and 85 percent of the country's rice production is cultivated in the delta. However, the Ayeyarwady river causes inundation for the floodplains during the monsoon season, leaving inhabitants vulnerable to displacement (Lwin et al., 2020).

### ***Displacement, self-reliance and collective action***

The increasing frequency and intensity of cyclones, tropical storms and increased rainfall leaves the Ayeyarwady delta particularly vulnerable. The ruling military junta failed to respond adequately in the aftermath of cyclone Nargis in 2008, which made landfall in the Ayeyarwady delta. It had refused initial international aid, and the immediate response was initiated by civilian actors through collective action. Collective action refers to the shared goal among a group, which involves a common voluntary action that contributes to achieving the shared interest (Adger, 2009; Ratner et al., 2013).



Cyclone Nargis was a sudden onset event, and highlighted the unpreparedness for natural hazards on a large scale. Initially, the military government refused international aid and access to the Ayeyarwady delta was hindered, even for its own citizens. Simultaneously, it showed the important role that civil networks, communities and collective action have in the response to natural disasters (Seekins, 2009; South et al., 2011; Stover & Vinck, 2008). Communities in the delta experienced three 'phases' of assistance (South et al., 2011). Firstly, the activities from neighbours, families and communities to support each other for direct survival and securing protection. Securing food, drinking water and contacting the outside world. Prioritising vulnerable members of communities, activating social and religious networks between communities and outside of the region. Organizing temporary movement to safer locations, using informal and local formal networks for the need of survival and protection of the community and its members, were the first responses. Local leaders did not wait for instructions from higher authorities before taking the responsibility in decision making for the need of survival in the first week (Prasse-Freeman, 2012; Selth, 2008). In the second phase, the activated formal and informal networks connected affected communities to other Myanmar citizens, civil society and local NGO's, who collected donations and purchased supplies to be send to the affected communities (South et al., 2011). After a month, the military government allowed international relief into the country after diplomatic efforts.

Adger (2003) adds to the argument, that social capital and collective action are the 'glue' within societies, to increase climate adaptation. The role of the state, in facilitating sustainable and resource management infrastructure to enhance the adaptive capacity, determines what role social capital can play. As Nargis highlighted, civil society initiated a response for civilians where the state was absent. As Myanmar is vulnerable to extreme weather events and natural hazards, severe flooding during the monsoon season are reoccurring events. Adaptation to these hazards is crucial for economic and social developments of the country (Adger, 2009).

### ***Disaster management and climate adaptation***

The frequency of sudden onset events as cyclones, storms surges and slow onset events as severe flooding, have been increasing in Myanmar since the 1980's. In the case of Nargis, long-term causes as deforestation, population growth, dam construction that reduced the amount of sedimentation, and lack of early warning systems, contributed to the high amount of casualties (Brakenridge et al., 2017). Over the last decade, efforts have been made in the development of disaster management, from policy, strategy and to implementation, and is an ongoing process. In 2015 cyclone Komen hit the country. Extensive rainfall before and after, caused severe flooding upstream the Ayeyarwady river and in the delta, leaving 132 casualties. In 2016, the extensive rainfall caused flooding for a longer period of time as well. Where Nargis was a sudden onset-event, the 2015 and 2016 floodings, influenced by Komen, were slow-onset events. In terms of communication, and collaboration with other stakeholders, local government, CSO's and NGO's, has increased over time, as well as the involvement of the military in disaster management (Htein, Lim, & Zaw, 2018). Since the ruling Myanmar junta became a semi-civilian government in 2011, frameworks like the Myanmar Disaster Management Law (2013) and Myanmar Action Plan on Disaster Risk Reduction have been developed to decrease vulnerability to natural disasters and increase disaster risk management. In addition, the National Recovery Framework was developed after the 2015 and 2016 floods, the longer term Myanmar Sustainable Development Plan (2018-2030) and Union level policies and strategies have been formed to initiate climate adaptation measurements (Displacement Solutions, 2018; Htein et al., 2018).

### §1.1 RESEARCH OBJECTIVES

The increasing level and amount of flooding has been pressuring Myanmar for the last twenty years, especially in the Ayeyarwady delta. The political climate in Myanmar has seen a lot of change in even ten years of time. There is little scientific research conducted on how communities collectively organize responses in relation to climate change, after the change in the political landscape in Myanmar. Cyclone Nargis in 2008 has been extensively researched, but there is little information about the effect of climate change and natural hazards, in the Ayeyarwady delta and how the government change in 2011, has affected the room for collective action in community responses. Natural disasters as Nargis and Komen, and severe flooding, have highlighted the capabilities of communities themselves, in organizing a response. Therefore, researching the subject of collective action in relation to flooding, will give insights on how communities deal with the impacts and consequences of climate change over an extended period of time.

The research will partly focus on collective action, the initiatives that are collectively organized on community level in response to the effects of climate change. In order to grasp a better understanding on organized collective action, participation intention, individual and collective motives are concepts that determine the actions, patterns of interaction and outcomes. Institutional arrangements, social capital and social identity influence how, where and in what form initiatives are organized. How communities organize collectively in response to climate-change induced natural hazards, will be researched in the Ayeyarwady delta of Myanmar. The overall objective is to gain knowledge on the effect of climate change on the organization of responses on community level to adapting to a changing environment.

## Theoretical framework

### §2.1 CLIMATE CHANGE AND NATURAL DISASTERS

Myanmar is one of the countries, where increasing temperature fluctuations have been registered. In developing countries, agriculture has a significant contribution to the economy. Temperature fluctuations, and changing weather patterns indirectly affect the economy, and increases vulnerability to climate change (Davies et al., 2009). In Myanmar, 60 percent of the population relies on agriculture for as a source of income, and accounts for 25 percent of its share in GDP, 17.5 billion USD in 2018 (Eurocham Myanmar, 2018). As agriculture is an import pillar for the economy of Myanmar, exposure to temperature fluctuations and changing weather patterns have a negative effect on agricultural systems. The Ayeyarwady delta, is the main agricultural production area in the country, and rice is the main cultivated crop. The chances of natural disasters as cyclones, tropical storms and flooding, taking place in Myanmar, are increasing, influenced by the effect of climate change (Brakenridge et al., 2017). As Thomalla et al. (2006) state, “Natural hazards and climate change impacts affect numerous natural, economic, political and social activities and processes. Hence, these challenges need to be addressed in a holistic and integrated manner at all scales and on all political levels and involve all sectors of society” (Thomalla et al., 2006, p. 45).

#### ***Vulnerability, resilience and climate change adaptation***

The discussion that takes place on academic level, differentiates the concepts of vulnerability, resilience and adaptation. Turner et al. (2003), refers to resilience in a simplified manner, as the ability to respond. Resilience is a concept that is frequently used in literature dialogue, relevant to resource management in climate change adaptation, and has a strong environmentalist approach. Vulnerability, on the other hand, is closely connected to disaster risk management. It refers to, “complex interactions of social, economic and environmental factors operating on different spatial and temporal scales give rise to vulnerability as they affect the ability of individuals and communities to prepare for, cope with, and recover from, disasters” (Thomalla et al., 2006, p. 43). Whereas, climate change adaptation has mainly the focus on how individual actors and sectors, may be able to adapt to changing environmental conditions, in contrast to tackling the broader structural constraints that determine vulnerability (Thomalla et al., 2006; Turner et al., 2003).

#### ***Social resilience***

Authors and frameworks, like the Sendai 2015-2030 framework on disaster risk reduction, state the importance of social resilience in reducing the risk of natural disasters. The concept of social resilience is often addressed as community resilience. It refers to the association on community level, to increasing local capacity, social support, and recourses, and a decreasing level of risks, collective trauma and misconceptions (Lwin et al., 2020; Rodima-Taylor, 2012). As of now, there is no specific agreement on how social resilience is defined within the literature. The following definition will be used: “social resilience has been defined as the process of adequately anticipating, mitigating, and coping with disasters through the use of social actors and mechanisms to provide a smoother recovery process and minimize the disruptions and impacts of future disasters” (Lwin et al., 2020, p. 1). The role that the community plays is fundamental in establishing early warning systems, to improve the capacity for social resilience. The level of social resilience can be increased by enhancing awareness about the risks of natural disasters, communication, and actively engaging communities in communication and participation, using local knowledge, resources, trust in local governance, and economic investment, are part of this (Patel et al., 2017).

### §2.2 DEFINING COLLECTIVE ACTION

A relating concept, is *collective action* in responding to climate change. Breaking the concept down, collective action includes the involvement of a group of people. At the core, there needs to be a shared

goal among the group, which involves a common voluntary action that contributes to achieving the shared interest (Meinzen-Dick, DiGregorio, & McCarthy, 2004). In a clearly defined group it is easy to identify collective action. In situations where the boundaries of the group are not necessarily fixed or formed, people contribute towards the shared goal. However, some people may participate once, others more, or all parties may not know exactly who are involved, but their actions are identifiable as collective action.

### ***Social capital***

Group behaviour stands central in collective action, which can be present in formal and informal situations. There is no formula, collective action can be an one-time occurring, an institution or a process. Many factors influence collective action, as social capital and cohesion are important in this aspect. Clearly defined group boundaries and stability of group-membership over time will expect to facilitate collective action (Doss & Meinzen-Dick, 2015). Assigning responsibilities and allocating benefits will become an easier task. Building rapport over time will lead to people being more assured that they will benefit from the investment in the common goal. Social capital is the shared knowledge, norms, rules, understanding and expectations about interaction patterns that individuals in groups bring to a recurring activity. The relation between social capital and collective, is that social capital facilitates collective action (Meinzen-Dick et al., 2004).

### ***Agency***

Individuals can largely impact collective action, which can be viewed through the lens of agency. When an individual is involved in an informal or formal contract as group representative, in the organization of the mobilization of people and cooperation, the individual is bound to represent the group interest. In practice, this can take form in local leaders undertaking action, making collective action more effective. Effectiveness of an involved individual is particularly visible in situation where specialised knowledge is required, when someone has important technological or bureaucratic knowledge (Meinzen-Dick et al., 2004; Ratner et al., 2017). Complementary from a groups perspective, a strong sense of a collective identity is a requirement for group members to engage in behaviour that contribute to improving the groups' situation. Taking this evolvement a step further, when the group's goals, motives and norms become self-defining, results in increased involvement because it comes from an 'inner obligation' (Bamberg et al., 2015).

### ***Community participation***

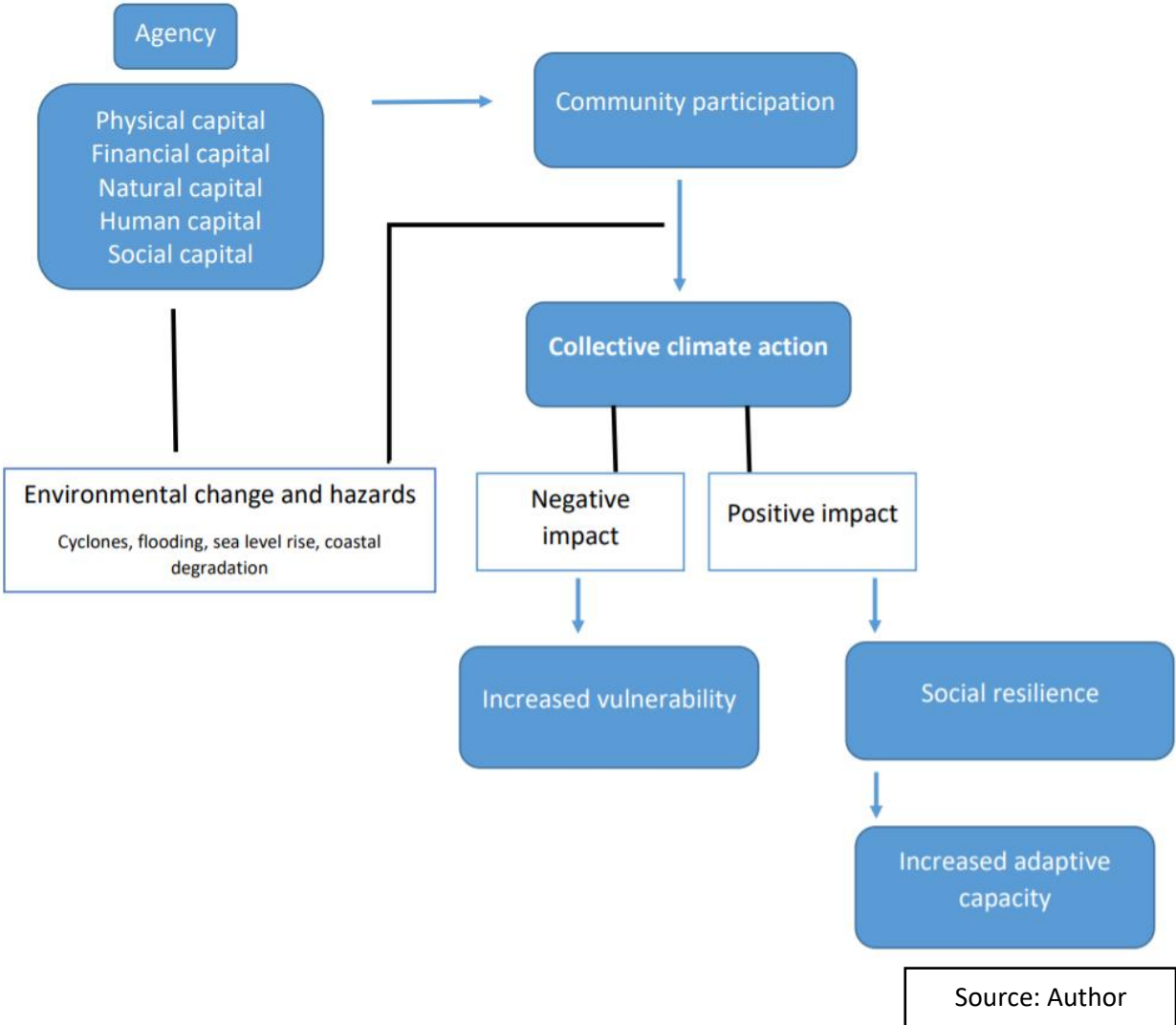
Collective action does not just happen, but is initiated. Over time collective action goes through the process of initiation, forward to preparation, participation and continuation of community involvement. Strongly connected to participation is power. Power is determined by information, money, skill and people's confidence. Power relations determine the weight of support towards the shared interest and room for involvement of other community members. Getting insight into power relations and stakeholders are important in researching collective action because it influences the process and participation (Wilcox, 1994). In addition, when people care about the shared interest, they become committed to achieving the goal. Commitment is needed, but ownership is equally important in this process. Letting people in a community think about ideas and negotiate with others, will let to create more commitment to achieve the shared goal (Bamberg et al., 2015; Wilcox, 1994).

### ***Climate action***

Environmental change has put increasing pressure on land, water, resources and on economic and social levels. Scientific research has over the years put more focus on the social component of environmental change, in mediating local climate change adaptation and structuring collective action for environmental management (Rodima-Taylor, 2012). The effectiveness of adaptation strategies is dependent on the options which are social acceptable, institutional constrains and the place of environmental adaptation in the broader scale of economic development and social progress (Adger, 2009). The ability to act collectively, determines the ability for local adaptation. In this thesis, a bottom-

up approach is used, to research the impact of flooding on communities, how it effects their livelihoods, and how they collectively cope.

§ 2.3 CONCEPTUAL FRAMEWORK





§3.1 RESEARCH QUESTION

Given the increasing frequency of natural disasters in the Ayeyarwady delta, influenced by climate change, and the dynamic, in a sensitive political situation, raises the question of how do people living amidst this, deal with flooding. Are they able to adapt? How does flooding affect their livelihoods and the decisions they have to make on a daily basis? What role does the community have?

The region of Thabaung township, located in the Ayeyarwady delta is researched. Thabaung township is one of the most affected townships in the floodings of the year 2015. Climate change legislation and environmental related policies, point out that needs of the population have to be considered when formulating policies, strategies and for implementation. Responses from communities to flooding and what collectively is organized, is analysed through a bottom-up approach, to gain perspectives on how flooding affects their life on a daily basis, in the long run and how communities address these issues. The following research question and sub-questions are central in this thesis:

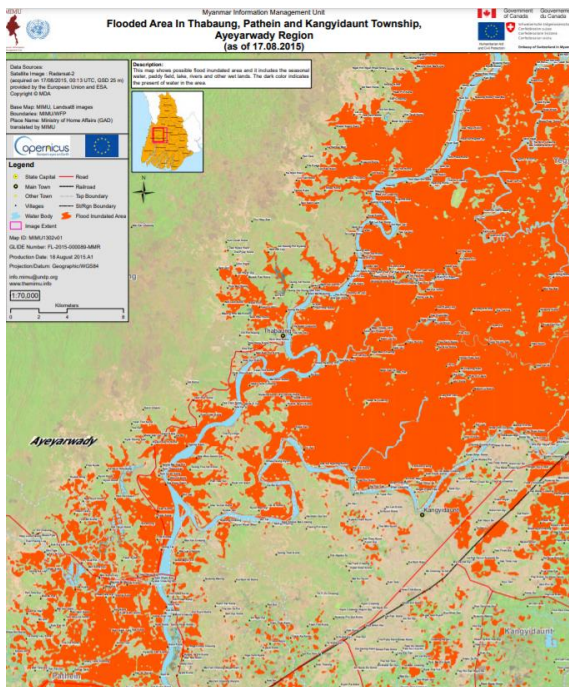
*What is the impact of flooding on livelihoods and the adaptiveness of communities in the Ayeyarwady delta, Myanmar?*

In addition to the research question, the following sub-questions will be used to complement the research question, through a bottom-up approach:

- How has flooding affected the livelihoods of communities in the Ayeyarwady delta?
- How have people adjusted their livelihoods and communities to deal with flooding?
- What kind of community initiatives can be identified in relation to flooding?

§ 3.2 SELECTION OF RESEARCH SITES

The following methods were used for data collection. Over a period of 7 days, the villages of Hpa Yar Ni, Sit Pin Gyi and Khat Ohn Chaung in Thabaung Township, in the Ayeyarwady Division were the focus areas of the research. The villages are situated in the eastern part of Thabaung township, a plain that is prone to flooding. In the monsoon season of 2015, Thabaung township was one of most affected townships in the country, see map 1. In August of 2015, 37 relief camps were opened in the township hosting over 7000 displaced people, 260.000 acres of rice paddy fields were flooded, and over 1200 schools had to close indefinitely (Zin, 2015). Therefore, villages in Thabaung township were chosen to conduct the research, to grasp a better understanding of the impacts of flooding on the livelihoods, the community, and how community initiatives are organized to cope with flooding.



Map 1: The affected flood plain in Thabaung township in August 2015 (MIMU, 2019).

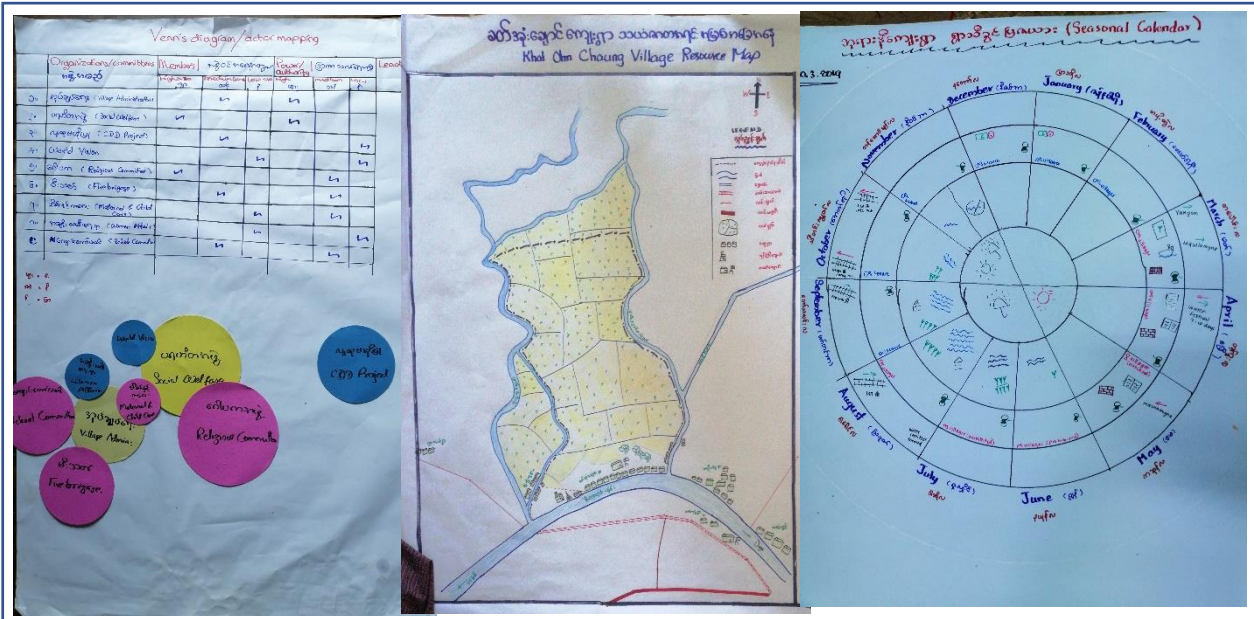
The amount of data that was collected, was done through the support of two interpreters. One of the interpreters was working for the organization ALARM, and the other a volunteer for the church. As a result of limited access to the rural communities, the majority of the data collection was done in 7 days, in March of 2019. Foreigners need a permit to being able to stay overnight in rural areas, outside of the major cities. Therefore, it was difficult to arrange a second visit. The research was conducted through a bottom-up approach. In this chapter, a brief analysis is made of the data types and how it worked in practice. The guides used for data collection can be found in the appendix.

§3.3 ACTOR MAPPING

To gather an overview of actors involved in the villages, the first participatory method that was conducted was actor mapping. The participatory exercise can be divided into two parts, the mapping and the focus group. The participants included village chairmen, village administrator and people who are involved in committees. Participants were asked to list all the actors in the village, village administration, committees and religious actors. Once all the relevant actors were listed, the amount of members and their relative power were written down, with additional contacts of leaders, visible in image 1.

The second part of the exercise was the focus group. Once all the actors were listed, members and relative power, the actors were written down on paper. The next step was making the actor map and connecting the relations between the actors. Along the way, the participant explained in what kind of activities the committees were involved in, and the nature of the relationship to other actors. In addition, the participants explained for each committee what their role was in responding to flooding.

Image 1,2 and 3 : Left, the actor map. In the middle, the resource map. On the right, the seasonal calendar.



Timeline mapping

In order to get an overview and an understanding of all the environmental hazards and effects that have impacted the villages, a timeline map was made. A timeline was constructed by asking participants about the environmental hazards that affected the village and themselves the most. What kind of effects did the hazards have? The participants described the environmental effects on their livelihood, houses, need to migrate, support from donors and support within the village. From their

input, a timeline was constructed with the events which affected the village the most, see image 4. The timeline was created in each village.

Image 4: The timeline map of Hpa Yar Ni.

