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When the Dust Has Settled:

A Post-Disaster Recovery Study of Water and Sanitation Reconstruction after the 2015 Flood in Phalombe and Nsanje Districts, Malawi.

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ABSTRACT

This thesis is the result of the research project carried out as part of the Master Programme MPhil in Development Studies, Specialising in Geography, at the Norwegian University of Science and Technology. The aim of the study has been to describe and discuss the water and sanitation recovery process in Phalombe and Nsanje Districts, Malawi, following the 2015 Southern African Flood. The study includes an investigation of the opportunities and challenges related to the recovery process and the nature of the involvement of different actors, with special focus on the contribution of local communities, local government and the importance of outside assistance.

The data was collected during by using a case study approach, choosing two districts and four villages within the districts. The study uses a qualitative methodology, and the research methods consists primarily of interviews and focus group discussions with villagers in the four villages, local authority figures and District Government representatives, as well as a representative from UNICEF, which were the co-leading body of the WASH cluster.

The study shows that the water and sanitation infrastructure not only suffers from direct, structural damage, but also indirect damage caused by the population displacement that follows the flood event as the existing facilities in some areas are being overused. In addition, recovery, resilience and adaptation are being used central concepts in this study. A quick recovery, high resilience, and appropriate disaster adaptation can lead to an increased preparedness and mitigation towards future disasters, which could lead to fewer losses and less damages in the future.

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ACRONYMS

ACPC	Area Civil Protection Committees
ADC	Area Development Committees
ADDRMO	Assistant District Disaster Risk Management Officer
BOMA	British Overseas Management Administration
CARD	Churches Action in Relief and Development
CPC	Civil Protection Committee
DCPC	District Civil Protection Committee
DDRMO	District Disaster Risk Management Officer
DoDMA	Department of Disaster Management Affairs, Government of Malawi
DPD	Director of Planning and Development
DWO	District Water Officer
ENSO	El Niño Southern Oscillation
FDG	Focus Group Discussion
FWS	Forecasting and warning systems
GDP	Gross Domestic Product
GoM	Government of Malawi
IFRC	International Federation of Red Cross and Red Crescent Societies
LDC	Least Developed Countries
MDG	Millennium Development Goals
MGDS	Malawi Growth and Development Strategy
NAPA	National Adaptation Programmes of Action
NCST	National Commission for Science and Technology
NDRM	National Disaster Risk Management
NESH	National Research Ethics Committee for Social Sciences and Humanities
NFI	Non-food items
NGO	Non-Governmental Organisation
NRCM	National Research Council of Malawi
NSO	National Statistical Office
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
ODF	Open Defecation Free
PDNA	Post-Disaster Needs Assessment
PFM	Public financial management

SDG	Sustainable Development Goals
SES	Socio-economic status
STA	Sub-Traditional Authority
TA	Traditional Authority
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VCPC	Village Civil Protection Committees
VDC	Village Development Committees
VH	Village Headmen
VIP latrine	Ventilated Improved Pit Latrine
WCDR	the 2005 World Conference on Disaster Reduction
WWAP	World Water Assessment Programme
WWDR	World Water Development Report

CHAPTER 1: INTRODUCTION

1.1. Background of the study

"Disasters have a direct relationship with economic and social development in countries that are inflicted with catastrophic disasters" (Khosa, 2014: 384). The study of natural hazards has been a well-established field of study within geography since the 1940s, and different researchers suggests numerous factors that contribute to the severity of the effect of a hazard on human populations. These factors includes inadequate infrastructural quality, the populations' health and nutritional status, marginalised populations, political instability, increased urbanisation and unplanned development, inadequate social welfare infrastructure, population size and growth, and pressures on the natural environment as such factors (Rosenfeld et al., 2005).

In January 2015, six Southern African countries, including Malawi, experienced severe flooding caused by heavy seasonal rainfall in combination with the tropical cyclone Chedza (OCHA, 2015a). The UN reported that the Southern Region of Malawi received 400 percent higher rainfalls than usual, which led to the Shire River reaching its highest levels in 30 years. The flood caused severe damage to infrastructure, crops and livestock, and forces people to flee their homes to seek refuge in displacement camps located on higher grounds (OCHA, 2015b). There were a growing concern for disease prevention due to poor sanitary facilities and drainage conditions at relocation sites. The most affected districts were located in the Southern Region. The two districts in this study, Phalombe and Nsanje, are two of these most affected districts. The needs of the affected population and the extent of the damage caused by the flood resulted in the State President, Mr. Peter Mutharika, declaring a state of disaster in the 15 affected districts (of the total 28 districts) on 13 January, and at the same time appealed to the international community for support (DoDMA, 2015 a).

Floods are natural parts of the hydrological cycle and the life of rivers. However, the frequency and severity of floods can increase caused by human actions like deforestation and interference with river channels (Schmuck, 2012). A population perception is that the increased frequency of floods and storms is a result of global warming, more specifically linked to the belief that the El Niño Southern Oscillation (ENSO) is increasing in frequency and intensity as part of the climate change (Wisner et al., 2004). Humans choose to live in or near flood prone areas

because these sights often offer benefits such as easily cultivated agricultural land and location in close proximity to a water supply.

This study originates in the belief that people in developing countries tend to suffer greater losses from natural disasters than people in developed countries. "Natural disasters occur all over the world; however, their impact in developing countries is greater due to the geographical location in zones highly susceptible to natural hazards, and also due to the different types of economic, social, political and cultural vulnerabilities" (Alcántara-Ayala, 2002: 121). Toya and Skidmore (2007) finds that countries with higher educational attainment, greater openness, more complete financial systems and smaller governments experiences fewer losses from natural disasters. The ideal outcome of a disaster is resistance, meaning that the available resources (both social and economic) have efficiently blocked the stressor that threaten the wellbeing or functioning of individuals, organisations, communities or societies (Norris et al., 2008). When a disaster occur in a developing country, the post-disaster recovery efforts may compromise the overall development initiatives as resources are being allocated to tackle the recovery needs of the affected population.

This study focuses on the post-disaster recovery of water and sanitation facilities in Phalombe and Nsanje Districts. When discussing a natural disaster is can be helpful to divide the disaster mitigation into four phases: *prevention*, *preparedness*, *response* and *recovery*. After the 2015 flood, extensive information about the response and relief efforts were made public through timely situation reports from various actors like the Department of Disaster Management Affairs (DoDMA), UNICEF and different Non-Governmental Organisations (NGOs)[1]. However, this study originates in the desire to investigate my assumption that post-disaster assistance decreases with time after the time of the event, with specific focus on the long-term recovery efforts within the affected communities. The topic was narrowed down to the recovery of water and sanitation facilities based on the importance of these services both during and after the disaster.

1.2. Problem Statement

This thesis explores the nature of the recovery of water and sanitation infrastructure in Malawi after the 2015 flood. The aim of the study is to describe and discuss the recovery process, as

[1] See DoDMA, 2015a and UNICEF, 2015 for examples of Situation Reports after the 2015 flood in Malawi.

well as opportunities and challenges faced by the different actors contributing – with special focus on local communities and local government and the importance of international assistance. The study focuses on the water and sanitation reconstruction in Phalombe and Nsanje, two of the most affected districts.

The choice of focus on water and sanitation bases on the importance of water and sanitation facilities ensuring good health among affected people by preventing disease outbreaks. Recovery after a natural disaster is relying on the efforts of all levels of society, and especially the contributions from the affected people and communities.

1.3. General Objective

To understand and analyse the recovery process in Malawi after the 2015 flood, including the nature of the recovery process, engaged actors at different levels, challenges and opportunities related to the recovery process, and the role of the local community.

1.3.1. Specific Objectives

- To understand the nature of the recovery process in Phalombe and Nsanje districts, including the roles of the participating actors and the challenges (and opportunities) faced throughout the process.
- To investigate the role of the local communities own responsibilities in the recovery process.