Description	Years (y5)									
	1975	1980	1998	2012	2013	2017	2015	2016	2017	2018
<b>Environmental hazards</b>										
<b>Migration</b>										
<b>Effects</b>										

**Resource mapping**

Maps of the villages in Thabaung township are scarce. Together with one of our interpreters and colleague of ALARM and village chairmen, a resource map was made, see image 2. Mapping the resources was helpful in understanding how the surrounding land and waterways are used in the villages. Where the flooding impacted the villages the most and the challenging livelihood issues. In addition to landownership, the water tenure system surrounding the villages are complex. Explaining with use of the map, the exercise gave useful insight information about water tenure system.

**Seasonal calendar**

The seasonal calendar, as can be seen in image 3, is used to grasp understanding of the seasonal patterns and how that affects livelihoods. The timeline mapping supports in grasping the effects of environmental hazards over a longer period of time and the increasing pressure of flooding. The seasonal calendar is used to grasp the effect of the environment on a year seasonal basis. The participants explained the seasons and when in the year the flooding season start. The participants explained how the seasonal changes influence their livelihoods activities, when they migrate and when they come together as committee members to prepare for flooding. This exercise helped in grasping a better understanding of when flooding takes place, and how it affects livelihoods, mobility and capacities in the community.

**§3.4 WALKALONG INTERVIEWS**

In each village, walkalong interviews were conducted. In the process of making the resource map, the vulnerable parts of the village are discussed. The walkalong interviews were used to grasp a visual understanding of the effect of flooding on the village physically. In the form of housing, protection of forest, and the difference between the higher and the lower parts of the villages. In two of the three villages, the walkalong interviews were conducted in the beginning of the visits. Hereby, vulnerable parts of the village were identified. During this process, the walkalong interviews were used to identify participants for the focus groups and interviews. The walkalong interviews were conducted in an informal manner, with a village chairmen and an interpreter.

**Problem ranking**

As part of the participatory workshop, the problem ranking was conducted. In the exercise of the timeline mapping, the main environmental issues came forward. The problem ranking was used to identify and verify the environmental issues present in the village. The participants of the timeline mapping participated in the problem ranking, see image 5. Symbols were made, in order to simplify the environmental issues. In this way, the participants could clearly see and identify which issues



affected the village and their livelihoods the most. This exercise confirmed that flooding is the most affecting environmental problem. This is combined with heavy rains and strong waves, which go together with the flooding but are a stronger force when it comes to affecting physical assets. As method, it is included into the focus group and will not be mentioned separately. In the first village the exercise was conducted separately, in the other two villages questions were asked to confirm the primary environmental issues.

*Image 5: Problem ranking in Hpa Yar Ni.*



### §3.5 FOCUS GROUP DISCUSSIONS

The participatory methods (actor mapping, timeline mapping, resource map and seasonal calendar) were followed by focus group discussions, to gather insights on the topics discussed, the environmental issues over time, livelihood challenges, committees and in particular responses to flooding. The first day in the villages, focus groups were conducted together because of participatory methods. Once these were conducted, some of the focus groups were conducted separately, with a focus on each research topic. In particular, in each village a focus group with village chairmen, committee members and water committee members was conducted, on the impact and responses to flooding. Focus groups with village leaders, fishermen and farmers, most affected households and women were held. The participants were chosen to gather a representative view of village demographics. In addition, often interviews would end up in focus groups, because people in the neighbourhood would join the interview.

#### ***Semi-structured interviews***

On the qualitative side, semi-structured interviews were used to gather a deeper understanding of the impact of flooding on peoples' lives. Village chairmen and committee members who were involved in the organization of responding to flooding were interviewed on their personal involvement and motivation. The communication, functioning within committees, relation to other stakeholders on community level and donor involvement were topics included in the in-depth interviews. The in-depth interviews gave a lot of useful information on the process, functioning and motivations of people involved in the organized initiatives to flooding. In addition, in-depth interviews with community members were held to gather a deeper understanding of their livelihood challenges, decision-making on household level during flooding and dynamics within the communities.

#### ***Secondary data***

In addition to the first-hand data collection, secondary data will provide a better understanding of the changes in the environment in the Ayeyarwady delta. We have access to this data through our host-organization ALARM and NGO's who work in the Ayeyarwady delta. On local level, the village chairmen provided documents with information about the villages, on environmental, demographic and social level.

### §3.6 DATA SUMMARY

The primary data collection was collected over the course of 7 days, three days in Hpa Yar Ni, two days in Sit Pin Gyi and three days in Khat Ohn Chaung. The summary of the methods conducted in Thabaung township can be seen in table 1. Generally, each of the participatory methods took two hours to do. Time needed for the focus groups fall between the range of 1,5 up till 3 hours. Interviews were conducted within a time range of 40 minutes and 1,5 hour.

*Table 1: The collective data set of methods conducted in Thabaung township.*

	<b>Number of Households</b>	<b>Focus Groups</b>	<b>Interviews</b>	<b>Seasonal Calendar</b>	<b>Resource Mapping</b>	<b>Disaster Timeline</b>	<b>Actor Mapping</b>
<b>Hpa Yar Ni</b>	400	6	15	1	1	1	1
<b>Sit Pin Gyi</b>	400	3	7	1	1	1	1
<b>Khat Ohn Chang</b>	180	7	9	1	1	1	1

For the findings, the analysis will include the villages of Hpa Yar Ni and Khat Ohn Chaung. The information gathered in Sit Pin Gyi was useful, however the data gathered from the village is questionable of its representativeness. The data seems to be one-sided, as a share of the different socioeconomic backgrounds was under represented during the data collection. On some issues Sit Pin Gyi is significantly different than Hpa Yar Ni and Khat Ohn Chaung, but because the information has not been discussed to a certain extent with the community members, there is no option to analyse the data.

### §3.7 LIMITATIONS

The amount of learning moments, are too many to write down. As a researcher, one of the most important learning experiences, was how to approach sensitive topics. The topic of collective action operates in the semi-political sphere, and talking about critiques, self-reflection and government involvement are topics that need to be approach in a sensitive manner while doing research. In the end, the impression that research participants gave, was that they were fairly open discussing these topics. In the context of Myanmar, social hierarchy is very important, and talking about critique, self-reflection and decision-making processes could be sensitive if questions would be asked in a power-undermining way.

One of the challenges and difficulties was the time frame and space, that was operated in. Because of dependence on government permission to the research sites, it was difficult to arrange permission for a second long-stay visit. It is very difficult to get access in the first place, and the host-organization ALARM, was crucial in identifying the research sites and facilitating support to arrange access to the area. Therefore, a short exploratory visit was done and a longer, intense 7 day visit to gather all the data. The data collection took place in March 2019, and the data that is discussed in this thesis is reflective of that time period.

Being aware of our own positionality as researchers, participants may have held back on certain topics because they know, researchers have to go through government actors. At the same time, there was a language and cultural barrier, and of we were not always aware of the social hierarchy present in the villages. This influenced focus groups and interviews, as village leaders would often be around us. During the presence of village leaders, we noticed that some of the participants would hold back in answering and let the leaders speak. One way we tackled this, was to do interviews at people's houses



alone. For the women's focus group, it was a challenge to secure an environment where only women were present, but we eventually succeeded in doing so.

In addition to this, one difficulty is speaking to individuals. Individual interviews would turn into focus groups or group interviews, as everyone would join if the interview would be held in an accessible space, as a garden. One way to tackle this, was to request to do interviews in people's houses. In addition, we made specific requests to conduct the interviews with a person alone. Because of this, we were able to conduct some interviews with only one person, but most of them were conducted with people joining our interview.

## CHAPTER 4: INTRODUCING MYANMAR

*Formerly known as Burma, this chapter will introduce Myanmar and the impact of a changing environment on the country. Therefore, other socioeconomic and political perspectives will shed light on how climate change and environmental impact is connected to broader developments in the country. First, the chapter will explain the former and current political climate and economic developments. Secondly, what policies regarding the environment are present in Myanmar and thirdly, introducing the Ayeyarwady delta and its environmental vulnerabilities, as research site.*

### **Myanmar in political perspective**

#### §4.1 CONTROLLED TRANSITION

Over the course of the previous decade, the political climate has changed in Myanmar. The transition from military government to a semi-civilian government in 2011, was a defining step for political change in the country. The new administration of president Thein Sein, a former military general, in office from 2011-2015, had to address an extensive amount of challenges. Myanmar has widely been considered a fragile state by nearly all definitions, and according to the UN, is one of the world's Least Developed Countries.

Under military rule, from 1962 until 2010, Myanmar had maintained an attitude of shunning international relations and focussing inwards. Sanctions were opposed by Western countries, but by establishing good relations with China, India and Russia, the military government managed to avoid sanctions from other ASEAN countries (Selth, 2018). The country spend most of the period in isolation, and despite internal and diplomatic pressure, the regime maintained power. However, on economic, technical, military and other levels, Myanmar's position was far behind its neighbouring countries and the rest of the world. In order for Myanmar to remain its independence, security, prestige and economic growth, the country needed change. For decades, pressure had been building up, with the public demanding more personal freedom, access to the rest of the world, foreign goods and services. The Tatmadaw, Myanmar's security forces, wanted to become more professional, have access to modern weapons, warfare techniques and superior technology. Thus in 2003, the State Peace and Development Council (SPDC), the official name of the military government, presented the 'Seven-Step Roadmap to Discipline-Flourishing Democracy'-plan (Farrelly, 2013; Selth, 2018; Ware, 2014). The word itself *discipline democracy* describes it, the government is semi-civilian. The Tatmadaw's position is secured by the 2008 constitution, as 25 percent of parliament is filled by the military. Any change to constitutional amendments require the votes of three-quarter, plus one. Therefore laws and constitution amendments can be vetoed by the Tatmadaw (Barany, 2019; Selth, 2018).

#### **Three transition priorities**

Myanmar has been economically far behind its neighbouring countries for decades. In attempting to boost the economy, the Thein Sein administration pursued a strategy of political liberalization and economic reform (Wilson, 2016). The three priorities of the Thein Sein government was overseeing the transition from military to civilian rule, ending ethnic conflict and changing the centralized economy into a market-oriented one. One of the first policy changes that was put in place was the Special Economic Zone Law in 2011 and the following year the Foreign Investment Law to stimulate economic growth and development (Ramirez & Tretter, 2013). A nation-wide ceasefire agreement was signed in 2015, where 8 out of the previously agreed 16 armed groups, the Tatmadaw (armed forces) and government signed the agreement.

#### §4.2 NLD GOVERNMENT AND RAKHINE CRISIS

The 2015 elections were won with a landslide victory of the National League for Democracy (NLD), led by Aung San Suu Kyi. As State Counsellor, she holds the position of un-official prime minister (Selth, 2018). The Tatmadaw does not have civilian oversight and the ministries of Defence, Home Affairs and Border Control fall under their control. After being the opposition for decades, the NLD government

took office in 2016. With relatively little experience in governing, the government is facing many challenges. It took some time for the government to undertake administrative change, for which it was criticized (Barany, 2019; Selth, 2018). Aung San Suu Kyi, a Nobel Peace Prize winner, was heavily criticized by the international community in her response, or lack of response, against the military or protection of the million refugees, when the Tatmadaw started ethnic cleansing operations in Rakhine against its Rohingya population in 2017 (Barany, 2019). The Rakhine conflict is a complex situation, in a country which already has wide-spread conflicts for decades. At the same time, it highlights Aung San Suu Kyi's position. The Tatmadaw has monopoly in applying means of state force, as being in control of the ministries of Defence, and through Home Affairs, the police forces as well. The NLD and Aung San Suu Kyi need to have a working relationship with the Tatmadaw, if they are able to govern (Selth, 2018).

### ***Development goals and aid delivery***

Meanwhile the international community had set a target with first the Millennium Development Goals, (MDG's), and currently the Sustainable Development Goals (SDG's). All UN member states have signed both agreements, including Myanmar. At the time of the first agreement, the country was under military rule. A few of the MDG targets were met, but little progress was made in eliminating extreme poverty (Ware, 2011). Considering the momentum the MDG's created, the potential was not realised in Myanmar. The same international community that agreed upon the goals, had put sanctions in place because of the violent crackdown in 1988 and the regime's refusal to accept the NLD's 1990 election victory. Western international policies at the time were aimed to isolate and weaken to the regime (Selth, 2008; Stover & Vinck, 2008). Official Development Assistance (ODA) was cut short as a direct result of that, reflecting the international perception that it is not possible to operate and provide humanitarian needs in such a sensitive political context. Even though the country had significant humanitarian and economic needs to alleviate poverty, contradicting MDG goal one (Décobert, 2020).

### **§4.3 DEVELOPMENT ASSISTANCE**

The call to normalize aid and development in Myanmar, began a few years before the development shift took place. Because of the connectiveness of politics, conflict, aid and development, it was a sensitive political subject. Calls from the international community to normalize aid, were not taken seriously by the military government. When cyclone Nargis hit the Ayeyarwady delta, May the 2<sup>nd</sup> of 2008, with an impact of such a magnitude, the State Peace and Development Council initially refused to accept humanitarian assistance. In the crucial first days and weeks after Nargis, the military government failed to respond adequately (South et al., 2011). British, French and US navy ships were waiting for in Thai waters for approval to enter the country as part of the international relief response, but approval never came (Stover & Vinck, 2008).

The SPDC was forced to adjust its position after one month, on the one condition that it was in charge of aid distribution and added extremely strict conditions of aid deliverance. Nargis had raged across the country, leaving a trail of destruction in its wake. It was clear that a large and long term relief response was needed. By July, around 140.000 people had died during or in the weeks after the cyclone. Among many factors which explain the slow response, the one that stands out the most is the refusal of humanitarian assistance (Selth, 2008; Stover & Vinck, 2008).

### ***SPDC's lack of response***

The military government was worried that with an influx of foreigners into a rural area with limited resources would lead to loosening the tight control over its population. Monitoring a large number of foreign officials, aid workers and journalists is hard to manage. The SPDC believed that the influx of determination to undermine the military's authority. Through that narrative, foreign aid assistance would highlight the SPDC's own lack of capacity, thus would lead to political unrest. Because of the devastation Nargis left behind, it required a large and long-term aid operation, along the lines of the

response of the 2004 tsunami in Indonesia. Accepting foreign aid would mean having an international presence in the country for a longer period of time, to oversee the aid distribution. An additional concern the military government had, was the fear that foreign aid workers would smuggle weapons into the country to mobilize the population into an uprising. Even if that would not be the case, the SPDC feared that only the presence of foreigners would cause turmoil. It could disrupt the plan to introduce the population to the 'discipline-flourishing democracy' plan (Selth, 2008, 2018; Stover & Vinck, 2008). The SPDC's attitude and lack of response was met with a lot of outrage from the international community. Nargis highlighted how the SPDC's fears and attitude translates into an internal focus, paranoia towards the international community, foreign policy and how that dominates the narrative in the response to Nargis.

With the change in government in 2010, a huge shift took place in the deliverance of aid. Firstly, the Thein Sein administration had the MDG's more prominent on the political agenda. Secondly, Western donor countries shifted towards establishing diplomatic ties and increasing political engagement, with a focus on promoting trade and investment. Alongside this, a shift took place in aid deliverance (Décobert, 2020). The approach of humanitarian aid shifted towards development aid. The influx of development assistance peaked in 2013, after sanctions were dropped, with \$6 billion US dollars. To put this number in perspective, Myanmar received eight years before that, in 2005, an amount of \$100 million US dollars in ODA (Décobert, 2020; Ware, 2011).

### **Reformation**

The country would be introduced to the semi-civilian Thein Sein government only two years later in 2010. Policy reformation has been high on the priority list, in which the international community is in engaged. The contrast could not have been more significant to five years before. Development assistance has become more normalized over the last decade, under the Thein Sein and the first NLD administration (Kudo, Toshihiro; Kumagai, 2013). A substantial amount of reform took place, under both administrations. The first 'wave' of reformations took place during Thein Sein's first three years in office. In the first year, political reforms were introduced, socio-economic reforms in the second year, and economic reform in the third year. The political reforms ensured the liberalization of the political system. Whereas the socio-economic and administrative reforms, during the second and third year, were mainly intended to fight corruption, initiate the peace process, improve governance and reform the economic environment (Bünthe & Dosch, 2015). When the NLD became the governing administration in 2015, expectations were high. Could the NLD, after decades of being the opposition, take Myanmar out of poverty and towards a growing, brighter future? Since opening up in 2010, the country has steadily shown GDP growth of, 6 percent per year. Under the NLD administration, it was expected to increase more. However, this did not come, although the GDP growth remained a steady 6 percent (Allen & Overy, 2020).

### §4.4 PUBLIC ADMINISTRATION AND POLICY

The same year the 'cleansing operations' in Rakhine State took place, the NLD government undertook quite some administrative changes. Myanmar did and does not have the capacity where administrators can swiftly follow up, adapt and implement new policies. Nor did it have a coherent policy agenda. Simultaneous to the political turmoil, the NLD administration formed a new ministry and appointed an extra minister to a ministry. The establishment of the Myanmar Development Institute (MDI), a think-tank to designated to provide technical assistance in research, policy and implementation strategies for economic reform, was one of the first steps to change this issue and build capacity within the government (Allen & Overy, 2020). To further develop the Myanmar, the NLD government formed the Myanmar Sustainable Development Plan 2018-2030 (MSDP), with a long term vision. This plan is a blueprint for development, in a coherent form, structured around 3 pillars, 5 main goals, accompanied by elaborate strategies and action plans (Ministry of Planning and Finance, 2018). Under pillar 3 'People & Planet' and goal 5 'Natural Resources & The Environment For The Prosperity Of The Nation',

the government is acknowledging the need for the protection and better management of the environment. The guiding instruments are for example:

- Myanmar National Climate Change Policy 2017-2030
- Myanmar Action Plan of Disaster Risk Reduction 2017
- National Biodiversity Strategy and Action Plan 2015- 2020

In the MSDP, the government aims integrate existing plans and priorities. It incorporates local development needs with the global sustainable development agenda. Coherence and harmony is what previous government plans were lacking, as they had sub-national, sectoral and ministerial directions. A national strategy in which long-term goals are streamlined, is what the government envisioned (Ministry of Planning and Finance, 2018).

### ***Implementation challenges***

When it comes to policy formulation in relation to climate change, environmental hazards, and disaster risk management, most of policies are formulated within the last five years or less. In terms of policy formulation and reform, a lot of progress has been made over the last five years. The translation from policy into implementation is where a lot of the challenges lie. Limited capacity, limited governance expertise, corruption and inefficiency are examples of the challenges which are present. Most of the policies regarding natural disasters and environmental issues acknowledge the pressing needs around the country. However, most of the proposed projects have a focus on the more prosperous economic regions of Myanmar, Yangon and Mandalay. The implementation of these policies, formed on Union level, come down to regional level. In the political system, Myanmar is federalizing, gradually more power has been given to Regional and State levels. The cooperation between Regional, State and Union level is quite limited when it comes to addressing climate related issues. In a development country, where the environmental vulnerabilities are incredibly concerning, it adds another layer of complexion in addressing these issues.

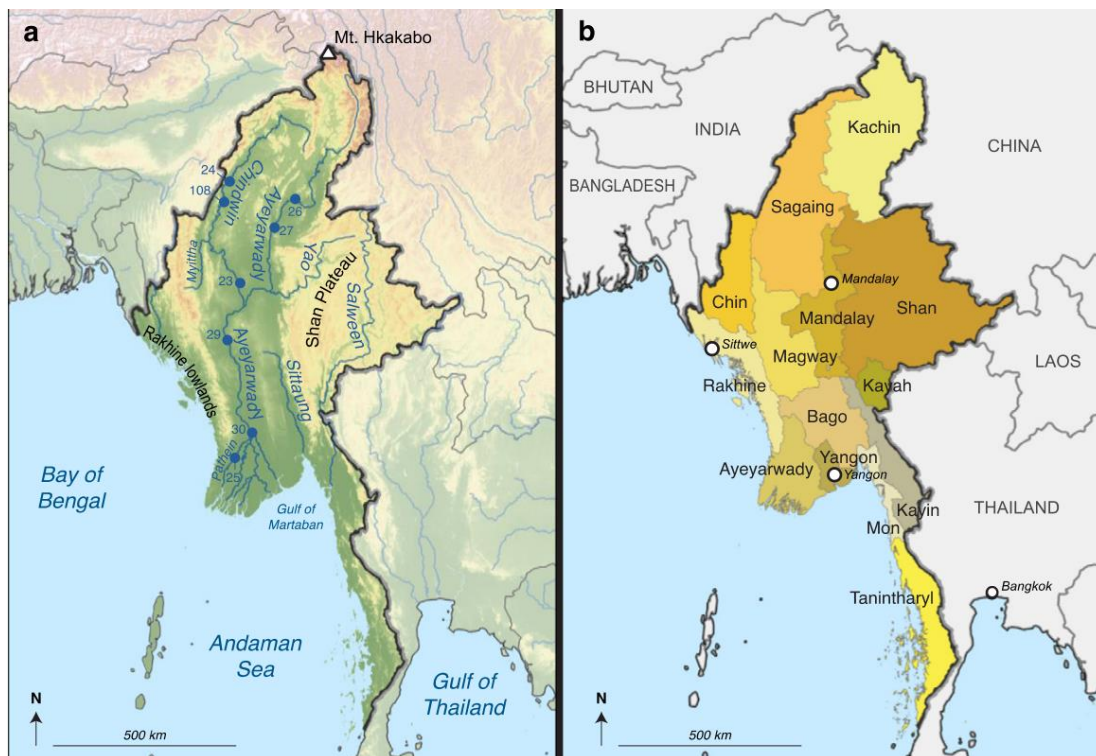
## ENVIRONMENTAL VULNERABILITIES IN THE AYEYARWADY DELTA

### §4.5 AYEYARWADY RIVER BASIN

The Ayeyarwady delta, known to be Myanmar's rice bowl, is the heart of the country's rice production. The densely populated area is home to around 6 million people, where 88 percent lives in rural settings. The Ayeyarwady delta is the largest river basin in Myanmar, covering 404,200 km<sup>2</sup> (Oo et al., 2018). Delta areas have become increasingly vulnerable because of climate change. The Ayeyarwady delta is no exception, as it has been prone to flooding, salt water intrusion, coastal erosion, and cyclones. The region is not unfamiliar with flooding, as it occurs regularly during the monsoon season. The Ayeyarwady's river basin covers 61 percent of Myanmar's land area, and is 2170 km long (Simmanee, 2013). The river flows from Kachin in the north, as part of the South-Eastern Himalaya range, through the dry zone plain, with the Shan plateau to the east. The Rakhine and Chin mountains west, and flows into the Andaman Sea, see map 2. The mean annual rainfall is approximately 2300 mm, ranging from 4000 to 6000 mm in the coastal regions, to 500-100 mm in the dry zone (Brakenridge et al., 2017). The Ayeyarwady delta experiences out of the all Southeast Asian deltas, the highest intensity in rainfall, making it a region which is prone to flooding .



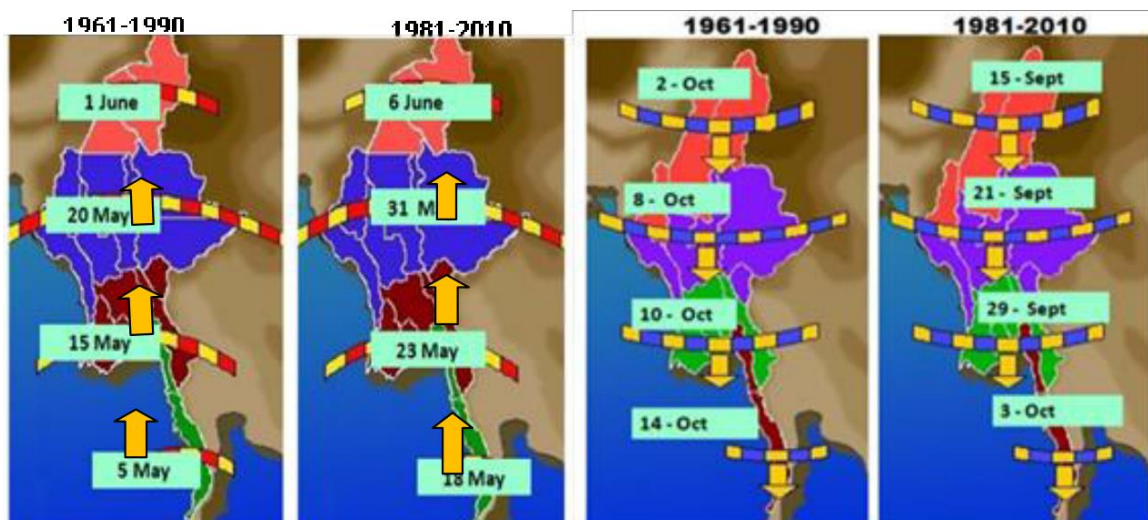
Map 2: Physical features and States of Myanmar (Brakenridge et al., 2017)



**Changing monsoon pattern**

The monsoon season starts in the middle of May and lasts until October. Thingyan, New Year according to the Burmese calendar, marks the end of the dry season and the start of the rainy season. The rainy season, accompanied by humidity, accounts for 90 percent of the country’s annual rainfall. Climate change has affected Myanmar in several ways. Extreme weather events have become more common. While the frequency of tropical storms has dropped since the 1970s, cyclones have particularly increased since the 1990s, including the scale of these onset events (Hedley et al., 2009). The extreme weather events take place during the rainy season. The monsoon pattern has been changing over the last four decades, as a result of global warming. Between 1961 and 1990, the duration of the monsoon season was 144 days. Whereas, between 1990 and 2010, the monsoon season lasted averagely 122 days (Aung et al., 2017). Over this period of time, the start of the monsoon season has delayed, and early withdrawal of the rain season, which affect the intensity of rainfall, see figure 1.

Figure 1: The changing dates of onset and withdrawal of the monsoon season between 1961 and 2010 (Aung et al., 2017).



Globally, monsoon seasons are likely to increase in area and intensity, while monsoon circulation is going to weaken. As climates become warmer, the transportation of vaporized water from ocean to land will contain more water vapor. The change of temperature influences the strength and extent of the monsoon circulation. With an increase in global temperatures, monsoons will carry more rainfall (WWF, 2017). Predictions are, that this especially will be the case for monsoons in Southeast Asia, with late onset and late withdrawal of the wet monsoon. There are local differences, based on land use change, natural variability and changing in aerosols.

The predictions for Southeast Asia deviate from observations in Myanmar, as early monsoon withdrawal is a noticed trend (Ivars & Venot, 2019; WWF, 2017). Cyclones, tropical storms, storm surges and flooding are the most present of natural disasters. There are several scenarios which influence flooding in the area. Flash floods from the mountain range bordering the delta, tidal changes from the sea, heavy rainfall from upstream, cumulative with heavy rainfall locally, can cause flooding in the delta. Over the last decade, severe flooding took place in the years 2011, 2013, 2015, see map 3, and smaller flooding incidents in 2012 and 2016 (Khaing, May, & Myint, 2019).

#### §4.6 NARGIS' IMPACT ON THE AYEYARWADY DELTA

The political dimension of the impact and aftermath of Nargis, played a large role in the number of casualties in the delta. As previously discussed, around 140,000 people lost directly and indirectly their lives because of the cyclone. The devastating damage it had done to the environment in the Ayeyarwady delta was extensive. Underlying issues exacerbated the effect of Nargis. In the delta, deforestation, overexploitation of fisheries and degradation of mangroves and the soil, causing erosion, were already present environmental vulnerabilities. Because of this, the impact of Nargis was more severe. Over the time period of 80 years, 75 percent of Myanmar's mangrove forests in the Ayeyarwady, has been lost due to human interference. Data reveals mangrove forests, natural barriers against storm surges, have declined from 260.000 ha in 1924 to 67.000 ha in 2007. Most of the decline has taken place over the last two decades (Hedley et al., 2010; United Nations Environment Programme, 2009).

The deforestation of mangrove and other forests is because of the harvest of timber, charcoal and the clearing of land for paddy fields and nipa palm to generate income. Mangroves forests act as a natural barrier against storm surges and salt water intrusion. The clearing of trees has reduced the protection from strong winds and waves during flooding. Nargis swept through the delta, with wind speed going up to 200 km per hour, accompanied by 12 feet storm surges. In total, 38.000 ha of mangroves were destroyed, over 63 percent of the paddy fields in the delta were flooded and 43 percent of fresh water basins were damaged (United Nations Environment Programme, 2009).

#### ***Civil society and communal response after Nargis***

When the military refused international aid and organizations into the country, when cyclone Nargis occurred in 2008, civil society organizations and communities themselves organized interventions. Pressure and threats from the international community to the lack of response by the junta, led to the deliverance of aid being delayed. The denial of aid to the people in the delta, is in direct violation of international humanitarian law. In the delta, informal networks were used to connect civil society actors to connected local communities, in order to save lives. Self-protection mechanisms that communities adopted were the prioritization of the most vulnerable, sharing and supporting within and between communities, temporarily moving to save locations, secretly distributing aid, activating religious networks, local informal leadership advocated to local authorities and aid providers (South, 2012). The then informal response highlights the extensiveness of how civilian networks were informally organized under a dictatorship. People with different socioeconomic backgrounds, including monks, business people, activists, farmers and daily wage laborers, started collecting food, clothing

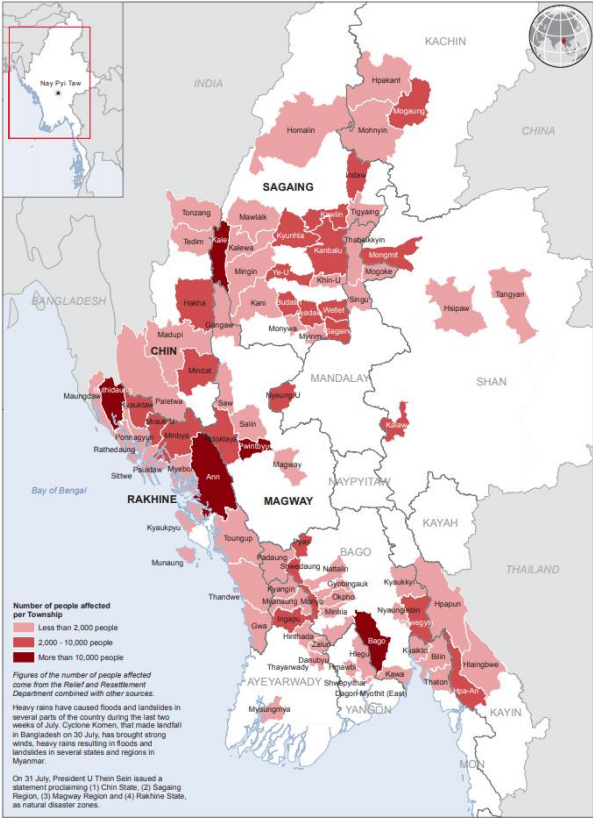
and building materials locally, and went to the delta to deliver these relief needs. These newly formed networks played a crucial role in the first response. Simultaneously, local staff from international humanitarian organization went to the delta to, together with the newly organized CSO's, laying the foundation for large-scale relief efforts (Human Rights Watch, 2010).

Religious groups, Buddhist monks, church groups and imams, often took the initiative, in organizing the response to Nargis. The year before, 2007, Buddhist monks were met with violence by the military during the Saffron revolution, when thousands demonstrated against the economic distress and stagnation. Religion plays an important role within Myanmar society, where the majority of the population is Buddhist. In the response to Nargis, there was a high level of collaboration and cooperation between church groups, monasteries, and mosques. Religious leaders were less likely to be subjected to harassment by the authorities, making it able to operate under the radar (Human Rights Watch, 2010; Prasse-Freeman, 2012). In the delta, a minority of the population is Christian, the majority is Buddhist. On local level, monasteries or churches are present in almost every village, holding a central position within communities. For cyclones, tropical storms and flooding, monasteries and churches often operate as shelters. In Human Rights Watch's report about the aftermath of Nargis, a monk had said: "The government didn't do anything, so we 15 monks and the community did it ourselves. There was nothing from the government. I had to organize the cremation of 150 bodies" (Human Rights Watch, 2010, p. 48).

Map 3: Number of flood-affected people per township on the 4<sup>th</sup> of August 2015 (MinBuza, 2015).

§4.7 MONSOON SEASON 2015

The years where flooding severely affects the Ayeyarwady delta, and other parts of the country, is often in closely connection with occurring cyclones. In the case of the 2015 flood, exceptionally heavy rainfall started at the end of June in the Ayeyarwady delta, and in the middle of July, in the centre and northern parts of Myanmar. Overflowing riverways, caused landslides and flooding low-lying areas, on the 30<sup>th</sup> of July, cyclone Komen hit the country. In terms of intensity, cyclone Komen was one of most severe storms after Nargis in 2008. Above average rainfall, accompanied by strong winds, continued to impact the region. As can be seen on map 3, heavy rainfall with cumulative rainfall from cyclone Komen, has severely affected people in townships in Rakhine, Chin, Kachin state and Mandalay, Sagaing and Bago region.

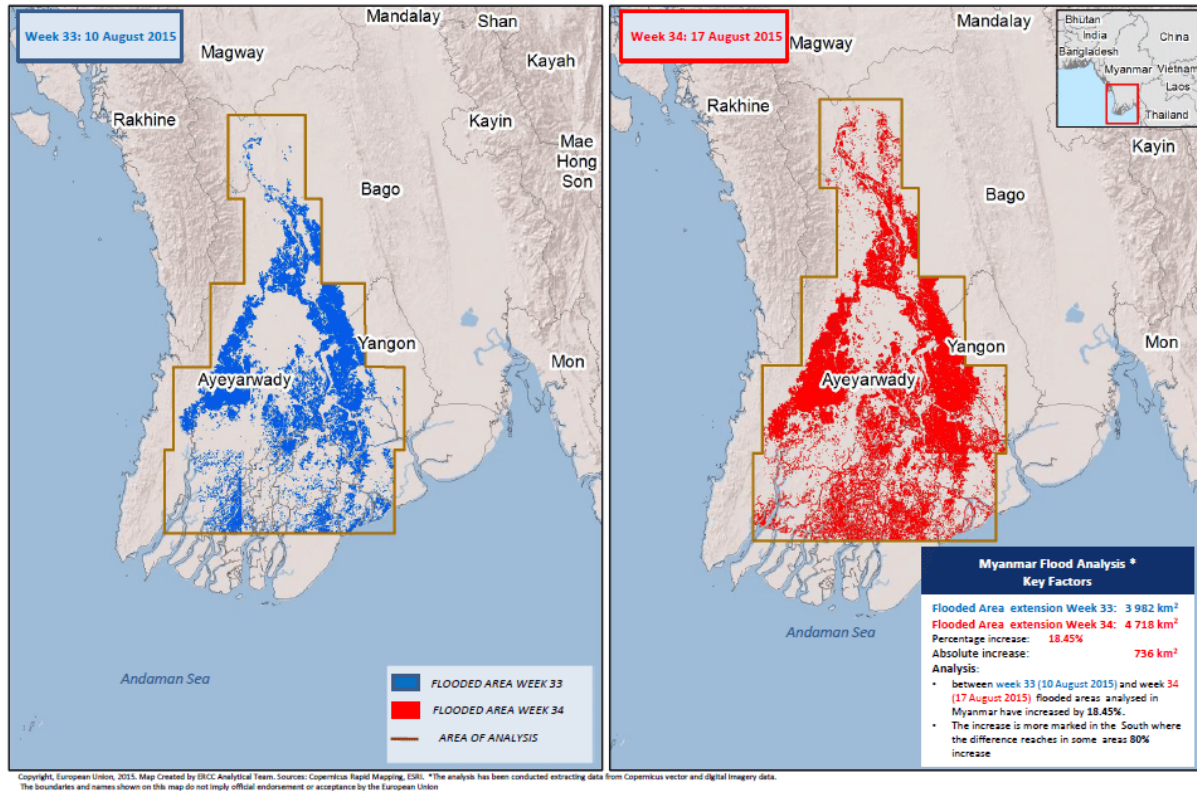


Rainfall started in the Ayeyarwady delta at the end of June, with an amount of roughly 100 mm per day. The water level rose, but not exceeding danger levels. At the end of July, when cumulative rainfall from upstream reached the delta, danger levels were reported in Hinthada on July 30<sup>th</sup>, see figure 2. Hinthada is situated at the northern part of the delta, where the Ayeyarwady splits into several delta rivers. The second highest recorded water level was observed in Hinthada, exceeding the danger level of 1342 cm, see figure 2. Data from weather stations indicate that floods in the delta were not caused by local rainfall, but by the flow from upper catchment, cyclone Komen, combined with sudden heavy rainfall from the mountain range west of Hinthada. Runoff from the mountain range could not flow into the Ayeyarwady because of exceeding water levels, causing the water level to exceed danger



levels, the second highest level recorded in 30 years in Hinthada. Patheingyi, the Ayeyarwady Region's capital, situated 140 km southwest of Hinthada, recorded danger levels on the 2<sup>nd</sup> of August, four days later than Hinthada, but was less affected by the flash floods from the mountain range than Hinthada (Brakenridge et al., 2017; JICA, 2016).

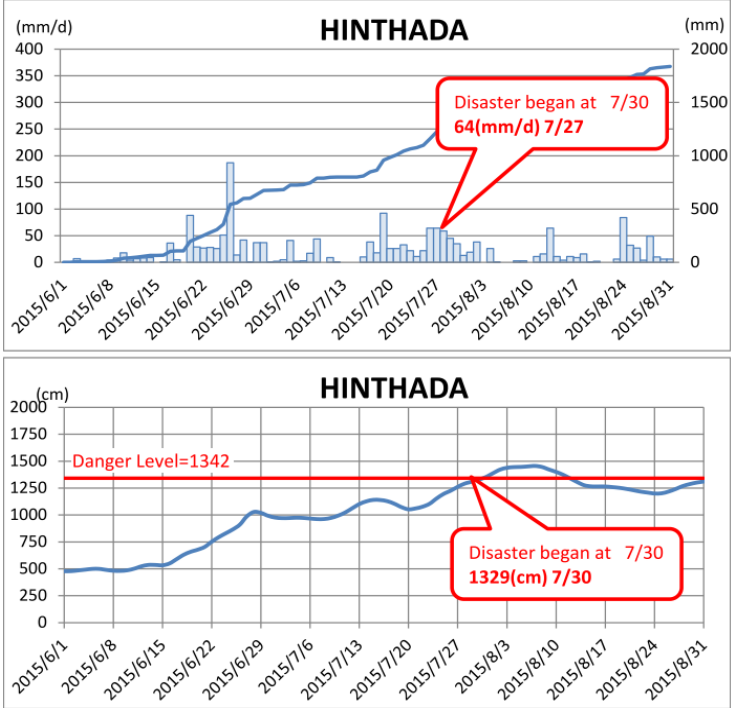
Map 4: Inundated areas in the Ayeyarwady delta, a week apart in August 2015 (Minbuza, 2015).



As can be seen on map 4, 4700 km<sup>2</sup> of the delta was flooded on the 17<sup>th</sup> of August, 2015. The duration of extreme high water levels was between 3-17 days. However, many floodplain areas were inundated for longer periods of time. Media outlets reported that in the Ayeyarwady delta, high water levels were still present in September. Throughout the period, 1.6 million people were displaced, 17,000 homes were destroyed, 132 people were killed, agriculture and infrastructure was largely affected, leaving about 119 million USD in economic damage (Brakenridge et al., 2017).

The failing of protective measures, deforestation, and mismanagement of irrigation have been cited as influencing factors. After Nargis occurred in 2008, disaster management has been high on the priority list of the government's agenda. The Natural Disaster Management Law was legislated in 2013, and after the National Disaster Management Central Committee was founded, to enhance capability of the organization, and support effective joint efforts with other organizations. Although the committee relies on collaborative network, there was no primary lead responder for disaster management. Therefore, the military, as one of the most capable organizations when it comes to capacity to respond, resources and preparedness, plays an important role in disaster management (Zaw & Lim, 2017).

Figure 2 : Recorded rainfall and water levels in Hinthada, Ayeyarwady delta, from June 1<sup>st</sup> until August 31<sup>st</sup> 2015 (JICA, 2016).



§4.8 FOREIGN AID AND DISCRIMINATION

The monsoon season of 2015, was the first large-scale natural disaster, affecting the entire country since Nargis occurred in 2008. In terms of the political playing field, the situation was entirely different than it was just seven years before. In this period, an overhaul of Myanmar’s aid system had taken place, and was still taking place. On the 4<sup>th</sup> of August 2015, the Union government appealed to the international community for support in the response to cyclone Komen. In 2008, a lot of the funding from international actors went through civil society and cross-border operations, because of the Tatmadaw’s refusal of foreign aid. This time, most of the international funding, went through government channels. The new dynamics provided positive outcomes, a more collaborative approach with NGO’s and multi-and bilateral organizations working with the government. There were still a lot of challenges, critiques and forms of mismanagement. One of them being, the reported direct and indirect discrimination of the government disaster response in ethnic states, Chin and Rakhine state (Desportes, 2019). In these states, civil society organizations coordinated the response to cyclone Komen, where the state failed to provide significant support.

## CHAPTER 5: FINDINGS AND ANALYSIS

In this chapter the findings of the research are presented, in accordance to the research and sub-questions. The findings are collected from fieldwork, which have taken place in March and April 2019. The demographic composition of the research areas are discussed, in addition to the themes that relate to flooding for the communities in the delta. Secondary data is used in specific sections of the analysis to build on data that is collected during fieldwork.

### §5.1 DEMOGRAPHIC COMPOSITION THABAUNG TOWNSHIP

The communities where the data collection has taken place, are located in Thabaung township. Bordering Rakhine on the northwest side, the westside Thabaung township includes a mountainous strip which separates the rivers from the Indian ocean. Most of the population of Thabaung township, around 150.000 people, live in the rural, east part of the township. Within the Ayeyarwady delta, the region can be divided into three categories of environmental vulnerabilities. In the lower part of the delta, deforestation of mangroves, salt water intrusion, and is vulnerable to storm surges and flash floods because of coastal erosion, are issues relevant there. The middle part of the delta, where fresh water and salt water is combined, depending on the season, is prone to flooding. The upper delta, where brackish water and coastal erosion is not present but freshwater is, is quite prone to riverine flooding (Ivars & Venot, 2019). Thabaung township, as can be seen on map 5, is situated in the upper part of the delta. The Patheingyi river, one of the main delta branches of Ayeyarwady river, flows through Thabaung, as well as other smaller tributaries. Hpa Yar Ni and Khat Ohn Chaung are situated between the Darka river, a smaller side branch of the Patheingyi river, and between the Patheingyi river itself, as can be seen on the map below.

*Map 5.: The location of the research sites and major embankments and dikes in the Ayeyarwady delta (Ivars & Venot, 2019).*

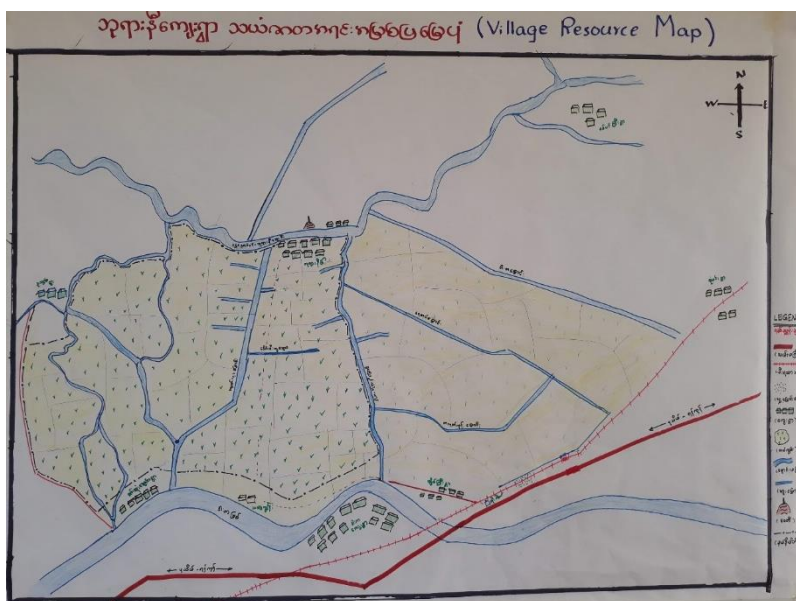




### **Hpa Yar Ni**

The population of Hpa Yar Ni, see map 6, consists of 400 households, and is home to 1400 people. In the 20<sup>th</sup> century, when Myanmar was called Burma, ethnic fighting in the 1950s between Karen and Burmans in the country affected the village. Village elders explained that before the ethnic fighting around 150 households lived in Hpa Yar Ni. After the fighting, 115 households were left. The population in the village experienced a relative amount of welfare before the fighting, and the road to recovery took a fair amount of time. Present-day, Hpa Yar Ni consists of 400 households, where the population is dominantly of Buddhist religion. The majority of the community, between 250 and 300 households are low income households. Between 95 and 145 households are considered middle income households and between 4 and 6 households have a high income. The distinction of whether a household is considered low, middle or high income household, is not based on an exact amount of income. Instead, the possessions and main occupation of a household are the base.

*Map 6: The location of Hpa Yar Ni, within village tract boundaries and its surrounding waterways.*



### **Khat Ohn Chaung**

The village of Khat Ohn Chaung is like Hpa Yar Ni located near waterways. However, Khat Ohn Chaung is situated along the Darka river, a tributary of the Ayeyarwady river. As can be seen on map 7, the village borders Kangyidaunt township. Khat Ohn Chaung is the place of residence for 180 households. Among the households, 100 households have a low income and 50 households have a middle income. Around 20 households are considered to have a high income. Fishing is the primary income source for one third of the households, and farming accounts for two third of the households as the main income source. Secondary income sources in the village, is daily wage labour. A few villagers owned a shop and some women are domestic workers. The gap in income between community members is smaller than Hpa Yar Ni. Over half of the households are poor, but a larger share of middle income households live in the village. A significant amount of houses are made of wooden construction, have bushes and trees on their plots. Of the 100 households which have a low income, around a quarter is situated in the lower part of the village.