1.3.2. Research Questions

When going to Malawi to investigate this matter further, I had formulated research questions to help guide me towards the information I was seeking. The research questions works as the basis of the fieldwork and data collection.

1. What are the differences between short- and long-term recovery on water and sanitation?
2. What are the nature of involvement and the responsibilities of the different actors who are contributing to the recovery process?
3. What is the role of the affected population or communities?

By answering these questions, I hope to contribute to the knowledge on post flood recovery and restoration in private households by using the example of water and sanitation infrastructure.

1.4. Justification of the Study

Whether flooding has increased over the last decades is controversial. Nevertheless, the reality is that more people are affected by floods (Schmuck, 2012). Deaths associated with natural disasters, particularly rapid-onset disasters, are overwhelmingly due to trauma, injuries, or drowning. Deaths from communicable diseases after natural disasters are less common. The risk factors for outbreaks after disasters are associated primarily with population displacement. The availability of safe water and sanitation facilities, the degree of crowding, the underlying health status of the population, and the availability of healthcare services all interact within the context of the local disease ecology to influence the risk for communicable diseases and death in the affected population (Watson et al., 2007). Even though the deaths from communicable disaster after disasters are uncommon, many people get sick from drinking contaminated water, which leads to them being unable to contribute to the recovery and development efforts.

In the field of geography, hazard research has been well established since the 1940s. The hazard research pioneer, Gilbert F. White (1911-2006), published his doctoral dissertation *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States* in 1945 (White, 1945). White is being referred to as the leading natural hazards, natural resources, and environmental geographer of the twentieth century (Hinshaw 2006; Westcoat 2006). White opened the policy realm to rational management of human processes in addition to our relationships to the geographies of natural processes (Tiefenbacher 2013). In his doctoral dissertation, White (1945: 2) wrote, ‘‘floods are ‘acts of God’, but flood losses are largely acts of man. Human encroachment upon the flood plains of rivers accounts for the high annual total of flood losses’’. Since the 1940, the literature has expanded in terms of the sources of hazard and critical evaluation of the deeper causes behind the decisions that increase hazards. The geographical interest in hazards goes beyond the understanding of the geophysical process, and recognises the importance of human processes (economic, social, psychosocial etc.) in the creation and response to hazards. Burton, Kates and White (1993) looks at the impacts of natural hazards as derived from the interaction between nature and society. We are trying to understand why people choose to live in places and in ways that increase the likelihood of being impacted by hazardous conditions (Tiefenbacher 2013).

Hazard studies have also increasingly focused on community participation and resilience. In this study, resilience refers to the ability of affected people, communities and nations to recover from a disaster that disrupt people’s livelihood patterns. Concepts like bouncing back from the

disruptive event and building back better to be more resilient to future hazards are both commonly used, but also being questioned. Wisner et al. (2004: 359) argues that "in order to have 'recovered', a household should have not only re-established its livelihood, physical assets and patterns of access, but should be more resilient to the next extreme event".

If and when a flood hits, affected families in Europe will get assistance from the government and to a certain degree also from insurance companies, while African families can only hope to get temporary shelter in camps and some assistance from a non-governmental organisation (NGO) working in their area (Schmuck, 2012). Recovery in African communities can take years as the affected people have lost everything and the government rely on external assistance for recovery. In a flood situation, clean water supplies and good sanitation is important to prevent disease outbreaks. This is why efforts regarding water, sanitation and hygiene (WASH) is so important following a disaster. Access to adequate amounts of safe water and sanitation facilities are related to human wellbeing and development. Unsafe drinking water is linked to waterborne infections such as diarrhoea, typhoid fever, cholera, dysentery and infectious hepatitis. Access to safe water supplies and sanitation facilities can be jeopardised by a natural disaster. Floods may cause structural damage to water and sanitation infrastructure, as well as contaminating the water. The greatest waterborne risk to health in most emergencies is the transmission of faecal pathogens due to inadequate sanitation, hygiene and protection of water sources. Diarrhoeal diseases outbreaks can occur after drinking contaminated water, commonly reported after flooding and is related to displacement (Gurzau et al., 2009).

In development theory, there has been a general shift from the traditional 'top-down' to 'bottom-up' or 'grassroots' theories and approaches to development. Modernization theories followed the European model of development, while dependency theories stated that Southern countries were poor due to exploitation by Northern countries. Neoliberalism focuses on the market, stating that governments should retreat from direct involvement in economic activities. These theories mentioned, in addition to the basic needs approach, stating that government and aid policies should provide for the basic needs of the world's poorest people, have all an 'top-down' perspective on development. The grassroots approaches emerging in the 1980s, shifted focus from a national level of development initiatives to acknowledge the importance of considering the local context and indigenous knowledge. Earlier, focus has been on national level economic growth, now shifting to the recognition of other developing aspects where

NGOs and grassroots organisations and individuals plays a greater role on a more local scale (Willis, 2011).

This created the background for choosing water and sanitation as topic for this study. During the Malawi flood, people were fleeing their homes, seeking refuge in temporary camps. In some area, people were staying in the camps for several months before they were able to move back or to a relocated sight. The health situation in the camps were not great, but WASH related efforts prevented large-scale communicable disease outbreaks. During the 2015 floods, a total of confirmed cases of cholera was 423 and the total number of deaths was six (DoDMA, 2015b). After people started moving back, distribution of aid and assistance became harder. In addition, with time after a disaster, relief funds decreases. Long-term recovery assistance has to rely on government funding and NGOs that have money for this in their budget. This may lead to a long lasting recovery process relying on the allocation of funds from outside actors.

In addition to the importance of the recovery process for improving the preparedness for future events, the scheduled time for the fieldwork provided the opportunity of focus on post-disaster recovery efforts as the fieldwork were conducted eight months after the flood event occurred. The choice of looking at water and sanitation recovery in private households were because water and sanitation is a precondition for good health, which leads to a strong community that are able to participate in the recovery.

This study is an important addition to the research on the effects of disasters by looking at two geographical areas affected by floods and by illustrating the recovery efforts on water and sanitation reconstruction and improvement. To be able to recover and again focus on development projects, people should strive for a quick recovery.

1.5. Structure of the Thesis

This thesis is divided into seven chapters. This chapter (Chapter 1) introduces the basis of this thesis, which includes an introduction to the topic, the research objectives and questions. Chapter 2 provides the contextual framework, which includes an introduction to hazards and disasters and the Disaster Management System and plans in Malawi together with an overview of the 2015 flood and a country and district profiles. Chapter 3 presents the theoretical framework used to analyse and discuss the empirical evidence in chapter 5 and 6. The theoretical framework includes the concepts of post-disaster recovery and resilience. Chapter 4

describes the methodology used during this study and includes methods for gathering the empirical data, the analysis process, ethical and practical considerations, and limitations of the study. In chapter 5, the short-term recovery efforts are being discussed, including the emergency response and relief, the development of needs assessment reports, and how the efforts are being coordinated. Chapter 6 focuses on the long-term recovery efforts, including the reconstruction of damaged facilities. Chapter 7 provides the concluding discussions and answers to the research questions.

CHAPTER 2: DISASTER OCCURRENCE AND MANAGEMENT IN THE MALAWIAN CONTEXT

Both the majority of the Malawian population and the national economy is based on agricultural production, which leads to a dependency on natural rainfall and climate stability, or developed irrigation systems. Climate change, and especially any changes to the precipitation patterns, will impose additional constrains on the vulnerable economy and hence affect the economic growth of the country (Government of Malawi [GoM], 2002). The intensity and frequency of disasters due to hazard events have been increasing due to climate change, population growth, urbanisation and environmental degradation (Nsanje District Council, 2015), and floods are one of the events that may cause disasters which affects Malawian farmers.

2.1. Hazard Risk and Vulnerability in Malawi

Malawi is a country that faces great threats by natural disasters. Climatic variability is the main source of natural hazards in the country (Benson & Clay, 2004). The events that occur in the country includes floods, drought, landslides, pests and disease outbreaks, tornadoes and strong wind systems, and earthquakes. Natural disasters hinder socio-economic development efforts as the agricultural sector, in which Malawi is highly dependent, is adversely affected. The country has a low capacity to either adapt or mitigate the impacts of these extreme climatic events (GoM, 2002). Parts of the country experiences floods and people living in close proximity to rivers may experience seasonal floods almost every year. Farmers in Malawi are highly vulnerable to any changes in the precipitation patterns, and a hazard event causes severe negative effects. In the lower Shire Valley where Nsanje District is located, cycles of recurrent floods and droughts are normal. Between the years of 1967 and 2003, Malawi experiences 6 major droughts and 18 incidences of flooding, which heavily affected the countries smallholder farmers. The last two big floods in Malawi before the 2015 flood includes one in Nsanje District in January 2012 and one in Mangochi District in January 2013. These big floods affected many people and washed away crops, and resulted in loss of human lives, destruction of infrastructure, crop loss, long-lasting food insecurity and health impacts like diarrhoea, cholera and malaria (GoM, 2015a).

As mentioned, the Malawian economy is fragile and depends on the climatic conditions. The most important agricultural product for most Malawians is rain-fed maize, which accounts for over 70 percent of the energy intake. Maize are extremely sensitive not just to drought or low

rainfall, but also to erratic rainfall during the growing season and to abnormally high rainfall (Benson & Clay, 2004). Climatic change will import additional constrains on the agricultural production and hence affect the economic growth in the country (GoM, 2002). Consequences includes crop failure and unstable commodity process (Globalis, 2014), as most Malawians live in rural areas depend on agricultural production.

2.2. Disaster Management System in Malawi

"Disaster management efforts aim to reduce or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery" (Senevirante, Baldry & Pathirage, 2010: 376). The disaster management system and structure in Malawi is divided into national and district level. The overall national disaster reduction goal is a "sustainable reduction of disaster losses, in lives and in the social, economic, and environmental assets of communities and of the nation" (UNISDR, n.d.). The Department of Disaster Management Affairs (DoDMA) is responsible for coordinating and directing the implementation of disaster risk management programmes in Malawi in order to improve and safeguard the quality of life of Malawians, especially those vulnerable to and affected by disasters (UNISDR, n.d.). Both Phalombe and Nsanje has an Office for Disaster Management at district level: the District Disaster Risk Management Office.

2.2.1. Disaster Management Plans and Policies

Malawi has developed a series of Disaster Management Plans at various levels. At national level, they have the *National Disaster Risk Management Policy* (NDRMO) (GoM, 2015b) and the *National Plan for Action* (NAPA) (GoM, 2006). At local level, *District Contingency Plans* covers the preparedness, response, mitigation/prevention and recovery arrangements of disasters within the respective district. When a disaster happens, *Needs Assessment Reports* are developed to map out the damage, needs and resources available to respond to the disaster.

The National Disaster Risk Management Policy presents an opportunity for effective implementation and coordination of Disaster Risk Management programs and activities. The Disaster Risk Management Policy aligned to the Hyogo Framework for Action (HFA) adopted by the United Nations World Conference on Disaster Reduction in 2005 of which Malawi is a signatory. The NDRM aims at achieving sustainable development through ensuring that disaster risk management is integrated in development planning in all sectors in the country. The policy will also function as a facilitation for the effective coordination of disaster risk

management programmes. It highlights six key priority areas and strategies for making Malawi a nation resilient to disasters (GoM, 2015b). These priority areas are: (1) mainstreaming disaster risk management into sustainable development; (2) establishing a comprehensive system for disaster risk identification, assessment and monitoring; (3) developing and strengthening the early warning system; (4) promoting a culture of safety and adoption of resilience-enhancing interventions; (5) reduce underlying risk; and (6) strengthen preparedness capacity for effective response and recovery (UNIDSR, n.d.). The policy also provides a common direction to all government, non-governmental organisations, private sector organizations, media and development partners at national and local levels on how to implement disaster risk management programmes and activities effectively (GoM, 2015b).

The National Plan for Action (NAPA) evaluated the impacts of adverse climatic conditions in eight important sectors of economic growth, and ranked the identified activities to arrive at a list of fifteen urgent and immediate priority needs for adaptation. The analysed sectors are agriculture, water, human health, energy, fisheries, wildlife, forestry and gender. NAPA was developed recognising the affected majority are least resilient to cope with the impacts of climate change and its adverse effects (GoM, 2006). The NAPA identifies five priority areas:

1. Improving community resilience to climate change through the development of sustainable rural livelihoods,
2. Improving agricultural production under erratic rains and changing climatic conditions,
3. Restoring forests in the Upper and Lower Shire Valleys and other catchments to reduce siltation and associated water flow problems,
4. Improving Malawi's preparedness to cope with droughts and floods, and
5. Improving climate monitoring to enhance Malawi's early warning capability and decision-making and sustainable utilization of Lake Malawi and lakeshore areas resources.

At local level, the Disaster Management Plans varies from district to district. However, all districts should have a District Contingency Plan, developed to guide stakeholders in implementing various disaster preparedness, response, mitigation and recovery activities. The contingency plans priority different hazards based on the hazard risk in the district. In Nsanje, for example, the contingency plan focuses on prolonged dry spells, floods and other hazards like strong winds, human disease outbreaks, and disease outbreak and pest infections (Nsanje District Council, 2014). Phalombe has both a Contingency Plan (see Phalombe District Council,

2014/2015) and a Disaster Risk Management Plan (see Phalombe District Assembly, 2009-2014). When a disaster occurs the national and district Governments produces Post-Disaster Needs Assessments, which are distributed to the partners participating in the response and recovery (See GoM, 2015a; Nsanje District Council, 2015).

2.3. The 2015 Flood

The 2015 flood started in parts of Malawi on January 12, and the President declared a state of disaster on 13 January 2015. Nsanje and Phalombe were two of the most affected districts. The rainfall experienced in the beginning of January 2015 was the highest rainfall on record in Malawi and constitutes a 1 in 500-year event, causing significant flooding, predominately in the Southern Region. The National Post Disaster Needs Assessment (2015) estimated that 1,101,364 people was affected, 230,000 were displaced and 106 people were killed. The 2015 flood caused substantial damage and loss in the productive, public infrastructure and social service sectors. The flood damaged people's homes and household property. Standing and stored crops was washed away and livestock were lost. Other infrastructure, such as roads, bridges, irrigation schemes, and school and health facilities were also damaged (GoM, 2015a).

The Malawi President, Professor Arthur Peter Mutharika, declared a state of emergency because of the heavy flooding in both Shire and Ruo Rivers. The Ruo River joins Shire River in Nsanje, close to the town Chiromo (see appendix VI, showing a sketch map of Nsanje District). These two rivers are part of the Shire Highland drainage system, which makes the district at risk of flooding caused by rain in other parts of the country. The Shire River is the only outlet of Lake Malawi, while the Ruo River originated in the Mulanje mountains. The muddy water pass through a large stagnant known as the Elephant Marsh. The flooding were a result of heavy down pour experienced during the two weeks of January 2015. The floods in Nsanje was exacerbated by the rains in the Shire Highlands, which drains it waters in either Shire or Ruo Rivers (Nsanje District Council, 2015).