Khat Ohn Chaung, as can be seen on map 7, is spatially divided from west to east along the river. Over the length of 1 kilometer, the houses are spread along both sides of the road. Along the stroke of establishments, trees and bushes take up the space between houses. As can be seen on the map below, the lower part of the village, is situated on the east side of the village. Low income households, with fishing as primary income source live along the smaller water way. When strong waves hit the village, the bamboo houses present in that area will be hit first. These houses are not surrounded by

vegetation, which serve as natural barriers that break the strong waves. A consequence of this, is that houses on the east side are more severely damaged than houses which are situated on the higher part of the community, surrounded by vegetation.

Map 7: The location of Khat Ohn Chaung, within the village tract boundaries, alongside the Darka river.



SQ 1: In what way has flooding affected the livelihoods of communities in the Ayeyarwady delta?

## §5.2 LIVELIHOODS

When driving from the former capital of Yangon to Thabaung township, a journey of roughly 5 hours, the contrast between the two settings is immense. Access to the research locations is limited, as the villages are only reachable by boat. The outboard motor of the small fisher boat disturbs the quietness as the boat travels upstream alongside rice fields. After 20 minutes the village of Hpa Yar Ni is reached. It is the second time visiting the village. A prior visit to the village evolved into a community meeting in the monastery. Around 50 community members who were present, expressed the way flooding has impacted their lives, and the same people provide a warm welcome as the boat reaches the newly build jetty.

The villages of Hpa Yar Ni and Khat Ohn Chaung are directly situated near waterways. The main sources of income are fishing and farming, as can be seen in table 2. The population of Hpa Yar Ni, where 80 percent of the households consider fishing their main source of income, has grown over the period of 30 years. Between the '80s and 90's, according to the villagers, the waterways surrounding Hpa Yar Ni contained variety of fish, attracting fishermen to settle in the villages: *"Before 20 years ago, before 2000, it was very easy to get food and catch fish. There was no need to pay much for permits and tax for the river and the streams. Because there were a lot of job opportunities, and the growing household population because of growing generations, the village population grew"* (HYN, Interview 15). Nowadays, the variety and quantity of fish has drastically decreased. According to the villagers, farming provides more stability and more income, compared to fishing.

Table 2: Primary income sources for the households in Hpa Yar Ni and Khat Ohn Chaung.

Primary income sources	Hpa Yar Ni		Khat Ohn Chaung	
	Freq.	Perc.	Freq.	Perc.
Fishing	320	80%	60	33,3%
Farming	80	20%	120	66,7%
<b>Total no. of households</b>	400	100%	180	100%

## §5.3 FISHING TENURE SYSTEM

Fishing generates less income than farming does, because of various reasons, a lot of the low income households have fishing as primary income source. Participants expressed that the fish population has decreased over the last three decades. Fishing rights are hard to obtain, as the fish population is on a high after the monsoon. Poorer fishermen explain that they cannot compete with the tenure owner for fishing rights, leading to an increase in illegal fishing. Myanmar, and the Ayeyarwady delta has three distinguished seasons, a tropical climate Am on the Köppen-climate classification. The monsoon season, where high temperatures and humidity dominate the months of May until the end of October. The dry season starts in October, and ends in April, can be divided into two seasons. The winter season starts in October until February, is categorised by temperatures of 25 degrees Celsius during daytime. During the summer, dry and hot, starts in March and lasts until the monsoon starts, until mid-May, temperatures can easily reach 40 degrees Celsius in the delta. The fishing tenure system is linked to the seasons. The waterways in the delta, surrounding Hpa Yar Ni are up for tenure, as can be seen on

map 6 and image 6. The tenure owner has exclusive fishing rights, starting in October and lasts until January. Right after the monsoon season, the amount and variety of fish species is high. According to the focus groups participants, the tenure owner sells the right to fish from January onwards.

*Image 6: Houses are directly situated near the stream in Hpa Yar Ni.*



After January, the tenure owner sells the rights to fish in the streams to local fishermen, to fish for a fixed period of time. This is around one to two months. The fishermen who cannot afford the rights, fish illegally. Some of the fishermen do not have ownership over a boat, or fishing equipment. Securing loans to buy fishing nets, or having to row their boat instead of having a motor attached to it, plays a role in how much income is generated:

*“The tender winner trying to catch everything and only in the later part of the season, how do you call, in these tradition, the number of catch is already decreasing. At that time they have the permission to catch fish...To have the right to catching fish, they have to buy the right by cash, if they do not have the cash in hand, they have to borrow. To pay the tender owner, they have to borrow from the trader. When they catch fish, they have to sell the fish to the trader. When the trader lends the money, he does not take interest. But, these fisherman have to sell the fish to him. At that time, the price is less than other people. About 500-600 per viss, it is Myanmar measurement. It is equal to 3.6 pounds” (HYN, Interview 10).*

For fishermen, the months of January and February, are important for generating income, if they are able to buy the fishing rights from the tenure owner. The low-income households, situated in the lowest part of the villages, are fishermen. During the months of January and February, in the dry season, it is relatively easier to catch fish. During the dry summer months of April and May, when the water level is the lowest and fish is scarcer, it is by law forbidden to fish. Illegal fishing, mostly takes places during these months. Sometimes, illegal fishing is tolerated by the tenure owner, but fishermen have to abide by certain rules:

*“Some of the tenure owners allow people like me, who don't buy the rights, to fish at that time. But with special fishing nets, like this. With a small net... Some of the fishing nets are for the big fish, some of the fishing nets can catch only small fish. So the owner allows me to fish, but only with the small type of net so I can only catch small fish. Some of the tenure owner never allow for fishing, in their tenure area and period (October - March). Some of the owners allow, but only with the special kind of net for small fish” (KOC, Interview 2).*





Image 7: Fisherman holding a smaller fishing net, he is allowed to use by the tenure owner when fishing.

In other cases, the tenure owner does not sell the fishing rights after January, or put penalties on illegal fishing. Interviewees expressed that they are scared of the consequences of illegal fishing, and what the tenure owner will do. Other people, do take the risk to fish illegally:

*"In here, during the flooding, the tenure owner does not allow for fishing. If they catch fish, the tenure owner will punish them. He will do that by taking or keeping their fishing materials. At that time, some of the households do not have fishing nets. At that time, they go to the other trader. "Please, can you give me some money to buy fishing nets?", as they fish all year illegally" (KOC, Focus group women).*

When May and June come around, and the monsoon rains slowly rise the water level of the rivers in the Ayeyarwady delta, a permit is not needed to fish. However, it is forbidden to fish during the summer months, when the breeding season takes place. During the monsoon season, when heavy rainfall starts, flooding becomes a challenge for households who are dependent on fishing for the primary source of income. Low-income households are sometimes not able to afford a boat, or have a rowing boat, without a motor. The forces of strong winds and waves during flooding can often destroy the engine, or the boat entirely. Leaving fishermen, without a boat and unable to afford a new one:

*"My boat is very small, a rowing boat. A boat without an engine makes it more difficult in catching fish in rainy season, hard work, strong current. Another problem is the fishing nets. Because they are destroyed after two months. At that time, I need to buy new fishing nets, but that costs money. If I have not enough money, I cannot buy it. Another thing is the fishing area, I am not involved in the collective system, so I do not have a fishing area" (KOC, Interview 2).*

#### §5.4 FLOOD DISPLACEMENT

In Hpa Yar Ni, the height difference between the upper and lower part of the village is 6 feet. The lower part of town, is dominated by low-income households, without any trees that could provide protection during storms. When the monsoon season starts, around 50 households living in the lower part of town move out of the village. This happens before the water committee is assembled. Residents from that area, mainly fishermen, express that they move as a precautionary measure:

*"For the migration, they decide it by themselves. Because, they have the experience with the strong waves. They know if the strong waves are coming, they decide to move, because they*

*can't risk it for stay in the house. As you can see, it is a small house, some of the houses there is only 7 to 8 family members living in the small house. So, they can't risk it the big waves, so decide to move" (HYN, Focus group fishermen).*

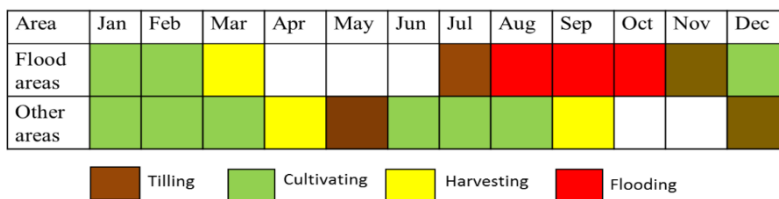
During the two months, when the families are flood displaced, they go to higher ground near the main highroad and railroad, that connects Pathein to Yangon. According to the fishermen, it is safer there, they are more able to catch fish and have, better market access, which is already limited when flooding occurs. Interviewees express their difficulty in adjusting to life there. Staying near the railroad is a safer option against flooding, but people worry about their safety when staying there, because the tents they live in, are closely situated to the road or railroad which can be quite dangerous. When it comes to gathering income for their respective families, family members worry for the ones fishing when strong winds are passing through the delta:

*"They have difficulty to go for fishing because of the force of the wind and the rains. At that time, the rest of the family is worried about the person who goes on fishing, and at the same time the fisherman worries about their family... They are still able to trade the fish during flooding.. They contact with the trader, the trader comes to the railway. The trader has a big boat, he can go there and collect and then send to the towns"(HYN, Focus group fishermen).*

### §5.5 FARMING

Historically, the village was entirely focused on fishing. Hpa Yar Ni was surrounded by dense forest, and some villagers managed farming by themselves. Twenty percent of the households in Hpa Yar Ni, and 66,7 percent of the households in Khat Ohn Chaung consider farming their primary source of income. The main crop that is being grown, are rice paddies. Summer paddies, are grown during the dry season, and wet paddies, after the monsoon. Chillies, pulses, groundnut, sunflower and vegetables, are other important crops, see figure 3. The increase in flooding has put pressure on the farming lands, putting harvests at risk of failure. Farmers expressed, they usually plant paddies twice per year. Drought and increased salinity makes it difficult to plant summer paddy in other parts of the delta. Thabaung township, and the research areas are surrounded by tributaries, but water shortage is an issue for villages located at a distance from the streams.

Figure 3: Cropping calendar for flood-prone areas in the Ayeyarwady delta (Khaing et al., 2019).



Under military rule, there were certain policies and requirements that farmers were strongly advised to follow. During the 1990s, the cultivation of summer paddy was one of the agricultural strategies, to promote the cultivation of other crops. During this time period, the military regime reallocated agricultural land, often to people with military connections. If a small-scale farmer did not meet the targets the regime had set for the cultivation of summer paddy, the land could be confiscated and given to larger corporations (Ivars & Venot, 2019). The effects of this policy, can be seen in the production numbers of summer paddy. In Thabaung township, the production numbers of summer paddy exceed that of monsoon paddy, see table 3.

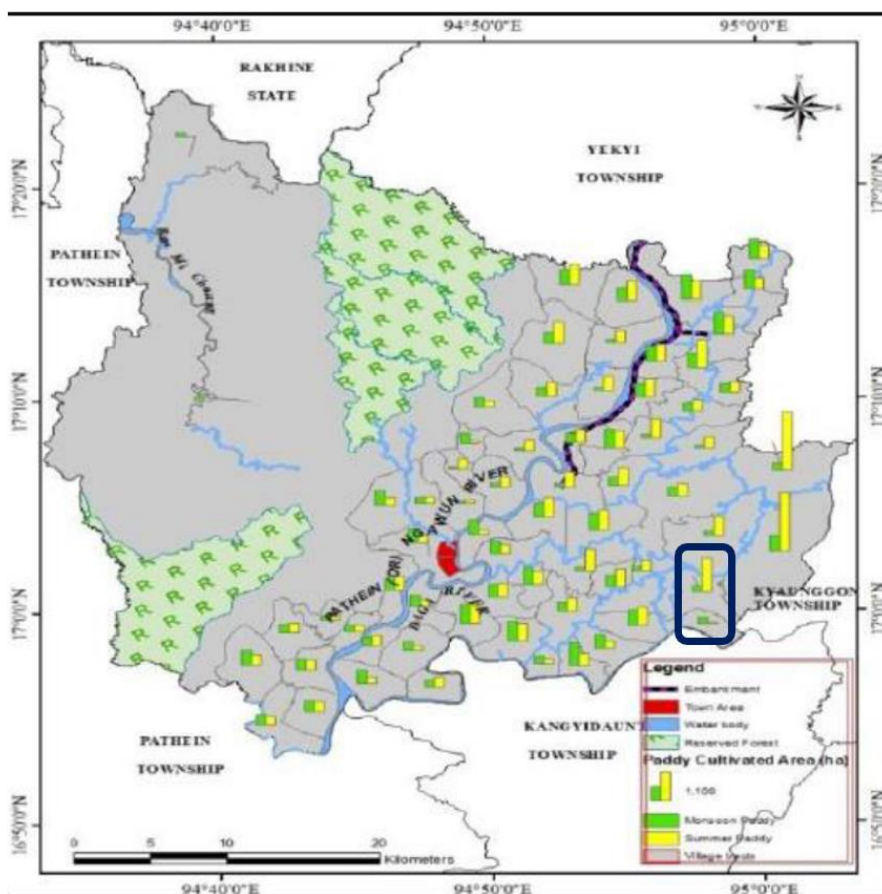


Table 3: Cultivated paddy areas and production in Thabaung township between 2010 and 2017 (Soe, 2020).

Years	Monsoon Paddy Cultivated Area (hectares)	Monsoon Paddy Production (basket)	Summer Paddy Cultivated Area (hectares)	Summer Paddy Production (basket)
2010-2011	34,531.1	6,241,178	34,525.9	7,575,226
2011-2012	26,617	4,378,333	26,713.8	5,368,484
2012-2013	19,759.6	3,542,080	35,346.8	7,181,942
2013-2014	21,748.5	3,910,971	35,071.4	7,157,159
2014-2015	27,584.2	5,252,566	33,348.5	6,871,439
2015-2016	27,543.7	5,260,496	35,865.2	7,511,320
2016-2017	27,543.7	5,770,564	36,743.6	9,068,260

It is unclear to what extent the farmers in the researched villages were affected by the policies during the 1980s and 1990s. Villagers in Hpa Yar Ni expressed that during the 1980s, a company cleared the land surrounding the villages of trees and bushes. According to the villagers, the company had monopoly over the area, and prepared for farming to take place. The vegetation around Hpa Yar used to be forest, nowadays, there are hardly any trees present. Farmers expressed that flooding extensively influences their livelihoods. Water covers the flood plain in Thabaung, and villagers expressed that flooding has affected the ability to plant rice paddies, twice per year, the variety depending on the season. Summer paddy is cultivated during the months February until May, see figure 3. Monsoon paddy is usually planted in June and harvested in October, when the monsoon season ends.

Map 8: The distribution of monsoon paddy (green) and summer paddy (yellow) per village tract in the research villages (blue) in Thabaung township in 2018 (Soe, 2020).



## §5.6 SUMMER PADDY CULTIVATION AND MECHANIZATION

The cultivation of summer paddy is for the farmers in Hpa Yar Ni and Khat Ohn Chaung, an important source of income. A variety, which is grown during the dry summer season, is less water intensive, making it suitable to be grown prior to the monsoon season. Throughout the delta, drought and increasing salinity levels affect farming. The eastern part of Thabaung township, as Hpa Yar Ni and Khat Ohn Chaung are situated, see map 8, has the lowest elevation levels of the township, between 1 and 3 meter (Soe, 2020). Because of the location in the upper delta, salinity levels are relatively stable during the dry season. Therefore, the eastern flood plain of the township a favourable location for summer paddy. As Hpa Yar Ni and Khat Ohn Chaung are surrounded by waterstreams, small-scale irrigation systems are used to supply the summer paddy with a constant flow of water:

*“When the paddy growing season starts, the farrowing process is done by the machines. At that time, the work of the laborer is only spreading the seeds. This is the first one, spreading the seeds. Then, irrigating water. During the time of harvesting also...um, one more thing is spraying chemical fertilizer or spraying pesticides. At the time of harvesting it is already done by the machines and the work is only carrying or something like this...These processes do not need many people” (KOC, Interview 7).*

Labourers in the villages expressed that mechanization has decreased job opportunities within the village. Prior, farmers employed labourers with the tasks of carrying seeds, transplanting and harvesting. The introduction of machinery, makes the cultivation of rice less labour intensive:

*“The main reason is because of using machine. That also depends...according to her opinions, how do you call, people started to use reaping machines... When the farmer started to use reaping machines, at that time, technology is not yet advanced very well. That’s why people need to clean or something like this - people still have some work. Nowadays, when this reaping machines...how do you call..it is already when they harvest the paddy, it is already cleaned and everything is ready” (KOC, Interview 7).*

Farmers priorly employed several casual labourers for the time period of five months, to cultivate rice. According to villagers, the employment of casual labourers has been cut, due to increasing machinery use. Nowadays, a farmer generally employs one casual labourer during the time that rice is being cultivated, for the management of 15 acres of land. In Khat Ohn Chaung, where 66,7 percent of the households consider farming their main source of income, about 30 casual labourers have stable employment farming. During this time period, farmers and their family members work on the farming lands, and build a small tent, to reside on the farming lands. Farming lands within the village tract can be quite a distance from the village, with farmers stating it is more convenient building a tent on the lands, than to travel daily from the village to the farming lands:

*“The first thing is for saving time, they living here, another thing is in the fields...they are so many pests. So to take of the situation, um, they live in the farming area. Sometimes it is not similar living in the village and living in there. Because...staying in the farm areas because at night most of them, some kind of insect- mosquito, or sometimes we call it “Pya Oo.”It is a small insect, if he bite, there is a big largest mark. And also...sometime the wind, if the wind is strong they have difficulty sleep or something”. (KOC, Focus Group 6).*

## §5.7 MONSOON PADDY CULTIVATION

As rice is cultivated for two cycles, flooding has a large effect on the cultivation of monsoon paddy. Going hand in hand, the rain that the monsoon brings, eventually brings soil nutrients through flooding onto to the floodplains of the Ayeyarwady delta, where it acts as natural fertilizer to the soil. This is exactly where one of the problems lie. The main issue in Thabaung township is the amount sedimentation in the rivers and streams. A large influx of sedimentation can enter the area, because of deforestation in West-Rakhine, which causes a lot of erosion. The eroded sediment, is because of

and through flooding, transported to the rivers in Thabaung township. Over time, a lot of this sediment builds up, making the riverbed more shallow and causing the riverbanks to be inundated quite and according to Soe (2020), the streams in Thabaung should be dredged to deepen the stream bed. This would reduce the intensity of flooding to an extent, as the discharge of water can increase (Anthony et al., 2019; Soe, 2020).

In Thabaung township, farmers expressed that flooding has affected the cultivation of monsoon paddy greatly. As the flooding has increased in frequency and intensity, it has had a negative effect on the cultivation of monsoon paddy. The main rice variety that is being cultivated within Myanmar, is usually planted in June and harvested in October. The paddies require an intensive amount of water in order to be cultivated, yet inundation which exceed a certain water level, causes damage. Over time, this has affected the necessary requirements for planting monsoon paddy. Flooding in Thabaung township can occur between 1-3 times per monsoon season, and can last up to three months. Because of exceeding water levels, farmers in Thabaung township are only able to start planting monsoon paddy after water elevation levels drop. Farmers noted, that over the last two decades, it has occurred frequently that this will take place at the end of September or in October. Only then, farmers can start planting monsoon paddy, while this usually takes place in June or July, at the beginning of the monsoon season. As a result, farmers have a shorter time span to cultivate monsoon paddy. This affects the yield, quality of the harvest and excess of sedimentation can damage the fields.

#### §5.8 LATE MONSOON WITHDRAWAL AND FLOODING

The changing seasons in Myanmar, are clearly distinguished from one another. Farmers explained that the unpredictability of a third flood, puts a lot of pressure on the ability to grow monsoon paddy and the environmental and financial implications this has. Usually in the Ayeyarwady delta, the water levels are the highest in August, and slowly go down before the end of the season in October. As a result of the changing climate in Myanmar, the onset of the monsoon is delayed, as well as the withdrawal. For the farmers, the unpredictability of a flood occurring at a late stage in the monsoon season, can have detrimental effects: *“Normally, in this area, only at the end of the rainy season they started to grow paddy. This year, at the end of the rainy season they grow paddy and unexpectedly the flood come again... They only lost this year (2018). Other years the water level decrease, decrease, decrease and will not come back” (HYN, Histogram)*. In Khat Ohn Chaung, the flood in late October of 2018, had ruined the harvest of the cultivated paddy too: *“They talk about destructive rain. It was raining for 5 days in a row, and the numbers of paddy decrease. About 4000 basket decrease for 200 acres” (KOC, Interview 7)*.

Considering the changing monsoon pattern, the amount of monsoon paddy that is cultivated in Thabaung township, has decreased significantly. Village elders reported that while flooding, is considered part of the monsoon season in the delta, it did not occur that often as it does now: *“Before 1980, floods were rare, it would happen sometimes, every 3-5 years. After 1980, the building and breaking down of embankments, flooding has increased in the village. The military government has made canals to increase the productivity of farming” (HYN, Interview 15)*.

Farmers reported, that in July when the water level starts to rise to flood levels, about 75 percent of the farming areas in the village are covered by water. In August and the first half of September, the water levels are above 10 feet, according to the villagers, see table 4. In September and October, water levels drop gradually, until it becomes into a favourable condition for paddy cultivation. Farmers argued that 66,7 percent of the farming lands were still slightly inundated in October. Farmers prepare the land, and plant the monsoon paddy. It is around that time period, that an unpredictable late and intensive rains can damage the paddies, and cause water levels to rise again, to further damage the harvest.

Table 4: Flooding frequency and water levels in 2015 in Hpa Yar Ni (HYN, Interview 13).

Flooding frequency	Water level (feet)	Months
1	13 ft.	June and July
2	10 ft.	July and August
3	7 ft.	September and October

As can be seen in table 5, the damaging of paddy fields occurs extensively, and on a yearly basis. Having lost income due to the destruction of the paddy harvest, farmers argued that it can take up to three years to recover financially from the destroyed harvest. It leads to farmers re-thinking their decision to cultivate monsoon paddy, which is visible in the lowering numbers of wet paddy cultivation. In the long run, farmers have a lowering rate of income. Factors as, size of land, ability of growing other crops, amount of debt, determine whether the farmers within the community are able to adapt to the changing situation. Investments that small-scale farmers have to make, in order to cultivate paddy, are for instance, taking out a loan to buy fertilizer and pesticides. Losing a harvest to inundation, and having fields being damaged by flooding, creates more debt for farmers.

Table 5: Cultivated land and destroyed paddy in Thabaung township 2004-2016 (Soe, 2020).