The 2015 flood was not the first flood in either Phalombe or Nsanje. Areas in close proximity of rivers in the districts may experience some flooding every year. What was different in 2015 was that the extent and damage compared to previous years. The flood also took people by surprise because they were not expecting floods at that time. Floods were expected when Lake Malawi and its feeding rivers were bloated up. Seasonal floods may be expected and hence people are better prepared to tackle its effects than after untimely floods (Schmuck, 2012). The

"surprise" factor contributes to the effects of the flood in terms of total damage and recovery needs.

Both Phalombe and Nsanje represent some of the poorest areas of Malawi. The recent Integrated Malawi Household Survey indicates that both Phalombe and Nsanje have poverty rates above the national average of 50.7 percent (2010 – down from 52.4 percent in 2005). Phalombe has a poverty rate of 64.5 percent in 2010, which has increased from 61.9 in 2005. Nsanje is even poorer, with a poverty rate of 81.2 percent, increased from 76.0 percent in 2005 (GoM, 2015a).

2.3.1. The 2015 Flood Damage to Water and Sanitation

During a flood, water rise and leads to a pressure on structures. If the water is moving/flowong, additional pressure is added and may contribute to structural damage. The damage is either physical damage to structures, chemical contamination or by washing away objects (Schmuck, 2012). When discussing structural or direct damage, in Nsanje, there were more damage to the water supplies than in Phalombe, and there were similar damages to the sanitation facilities.

It is important to get some sort of overview of the chaotic situation as soon as possible to map out the needs of the affected population, and to coordinate the relief efforts. The Malawi Post-Disaster Needs Assessment (PDNA) shows that the total recovery costs on water and sanitation after the flood is MKW 5.8 billion (or US$ 13.2 million). This includes both short-term recovery needs like the provision of relief sanitation facilities and emergency water supplying mechanisms, and long-term recovery efforts including sanitation and hygiene promotion (GoM, 2015a).

In Phalombe, there was extensive damage to the sanitation facilities in the affected communities and some of the water schemes and boreholes were affected. In Nsanje, some boreholes were contaminated and some were washed away, and the sanitation infrastructure in the communities were severely damaged. Major efforts to recover latrines in the affected communities were necessary, and some reconstruction of damaged water supply infrastructure were required to be able to return to the pre-disaster state of water and sanitation coverage. Both districts had displaced people living in camps after the disaster, causing additional stress to the existing water points and sanitation facilities.

In Nsanje on the other hand, most boreholes were affected either through structural damage or due to contamination. The structural damage included boreholes being washed away, submerged or scoured (which means that the dirt around the water pump is washed away; leaving the substructure of the water pump is exposed). In addition, some pipelines and water supply schemes were washed away. A larger number of people were also relocated, resulting in additional pressure on existing water points in the areas where they were being relocated. Access to safe water was low due to unavailability or inadequate safe water points leaving people vulnerable to communicable diseases (Nsanje District Council, 2015a).

The total damage to the sanitation and hygiene facilities were significant, however, the total cost is not known (GoM, 2015a). The damage to latrines in Phalombe were severe as 40,779 basic latrines and eight permanent latrines had collapsed. Damage to the public sanitation infrastructure are receiving assistance to reconstruct, while hygiene promotion is provided to the affected communities, encouraging them to reconstruct their latrines. In Nsanje, several toilets and bathing shelters collapsed or washed away.

2.4. Malawi: Country Profile

The Republic of Malawi is a small landlocked, densely populated country in South-East Africa. The country is located in the southern end of the Great East African Rift Valley, bordered by Tanzania in the north, Zambia to the north-west and Mozambique to the east, south and west (for map of Malawi, see figure 2.1). The total area of Malawi is 118,484 square kilometres of which 20 percent is covered by water. Lake Malawi is the third largest lake in Africa and stretches from north to south of Malawi along the rift valley. Shire River is the only outlet of Lake Malawi, which flows south through the Southern Region of Malawi before it joins the Zambezi River in Mozambique. The land area consists of plateaus, highland and valleys and the altitude varies from 40 meters above sea level in the Lower Shire Valley to 3000 meters above sea level on Mulanje Mountain (the third highest point in Africa) (GoM, 2002), with the majority of the land area located around 1000 to 1500 meters above sea level. The climate is sub-tropical with two distinct seasons: a wet, warm season lasting from October to April, and a dryer, cooler season lasting from May to September. The Southern Region have the highest annual rainfall and the highest temperatures (NSO Malawi, 2015).

Administratively, Malawi is divided into three regions (Northern, Central and Southern Region) and 28 districts. The two Districts in this study, Phalombe and Nsanje, is located in the Southern

Region. Malawi is former known as Nyasaland. The Scottish missionary, Dr. David Livingstone, visited the area in 1859 and made the country known to the international community. The area became a British protectorate in May 1891, and the Federation of Rhodesia and Nyasaland (now Zimbabwe, Zambia and Malawi) existed from 1953 to 1963. Malawi achieved its independence on 6 July 1964 and Republication status on 6 July 1966. In 1994, the political government changed from one party state, ruled by Dr. Hastings Kamuzu Banda, to a multiparty democracy, and a new constitution was endorsed (GoM, 2002). As a former British protectorate, one of the two official languages is English, in addition to the local language Chichewa.

Malawi has a population of 16.7 million in 2015 (World Bank, 2016b), which makes it one of most densely populated countries on the African Continent (Globalis, 2014). Malawi is one of the world's poorest nations with a Gross Domestic Product (GDP) per capita (in current US$) of 255.0 (World Bank, 2016a), which puts Malawi in the category of Least Developed Countries (LDC). 50.7 percent of the total Malawian population are living below the poverty line (17.3 percent in urban areas and 56.6 percent in rural areas) (NSO Malawi, 2015). Most Malawians are smallholder farmers relying on rain-fed agriculture, which makes them especially vulnerable to any changes in the precipitation patterns. Both too little and too much rain is a problem. In addition, Malawi experience frequent floods and dry spells. Benson and Clay (2004: 14) lists six factors that contributes to an increasing economic sensitivity in Malawi: unsuitable agricultural practices, structural change in agriculture, institutional weakness in agriculture, political instability, short-term variability in external aid levels, and the effects of HIV/AIDS on human resources.

The Malawian economy bases on agricultural production. The agricultural sector is the largest employer (employing 80 percent of the labour force), foreign exchange earner (90 percent of export earnings), and contributes to 35-40 percent of the Gross Domestic Product (GDP) (GoM, 2002). The economy is heavily overburdened and vulnerable both due to the dependence on rain-fed agriculture and high transportation costs, as Malawi is a landlocked country. The main exported commodities are tobacco, tea, sugar and cotton, and the main imported commodities includes fuel oils and fertilizers (NSO Malawi, 2015). The low agricultural productivity is a key obstacle to poverty reduction. The majority of the country's poor remains locked in low productivity subsistence farming (World Bank, 2015). Natural hazards affects the agricultural production, especially through floods and drought, puts the country in a vulnerable position.

The main development challenges in Malawi includes an improvement in mainly the energy and water delivery infrastructure, addressing the lack of health workers, and reforming the public financial management (PFM) system and the large and relatively inefficient public service (World Bank, 2015). Most development projects are often conducted in isolation of each other, and with little or no regard to the impact on other sectors or the wellbeing of the society in general (GoM, 2002).

Figure 2.1: Administrative Map of Malawi (Nations Online 2016), Nsanje and Phalombe districts outlined

2.4.1. Phalombe District

Phalombe District is located east in the Southern Region (see figure 2.1), and borders the district of Zomba and Mulanje to the west and south, and shares an international border to Mozambique to the east (sketch map of Phalombe is found in Appendix I). The district total land area covers 1633 square kilometres (1.7 % of Malawi's total land area), with a habitable area of about 1298 square kilometres. The district is only accessible by road as there is no airfield, railway line or water transport in the district (Phalombe District Assembly, 2002). Phalombe is a rural district with high poverty levels. Most households depend on rain-fed subsistence farming. Due to an unsustainable population growth, land holding size diminish which in turn increases the pressure on natural resources. These resources includes forest, fish, water and land resources (Phalombe District Council, 2012-2015).