No	Years	Village Tracts	Flood		Destroyed Hectares		Recultivated Hectares
			Paddy Field	Hectares	Paddy	Matpe and Petisein	Total
1.	2004-2005	47	125	2,333	2,333	-	2,333
2.	2005-2006	-	-	-	-	-	-
3.	2006-2007	56	131	5,998	4,374	1,620	5,998
4.	2007-2008	53	129	6,664	2,496	4,167	6,664
5.	2008-2009	45	130	4,167	2,142	2,025	4,167
6.	2009-2010	46	106	2,155	1,367	787	2,155
7.	2010-2011	51	114	2,627	2,168	458	2,627
8.	2011-2012	22	48	300	196	-	196
9.	2012-2013	42	94	3,064	3,064	-	3,064
10.	2013-2014	38	88	1,887	320	-	320
11.	2014-2015	45	176	1,641	-	-	-
12.	2015-2016	3	138	2,941	2,941	-	2,941
13.	2016-2017	36	107	2,733	2,733	-	2,733

Source: Agricultural Departement, Thabaung Township

### **Chemical fertilizer and pesticides**

The use of chemical fertilizer and pesticides, or rather the overuse of these products, is a large problem within Myanmar. The quality of the soil and yield is greatly affected by this. Lack of the availability of viable information, better quality products and reasonably priced, are part of the problem. Yet, fertilizers and pesticides containing harsh components are often illegally imported from China. The low quality and chemical fertilizer and pesticides, are cheaper than other local fertilizers on the market. It is unclear to what extent chemical fertilizers and pesticides have or are been used by the farmers in Hpa Yar Ni and Khat Ohn Chaung, but villagers are aware of its implications on the environment:

*“They become aware that since last year, they experience the shortage of the fish. The reason that they think is that because of the government irrigation system, and the use of chemical fertilizers in the farm”. (KOC, Focus Group 5).*

### **§5.9 SECONDARY SOURCES OF INCOME**

Increasing debt, harvest loss and income loss because of fish depletion are common reasonings when asking villagers, about needing several income sources. For small-scale fishermen and farmers, their

main profession yields not enough income to sustain their families. As job opportunities have decreased, a lot of households need secondary income sources:

*"I am employed in the farm by my parents. My main income is fishing, this one is secondary. I buy the right of catching fish from the tender winner, so I also catch during the time of free catching... October, November, December, January. For four months working the farm. (talking). During the rest months, for the other months, fisherman. It depends on the situation. I cannot go out for fishing every day" (KOC, Interview 4).*

Aside from fishing and farming, casual labour is an important source of income for the majority of households. Availability of labour depends on the season. Farmers require more labourers during harvest and planting season. Other times, construction work in the village, requires casual labourers to do carrying of construction materials, and provide construction work for a fixed period of time. In the villages, over the period of four years, the construction of a school building with a shelter function, a concrete road connecting all parts of the villages as can be seen in image 8, and electricity lines in the planned future, provided casual job opportunities as part of the World Bank's Community Driven Development (CDD) project.

*Image 8 : Concrete road in Hpa Yar Ni, as part of the CDD project.*



Casual labour is not a stable form of income for villagers, in terms of salary and job security. The salary that a casual labourer receives per day, can fluctuate. When a construction in the village takes place, and casual labourers are needed for carrying materials, they will not be paid by the hour but by the quantity of materials, and divided by the amount of labourers who have worked that day: *"For the women, they cannot shoulder, or they cannot carry the heavy cement bag. They only participate in carrying sand and in gravel. On that occasion, there are many women works together... About 40 women. At that time, they do not get much. About 1,500-2000 kyat (€1)" (HYN, Focus Group 3).* The amount of salary a worker receives, can fluctuate because of that. According to villagers, a person or company will determine the amount of salary in total the labourers will receive depending on the activity. The more labourers participate in an activity, the more they have to divide the same amount of money.

#### §5.10 TEMPORARY MIGRATION

Casual labour is however, not a sustainable flow of income. It is demand and seasonally driven, a construction project can provide a low, but stable income for a period of time. Farmers do not need casual labourers any more than two weeks at the most per year. With job opportunities decreasing, or because of income loss influenced by flooding, workers turn to temporary migration for income



diversification. Mawlamyine, the capital of Mon State, is a frequent destination for men in the village, as it is a hub for heavy construction work. Women in turn, go to garment factories in more closely located Pathein, and Yangon:

*“The work in Mawlamyine is suitable for only the men... For Mawlamyine, they prefer the younger one. If they are 40, or over, they will not be accepted... It’s a kind of hardworking, yes. They need to be strong enough. They are carrying heavy loads, such as cement or food items. Infrastructure, how do you call, construction materials... The girls who have to go and work in the garment factory also, they have to show their identity cards and their age limit cannot exceed 25 years” (HYN, Focus Group 3).*

In Hpa Yar Ni, about 12.5 percent of its inhabitants, temporarily migrate to other places in the country for generating income. Out of the 180 migrants, 40 women go to Yangon and Pathein, 40 men go to Yangon, and the majority of 140 men, go to Mawlamyine. Labourers stated, that when they temporarily migrated to one of the construction hubs in Mawlamyine, the principle of demand, influences job security. If there is demand, there is a place to work, but if there is no demand, there is no work. Focus group participants argued, that if they were to migrate temporarily out of the village to generate income, there is no guarantee that they will find a job that provides that. A few casual labourers said, that they had to return to the village after not being able to find a job. Nonetheless, the majority of the focus groups participants agreed that the likelihood of generating income in the construction industry in Mawlamyine and garment factories in Pathein and Yangon, is higher than generating income in the village. It is a financial risk, as some returned workers reported they were not able to pay the loan back, which they had used to cover travel expenses, after not finding a source of income. Instead of a loan, other workers used their property as collateral in securing finances:

*“When he gets there, he is waiting for the situation, one day he will be able to work. Waiting, waiting, he does not get any chance. That’s why he work as a daily wage worker and the situation is not good. Regarding with his transportation expense, he needs to pawn his mortgage or he needs to pawn his cooking utensils...something like this. According to him, he did not borrow any money but he pawns the property he has and went there. When he get back, he needs to borrow money from this village. When he gets money from here he can come back (HYN, Interview 12)”.*

#### §5.11 FLOODING AFFECTING LIVELIHOODS

The communities in Thabaung township are greatly affected by flooding. The fishing and farming communities experience the negative impact flooding has, in different ways, in regard to their livelihoods. Fishing, farming and casual labour are the main sources of income. As a direct result of an increasing frequency and intensity of flooding, farmers have experienced damage to the cultivated paddies, and it has occurred once, that a harvest was destroyed by a late third flood. Because of this, the majority of farmers are not able to cultivate monsoon paddy, and are dependent on other seasonal crops to generate income. Long term, the financial risk it takes to cultivate agricultural land has increased. The income that farmers generate on a yearly basis, will decrease, and the risk of being in debt, increases.

In comparison, agricultural activities generate more income than fishing, thus farming is seen as a more stable source of income by the majority of people in the villages. Flooding affects households with fishing as main income source greatly. In the tender system that is used, fishermen are not financially able to compete with the tender owner. The owner employs a share of fishermen in the village, who sell their catch for a fixed price to the owner. The other option, is buying parts of the stream for a period of time, from the owner, after the latter has exclusively been fishing the streams after the monsoon season. Small-scale fishermen, are not financially able to go for that option, thus engage in illegal fishing or rely on the tolerance policy of the tender owner.



The fish population has decreased over the last decades, influenced by overfishing and climate change among other things. In terms of flooding, the increasing intensity and frequency, increases the likelihood of damage to boats, fishing nets and mostly, poses a danger to the physical security of fishermen themselves. Small-scale fishermen often have small rowing boats, and the strong winds and waves pose a real threat, as well as. The bamboo houses in the lower part of the villages, where most of the inhabitants are small-scale fishermen, are inundated for longer periods of time and are not safe. Households in that part of the village, move to higher ground near the railroad, a 20 minute trip by boat from the village. Villagers argued, that it is safer to fish near the railroad than staying in the village. Food is insecure for these families, and occasionally, they do not have purified drinking water. Overall, the input of costs for fishing is high, as a result of flooding. Fishermen argued, that they have to replace fishing nets after the monsoon season, and they risk severe damage to their boat and motor, as well as their own safety. Given that fishing generates less income than farming, most small-scale fishermen have secondary sources of income. Farming and casual labour are secondary sources of income, and temporary migration has increased significantly over the last five years. Often citing, increasing debt, influenced by flooding, as one of the main motivations to temporarily migrate for generating income.

SQ 2: How have people adjusted their livelihoods and communities to deal with flooding?

### §6.1 INCOME DIVERSIFICATION

For the majority of the households, flooding has greatly affected the way in which income is generated. For the percentage of high and middle-income households, 40 percent in Khat Ohn Chaung, and around 33 percent in Hpa Yar Ni, flooding has immense impact on their livelihoods as well. Most of these households, have larger areas of land in their possession and more financial room to invest in resilient housing, or explore other options to generate income. More quality seeds, organic fertilizer, machinery, livestock, or other crops that are more suitable to grow during the dry season, are examples of that. Income diversification, as a strategy to adjust to the effect of flooding on livelihoods, is a strategy that applies for every household in Hpa Yar Ni and Khat Ohn Chaung. The difference between the low-income households, and middle and high-income households is, to what extent this applies. Financial room, allows to take risks in exploring other options for generating income. Additionally, they have a lower risk of having large amount of debt, if for instance, flooding causes a harvest to be damaged. A higher-income family explained, how severe flooding has affected them, but they experienced little financial trouble:

*“In the flood situation in 2004, they lost the rice, about 2.2 million kyat (€1300) worth of rice. In 2016 they lost about 300.000 kyat (€180) worth of rice during the 2016 flooding... But when the flooding came at that time, the water was too fast. He did not have enough time to move the rice to the higher level. For making another level was not possible because it already reached the window... No he did not get into trouble (laughs), because he is already rich, in comparison to other villagers (KOC, Interview 3)”.*

The low-income households diversify their income sources as a strategy to adjust their livelihoods to deal with flooding. However, the drivers that are behind that strategy, are often forced. Numerous households reported that the direct, and indirect effects of flooding, has led to debt. Decreasing job opportunities, lowering incomes, and high costs that are connected to flooding, impact small-scale fishermen, farmers and casual labourers especially. Temporary migration, as a strategy to generate income, has been increasing over the last ten years.

### §6.2 FLOOD DISPLACEMENT

Of these strategies, two distinctions can be made. Firstly, the small-scale fishermen in the lower part of the villages, are displaced for a period of 2 to 3 months. They are flood displaced, but partially this is part of a strategy to adjust to flooding, with the financial means that they have.

*Image 9: Houses in the lower part of Hpa Yar Ni (Si Thu Htun, 2019).*



In Hpa Yar Ni, the height difference within the village is 6 feet. The water level in the houses in the lowest part of the village, all of which are low-income households, will reach the living floors of the houses much earlier than the houses in the other parts. As image 9 illustrates, the houses made of bamboo are on stilts. Water levels can reach up till 15 feet in August in Hpa Yar Ni, leaving the houses completely covered by water and unliveable. As the pictures below show, the water levels often reach

*Image 10: Houses in the middle part of Hpa Yar Ni during the monsoon season (Si Thu Htun, 2019).*



just below the living floor. The families in the lower part of the village, therefore decide to leave Hpa Yar Ni, prior to their houses being flooded. In total, about 100 households reside near the higher ground at the railroad. They start to move when the water levels are about 6 to 7 feet:

*“For the migration, they decide it by themselves... Okay, when they migrate in the new place, they feel secure for the life. But it’s not safe, when raining or strong wind, because it is just a tent. For their food and livelihood, they said it is okay because they can also make fishing at the railroad.. Sometimes if the donor comes, they get the purified water, but when they don’t get, they use the water from the river ” (HYN, Focus Group 2).*

The small-scale fishing households, argue that it is safer to fish and to stay at the higher grounds near the rail road. Some of the fishermen have lost their boats due to the damage of flooding. It is dangerous to fish in the open waters during flooding, due to wind, waves, and whirlpools, especially for small rowing boats. According to the fishermen, staying near the railroad, allows for more protection from the wind and waves. As can be seen in pictures 9 and 10, the bamboo houses provide little shelter from the storms and water. To save costs, and to ensure that the houses are not completely damaged after every monsoon season. The people leaving for the higher ground, take the house apart. The roof, and walls made out of leaves will most likely not survive the weather conditions during the monsoon season, and are taken apart, leaving only the bamboo frame. It takes three to four days to prepare this, before leaving the village. From these materials, they build a small tent near the railroad. One of the issues that the families struggle with, is food insecurity. Most of the households have access to plain rice, but access to vegetables and meat is very limited. During this time, families have to ration. Three meals a day, is cut back to one meal a day. Furthermore, it can occur that households do not have access to purified drinking water. In that case, they take water from the river, use a purifying stone to filter out the sand, boil the water, and use that to drink.

The families residing in the lower-part neighbourhood, decide together, when the best time is to leave, and organize together the transportation to the higher ground. In Hpa Yar Ni and Khat Ohn Chaung, there is a designated Water Committee, in which the fire brigade plays an important role in the transportation of residents to safer locations. However, the households in the lower part, have to organize the transportation, and the associated costs themselves. According to the residents, the water level is not high enough yet in other parts of the village, for the Water Committee to be formed yet, leaving the families who live in the lower part, and have to leave first, without direct support from the Water Committee. Half of the population of Hpa Yar Ni, is flood displaced. 100 households go the

rail road, 70 households take shelter in the monastery and the school, and the rest of the 230 households stay in their house. Out of the households who are able to stay in their houses, some are able to reside in their house during the day, but use the school building or monastery as shelter to sleep, before returning to the house the following day. Others houses are situated on higher ground within the village, where a 6 feet height difference, makes a difference in whether the water level reaches the living floor or not. Households who's income sources are less affected by flooding tend to stay in the village. The places where people seek protection are dependent on where their source of income is situated, and the resilience of their house. The worst flooding Hpa Yar Ni experienced, was in 2015. During this year, 180 households went to the higher ground near the rail road.

### §6.3 TEMPORARY MIGRATION

The secondly, the other strategy to income diversification is temporary migration. This is a trend, which has started to increase since 2014. For the majority, the summer months of March, April and May when job opportunities are low in the villages, is when households seek to generate income elsewhere in the country. In this time, the harvest of the summer paddy has ended, and there are little opportunities for small-scale fishermen, farmers and casual labourers to generate income. The job opportunities that are available in Mawlamyine, Yangon, Patheingyi and Hpa-An, destinations where migrants go to, are intense physical labour. Some families go together, where there are job opportunities for both the men and women. Others, send remittances to their families back, and return before the monsoon season. Frequently, one of the main motivations that is cited, is economic distress: *"The main reason is he needs money for food security. At the same time, he also needs money to rebuild his house (after flooding). Because, his family has to still with his parents. His family does not have their own house right now"* (HYN, Interview 12). The intense and physical labour generates more income for small-scale fishermen and farmers. Through personal connections, the residents of the villages came in contact with people who had experience working in the construction industries in Mawlamyine.

Residents from the villages, mainly men, have started working there during the summer months, and send back remittances, since 2014: *"Situation of the work is better than here. But the income depends on the workload. It is not normal. He also tries to send back money once a month, something like this. About 50,000 kyat (€30)"* (HYN, Interview 1). While this strategy of income diversification allows households to generate more income, this does not go without challenges. Migrants reported that an increased debt, often cited as one of the main motivators, combined with an uncertainty of job opportunities, and physical health issues as a result of the intense labour, is very distressing:

*"When he was working in Mawlamyine, the workload is very high. As I said before, they cannot rest as they like. According to the demands of the workload they have to work day and night. And when they are staying there the spending accommodation and food is very high. They are very full of stress, at the same time they worry about their families living in this native village. That is why according to his experience, mentally upset or distressed"* (HYN, Interview 15).

Some migrants cited, that in order to go to these industry hubs as Yangon and Mawlamyine, they used their property as collateral or a small loan, to cover for the transportation costs.

### §6.4 DEBT

According to focus groups participants, debt is an issue that all households struggle have in the villages: *"Even the monk has debt (laughs). Everyone is in debt... 20 percent interest rate is normal"* (Focus Group 3, HYN). The quote illustrates the situation in one sentence. Almost all of the inhabitants in the villages, has debt. The difference is, to what extent debt influences the decisions families have to make to generate income, and adjust to flooding, which leaves little financial room. High-income households from the village, and neighbouring areas, are able to act as lender. The lesser the income of the household is, the higher the interest rate. A twenty percent interest rate is considered 'normal': *"Even 20 percent is still difficult to borrow from them. If they do not trust, they cannot.. They do not lend. I*

mean, they cannot get lesser interest rate than this. Even with this rate, it is difficult to go to rich people and get money. For example, I need money and go there. But he doesn't trust me, I cannot get" (HYN, Focus Group 3). According to the residents, about 70 to 80 households cannot get a loan in Hpa Yar Ni, the most vulnerable households. In the past, this has led to disputes within the village. In this case, the village administrator acts as negotiator between both parties and unsolved cases go to the township court.

The contradiction is clear, middle-income households are able to obtain a loan at a lower rate, around 5 percent. The amount of debt low-income households already have, which they are not able to pay back, will only increase as a result of these loans with extreme interest rates. Costs that are related to housing and people's livelihoods are high:

*"The main reason of going to Mawlamyine is, how you call, to settle the debt. Once the machines in the boat was stolen... The motor yes. Was stolen, and when he needs to buy a new one he needs to borrow money from others. (Talking). Yes, it costs more than 20 leks, about 220,000. When they try to borrow from others, they have to return about 35- 350,000s. More than 30 leks. (350,000k). Including interest. This one is how you call, loan amount. When they return" (KOC, Interview 9).*

§6.5 HOUSING

The impact flooding has on housing, is enormous, as is the financial impact. The population of Hpa Yar Ni used to be smaller, around 150 households in the 1950s. At that time, the residents lived on the higher grounds, now the west side of the village. With an increasing population, the village expanded to the east side of the village. That meant, that people moving to Hpa Yar Ni, had to build their house in the lower part. The west side and higher part, is mostly inhabited by middle and high income households, and lower income households who have been living there for generations. The increasing frequency of flooding and the increasing water level during flooding, in the severeness is has affected Hpa Yar Ni and Khat Ohn Chaung in this form, is a development of the last decade. In the current form flooding takes place, the water level reaches houses. As can be seen on table 6 below, the water levels in Thabaung township during flooding are very high. Village elders explained:

*"When flooding occurred 20 years ago, the water level did not reach the first level of their house, but just below. When flooding was present, they could still stay in their houses as they do not reach the living floor. Now, the water level comes higher, especially with strong waves, where the lack of bushes does not protect them from the strong waves. This day, the people in the village cannot stay in their house and move to the higher place near the railway" (HYN, Interview 15).*

Table 6: Highest water levels (ft.) recorded in Thabaung township between 2004 and 2016 (Soe, 2020).

No	Year	Highest Water Level
1.	2004	22.75`
2.	2005	18.50`
3.	2006	18.60`
4.	2007	22.00`
5.	2008	20.30`
6.	2009	18.95`
7.	2010	18.40`
8.	2011	19.70`
9.	2012	21.00`
10.	2013	20.25`
11.	2014	19.15`
12.	2015	22.25`
13.	2016	22.40`



Middle and high income households are able to invest money into more resilient housing. Materials as concrete, timber, or a combination of concrete poles and wooden constructions, make up the more resilient houses, which increases the longevity of the houses. Cement and wooden constructions can last up between 15 to twenty years, according to the villagers. The majority of the houses on the west side of the village have wooden or concrete poles, which are more resilient against strong waves. On the east side live the low income households. Their houses are made of bamboo. Because of the strong waves and winds which occur during flooding, affects the longevity of the houses.

*Image 12: On the left side, low-income bamboo houses in Sit Pin Gyi. On the right side, middle and higher income houses in Hpa Yar Ni (source: author).*



Low-income households in the east side of the village have to rebuild their bamboo houses every two-three years. A bamboo house used to be rebuilt every five to six years, before waves would reach the living quarters. Additionally, villagers explained there is a limit to what length bamboo stilts can be used. Priorly, the stilts were not as high, and because of flooding, they had to make the level of the living floors higher, as can be seen on images above. When flooding starts to reach the living floors of the houses, see image 13, people make a second floor within the small bamboo house. As rebuilding the bamboo houses in itself is a large investment for the low income households, investing in more resilient housing is not an option:

*“It can be built in three days, it does not take very long. But, find enough money to buy bamboo, if they can, they buy that first. The other villagers support the rest of the house, with the help with other they build. According to him, it costs about 200.000 kyat (€120) to build the house. Material costs will be 100.000 kyat (€60), labour costs are the rest. Some of the villagers volunteer and help” (HYN, Interview 6).*

Because of the height difference in the Hpa Yar Ni and the type of housing, the effect of flooding can differ in severeness. The poorer people in the lower part of the village are the most vulnerable to flooding. Especially, because the costs of repairing are high for these low-income families. Additionally, because of their location within the village and the materials used, the likelihood of flooding damaging their house, multiple years in a row, is very high. Take into account, the interest rates of 20 percent, low-income households have to pay in order to get a loan. Down the line, for a lot of households it is virtually impossible to escape the cycle of debt, and to invest in more resilient housing.



*Image 13: The water level reaches the first flooding during flooding Hpa Yar Ni (Si Thu Htun, 2018).*



In Khat Ohn Chaung, the construction of the houses were for the majority made out of wooden constructions, or combinations where cement poles would support a wooden construction, see image 14. Where Khat Ohn Chaung is surrounded by bushes and trees, to serve as a natural protection barriers, see image 15, Hpa Yar Ni does not have such protection surrounding the village anymore. According to the residents, because of the strong winds and waves, young trees are not able to grow bigger anymore, as they do not take root.

*Image 14: A considered medium to high-income household with cement poles and wooden construction in Khat Ohn Chaung (Source: author).*

The two research villages had different locations, as Hpa Yar Ni was located lower than Khat Ohn Chaung. In the latter village, there were significantly less reports on damage to houses in comparison to Hpa Yar Ni. Over the last decade, half of the households within Khat Ohn Chaung, were able to partially invest in what they considered more resilient housing. Because of difference in height between the two locations, the households in the lower part of Hpa Yar Ni, leave for the rail road, at the end of July.



Image 15: A bamboo house surrounded by natural protection barriers in Khat Ohn Chaung.



#### §6.6 CULTURAL AND RELIGIOUS EVENTS

During the months which flooding takes place corresponds with important religious and cultural activities. The monsoon season plays historically and culturally meaningful role, an prime example is Thingyan, marks the start of the new year according to the Burmese calendar. Just before the rain season is about the start, Thingyan is celebrated by throwing water. During the monsoon season, important religious activities as Waso and Thadingyut take place in months of August and October. According to the villagers, flooding prevents them from celebrating these important religious holidays, or they take place in a sober form. The communities in the Thabaung township hold close relationships with its members. Flooding intervenes with the ability to celebrate important religious and cultural activities, for all members of the community, and to celebrate this together: *“Because the water level reaches to the monastery. In that case, they do not hold any festivities. In addition, people are separated in the community as some are here and migrants are at the higher place. Sometimes they make a brief festivity. They just say that when they are at a higher place they miss the chance to celebrate, so they thought that is difficult”* (HYN, Focus group 5).