Phalombe District is divided into two Traditional Authorities (TA Nazombe and Mkhumba) and three Sub-Traditional Authorities (STA Jenala, Kaduya and Chiwalo). The district practices a local Government system with a local assembly headed by the elected Chairman and members consisting of Ward Councillors (from the 12 wards), Members of Parliament (MPs), Traditional Authorities/Sub Traditional Authorities and any other co-opted members. The district assembly function as a policy making body at the district level. Of the central government sectors is almost all Ministries/Departments represented at the district level. The sectors important in this study is the District Water Office and District Environmental Health Office as these covers the water and sanitation in the district. These Sectors collaborate through the District Executive Committee (DEC) which comprises the heads of departments. The District Commissioner is the administrative head and co-ordinates and oversees Government activities at the district level. There are 42 Group Village-Headmen (GVH) and 264 Village-Headmen (or chiefs). The Traditional Authority and Group Village-Headmen chair the Area Development Committees and the Village Development Committees in their respective areas and villages. The Traditional Authorities gave certain powers and their basic function are related to traditional issues. Every Traditional Authority has Group Village-Headmen whose main role is amongst other things to assist the District Government in maintaining public order, mobilising people for rural development projects and to settle any disputed arising within their jurisdiction. In addition, the chiefs and village headmen acts as agents of development as they pass on all messages on development to the public. The information chain goes from the District Commissioner and the Director of Planning and Development (DPD) to the Traditional Authorities. The TAs summons the Group Village-Headmen and Village Headmen, who eventually transfers the message to the

people at the grassroots level. Likewise, anything rising from the grassroots level is passed on to the higher authorities through the same channel (Phalombe District Assembly, 2002).

It is observed that high population in the district contributes to environmental degradation. Inadequate funding and human resource at district level also reduce the extent to which the council plans and implements environmental programs. In addition to this, high poverty levels and knowledge gaps have led to overexploitation of natural resources (Phalombe District Council, 2012-2015).

According to the Phalombe District Water Officer, the water supply in Phalombe includes over 700 boreholes and eight gravity fed water schemes supplying water through a network of pipes and taps. The water schemes have over 2800 taps in total. The schemes were constructed in the 1970s of small plastic pipes. The construction of boreholes has happened gradually as the process is expensive and the District Government relies on partners coming in to drill. Partners in Phalombe includes Concern Universal, the Malawi Red Cross and CADECOM (Catholic Development Commission). Both the District Government and its partners maintain the boreholes. There are some seasonal variations in the water supply leading to some taps and boreholes running dry usually at the end of the dry period (October). Due to the flood, the water supply coverage has dropped as some boreholes were affected and some water schemes were damaged.

The District Environmental Health Office is responsible for sanitation. Water and sanitation has been a key focus in the district for the past years. One of the Traditional Authorities, TA Kaduya, were declared an Open Defecation Free Authority prior to the flood, meaning that all people within the TA are using improved sanitation facilities instead of the bushes. Improved facilities includes some sort of latrine with the traditional pit latrine as the most common.

2.4.2. Nsanje District

Nsanje District is located at the southern tip of Malawi within the Lower Shire Valley, and has a total land area of 1,942 square kilometres (see sketch map of Nsanje in Appendix II). The district borders Chikwawa District to the northeast, Thyolo District in the north and the Republic of Mozambique surrounds the rest of the district. The district is accessible by road

from Blantyre, a drive that takes over four hours before you reach the Nsanje BOMA[2] due to the poor condition of the M1 road that runs south through the district. The district was, until 2000, also accessible by a single-track railway line from Limbe (Blantyre) to the Mozambique border, a journey that used to take over eight hours.

The formal administrative structures in Nsanje includes the District Assembly, local institutions established at community and district level and technical institutions comprising of professional personnel from the government, statutory corporation and the NGOs. The Nsanje District Assembly is headed by the Chairperson selected among the 21 councillors (each representing a ward). The District Commissioner heads the Assembly Secretariat, which comprises of the sector leaders of the Government, Statutory Corporations and NGOs. The District Executive Committee (DEC) is the technical advisory body of the District Assembly and comprises of all heads of government sectors, statutory corporations, NGOs and Civil Society Organisations operating in the district. The DEC is responsible for carrying out needs assessments, appraising, and monitor and evaluate development programmes. The district has nine Area Development Committees (ADC), which is the representative body of all the Village Development Committees (VDC) under the jurisdiction of the respective Traditional Authority. The Area Executive Committee (AEC) is the technical advisory body of the ADC and consists of members from extension workers from the Government and NGOs in the area. The Village Development Committees (VDC) is the representative body made up a group of villages who has the responsibility of identifying needs, planning and monitoring at village level and soliciting funding of development projects in their areas (Nsanje District Assembly, 2012).

There are nine Traditional Authorities in Nsanje: Mlolo, Mbenje, Tengani, Malemia, Ngabu, Makoka, Chimombo, Nyachikadza and Ndamera, 59 Group Village Headmen (GVH) and 465 Village Headmen (VH) in Nsanje District. These provide the main link between the Central Government and the rural communities. The TAs are involved in development management through the Area Development Committee (ADC), and Village Development Committees (VDC). The Traditional Authorities are also members of the District Assembly as ex officio members (Nsanje District Assembly, 2012).

[2] All District Capitals is being titled British Overseas Management Administration

Almost all Government Ministries/Departments also have offices in the District carrying out their respective functions as mandated by their sector ministries acts. All Government Sectors in the district reports to the District Assembly while their respective Ministries are responsible for policy guidance, capacity building and performance standards. It is the Ministry of Water Development and the Ministry of Health and Population who is responsible for the water and sanitation within the district. Some NGOs working in the district helping the communities in various fields or sectors, and includes, amongst others, CARD who works with agriculture, water and irrigation and disaster management, and is the organisation I went with to Nsanje.

The use of water usually depends on its quality and quantity. The water supply coverage are adequate compared to the total number of existing water points. Water sources in the district includes boreholes, shallow wells and rivers. The water streams in the district varies between the rainy and dry season. The main sources of water supplies includes piped water supplies, groundwater points (boreholes), and water extension services. The district has Gravity Fed Piped Water Supply Schemes in TA Malemia and Ndamera, which includes 23 taps. Tap committees, in which some has been trained and some are not, maintain the water schemes. Nsanje District has 960 boreholes drilled by different stakeholders, including GOAL Malawi, UNICEF, Rural Livelihood Support Program, the Salvation Army, CARD and River of Life Development. Communities have been exposed to Community Based Management (CMB) training where a process of empowerment on village level operations and maintenance, hygiene education and sanitation promotion, financial management and leadership has been done. Water Pont Committees have been trained through participatory learning methods (Nsanje District Assembly, 2012).

People in the upland areas of the districts experience challenges to access safe water as most of the boreholes are located in the lowland areas. The reason is that these boreholes was constructed in the 1970s as refugee camps were established to accommodate refugees from Mozambique. The challenges in the upland areas is the access to safe water, in the lowland areas, the challenge is rehabilitation. In the early 1980s, all the existing pumps were replaced with pumps that is easier for the communities to maintain, as parts were easily found and affordable. Before the pumps were replaced, the Malawi Government were responsible for the maintenance of the boreholes in which they were struggling. However, the pumps are overworked and the rising costs of the parts make the communities failing to maintain them as

well. In Nsanje, as in Phalombe, the District Environmental Health Office is responsible for the sanitation situation. Sanitation in Nsanje is an issue as only 27.5 percent of the population in the districts have access to improved sanitation facilities (NSO Malawi, 2012).

Box 2.1: Water and Sanitation Situation in Phalombe and Nsanje Compared to National Situation

Based on the proportion of the population with access to improved water sources, both Phalombe and Nsanje is above the national level of 78.7 percent. In Phalombe, the majority of people access either piped water supplies or boreholes. In Nsanje, the water schemes are not as many and as large as in Phalombe, which explains the difference in the people with access to piped water supplies in the two districts.

Table 2.1: Proportion of households with access to safe water and main source of drinking water, Malawi 2011. Adopted from the Integrated Household Survey (IHS3) 2010/2011 (NSO Malawi, 2012)

	Proportion with access to improved water source	**Source of drinking water**					
		Piped into dwelling	Piped into yard/plot/ communal standpipe	Protected well in yard/plot/ public well/ borehole	Open well in yard/ plot/open public well	Spring/river/ stream/pond/ lake/dam/ rainwater	Total
Malawi	78.7	2.9	16.7	59.1	15.4	5.8	100
Phalombe	83.0	0.9	42.3	39.9	6.9	10.1	100
Nsanje	81.0	0.7	1.9	78.4	9.1	9.9	100

On the issue of access to improved sanitation, the situation is rather different, at least in Nsanje. Phalombe is almost at the national level, which can be explained by the focus on water and sanitation in the district for several years. In Nsanje, on the other hand, only 27.5 percent of the total population in the district have access to improved sanitation facilities. We can see from table ?? that the standard of the latrines are better than in Nsanje as most people in Phalombe have a traditional pit latrine with roof and the majority in Nsanje have a latrine without roof.

Table 2.2: Proportion of households with improved sanitation and type of toilet facility, Malawi 2011. Adopted from the Integrated Household Survey (IHS3) 2010/2011 (NSO Malawi, 2012).

	Proportion of access to improved sanitation	**Type of toilet facility**						
		Flush toilet	VIP latrine	Traditional latrine with roof	Latrine without roof	None	Other	Total
Malawi	72.4	2.9	3.6	65.9	18.7	8.8	0.2	100
Phalombe	67.1	3.0	3.7	60.3	14.8	18.2	0.0	100
Nsanje	27.5	0.7	3.2	23.6	42.8	29.7	0.0	100

CHAPTER 3: CONCEPTS AND THEORETICAL FRAMEWORK

This study aims at showing how rural households in Phalombe and Nsanje, Malawi, recovers from a disaster illustrated by using the case of water and sanitation reconstruction. This chapter outlines the theoretical and conceptual framework of this study, and focus on theories connected to the recovery process and the roles of the local community, local and national government, and the international humanitarian community.

I argue that a disaster event includes four stages – *prevention*, *preparedness*, *reaction* and *recovery*. Smith (2004) divides the disaster into *pre-disaster protection* and *post-disaster recovery*. This study focuses on Smiths post-disaster recovery phase, aiming at explaining the efforts engaged during and after the flood disaster by using the example of water and sanitation recovery.

Wisner et al. (2004: 359) suggests "that in order to be 'recovered', a household should not only have re-established its livelihood, physical assets and patterns of access, but should be more resilient to the next extreme event". This suggestion lies the foundation for the theoretical approach to this study. First, I will introduce the conceptual framework, which includes the concepts of natural hazards and disasters, flood, livelihood and recovery. Second, an introduction to floods as disasters and the importance of water and sanitation in a flood event. Then I would introduce the resilience concept and the theory of community resilience and social resilience.

3.1. Definition of Key Terms

Natural hazards is "extreme natural events that pose a threat to people, property and possessions" (McGuire, Mason & Kilburn 2002: 1), and includes floods, earthquakes, tropical storms, volcanic eruptions and landslides. Bryant (2005) divides natural hazards into climatic and geological hazards. He includes intense storms and winds, oceanographic factors such as waves, ice and sea level changes, and extreme precipitation phenomena as climatic hazards. Geological hazards includes earthquakes, volcanoes and land instability. Benson and Clay (2004) argues that natural hazards are either a geophysical, atmospheric or a hydrological event with the potential for causing harm or loss. Usually, natural hazard events are both uncommon and extreme.

In the National Disaster Risk Management Policy (GoM, 2015b: 13), the Government of Malawi defines *hazards* as "a potentially dangerous event, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage". According to this and other definitions, hazards refers to the potential occurrence of an event.

The magnitude of the impacts of a hazard event to a specific country, area or community is linked to their *vulnerability*. Vulnerability is defined as the potential to suffer harm or loss (Benson & Clay, 2004: 5). The Government of Malawi (2015b: 13) defines vulnerability as "the characteristics and circumstances of a community, system or asset that make is susceptible to the damaging effects of a hazard". Adger (2006: 270) concludes that "vulnerability is most often conceptualized as being constituted by a component that include exposure and sensitivity to perturbations or external stresses, and the capacity to adapt". *Adaptive capacity* or *capacity of response* is "the system's ability to adjust to a disturbance, moderate potential damage, take advantage of opportunities, and cope with the consequences of a transformation that occurs" (Gallopín, 2006: 296). As vulnerability is the degree of resistance offered by a social system to the impact of a hazardous event (Timmermann, 1981), reduced vulnerability is related to the reduction of risk and impacts of hazards (WWAP, 2015). The aspects of vulnerability arises from various physical social, economic, and environmental factors. *Resilience* is related to the speed of the recovery of economic activity, which may involve the recovery of lost and damaged capital (Benson & Clay, 2004), and is clearly related to the adaptive capacity component of vulnerability (Gallopín, 2006). For most authors, adaptive capacity, do not only include the resilience of a system but also coping with the impacts produced and taking advantage of opportunities (Gallopín, 2006).

When the potential hazardous event becomes a reality, the concept shifts from hazard to *disaster*.

> "Natural hazards are threatening events, capable of producing damage to the physical and social space in which they take place not only at the moment of their occurrence, but in the long-term, due to their associated consequences. When these consequences have an impact on society and/or infrastructure, they become disasters"
>
> (Alcántara-Ayala, 2002: 120-1)

Benson and Clay (2004: 5) defines disaster as "the occurrence of an abnormal or infrequent hazard that affects vulnerable communities or geographical areas, causing substantial damage, disruption, and perhaps casualties and leaves affected communities unable to function normally". Others define disasters as the occurrence of a hazard which has consequences in terms of damage, disruptions in essential community functions and livelihoods, and human, material, economic and environmental loss which often exceeds the community's ability to cope without external assistance (GoM, 2015b; Wisner et al., 2012). Natural disasters can have a rapid or slow onset, with serious health, social, and economic consequences (Gurzau et al., 2009).

Hazards is the potential threat to humans and their welfare (the cause), the *risk* is the probability of a hazard occurring and creating loss (the likely consequence) and the disaster is the realisation of the hazard (the actual consequence) (Smith, 2004). We can say that hazards threats human security, or the state of safety from hunger, disease, crime and repression and the protection from sudden disruptions (Gurzau et al., 2009). Increased industrialisation, expanding urbanisation, and decaying infrastructures will lead to an escalation in the numbers of disasters worldwide and the developing countries will carry the burden of this trend (Quarantelli, 1994). Housing quality is poor in developing countries compared to developed countries, making them less capable of withstanding severe force. Families often invade floodplains and other undesirable locations as they lack means for obtaining other property, putting them in the position of greater risk of death and severe damage. They are also often less successful in mobilizing support after disasters (Norris et al., 2008).