The impact of flooding leaves a large footprint on communities viewed from a collective perspective. The quote above illustrates how important cultural and religious events are toned down, and celebrated with a part of the community not present. When it comes to resilience of people, and dealing with the aftermath of natural disasters, it is equally important to take community structures into account when analysing the effect it has people, as individuals and as members of a community. In the context of Myanmar, where decades long, people were prohibited from organizing themselves collectively under military rule. Internal conflicts, poverty and social inequality are one of the main social challenges that is present in today’s society. Taking this into account, addressing natural disasters collectively can be sensitive and politically challenging, on different scales. The communities of Thabaung township expressed that the change to a semi-civilian government in 2011, and specifically after the NLD government took office, has created more room for formal organization on community level. Considering the negative impact of flooding over the last two decades, it impacts the resilience of communities. When formal organization is restricted and sensitive, how can communities implement anticipatory, absorptive and adaptive measures effectively? The communities in Thabaung expressed that while informal organization did take place in dealing with flooding, they experienced many limitations, and still do.

SQ 3: What kind of community initiatives can be identified in relation to environmental hazards?

### ***Community structures***

What community structures are present, formal and informally, and what does the effect of flooding have on these structures? This question will be addressed, in order to get an overview of what community structures are present in the villages of Thabaung township. One of the limitations in this regard, is figuring out the extensiveness of social hierarchy, and how it plays a role in how community structures are organized and who participates. Myanmar is a society where social hierarchy is an important factor in navigating society.

#### §7.1 INDIVIDUALITY AND LEADERSHIP ROLES

The existing community structures can be divided into two categories. The first one revolves around individuals in leadership positions. These individuals are key actors within community structures, and crucial in decision making processes, the organization and implementation of organized forms. While the choice of individuals response, differs within the community, it is important to consider the position of individuals within the setting of a collectivistic culture. To achieve collective goals, actions are a reflection of shared goals and activities which are culturally embedded. The emphasis lies on social relations in this context, as social capital and leadership are crucial in community recovery after a natural disaster (James & Paton, 2015).

Whether the organized events are cultural and religious, or relate to coordination of donors during flooding, these key individuals are highly respected and influential. One of the key actors in Hpa Yar Ni is the village administrator. The village administrator and the Village Administration Committee are the most powerful actors in the community. As representative from the government, the village administrator is the direct connection as representative of the community on township level. A law implemented in 2012, allows for the village administrator being elected by household heads. The village administrator is the link between the community and government. The functions that the village administrator holds is varied, from tax collection, land registration and reporting of demographics (Saw & Arnold, 2014). As the link between the government, township and the community, the village administrator is socially a powerful actor as he has the network, knowledge and financial resources. In addition to the village administrator, village elders and households heads are considered the core of community leaders.

According to the community members in Khat Ohn Chaung, the village administrator holds a different position in regard to the organization and implementation of organized forms in the village. Due to the lack of reliability, one of the key actors who does fulfil a similar position within the village is the head monk. Additional to the religious and cultural activities, the head monk is actively involved in the organization of the response to natural disasters and social welfare activities. In Khat Ohn Chaung, the monastery is the only two level building, in the higher part of the village. Thus, when flooding occurs, the building is used as shelter and is able to host a significant amount of people. The head monk is the key actor, in the organization of the religious committee and the social welfare committee.

Key actors as the head monk and village administrator play an important role within the community, meaning they have significant influence in to what is paid attention to within the community, how this takes place. Because there is little to no government funding for the committees in the village, aside from the village administration, whether community initiatives are supported, is influenced by these key actors. In relation to natural disasters as flooding, community initiatives that take place have the support of key actors. Their contribution can be in the form of stimulating the organization of flooding related initiatives, participating in the organization, using their social networks in securing funding or using private funds to partially cover the costs. The head monk in Khat Ohn Chaung explained, that he



used his social network, the people who worship him, to request support for the village: *“They need to contact to him to get support. Not in cash, they do not support in cash. Because cash is at that time not important. It is important to get food, clothing, water. So they request from the village to his people those things. They only will request in the worst situation”* (KOC, Interview 1). The role that these key actors play, impacts how communities as a whole cope with flooding. In the case of the research villages, these key actors used their status to initiate and support flooding related activities. It can set the tone or create space for other community members to join and participate in the collective activities that revolve around the collective needs.

## §7.2 MOTIVATIONS AND COLLECTIVE NEEDS

For collective action to take place, the level the involvement of community members is important to take into account. The term community in itself has different layers. Individuals have other priorities, meaning that one individual is more involved than another. The participation of community members in the organization of events displays the level of involved participation. Community participation does not just occur, it depends on initiation, preparation then participation and continuation (Wilcox, 1994). Taking into account the power relations between stakeholders in communities, is crucial in understanding collective action. The research sites in Thabaung township display an active community life and involvement. One of the board members of the Social Welfare Committee, a 29-year old man, in Hpa Yar Ni, expressed what was the initial motivation to initiate the formation of the committee:

*“The reason for him, is that he knows that in the village there are so many poor households. Some of the poor households, cannot afford a funeral. So he thought that they should form a committee. Another reason, during the flooding a lot of organizations come from other towns, with the name of 'social welfare'. They want to be like that... When flooding is present, donors come from other townships or towns. The donor name is 'title social welfare'. They say there are more social welfare organizations, here in the village they see 'oh if we form an organization like the donor, they can also have that in the village with a crew'. For this reason, they formed the committee”* (HYN, Interview 14).

Members of the communities expressed that dynamics have changed since the country starting opening up more, and strict rules that did not allow for groups to gather in public places or official organization of initiatives disappeared. For members of the community, this has been a new terrain. Under military rule, the organization of events did take place, but this took mainly place under the radar. Community members expressed that firstly, there is more space within the community to organize themselves collectively, and is encouraged to do so. The accountant of the Water committee, displayed the documentation of water levels, see image 16, and inventory of all the damage that flooding had done over the years, and expressed his motivation:

*“He enjoys it, the accounting part and thinks it is very important to do. As he is older, he has previous experience in accounting. Sometimes 3-4 donors arrive at the same time, which means that he is very busy... He finds it a shame, that young people have no interest in learning, as Myanmar has from a historical perspective has problems with documentation and because of it a lot of things get lost”* (HYN, Interview 13).

*Image 16 : The accountant of the water committee shows his accounting books, where all the donations and needs from the previous years are written down (Kers, 2019).*



### §7.3 CRITIQUE AND LACK OF TRANSPARENCY

The interview and focus group participants, recognized that on organizational level, community leaders and households with higher income held key positions in the community committees. According to them, they have more time and financial resources to put energy in committing to the organizational side: *“They cannot share their time for the activities of the committee. They are busy with work, harvest, at that time. They cannot organize some of the activities of the committees” (HYN, Interview 14).*

Low-income households are less represented in committees. They do participate and engage, as members of committees, but not in board-member positions. Social status is in this regard important to take into account, but others noticed that sometimes low-income households cannot pay the monthly contribution between 1000 and 3000 kyat (€1-€2), and participation in committees is not the priority during the harvest seasons.

One of the critiques, community members expressed in regard to the role of these key actors to funding and decision-making, is the lack of transparency: *“Some people are not pleased, they want to know where they spend the money on. Yes, transparency but just a few people. Actually, it is normal in Myanmar. Most of the people, especially don't believe in transparency for the finances. Everywhere it is, suspicion” (HYN, Interview 15).* Corruption is high in Myanmar, and in case of one of the committee members in Hpa Yar Ni, villagers requested a case on township level to investigate because they suspected corruption because of the lack of transparency: *“At that time, the township GAD called the committee to come to the township to explain the situation. The committee showed their financial explanation, their expenditure, financial record. The records were good, so it was okay” (HYN, Interview 15).* Similar critiques, about the lack of transparency, specifically, insight in financial expenditure of the committees, was given in Khat Ohn Chaung:

*“Currently all the money that is collected from the members is managed by the monk. There is no financial explanation on village level. He does not mean that he does not believe in the monk, but he means that if they can make financial explanation available to the village, as on trees as we saw other things. They will think, oh, they are using the money to do this to help with flooding and other things, and help with that. By seeing this, he thinks that some of the households are more willing to donate” (KOC, Interview 3).*

As the head monk, is the treasurer of the Social Welfare committee in Khat Ohn Chaung, and during flooding, he uses his private funds to support occasionally, it is a grey area. Simultaneously, the head monk expressed that for the Social Welfare committee, they were in the process of securing funding to start the construction of a cyclone shelter, with a double function:

*“So they already are busy with constructing the community centre. If the flooding happens, they can stay in the monastery and in that building. More than that, he also plans for constructing a building with three floors, he designs it as a three year project plan. For the construction site, he already request to the owner of the land. Because it is a farming area, he*



*already requested to the owner, the owner has already donated the land. They will use it for stay during the flooding, and also as part religious activities” (KOC, Interview 1).*

#### §7.4 THE ORGANIZATION OF COMMITTEES

The second category in community structures are in the form of committees. The committees which are present in the villages are respective specialists in their own regard. In each village, a village administration committee, women’s affairs organization, health committee, maternal and child committee, school committee and fire brigade is present. These committees are government issued, although due to capabilities, capacities and the amount of influence in the community, the operation of each committee may differ per village. Additionally, there is a water committee present, social welfare committee, religious committee and fishery and/or farming committee existing in each village. The latter are not government issued and initiated by community members. The committees operate alongside one another, and some committees cooperate on a regularly basis. As can be seen in table 7, the stakeholders in Hpa Yar Ni are closely linked together. Committee activities are organized independently.

##### ***Stakeholders***

As Wilcox (1994), states the important note of initiation, due to the political climate in Myanmar prior to the government change in 2015, community organized initiatives were not supported. The participants expressed, the impact of this on the organization of community life. In the previous situation, community life was active but there was little formal organization. After the government change in 2015, the government pushed for the organization of committees in villages. According to the participants, the formation of five committees in the villages are permanently present in villages, as they are government initiated, see table 7. The collective response of communities in the Ayeyarwady delta, to a natural disaster is not unified. How communities respond is dependent on the access to physical resources as cash, relationship to government actors, access to transport, the influence of community leaders to negotiate for other outcomes and the reliance on collective organized action (South et al., 2011). Thus, in response to flooding, the outcome can differ per community in the Ayeyarwady delta.

##### ***Government recommends formal committee organization***

Community members express the change in organized community life over the last 10 years. Political reform, starting in 2011 after the government change, has influenced the formation and organization on community level. The villagers explain that before the government change, it was forbidden to organize collectively. However, informal organization on community level did occur, but at a lesser intensity. The political reform resulted in the government initiating village tract local governance. With exception of the fire brigade and the village administration, the committees have been in place since around 2010. The committees which can be seen in table 7 are initiated by the government. In present community life, committees are formed by the government but also by community members themselves. Community organizations with initiation of village members are focused on flooding, social welfare, the union of farmers and fishermen. Some committees were formed by training organizations and NGO’s.

Table 7: Government initiated committees present in village tracts.

Name	Description
Village Administration Committee	Head of local government Responsible for rule of law in the village Most important stakeholder when it comes to decision making and diplomacy Includes village administrator, chairmen and household heads Close relation to the GAD (General Administrative Department) Funded by the government
Women's Affairs Organization	Activities to support women on issues regarding health, illness and pregnancy Securing financial support for women's health if needed Hosting donors in village Leader is a village chairman's wife
Health Committee	Leading and responsible in case of diseases and health emergencies Responsible for securing and awareness of villagers' health Focus on children and elderly Securing financial support Nurse is appointed by the government
Maternal & Childcare Committee	Similar to WAO and HC, and cooperate together Responsible for the distribution of vaccinations for children
School Committee	In charge of building of the school building and maintenance In charge of getting teachers to the village and organize accommodation Securing financial needs and materials for the school Organizing school activities Organize financial support for children who can't afford school
Fire Brigade	Leading role during natural disasters, fire and flooding Responsible for getting people to safety Responsible for food distribution in the village Picking up donors

When it comes to social support, all the committees cooperate depending on their expertise, the level of emergency and the needs of the concerning individuals or village needs. A lot of the activities overlap. For instance, the Maternal & Childcare and the Women's Affairs Organization help each other out, discuss and inform the village chairmen, when in case of a high risk pregnancy the woman needs financial support, medication or support when in need of visiting a hospital:

*"During the flood, the pregnant women are not suitable to stay and give birth in the monastery, because of religious beliefs. They should not be placed in the monastery. That's why they need to move to railroad. For delivering difficult baby, they are sent to the hospital, in Pathein... The railroad is also very accessible to the towns. It is easy to go to the towns. At the same time, the pregnant woman is also entrusted to the care of the nurse in the town. They already know the situation" (HYN, Focus Group 3).*

The relationships between the stakeholders in the villages are strong, participants expressed. The relative new organization of committees within communities has led to more cooperation and communication between community members. As can be seen in table 8, in Hpa Yar Ni, each committee has their respective power within community relations and amount of members. In image 17, it is visible how the stakeholders in Khat Ohn Chaung relate to each other. In Khat Ohn Chaung, community life revolves around the religious committee, where the monastery is the central meeting

point in the village. The social welfare committee and the religious committee are the most influential actors, which closely cooperate and communicate.

Table 8: All the stakeholders in Hpa Yar Ni and their respective power and members.

Organization name	Members			Power		
	High (>30)	Medium (10-20)	Low (<10)	High	Medium	Low
Village Administration Committee	X			X		
Fire Brigade	X				X	
Women’s Affairs Organization	X				X	
Children and Parents Organization	X					X
Religious organization	X					X
School committee	X					X
Health committee	X				X	
Social Welfare committee		X			X	
Fishery committee			X			X
Rural Development Committee (CDD)		X				X

\*Information is based on participation input conducted through actor mapping in Hpa Yar Ni.

The head monk, leader of the religious committee is closely connected to the social welfare committee. Social welfare meetings include the head monk, where involvement is strong. Over the last three years, a new monastery building is build and in 2019 starts the building of a cyclone shelter. During flooding, donors are being contacted for financial and support in the form of food. The social welfare committee and the monk work closely together, using personal networks for the collective benefit of gathering funds for the buildings and donors.

The relation ties of the committees are close, as can be seen in image 17 and expressed by participants. The social welfare committee works closely with the religious committee, maternal and childcare committee and World Vision. The government initiated committees, the village administration, school committee, women’s affairs organization, and the fire brigade have a close connection. In practice, this is realized in the form of monthly meetings. In case of township trials, each committee sends a representative to meetings, to discuss the case. Additionally, in the process of project planning, community meetings are held regularly to involve the committees and community members in the decision-making process.

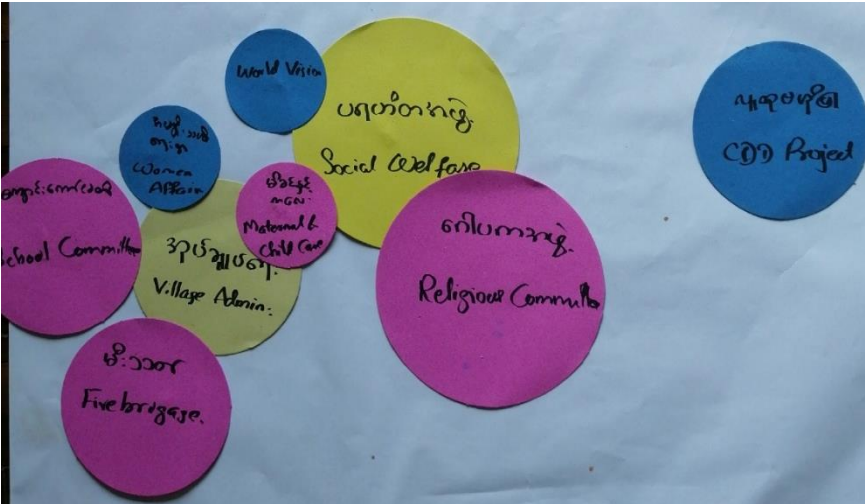


Image 17: Stakeholder relations in Khat Ohn Chaung (source: author).

## §7.5 WATER COMMITTEE

One of the organized forms on communal level that is specifically focused on dealing with flooding is the Water committee. It is organized in a permanent form, but this is not always the case. The water committee consists of representatives of the existing committees in the village. In Hpa Yar Ni, the committee does not exist every year of the same individuals, as this is dependent who the committees choose as their representative for the Water committee. The representatives have special knowledge about handling natural disaster crises and have had training on township level, are in a leading position and have an extensive network. Before the flooding starts, the committee assembles and discuss and divide tasks and responsibilities. The decentralized structure of the operation allows the responsibility to be divided. People know what to do, and for what they are responsible, as can be seen on table 9.

*Table 9: Tasks of the Water committee during a flood, and how this is divided.*

<b>Water Committee</b>	
<b>Responsibility/subcommittee</b>	<b>Task description</b>
Fire brigade	Bringing people in the village to safety, the monastery and the railroad near Daga when flooding starts Taking disabled and elderly people to the monastery Picking up donors in Daga and transporting them to the village Distributing food among the people in the village and securing they get the right amount for the household Transporting people near the railroad back to the village when the water level goes down
Village administrator	Reporting daily updates of the village to the General Administration Department (GAD) Reporting the needs of the village (financial and food support) to the GAD, who will contact government donors
Village administrator, head monk, chairmen and household heads	Contacting personal relations for donor purposes Making inventory lists of damage to houses Making inventory lists of household needs
Women's Affairs Organization	Hosting and taking care of donors when they stay in the villages Support community members in case of health emergency
Neighbours	Supporting neighbours in need in the form of food and lending boat

### **Communication with local government**

When flooding hits the village, the process goes as followed. In case of flooding and storms the General Administration Department (GAD) informs the village administrator by phone, and Daga. The weatherman in Daga, the nearest strategic town, informs the nearest villages through the radio in case when a flood comes. Most of the citizens of Hpa Yar Ni and Khat Ohn Chaung are in the possession of a radio or mobile telephone, see image 18. The GAD advises the village administrator to form the Water committee, and prepare for flooding. A community meeting is formed in the villages to inform the people in the village and start forming the Water committee. People express that it takes about 3 to 4 days to prepare, before the flooding comes.

Image 18 : Radio's visible in Hpa Yar Ni (source: author).



As the village administrator is the direct government representative, he is the first direct contact person. When water levels are extremely high, and flooding is affecting daily life severely, the village administrator has to report daily to the GAD. Inventory of damage to housing, other economic assets, displacement of residents and in case of missing persons or death: *"The 10 headed household head men are responsible for this, they need to inform the village chairman, they go around the neighbourhood and record every damage. They report to the village chairman, who submits it to the GAD"* (HYN, Focus Group 4).

The GAD publishes the information on Union level, with the information gathered from affected townships, the most affected regions. The list that is published by the government, is leading for donors. Donors, consisting of civil society organizations, non-governmental organizations, business, families and individuals, then can contact people in the affected townships. In this regard, the village administrator and the Water committee are first contact points: *"In 2014 they formed the committee. In this time, the flooding has gotten worse year by year. Before 2014, they don't form the committee, they don't have plans for these activities. The GAD believe that the Village Administration committee cannot solve the problem on its own, so they advise to form the water committee"* (HYN, Focus Group 4).

#### §7.6 DONORS

When donors come to the village, to donate funds, materials, food and drinking water, the Water committee will be the first point of contact. As the accountant of the committee expressed, sometimes three-to four donors arrive at the same time, and the community wants to be hospitable. Donors reach out to the communities through government channels, and key community members use their social network to reach out to donors. Because the majority of the donors are reached through government channels, the amount of donors can differ per year. Community members expressed, because other townships are more affected when flooding occurs, less donors will come to Hpa Yar Ni and Khat Ohn Chaung. When flooding takes place in Thabaung, and the impact is severe for the villages, it does not necessarily mean that more donors will come to the villages to deliver aid, and increases food insecurity: *"Totally no donor has not happened. But sometimes few donors are coming. In that condition, sometimes they have trouble for not enough food for the household. It has happened in 2014 and 2016. Only a few donors come to the higher ground. Few donors, few food"*(HYN, Focus Group 1).

The accountant of the Water committee will register the donors, and the needs of the village when they arrive. It can differ per donor, what type of aid the organization will contribute. Some donors bring food with them, and depending on the amount needed in the village, will contribute it. Other donors come to the village first, to gather information about the needs, materials, food or drinking water, and donate according to the needs of the village: *"As their best achievement, they consider that organizing the getting the donors to the village. Sometimes there are 40 to 50 people that come to the village for donating, at that time there are so many people. They need to take care of them, of their security, some of the donors don't know the level, or danger of the water"* (HYN, Focus Group 4). The Women Affairs Organization and the Maternal and Childcare committee are responsible for providing food and hospitality to the donors, when space is scarce. Women expressed during the focus group,



that is rarely occurs, but donors contribute to medical treatment during flooding: *“With the networking of one villagers, they get connection with the doctors...during that time, the villagers give the list of pregnant womens. These pregnant womens who are listed by the signatures of the doctors, they can go to the hospital and get free treatment” (HYN, Focus Group 3).*

### §7.7 DEATH DURING FLOODING

The Social Welfare committee is in both villages equally important in responding to flooding. In Hpa Yar Ni, expresses one of their successes, a cement platform that was funded by donors during the flooding season. Community members explained, that because of a generous donation, they were able to build a cement platform, where the coffins can be placed and protected from the waves and wind. Until the water level goes down, the body will be kept on the platform, see image 19.

If the family members of the deceased person, can afford to bury them in another village at higher elevation, this is what they would do. As this costs a lot of money, most of the people cannot afford it. In Hpa Yar Ni, the Social Welfare committee contributes financially to family members of the deceased person for the burial ceremony:

*“The case is, when the people die, they support 35.000 kyat (€18) per household. Other people who die, from the committee member families, they support 150.000 kyat (€78). In the village they thought that people die more and more after the formation of the committee (laughs). They do not have money for support for now because of recent deaths. For that case, the committee collects money from the rich people to support the household” (HYN, Interview 14).*

In Khat Ohn Chaung is not a cement platform present, and villagers have to construct a bamboo platform in case community members pass away. According to the community members, the bamboo construction is good enough but not extremely stable, but in case of strong winds, the coffin is not shielded from the wind: *“Yes they put the coffins on the tower, the coffins are also made from wood. After the water goes down, they bury the coffin. They sometimes go to the near village, which village has higher ground. They request at the village, for burying the body (KOC, Interview 4).*

*Image 19: A cement platform where coffins can be placed in Hpa Yar Ni. On the other side of the platform are four openings, which can hold four coffins inside (source: author).*



### §7.8 NEIGHBOURHOOD SUPPORT

Elderly and disabled people are the most vulnerable when it comes the time pressure of a coming flood. Under the village chairman, the 100 Household heads are responsible taking care of elderly, disabled people and other people in need in their neighbourhood. In Hpa Yar Ni, household heads

assign responsibilities to neighbours, family and the fire brigade for social and financial support. An elderly couple, around 80 years old, in the lowest part of the village, relies on neighbours. Nearest neighbours provide food and sometimes lend their boat, to let the man fish for the food intake for the couple. The fire brigade and neighbours are responsible to get the couple to the monastery for safety, when the water level gets too high. When a family does not own a boat, one will hire one together with neighbours to share the costs, or a neighbour who does own a boat, will loan the boat. When food insecurity occurs during this time, neighbours will let the fishing gear and boat be used by those who struggle.

Sharing the care for children during flooding, is one that neighbours share. Over the years, some accidents have occurred during the monsoon season where children have drowned. According to the villagers, children are taught able to swim around the age of 7 to 8 years old. The strong wind, waves and high water level that is present during the monsoon season makes it more likely that accidents could occur with young children. Thus, the neighbours share the duty of supervising children during the monsoon season, when parents go to work in the fields or fishing, and rotate in sharing that responsibility: *“During the flooding some of the children fall into the water and they died. They already experienced this in the village. They thought that during the flooding in some households the parents go to their workplace for fishing... So when the children are really small and young they bring them to their neighbours house, to watch them” (KOC, Focus Group 7).*

§7.9 COLLECTIVELY COPING WITH FLOODING

In the villages, there are many opportunities to develop and grow in responding to flooding. Their collective responses are a direct response, but there is a lack of preventative and adaptive measurements. When it comes to the adaptive capacity of the villages, the communities have a long way to go, as the capacity is low. Over the years, one thing that has improved in responding to flooding is communication and cooperation within the villages. The communication lines within the village have improved and members of committees cooperate more often with each other. The division of tasks of the water committee and the social welfare committee makes it clear which person is in charge. People are more aware of each other’s situation, whether they need financial, food or medicinal support and tasks do not overlap. Because of the improvement of communication, tasks are not done unnecessarily multiple times. When there is room for improvement, in Khat Ohn Chaung, people can put complains in a grievances box, see image below.

Image 20: Grievances box in Khat Ohn Chaung.



For a long period of time, the water of the Ayeyarwady turned dry lands into fertile agricultural grounds during the monsoon season. Flooding has increased in frequency and intensity over the two decades in the Ayeyarwady delta, influenced by climate change, poor water and natural disaster management, lack of coherent and efficient policies and implementation because of the unstable political situation. Addressing climate change, natural disaster-and water management became important pillars in the development of policies, since Myanmar started opening up in 2011. The NLD government took office in 2016, and the formation of the Myanmar Sustainable Development Plan (MSDP), an important long-term vision plan, and complementary policies and strategies address the impact of climate change, and flooding has on the country. The majority of these policies and strategies have been formed over the last five years, and have thus not fully been implemented (Ministry of Planning and Finance, 2018). Alongside, there is a gap between Union and State and Division government, in terms of knowledge and capacity for implementation. Considering the country has been under military rule from 1962 up to 2011, it takes a considerable amount of time to build capacity and transfer knowledge, for implementation on state/division and municipal level. The step of formulating policies and strategies on Union level has been undertaken, however the rest of the processes are still in the early stages. Therefore, the communities in Thabaung township continue to be affected by flooding, in the severity it has taken place over the last two decades.

### §8.1 EMBANKMENT PROTECTION AND DREDGING

According to research conducted by Soe (2020), part of the flooding in the flood plain, the stagnation of water, in Thabaung township can be assigned to increased erosion in Rakhine and Bago, that is deposited during the monsoon season in Thabaung township as, as the Nwagun and Daga river are tributaries of the Ayeyarwady river, as it transforms into the delta. As Soe (2020) mentions, sedimentation in the two tributaries that flow through Thabaung township as a result of deforestation and erosion in Rakhine state and Bago region, is one of the causes of flooding in Thabaung township. Countering deforestation in Rakhine and Bago, dredging of the Nwagun and Daga rivers, and strengthening of current embankments that protect the flood plain in the north of Thabaung township, near Hinthada, is recommended as counter measurements (Otsuyama et al., 2019; Soe, 2020). Howe and Bang (2017) stretch the importance of taking on adaptive measures and training of disaster management for local communities to increase resilience. The impact of flooding on the livelihoods of people and communities in Thabaung township has been discussed in the analysis part, but it raises the following question; to what extent have the community initiatives contributed to making communities more resilient to flooding?

Based on the research that is conducted in Hpa Yar Ni and Khat Ohn Chaung, the following can be stated. Firstly, the establishment of community initiatives that specifically have a key role in the time period of flooding, are the Water committee and Social Welfare committee. The establishment of both committees came to be around 2014, when flooding had become regular during the monsoon season, for a longer period of time, around 2-3 months. The formation was stimulated by the then Thein Sein government, and under the NLD government. Assigning responsibilities within the community has increased coordination and communication, when it comes to organizing the response to flooding. Each committee has their responsibilities and tasks to complete when flooding occurs, and cooperates with other specific committees in case of need. Priorly, miscommunication occurred more often within the community. Leaders were not as aware of the needs of other community members, and organized responses were not clearly communicated among the community: *“Before 2014, when the flooding comes they also work saving the people. But there is no responsible person for this, but did it anyways. But now that the water committee is formed they thought that have many advantages, because they can already assign special person to special tasks.”* (HYN, Focus Group 5). An added advantage is that because of designated roles within the community, this also counts for corresponding outside of the

community. When flooding is extensively pressing the community's resources during flooding, the communities rely on donors for the contribution of food and supplies. Having assigned roles, increases the preparedness in reaching out to donors, and communicating the needs of the community, which is being documented by the committee members.

## §8.2 ADAPTATION STRATEGIES

Initiatives that are organized and part of the strategies that communities adopt in Thabaung township, are mainly anticipatory and absorptive strategies. Early warning systems and coping mechanisms during the hazards are in place, but the adaptation strategies are limited, and that would diminish the impact of flooding over time (Forsyth, 2018). The community initiatives that are organized, are funded by the committee members themselves. Financially, there are a lot of limitations to what can be organized, as all the committees, except the government's village administration, operates on a limited budget. Because of that, most of the community initiatives that are organized, are reactive measures. Organizing transportation to safer places within and outside of the village, securing food and safe places to stay for community members, using social and religious networks in reaching donors, secure funding and transportation in case of hospitalization and funeral cases, are examples of this. With the limited capacities that the communities have, they manage to adapt as much as possible, to the increasing frequency and intensity of flooding.

The organization of community initiatives has contributed to this, but on household level, mitigation measures have been implemented as well. Focus group participants expressed, that if they lived in bamboo houses, they raised the height of the house, and added an extra floor. If the households were able to make the investment to construct timber housing, and concrete construction, most of them did, and some households were saving to do so. Additionally, households used income diversification as a strategy to not mainly rely on one source of income, and farmers had started investing in planting other crops and livestock. However, because of the financial limitations that the committees have, organizing long-term adaptation measurements and investments were not possible on a communal and household level. Households are therefore responsible for the long-term adaptation measurements of their own livelihoods. In Hpa Yar Ni, the year before, a concrete school building, with cyclone shelter function, had been constructed, and an additional cyclone shelter was under construction. Funded by the Japanese Development Agency, JICA, a similar plan of constructing a cyclone shelter was initiated, not financially secured yet, by the Social Welfare committee in Khat Ohn Chaung. Research conducted by Otsuyama et al. (2019) in Hinthada, north of Thabaung, on adaptive strategies of communities, concludes the following. Communities that have been affected by flooding regularly, experience increasing systematic vulnerability because of the negative effect on livelihoods and housing and limited strategic options that are available (Otsuyama et al., 2019).

## §8.3 INCREASING VULNERABILITY FOR LOWER PARTS

Secondly, there is a group within the villages that has become more vulnerable, despite of community initiatives. The Water and Social Welfare committees that are present in both villages, have as main goal, to support community members in transportation, food security, financial support for the organization of funerals, and shelter in case of need, during the flooding period. However, a large part of the households that reside in the lower part of the village, are longer flood displaced, and decide to leave the villages earlier to go to higher and safer ground. For personal safety, but also because as small-scale fishing households, staying near the rail road is a better position to secure their livelihoods, than staying in the village. The communication, cooperation and reliance on each other on neighbourhood level in the lower part, is high. However, because at the time of leaving the village, the water level of flooding is not significantly high, and not threatening for the rest of the village, the Water Committee is not assembled yet. Meaning, that the majority of the households who leave for the higher ground earlier, are partially excluded from the organized response to flooding by the Water Committee. Additionally, another layer of logistic difficulty is added, is when donors come to the

villages. Because the community is separated at that time, information sharing is more difficult, there is a likelihood that the vulnerable households near the higher ground might not receive the needs that they have to the full extent. Noticeably, people with differing socio-economic status within the community, have expressed that the Social Welfare and Water committees have contributed to better cooperation, communication and encouragement of participation. It became clear, that in regard to the situation of the households of the lower part of the villages, the discussion about debt and flood displacement, was not talked about and people felt ashamed of their situation:

*“The Water committee cannot afford to organize more, no funds. They don't have funding for the poor households, they assume that the poor households manage for themselves. They will support when they are at the higher place later when others come... Some of the households feel shame to share in the monastery. Because some of the households they cannot afford the food, they cannot have and manage. They feel shame, so they do not go” (HYN, Focus group 5 & Interview 6).*

#### §8.4 RESEARCH IN THE AYEYARWADY DELTA

Even though a significant part of the communities were displaced for 2-3 months because of flooding, no permanent resettlement had taken place. Nor, did most of the people have any intention to do so. Research that has been conducted over the last three years in the Ayeyarwady delta, in relation to natural hazards and the impact it has on community level, have come to a similar conclusions. Lwin et al. (2020), conducted quantitative research in the floodplain of Thabaung and bordering Kangyidaunt township. Apparent from the studies, was the sense of place, compromising of place identity, attachment and dependence, was considered ‘high’ for the vulnerable flood-prone communities, and ‘very high’ for the less vulnerable communities.

Communities who had high vulnerability to flooding, had more awareness about the risks, prior experience, knowledge about protection measurements of flooding, and trusting officials versus communities that were low-prone to flooding. In terms of the adaptive capacity of the communities, they demonstrate high levels of natural, social, human and physical capital, with the exception of financial capital. The social resilience of the flood-prone communities in Thabaung and Kangyidaunt township is present in a great extent, when it comes to community participation, trust in the neighborhood, social support, and exchanging information within the community (Lwin et al., 2020). Research conducted by Soe (2020), on the effect of climate change on agriculture in Thabaung, states that firstly, the streams and canals should be renovated. Sedimentation from upstream is one of the causes for flooding in Thabaung township. Secondly, the eastern part of the flood plain in Thabaung is more affected by flooding than the western part of the township, when it comes to affecting cultivation. Hpa Yar Ni and Khat Ohn Chaung are located in the eastern part of the flood plain in Thabaung. Farmers have partially stopped producing monsoon paddy, as flooding has caused damage to the cultivated paddies. Oo et al. (2018) adds to the argument, in researching farmers’ vulnerability to climate change in Pyapon district, the eastern part of the Ayeyarwady delta. That part of the delta, is in addition to flooding, affected by salt water intrusion. Similar to Thabaung, the main source of income in Pyapon district is agriculture. Oo et al. (2020) adds, if farming households’ solely rely on agriculture for source of income, they are more vulnerable. Farmers who had access to basic infrastructure and income diversification strategies, in the form of cultivating other crops and other sources of income outside of agriculture, were less sensitive to the effects of climate change (Lwin et al., 2020; Oo et al., 2018; Otsuyama et al., 2019; Soe, 2020).

Concluding, the initiatives that are organized on communal level do contribute to the resilience to flooding of the communities in Thabaung township. In this regard, the social resilience within the communities of Hpa Yar Ni and Khat Ohn Chaung is prominent. While the community initiatives contribute to the resilience, the capacity to organize initiatives on communal level, and adaptive measurements on household level, is limited due to the lack of financial capital.



***Impact on livelihoods***

Over the last two decades, flooding has increased in frequency and intensity in Thabang township, northwest part of the Ayeyarwady delta. Over the last two decades, the highest water levels registered in Thabaung township, range between 18 and 22 ft. (Soe, 2020). Having differentiation in elevation, the residents of Hpa Yar Ni reported having water levels of 15 ft. in August, the month with the most rainfall in the country. Extensive rainfall upstream, combined with erosion because of deforestation and depositing sedimentation in the Ayeyarwady delta, plays a role in how flooding affects Thabaung township. Over the last decade, flooding has increased in frequency, occurring up till three times before the monsoon season ends. The impact the flooding has on the livelihoods, and the adaptiveness of the communities in Thabaung can be divided into two categories.

**§9.1 DIRECT IMPLICATIONS OF FLOODING ON LIVELIHOODS*****Damage to harvest and inability to cultivate land***

The fishing and farming communities experience the negative impact flooding has, in different ways, in regard to their livelihoods. Fishing, farming and casual labour are the main sources of income. As a direct result of an increasing frequency and intensity of flooding, farmers have experienced damage to the cultivated paddies, and it has occurred once, that a harvest was destroyed by a late third flood. Because of this, the majority of farmers are not able to cultivate monsoon paddy, and are dependent on other seasonal crops to generate income.

***High input costs, increasing risk of safety and damage to fishing gear***

In comparison, agricultural activities generate more income than fishing, thus farming is seen as a more stable source of income by the majority of people in the villages. Flooding affects households with fishing as main income source greatly. The fish population has decreased over the last decades, influenced by overfishing and climate change among other things. In terms of flooding, the increasing intensity and frequency, increases the likelihood of damage to boats, fishing nets and mostly, poses a danger to the physical security of fishermen themselves. Small-scale fishermen often have small rowing boats, and the strong winds and waves pose a real threat, as well as. The bamboo houses in the lower part of the villages, where most of the inhabitants are small-scale fishermen, are inundated for longer periods of time and are not safe. Households in that part of the village, move to higher ground near the railroad, a 20 minute trip by boat from the village. Villagers argued, that it is safer to fish near the railroad than staying in the village. Food is insecure for these families, and often, they do not have purified drinking water. Overall, the input of costs for fishing is high, as a result of flooding. Fishermen argued, that they have to replace fishing nets after the monsoon season, and they risk severe damage to their boat and motor, as well as their own safety.

***Destruction of housing***

Wind and crashing waves, the force impacts the longevity of the constructed buildings. The majority of the houses in Hpa Yar Ni are made out of bamboo, in Khat Ohn Chaung, the majority of the houses were timber constructed buildings. In Khat Ohn Chaung, vegetation offered better protection against the wind and waves during flooding. Because of the increasing water level, and duration, the height of the water, comes up until the living quarters of people's houses. With an elevation level difference of 6 feet within the village of Hpa Yar Ni, some houses are completely inundated during flooding. There are a couple of measurements that residents take. From building a second floor within the construction, to taking the walls and roof off the bamboo construction leaving the frame, and partially taking the walls with them to higher ground. This is to save costs for building a construction at the higher ground, and protecting the frame of the bamboo house. Residents expressed, that because of the increasing amount of flooding, bamboo houses need to be rebuild every two-to three years, where this was around five-to six years before the current situation. If the household had the financial means,

investment in more resilient housing was made. Timber combined with partial concrete constructions, were used to increase safety and longevity. However, this increases more vulnerability of low-income households in the lower part of the villages. The input costs are high, around 200.000 kyat (€120) to reconstruct a bamboo house, and having to make that investment more often, while livelihood opportunities are decreasing, makes them more vulnerable.

## §9.2 INDIRECT IMPLICATIONS OF FLOODING ON LIVELIHOODS

### *Increasing debt and financial limitations to invest in adaptation*

The frequency that the exceeding water levels occur, and the direct of flooding on the livelihoods of people, accumulates over a longer period of time. The direct impact on housing and occupation, over a period of time, makes it financially difficult to recover from, or to make financial investments to diversify income and resilient housing. Farmers are not able to cultivate during this time period, which has increased over time. Additionally, an unexpected third flood late in the monsoon season, when the soil is being cultivated, can damage the monsoon paddies, and ruin harvest. Fishing households, report that winds and waves can ruin fishing gear, boats, motors, and other materials. Because this occurs regularly, the input costs for cultivation and fishing is high, especially, if there is no guarantee the new materials will have longevity. Simultaneously, in the tender system that is used, fishermen are not financially able to compete with the tender owner. The owner employs a share of fishermen in the village, who sell their catch for a fixed price to the owner. The other option, is buying parts of the stream for a period of time, from the owner, after the latter has exclusively been fishing the streams after the monsoon season. Small-scale fishermen, are not financially able to go for that option, thus engage in illegal fishing or rely on the tolerance policy of the tender owner.

Residents reported, that long term, this has increased debt for a lot of households in the village. Obtaining access to credit is difficult, and the options that are present in the village, receiving loans from high-income households have high interest rates. Low-income households reported, that loans had interest rates of 20 percent, meanwhile middle-income households were able to obtain loans with 5 percent interest rates. The gap between low-income households and high-income households is increasing, as an indirect implication of flooding. Debt and financial limitations impact the ability to invest in long-term resilient options for housing and livelihoods.

### *Income diversification as a strategy*

Given that fishing generates less income than farming, most small-scale fishermen have secondary sources of income. Farming and casual labour are secondary sources of income, and temporary migration has increased significantly over the last five years. Often citing, increasing debt, influenced by flooding, as one of the main motivations to temporarily migrate for generating income. The yearly income that is generated by farming and fishing, is decreasing. Income diversification is used as a strategy to spread risk, and generate income to compensate for the loss of income, and paying off debt. Part of this strategy, is temporary migration. The majority takes place out of the monsoon season. The main destinations are the construction industries in Mawlamyine and Yangon, for men, and garment factories in Yangon, and the closer located Patheingyi, for women. The labour is physical, intensive and there is no job guarantee, but generates a higher income than job opportunities near Hpa Yar Ni and Khat Ohn Chaung.

## §9.3 ADAPTIVENESS OF COMMUNITIES

On communal level, flooding impacts social and religious life during the time period of flooding. In Hpa Yar Ni, and Khat Ohn Chaung, a structured response in the form of committees are organized to respond to flooding during the monsoon season. Whether in official or unofficial form, community leaders and representatives of other community committees, collectively form a Water committee during the monsoon season. The main goal of the organized form, is to secure the physical of its community members. Securing transportation to safer locations within the villages and outside of it,

informing government officials and potential donors, making inventory of the damage of flooding, supporting community members when healthcare is needed, and in case of death, financially support funerals, are among the responsibilities of the Water committee. Responsibilities are divided, communication and cooperation has increased among different committees, and villagers have clear first points of contact in case of emergency. Neighbours play an important role in providing a direct social safety net. In case of food insecurity, compromised occupations because of flooding or in case of safety of vulnerable community members, residents rely on neighbours. Not in the form of direct financial support, but in other forms to support the other in need. It can be in the form of lending out a boat for a household which lost their boat to damage because of flooding, sharing food during food insecure times, taking care of elderly neighbours, watching young children of multiple households when parents work during flooding, are examples of this.

Social resilience is high in the villages in Thabaung township, and plays an important role in adapting to flooding. Because of the negative effect flooding has on people's livelihoods, and the long term implications this has on the adaptability of the communities, prevents the communities in adapting long-term measurements to increase resilience. Given the lack of financial capital, the communities have high awareness, and have implemented measurements with the capacities that are available. The response to flooding is reactive, and where possible, communities have adapted, but there no long term adaption present in the current form. In this, the Union government and Ayeyarwady division government should aid in constructing long-term adaptation measurements on local level.

#### §9.4 MOVING FORWARD

As suggested by Soe (2020), dredging could partially reduce the intensity of flooding in Thabaung township. On Union level, the development of policies and strategies in relation to environmental hazards and climate change, has been taking place and projects are in the pipeline to develop a stronger base in water management, natural hazards and climate change. In the current situation, communities in the flood-prone area of Thabaung, and other places in the Ayeyarwady delta, are vulnerable to flooding, and will continue to increase as time goes on.

Until the capacities are build, and the developed policies and strategies are implemented and proven effective, the government and other organizations should aim to strengthen and improve measurements that include social resilience in community based programmes aimed to adapt to flooding and other environmental hazards in the Ayeyarwady delta, to bridge the gap. Additional research is needed to prove more insight between the gap of government policies, implementation, and the involvement of communities, as starting point, in organizing climate adaptation measurements that increase the adaptive capacity.