3.2. Floods as a Disaster

Floods are one of the most common environmental hazard worldwide. According to the International Federation of Red Cross and Red Crescent Societies (IFRC), floods are the most common disaster globally between 2005 and 2014 (IFRC, 2015), in which the fact that rivers, floodplains and coasts has attracted human settlement for a long time (Smith, 2004) may be one of the contributing factors. Floods associated with tropical storms or El Niño/La Niña is regarded as one of the most dangerous natural hazard and a principal trigger of disasters (Alcántara-Ayala, 2002). Flooding appear to have increased in intensity and extent in the recent years (Bryant, 2005), and the number of flood events and flood impacts seems to be increasing on a global scale. It is difficult, however, to identify major trends in the physical causes of floods. A common agreement is that the increased losses are mainly due to more

detailed monitoring, a growing population at risk through continued floodplain invasion and rising wealth (Smith, 2004). As higher precipitation is one of the consequences of global warming, flooding has recently received the attention of media and relief organisations (Bryant, 2005). Whether or not the frequency and severity of floods has increased as a result of climate change and global warming is controversial, however, the fact is that floods affect many people worldwide every year.

The 2015 floods in Malawi was caused by heavy seasonal rainfall, intensified by the tropical cyclone Chedza who were forming in the Mozambique Channel (OCHA, 2015a). Tropical cyclones are defined as "intense cyclone storms that originate over warm tropical seas" (Bryant, 2005: 44). On average, a tropical cyclone can dump 100 mm per day of rain within 200 km of the eye, and 30-40 mm per day at distances of 200-400 km depending on local topography, cyclone motion and the availability of moisture. Rainfall is responsible for the loss of life, property damage and crop destruction from flooding (Bryant, 2005).

In non-industrial areas, the main threat related to floods is related to damage to homes and infrastructure and the loss of crops and livestock. Africans experience floods in both rural and urban areas, while this study focuses on flooding in rural areas. Flooding in the big African rivers like the Nile, Niger, Congo and Zambezi affect hundreds of thousands of people every year, in addition to numerous small floods occurring all over the continent. Both the small and the large-scale floods result in population displacements and disruption of livelihoods (Schmuck, 2012).

The physical causes of this flood is associated with excessive rainfall, which is the most common cause of floods (Smith, 2004). The 2015 flood can be characterized as a *high-magnitude regional flood*, where large-scale drainage basins or many smaller rivers in the same region is flooded (Bryant, 2005). In Malawi, both the larger drainage systems including the Shire and Ruo Rivers in addition to smaller rivers were flooding. In addition, five other neighbouring countries were also experiencing severe floods. In parts of Malawi, like Phalombe, the floods were characterized as *flash floods*, meaning that there is too much rain in too little time (Schmuck, 2012), referring to intense rainfalls in a relatively short period of time (Bryant 2005). The impacts of the flash floods can also be felt downstream from where the rain occurred (Schmuck, 2012), which were the case in Nsanje where the two rivers Shire and Ruo meets. In Nsanje, the floodwaters were staying for a longer time than in Phalombe.

Low-lying parts of major floodplains[3], such as Nsanje District, are vulnerable to flood disasters because of the high frequency of flood events in these areas. The risk of a disaster is much greater in developing countries than in developed countries. Developed countries tends to have some protection by engineering works and are subjects to planning controls (Smith, 2004). In Phalombe, the flood were characterized as a flash flood. Flash floods are mainly found in arid and semi-arid zones with a combination of steep topography, little vegetation and high-intensity, short-duration rain storms (Smith, 2004). However, in the case of Phalombe, the flash flood occurred as the rivers were unable to drain all of the precipitation, and with the flat landscape and little vegetation, the district were experiencing a flood reaching far beyond the proximity of the rivers that normally experience seasonal floods.

The physical characteristics of floods includes the depth and velocity of the water, the duration of the flood and the load (sediment, salts, sewage and chemicals). The physical stress on structures increases when rapidly flowing water contains debris such as rocks, sediment or ice (Smith, 2004). The flood power is the amount of work that a flood can perform, the destruction caused due to the amount of shear stress and the stream power – the amount of energy developed per unit time along the boundary of a channel (Bryant, 2005). During a flood, water rise and leads to a pressure on structures. The damage is either physical damage to structures, chemical contamination or by washing away objects (Schmuck, 2012).

Floods affect people's livelihoods in a number of ways. How harmful a flood is to people and their livelihoods depends on many factors, including the physical characteristic of the flood and social and cultural considerations (Schmuck, 2012). The 2015 flood were described as a disaster because it was beyond the normal flooding experienced in the country, which made the rescue operations very difficult hence the need for external help (Nsanje District Council, 2015). Floods can cause infrastructural damages to roads, making it difficult to access the affected areas and people. Floods displace households when their homes collapses. Floods also leads to crop damage and a reduced pasture area as the water submerges the areas. Livestock is also at risk of disease outbreaks. Floods also affect education in the sense that the displaced people often are seeking shelter in schools (Nsanje District Council, 2015), which were the case in both Phalombe and Nsanje as schools were commonly used as emergency camps. In Nsanje,

[3] A flood plain (or floodplain) is a generally flat area of land next to a river or stream. It stretches from the banks of the river to the outer edges of the valley (Evers & MacPhee, 2016).

where people were staying in displacement camps for a long time, efforts were made to move the people staying in the schools to other camps outside the schools.

In addition to wash away crops, livestock and household items, the 2015 Malawi flood claimed many lives (Nsanje District Council, 2015), 106 in total (DoDMA, 2015b). Flood-related deaths and homelessness is a great concern in developing countries (Smith, 2004). From a medical perspective, floods can affect people either through drowning, injuries, challenges of water and food safety, vector-borne diseases, wild animal displacements (rabies) and the outbreak of communicable diseases (Watson et al., 2007). The collapse of water supplies and sanitation facilities predisposes people to various health and social problems (Nsanje District Council, 2015). Gastro-intestinal disease outbreaks regularly occurs in developing countries where sanitation standards are low or when sewage systems are damaged (Smith, 2004). The health issues in conjunction with floods often relates to the issue of access to safe water and sanitation facilities. The importance of water and sanitation in combination with floods will be explained in the next section.

3.3. The Importance of Water and Sanitation in a Flood Situation

Floods causes structural damage to infrastructure, including water supplies and sanitation facilities. Neunteufel et al. (2015) shows that an increase of infrastructural damages in the WSS (Water Supply and Sanitation) sector will be mainly caused by floods or landslides due to intense precipitation events. Water supply and sanitation infrastructures are sensitive to damages due to extreme events and natural disasters.

Water and sanitation access are especially important during and after floods. The reason for this is that floods may contaminate the water sources and often results in a displacement of people. Lack of sufficient access to safe water can lead to weakness and pain through diarrhoea and other water-related diseases (WWAP, 2015). Disasters, regardless of type, that do not result in population displacement are rarely associated with disease outbreaks (Gurzau et al., 2009). Inadequate disposal of human excreta and personal hygiene is associated with a range of diseases (NSO Malawi, 2014), and is often the case after floods as people gathers in emergency camps, where the access to water and sanitation facilities may be lacking. Guarzau et al. (2009: 54) argues that a successful emergency response in the water supply depends on improvisation and gradual improvement of water supplies, progressing from basic services during the emergency and recovery phase, to more sustainable services in the long term.

Investment in improved water management and services is considered a necessity to reduce poverty and to achieve sustainable economic growth. Around the world, 748 million people lack access to an improved drinking water source, while billions lack safe water. In 2012, 2.5 billion people did not have access to an improved sanitation facility (WWAP, 2015). The Millennium Development Goals sought to "halve the proportion of the population without sustainable access to safe drinking water and basic sanitation between 1990 and 2015" (goals number 7C) (UN/MDG, n.d.), while the Sustainable Development Goals aims to "ensure access to water and sanitation for all by the year of 2030" (target number 6) (UN/SDG, n.d.). Investments in water and sanitation is vital to households that are lacking these services (WWAP, 2012). Water access for household use is crucial to ensure good health and social dignity. Access to water for productive uses such as agriculture and family-run businesses is vital to realize livelihood opportunities, generate income and contribute to economic productivity. One quarter of the global population living in developing countries and faces water shortages due to weak governance and human capacity. They also lack water transport infrastructures to get water from rivers and other water bodies. In practice, this gives fewer opportunities to make use of the water resources to grow food and for other productive purposes. Poor people receives direct benefits from improved water and sanitation services, which relates to a reduced health risk, reduced vulnerability, increased productivity and timesaving. Limited access to water in combination with low incomes forces people to choose between paying for water, food, school fees or medicines (WWAP, 2015).