## BIBLIOGRAPHY

- Adger, W. N. (2009). Social Capital, Collective Action, and Adaptation to Climate Change. *Economic Geography*, 79(4), 387–404. <https://doi.org/10.1111/j.1944-8287.2003.tb00220.x>
- Allen & Overy. (2020). Myanmar 's economic liberalisation : Three years on, (July 2019).
- Anthony et al. (2019). Overview of the Monsoon-influenced Ayeyarwady River delta, and delta shoreline mobility in response to changing fluvial sediment supply. *Marine Geology*. <https://doi.org/10.1016/j.margeo.2019.106038>
- Aung, L. L., Zin, E. E., Theingi, P., Elvera, N., Aung, P. P., Han, T. T., ... Skaland, R. G. (2017). Myanmar Climate Report. *Norwegian Meterological Institute*, (9), 105.
- Bamberg et al. (2015). Collective climate action: Determinants of participation intention in community-based pro-environmental initiatives. *Journal of Environmental Psychology*, 43, 155–165. <https://doi.org/10.1016/j.jenvp.2015.06.006>
- Barany, Z. (2019). Burma : Suu Kyi ' s Missteps, 29(1), 5–19.
- Brakenridge et al. (2017). Design with nature: Causation and avoidance of catastrophic flooding, Myanmar. *Earth-Science Reviews*, 165, 81–109. <https://doi.org/10.1016/j.earscirev.2016.12.009>
- Bünthe, M., & Dosch, J. (2015). Myanmar: Political reforms and the recalibration of external relations. *Journal of Current Southeast Asian Affairs*. <https://doi.org/10.1177/186810341503400201>
- Davies et al. (2009). Climate Change Adaptation, Disaster Risk Reduction and Social Protection: Complementary Roles in Agriculture and Rural Growth? *IDS Working Papers*, 2009(320), 01–37. [https://doi.org/10.1111/j.2040-0209.2009.00320\\_2.x](https://doi.org/10.1111/j.2040-0209.2009.00320_2.x)
- Décobert, A. (2020). 'The struggle isn't over': Shifting aid paradigms and redefining 'development' in eastern Myanmar. *World Development*, 127. <https://doi.org/10.1016/j.worlddev.2019.104768>
- Desportes, I. (2019). Getting relief to marginalised minorities: the response to cyclone Komen in 2015 in Myanmar. *Journal of International Humanitarian Action*. <https://doi.org/10.1186/s41018-019-0053-z>
- Displacement Solutions. (2018). *Establishing a Myanmar National Climate Land Bank*.
- Doss, C. R., & Meinzen-Dick, R. (2015). Collective Action within the Household: Insights from Natural Resource Management. *World Development*, 74, 171–183. <https://doi.org/10.1016/j.worlddev.2015.05.001>
- Eurocham Myanmar. (2018). *Agriculture Guide 2020. Agriculture Guide 2020*.
- Farrelly, N. (2013). Discipline without democracy: Military dominance in post-colonial Burma. *Australian Journal of International Affairs*. <https://doi.org/10.1080/10357718.2013.788122>
- Forsyth, T. (2018). Is resilience to climate change socially inclusive? Investigating theories of change processes in Myanmar. *World Development*, 111, 13–26. <https://doi.org/10.1016/j.worlddev.2018.06.023>

- Hedley et al. (2010). Evolution of the Irrawaddy delta region since 1850. *Geographical Journal*.  
<https://doi.org/10.1111/j.1475-4959.2009.00346.x>
- Htein, M. K., Lim, S., & Zaw, T. N. (2018). The evolution of collaborative networks towards more polycentric disaster responses between the 2015 and 2016 Myanmar floods. *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdrr.2018.08.003>
- Human Rights Watch. (2010). *I Want to Help My Own People: State Control and Civil Society in Burma after Cyclone Nargis*. Human Rights.
- Ivars, B., & Venot, J. P. (2019). Grounded and global: Water infrastructure development and policymaking in the Ayeyarwady Delta, Myanmar. *Water Alternatives*, 12(3), 1038–1063.
- James, H., & Paton, D. (2015). Social capital and the cultural contexts of disaster recovery outcomes in myanmar and taiwan. *Global Change, Peace and Security*, 27(2), 207–228.  
<https://doi.org/10.1080/14781158.2015.1030380>
- JICA. (2016). Survey Report on 2015 Floods, (March).
- Khaing, K. K., May, S. Y., & Myint, C. C. (2019). Assessing the Impact of Climate Change and Natural Disasters on residents in Ayeyarwady Region. *Hinthada University Research Journal*, 10(1), 9–19.
- Kudo, Toshihiro; Kumagai, S. (2013). Policy review on Myanmar economy. *Policy Review Series on Myanmar Economy*, 9(08), 1–5.
- Lwin et al. (2020). Assessing social resilience of flood-vulnerable communities in Ayeyarwady Delta, Myanmar. *International Journal of Disaster Risk Reduction*, 51(June), 101745.  
<https://doi.org/10.1016/j.ijdrr.2020.101745>
- Meinzen-Dick, R., DiGregorio, M., & McCarthy, N. (2004). Methods for studying collective action in rural development. *Agricultural Systems*, 82(3), 197–214.  
<https://doi.org/10.1016/j.agsy.2004.07.006>
- MinBuza. (2015). *DRR-Team Mission Report*.
- Ministry of Planning and Finance, M. (2018). Myanmar Sustainable Development Plan 2018 - 2030, (August), 1–66. Retrieved from  
[http://themimu.info/sites/themimu.info/files/documents/Core\\_Doc\\_Myanmar\\_Sustainable\\_Development\\_Plan\\_2018\\_-\\_2030\\_Aug2018.pdf](http://themimu.info/sites/themimu.info/files/documents/Core_Doc_Myanmar_Sustainable_Development_Plan_2018_-_2030_Aug2018.pdf)  
[http://www.themimu.info/sites/themimu.info/files/documents/Core\\_Doc\\_Myanmar\\_Sustainable\\_Development\\_Plan\\_2018\\_-\\_2030\\_Aug2018.pdf](http://www.themimu.info/sites/themimu.info/files/documents/Core_Doc_Myanmar_Sustainable_Development_Plan_2018_-_2030_Aug2018.pdf)
- Oo et al. (2018). Assessment of climate change vulnerability of farm households in Pyapon District, a delta region in Myanmar. *International Journal of Disaster Risk Reduction*, 28(March 2017), 10–21. <https://doi.org/10.1016/j.ijdrr.2018.02.012>
- Otsuyama et al. (2019). Adaptive strategies and transformation for community recovery – A case study of villages in Hinthada, Ayeyarwady Region, Myanmar. *International Journal of Disaster Risk Reduction*, 34(November 2018), 75–93. <https://doi.org/10.1016/j.ijdrr.2018.11.007>
- Patel et al. (2017). What do we mean by ‘community resilience’? A systematic literature review of



- how it is defined in the literature. *PLoS Curr. Disasters*, 9.
- Prasse-Freeman, E. (2012). Power, civil society, and an inchoate politics of the daily in Burma/Myanmar. *Journal of Asian Studies*. <https://doi.org/10.1017/S0021911812000083>
- Ramirez, M. D., & Tretter, Bl. (2013). The effect of Myanmar's foreign investment policies on FDI inflows: An analysis of panel data across ASEAN member countries. *International Journal of Accounting and Economics Studies*, 1(3). <https://doi.org/10.14419/ijaes.v1i3.1268>
- Ratner, B. D., Meinzen-Dick, R., Hellin, J., Mapedza, E., Unruh, J., Veening, W., ... Bruch, C. (2017). Addressing conflict through collective action in natural resource management. *International Journal of the Commons*, 11(2), 877–906. <https://doi.org/10.18352/ijc.768>
- Ratner et al. (2013). Resource conflict, collective action, and resilience: An analytical framework. *International Journal of the Commons*, 7(1), 183–208. <https://doi.org/10.18352/ijc.276>
- Rodima-Taylor, D. (2012). Social innovation and climate adaptation: Local collective action in diversifying Tanzania. *Applied Geography*, 33(1), 128–134. <https://doi.org/10.1016/j.apgeog.2011.10.005>
- Saw, K. P. C., & Arnold, M. (2014). Administering the State in Myanmar: An Overview of the General Administration Department, 52. Retrieved from <https://asiafoundation.org/resources/pdfs/GADEnglish.pdf>
- Seekins, D. M. (2009). State, society and natural disaster: Cyclone Nargis in Myanmar (Burma). *Asian Journal of Social Science*, 37(5), 717–737. <https://doi.org/10.1163/156848409X12474536440500>
- Selth, A. (2008). Even Paranooids Have Enemies: Cyclone Nargis and Myanmar's Fears of Invasion. *Contemporary Southeast Asia*, 30(3), 379–402. <https://doi.org/10.1355/cs30-3b>
- Selth, A. (2018). All going according to plan? The armed forces and government in Myanmar. *Contemporary Southeast Asia*, 40(1), 1–26. <https://doi.org/10.1355/cs40-1a>
- Simmance, A. (2013). Environmental Flows for the Ayeyarwady (Irrawaddy) River Basin, Myanmar. Unpublished. *UNESCO-IHE Online Course on Environmental Flows*.
- Soe, K. K. (2020). Climate change effects on agriculture in thabaung township, ayeyarwady region, Myanmar: Challenges and perceptions of farmers. *IOP Conference Series: Earth and Environmental Science*, 451(1). <https://doi.org/10.1088/1755-1315/451/1/012030>
- South, A. (2012). THE POLITICS OF PROTECTION IN BURMA THE POLITICS OF PROTECTION IN BURMA Beyond the Humanitarian Mainstream, 2715(May). <https://doi.org/10.1080/14672715.2012.672824>
- South et al. (2011). Myanmar-Surviving the Storm: Self-protection and survival in the Delta. *Local to Global Protection*, 1–121. Retrieved from [http://www.nargislibrary.org/wp-content/uploads/2011/11/L2GP\\_Myanmar\\_Nargis\\_study.pdf](http://www.nargislibrary.org/wp-content/uploads/2011/11/L2GP_Myanmar_Nargis_study.pdf)
- Stover, E., & Vinck, P. (2008). Cyclone Nargis and the Politics of Relief and Reconstruction Aid in Burma (Myanmar). *American Medical Association*, 300(6), 729–731.

- Thomalla et al. (2006). Reducing hazard vulnerability: Towards a common approach between disaster risk reduction and climate adaptation. *Disasters*, 30(1), 39–48. <https://doi.org/10.1111/j.1467-9523.2006.00305.x>
- Turner et al. (2003). A Framework for Vulnerability Analysis in Sustainability Science. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 100(14), 8074–8079.
- United Nations Environment Programme. (2009). Learning from Cyclone Nargis : Investing in the Environment for Livelihoods and Disaster Risk Reduction : A Case Study, 32.
- Ware, A. (2011). The MDGs in Myanmar: Relevant or redundant? *Journal of the Asia Pacific Economy*, 16(4), 579–596. <https://doi.org/10.1080/13547860.2011.610889>
- Ware, A. (2014). Development in a Fragile Pariah State: Myanmar 1990–2010. In *Development in Difficult Sociopolitical Contexts*. [https://doi.org/10.1057/9781137347633\\_12](https://doi.org/10.1057/9781137347633_12)
- Wilcox, D. (1994). Community participation and empowerment: putting theory into practice. *RRA Notes*, 21(21), 78–82. <https://doi.org/10.1007/s13398-014-0173-7.2>
- Wilson, T. (2016). Strategic Choices in Myanmar’s Transition and Myanmar’s National Security Policies. *Asia and the Pacific Policy Studies*, 3(1), 62–71. <https://doi.org/10.1002/app5.117>
- WWF. (2017). *Assessing Climate Risk in Myanmar*.
- Zaw, T. N., & Lim, S. (2017). The military’s role in disaster management and response during the 2015 Myanmar floods: A social network approach. *International Journal of Disaster Risk Reduction*, 25(February), 1–21. <https://doi.org/10.1016/j.ijdrr.2017.06.023>
- Zin, S. T. (2015). Seventeen Delta Townships Still Flooded. *The Irrawaddy*.

*Data collection*

<b>Hpa Ya Ni</b>	Number	<b>Khat Ohn Chaung</b>	Number
Problem ranking & actor mapping	1	Problem ranking & actor mapping	1
Walk-along interview	1	Walk-along interview	1
Focus groups	4 (combined), 1 Marijn	Focus group	4 (combined), 1 Marijn
In-depth interviews	10-15	In-depth interviews	10-15

**Chairmen problem ranking and actor mapping**

The first key person to talk to and gather information from are the chairmen. For this first exercise it is important to identify the environmental problems which have a large impact on the village.

Problem ranking environmental changes:

The following environmental changes are laid out here, are these correct?

- Flooding
- Big waves during flooding
- Tropical storm
- Cyclones
- Land degradation
- Erosion
- Increasing water level
- Deforestation
- Elephant poaching
- Salinization
- Water scarcity
- Food insecurity
- Fires

Could you rank these issues, which is according to you, the largest problem to less of a problem?

Problem number 1:

- Could you describe in your own words, why this hazard is a problem for you?
- What are the consequences of this problem, to your life?

Problem number 2:

- Could you describe in your own words, why this hazard is a problem for you?
- What are the consequences of this problem, to your life?
- Which problem is not relevant for you, and why?

## Venn's diagram

Figure 4: An example of Venn's diagram.

### Objective

- ◆ To know the relationship of the important persons from inside and outside of the village related to land management

### Required Materials for Resource Mapping

- ◆ A0 sheet, Maker pens (Red-blue-black), Pencil, Eraser, Paper Tapes, Color

### Participants who should involve in the exercise

- ◆ The medium aged people who know the village well
- ◆ One Village Influential Person
- ◆ The persons who are actively participating in the social activities of the village

### Procedures

- ◆ Write down the administrative departments, the village committee, the organizations from inside and outside of the village and the persons regarding environmental change
- ◆ Divide the large, medium and small circles according to the role of importance
- ◆ Write the concerned organization name on the circle
- ◆ Place the circles at the near or farther distance depending on good or bad relationship
- ◆ Draw the relationship lines according to the good, fair and poor status
- ◆ Describe the reason of poor relationship

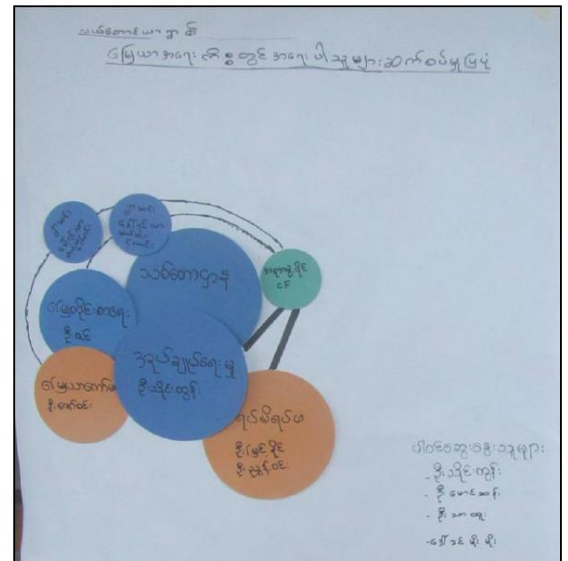
### Discussion Points for the village resource map

- ❖ Which organizations among the village organizations will involve in tackling the environmental change (hazards) and how? (giving the recommendations, bearing the witness in court, conflict resolution etc)
- ❖ Who are the main actors?
- ❖ What are the duties and responsibilities of the organizations?
- ❖ Are the organizations formed because of government's directions or for the village requirement?

### Walk-along interview:

In an addition to the problem ranking, a walk-along interview will contribute to paint a picture of the effects of the environmental problems visible in the village. The walk-along interview will be unstructured, since the participant will show his/her view on the effects of environmental hazards on the village. However, the following topics are used to gather the useful information needed for the research:

- What are the most visible effects, of the identified problem, in the village?
- What is according to you, the biggest problem that flooding has on the village?
- According to you, what for consequences has flooding on life in the village?
- What are, according to you, the most important events that are organized to deal with flooding?
- Do you think that the responses dealing with flooding, help with being more prepared and being able to deal with flooding?



**Focus groups**

In a prior exploratory visit to the village in Thabaung township, a focus group meeting pointed out the following groups are important for collecting relevant data in relation to collectively organized initiatives to address environmental change:

- Village chairmen/leaders (identify people from committee, identify elderly and disabled)
- Fishermen and farmers
- Most affected households (physical, poor)
- Water committees
- Women

*Focus group guide*

General information

Household member	Age	Gender	Occupation	Educational level

Histograms:

First, we'd like to understand more about the history of flooding and the effect on your lives. With the paper, we'd like you to mark each flood or natural disaster you have experienced. We are going to map:

- Horizontal: years
- Vertical: Natural disasters, movement (where, how long), effects, personal events

*Figure 2: An example of a histogram, which is used to conduct research and map vulnerabilities.*



Questions about histograms:

1. Have the effects of flooding gotten worse over time?
2. What were the most difficult periods?
3. Would you like to share the most significant events on your histogram?
  - a. How do floods affect your livelihood?

Questions about migration:



1. Is there anyone in the village that leaves for reasons other than flooding?
2. For what reasons do you normally travel away from the village?
  - How often does this happen?

Has anyone left the village permanently?

- Who were they? Why did they leave?

Questions about displacement:

1. How do you make a decision when you know a flood is coming?
2. How much time do you have to prepare before leaving after you find out?
3. What are the most important factors when you choose someplace to go?
  - Do you feel like you have a choice in where you go during the floods?
  - Who makes the decisions?

What are the biggest changes to your daily lives/livelihoods when you are living somewhere else?

Questions about community structures:

1. What kind of activities (where the whole/parts of community come together) take place in the community?
  - Who organizes these activities?
  - How do you know about the activities?

How often do you gather as a community/in your social life?

a. Weekly/monthly/yearly depending on kind of activity

In what kind of activities do you participate in? / Do the events include everyone?

Why do you go to these activities? → focus on 1 or 2 mentioned activities 'snapshot'

- Are there activities where you don't go to, why?
- What drives you to go to these activities?

Questions about village:

1. Are there people in the village who cannot leave when it is dangerous?
  - How do the elderly and disabled leave?
  - How do people without a boat leave?
  - Can we talk to someone who has had difficulty leaving during the flood?

Who has the most trouble in the village when it comes to floods?

Closing Questions:

1. Is there anything else about the floods that is important for us to know?
2. Do you think people would ever need to leave this village permanently due to the floods?
  - At what point would that be a possibility?
  - Would you have somewhere to go?

**Interviews**

*Introduction*

I am here in the village to conduct research about the effects of environmental change (climate change and hazards) on your community. Within this context, my focus is on how initiatives in the community are organized in relation to environmental change. I will be asking question about you as an individual and focused on community level.

The aim of the research if for educational purposes, to finish my master's degree. The data will be collected anonymously and your names and identifying information will not be made public. A side from the university, the report will be available to various organization and other actors involved, such as yourself. So by sharing the gathered information, it can be used for advocacy purposes.

With your permission, I would like to record this interview. It will help me to listen and understand exactly what you are saying. The recordings will not be shared and will only be heard by me and my translator. I'm very grateful for your time and would like to get started with the interview. Do you have so far any question and do I have your permission for the recording?

*Interview guide*

General information

Household member	Age	Gender	Occupation	Educational level

Introduction questions:

- For your household, what is the main source of income?
  - a. What is your secondary source of income?  
Examples: fisherman, farmer, teacher.
- Can you tell me, where in a day do you normally go, and who do you interact with?  
Examples: work (fields, river), shop, family, neighbours, friends

Question about flooding on household level:

- What is your experience with flooding in the village?  
Probe: what kind of effect has flooding on your livelihood?  
Probe: how does flooding affect your social life?
- How far in advance do you know about the flooding?  
Probe: how many days/hours in advance?
- Do you think you are informed in time before the flooding comes?  
Probe: communication with other village, chairmen, family, neighbours
- When the floods came, did you have to leave?  
Probe: time, how and who decided for your household/family
- When the floods come, do you discuss with your neighbours and family what you are going to do?  
Probe: influence, leave together, use boats together, plan beforehand
- When the water level is above 10 feet, does your family stay or seek shelter?  
Probe: stay, monastery or clinic, go to higher place near road, other village
- How do you come to that decision?  
Probe: head of household, family, neighbours, committee
- When flooding comes, is it common to leave your house unguarded?  
Probe: relation to neighbours, trust in community

Question about flooding on community level

- According to the first visit here, when the water level is above 10 feet, a water committee is formed. Could you tell me what the committee organizes?  
Probe: searching donors, getting families to higher ground, getting people back
- How does the committee inform the people in the community about actions and decisions?  
Probe: direct communication, indirect communication, head of households
- How is the community involved in the organized activities and initiatives?  
Probe: active role, frequent communication, finding donors, moving people to higher grounds

- Do you think that the activities organized by the committee meet all the needs of what the people in the village need?  
Probe: positive impact, problems that the committee faces
- To help people with flooding, what other activities can be organized according to you, to help people in the village out?  
Probe: education for students, cooperate with villages nearby
- Imagine, that the committee would ask for your advice in dealing and organizing activities to help people with flooding. What advice would you give them?  
Probe: better communication, permanent committee
- Do you have trust in the community, to help find ways to deal with flooding?  
Probe: capacities, capabilities of committee and chairmen
- What are, according to you, the most difficult problems to solve when it comes to organizing initiatives to deal with flooding?  
Probe: communication, distribution, finding donors, informing community
- Do you think the activities that the committee organizes, contribute to dealing and being more prepared for flooding?  
Probe: negative consequences, positive consequences
- If you had the opportunity, would you want to contribute to the organization of activities that deal with flooding?  
Probe: social relations, chairmen, women, types of events

Question about community and participation:

- Can you describe your life as a community member?  
Probe: connection to neighbours, village elders
- Would you consider yourself an active member of the community?  
Probe: active, passive, visit meetings, parties organized, involved in organization of initiatives
- Do you often go to activities that are organized in the village?  
Probe: parties, religious activities, community meetings
- Could you explain to me the reasons for going to these activities?  
Probe: motivation, parties, religious activities, community meetings
- Do you think it is important that the village organizes activities?  
Probe: social relations, initiatives that deal with flooding

Closing questions:

- Do you feel supported by your community?  
Probe: in participating in events, in organizing in events
- What do you think is the most important change that should happen in the village?

**Chairmen and committee**

Chairmen and committee member are involved in the decision making process around responses with flooding. Decision making, responsibilities, capacities of the operationalization of responses lays with the chairmen and the committee within the villages. Therefore a different set of focus group and interview questions are necessary in order to grasp the processes that are behind the decision making, organization, distribution and preparedness towards environmental change.

*Focus group guide*

Introduction questions:

- Describe the role of the committee in the community?
- How do you choose who becomes part of the committee?

#### Questions about structure committee

- Could you describe to me who is part of the committee?
  - a. What is everyone's role in the committee?
- What kind of activities does the committee organize?
- How often do you come together for a meeting?
  - a. Could you describe how often you meeting during the rain season?
  - b. What is the reason that the committee is not permanent?
- Why did you want to be part of the committee?

#### Questions about communication and decision making:

- Could you describe to me, when a flood is coming how the informing procedure goes?
  - a. How does information reach the village from regional (Pathein) level?
- When you come together as the committee what are the first priorities?
  - a. How do you come to this decision?
  - b. How do you divide the duties of the activities? (duties)
- Are villagers involved in the decision-making process?
  - a. How do you inform the villagers of the decisions and activities?
  - b. (How can the villagers tell you of their concerns?)

#### Questions about strengths and weaknesses:

- As a committee, in what things have you been most successful?
- In what year did the committee first come together?
  - a. Have the activities and responses changed over time?
- How did the villagers respond to the activities that the committee organizes?
- Are there things that are difficult for the committee to accomplish?
  - a. Do these difficulties come back every year?
  - b. How do you respond to that?
- Is there anything that the committee should change?
- Have the committee activities lead to being more prepared for flooding? (does the committee deal with also preparing for floods or only response?)

#### Questions about government and NGO responses:

- To deal with flooding, what does the government do after flooding?
  - a. What kind of projects is the government currently organizing?
  - b. In 2015, the highways have been raised. Did this have an effect on your village?
  - c. Did villagers have to travel less distance to go to higher ground?
- Does the government consult you in what are the largest problems in your village when it comes to flood preparedness?
- Does the government support you in organizing activities in your village to deal with flooding?

#### Closing questions:

- Does the community in the village support you in the activities you organize?
  - a. Do they respond positively?
  - b. Is there a lot of criticism?
- How important do you think this committee is in responding to flooding?
- Do you have any recommendations for me?

#### *Interview guide committee member*

#### Introduction questions:

- What is your position in the village?
- How often have you been a member of the water committee?
  - a. Why is the position not permanent?
- What is your role in the committee?
  - a. How are the tasks divided?

Questions about committee activities:

- When the committee comes together, what is the first priority?
- One of the committee's activities is getting donors. Could you take me through this process?
  - a. How do you identify/find donors?
  - b. In what kind of aid do they provide? (financial, physical goods, ect.)
  - c. Are donors involved in other activities next to flooding?
- One of the other activities is bringing people to higher ground when the floods come. Could you guide me through the process?
  - a. Who is responsible of getting the villagers to higher ground?
  - b. How do you move people who are vulnerable (disabled and poor) to higher ground?
  - c. For the period that villagers stay on higher ground, what does the committee arrange there?
- In the process of returning people back to the village, could you guide me through the process?
  - a. How does the committee decide it is safe enough for people to return?
  - b. Who goes back first, and last?
  - c. How long does it take before every one of the village is returned?

Questions about strengths and weaknesses:

- According to you, in what is the committee the most successful?
  - a. Has it always been like that, or has that developed over time?
- According to you, what is the weakest point for the committee?
  - a. How do you think that can be improved?
  - b. Is there anything the committee should change?
- According to you, have the committee activities contributed to being more prepared for flooding?
  - a. What things could the committee organize to being better prepared, according to you?

Questions about government and NGO responses:

- What does the government do to deal with flooding?
  - a. What do they organize to prevent it?
- Does government support the committee's activities?

Questions about community involvement participation:

- Do you think, that there is a good line of communication between the committee and the villagers?
- How are the committee activities received by the villagers?
  - a. Is there any criticism?
- Do you feel supported by the community in the activities that you organ?
  - a. How does the community show this?
- How would you describe the involvement of the community in the committee's activities?

Closing questions:

- How important do you think this committee is in responding to flooding?



- Do you have any recommendations for me?