3.4. Recovery

Recovery is the most important concept in this study. The concept is difficult to define, and can be broken down into stages. Examples of this is the UNDP concept of *early recovery*, or the difference between *relief*, *reconstruction* and *rehabilitation* (Wisner et al., 2012). Other key terms in disaster recovery includes *re-establishment* and *restoration*. All of these terms are using "re" to indicate a return to the pre-existing situation. This is a rather optimistic view, challenged by a more realistic view assuming that it is difficult, or even impossible or desirable to achieve such recovery (Wisner et al., 2004). Wisner et al. (2004: 359) suggests "that in order to have 'recovered', a household should have not only re-established its livelihood, physical assets and patterns of access, but should be more resilient to the next extreme event". "A livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living. A livelihood is sustainable when it can cope with and recover

from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (Scoones, 2009).

The term recovery refers to the restoration back to normality, which is of little use if 'normal' was the situation of vulnerability for the now affected people. A return to this pre-disaster status quo will almost assure that this people yet again will be affected by another disaster (Wisner et al., 2012). During the 1990s, *holistic* approaches to recovery and *comprehensive* recovery became fashionable. In principle, this form of recovery not only rebuilds infrastructure and houses, but also addresses economic, political and social needs of the affected people. This opened the way for more resilient livelihoods (Wisner et al., 2004). The aims of recovery varies on different scales; the aim for the country may be a return to financial stability, while revitalization and strengthening the livelihoods may be the aim of affected households. Economic recovery, improvements of the life spaces of home and community, and the re-establishment of public services and infrastructures, transport and communication systems is important aspects of disaster recovery. In addition, psychosocial recovery addressing mental trauma is also an important aspect (Wisner et al., 2012).

3.4.1. Post-Disaster Recovery Models

I have already introduced Smith's (2004: 49) post-disaster recovery model (or a disaster mitigation cycle), which includes the four stages relief, rehabilitation, reconstruction and learning review. The *relief* period includes the search and rescue efforts, medical aid and provision of food and shelter, followed by the *rehabilitation* phase that includes the removal of debris, restoration of public services and creating temporary housing. The *reconstruction* that follows is a much longer-term activity that includes permanent rebuilding, improvements and avoiding hazard zones. The final element included is the *learning review* that includes an education of teachers and builders, training volunteers and inform politicians. Smith argues that a closure through the education of people, both victims and managers at all levels is essential. At the community level, the understanding of capabilities and limitations of hazard mitigation is important. Since developing countries often depend on external aid after major disasters (Smith, 2004), international organisations and relief agencies need to pool their resources and experiences in order to achieve a global disaster reduction.

Wisner et al. (2004: 357) refers to another recovery model developed by Haas, Kates and Bowden (1977), which seemed to show that recovery proceeds in predictable *waves* of activity.

In the first few days after the event, *response* raise and fall, and immediate short-term *relief* activities increase as response tails of. The relief reaches a peak after a few weeks and then medium-term *reconstruction* takes centre stage, being replaced after several months by a set of activities that can be described as longer-term economic and social *recovery*. This final part of the process may take several years (Wisner et al., 2004). I find these models beneficial to describe the timeframe of actions during and after a disaster.

Wisner et al. (2004: 358) refer to Fothergill et al. (1999) when they argue that a good deal of empirical evidence suggests that people that are marginal, excluded and with poor access to power and resources before a disaster may lag behind the recovery model's tidy curves and face greater difficulties in accessing assistance. Ideally, the distribution of support or assistance follows the *rule of relative needs*, where the most support goes to those who need it most. Often, however, the distribution follows the *rule of relative advantage* because one's embeddedness in the community, political connections, and social class determine the availability and accessibility of resources. While these rules typically describe the distribution of post-disaster support *within* communities, they also describe the distribution *across* communities. The capacity to distribute post-disaster resources to those who most need them seems vitally important for community resilience (Norris et al., 2008).

3.5. Resilience in Disaster Recovery

The word *resilience* originates from the Latin word *resilio*, which means *to jump back.* Most literature states that the study of resilience evolved from the disciplines of psychology and psychiatry in the 1940s. Today, resilience is being applied in a number of fields, and especially in disaster-management. A lot of work on resilience has focused on the capacity to absorb shocks and still maintain function (Folke, 2006). The adaption of The Hyogo Framework for Action 2005-2015 (HFA) was a positive move that increased the attention to what the affected communities can to for themselves and how best to strengthen them (Manyena, 2006: 434). The Government of Malawi has also adapted the HFA in their National Disaster Risk Management (NDRM) Policy (GoM, 2015a). The increased attention to the capacity of the affected communities to recover with little or no external assistance following a disaster highlights the need for a stronger emphasis on resilience rather than just on the need or vulnerability (Manyena, 2006).

The outcomes of the 2005 World Conference on Disaster Reduction (WCDR) confirmed the importance of the resilience concept both in theoretical and practical terms in a wide range of disaster risk reduction discourses and in some interventions. Phrases like *sustainable and resilient communities, resilient livelihoods* and *building community resilience* have become increasingly more common in journal articles and programme documents (Manyena, 2006). In the National Disaster Risk Management (NDRM) Policy of Malawi, the Malawi Government stresses the importance of ensuring that disaster losses and impacts are sustainably reduced. Promotion of a culture of safety and adaption of resilience-enhancing interventions, and strengthening preparedness capacity for effective response and recovery is two of the six policy priority areas (GoM, 2015b).

Building resilience is not just about reducing vulnerability. Resilience is a measure of the capacity to absorb and recover from the impacts of the hazardous event. The resilience concept originated from physics and mathematics and was originally used to describe the capacity of a material or a system to return to equilibrium after a displacement. A resilient material bends and bounced back, rather than breaks, when stressed (Norris et al., 2008).

> Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner, through, among other things, the preservation and restoration of its essential basic structures and functions.
>
> (GoM, 2015b: 13)

Other definitions of resilience I find suitable in the context of disaster recovery includes Coles (2004, in Norris et al., 2008: 129) definition: "Resilience is a community's capacities, skills, and knowledge that allow it to participate fully in recovery from disasters". Norris et al. (2008: 130) defines resilience as "a process linking a set of adaptive capacities to a positive trajectory of functioning and adaption after a disturbance". We divide between ecosystem resilience and social resilience. The emphasis on human resilience is the process of enhancing human capacity to recover from a disaster within the shortest possible time with minimal or no outside assistance (Manyena, 2006). Resilience has generally been defined in two broad ways: as a desired outcome(s) or as a process leading to a desired outcome(s). The trend has been a shift from a more outcome-oriented to a more process-oriented approach. In other words, resilience is a goal the we should strive to achieve, or a quality that we should try to attain (Manyena, 2006). The dysfunction or distress that follows a hazard event is being followed by a return to

functioning. According to Norris et al. (2008), the more rapid the return to the pre-event functioning, the greater the resilience. The function after the event may not be equivalent with pre-event functioning, as people need to adapt to an altered environment (Norris et al., 2008).

3.5.1. Community Resilience

In this study, a community refers to a social unit located in a specific geographical area (like a village). Communities are composed of built, natural, social, and economic environments that influence one another in complex ways. A collection of resilient individuals does not guarantee a resilient community (Norris et al., 2008).

Norris et al. (2008) argues that communities have the potential to function effectively and adapt successfully in the aftermath of disasters. Community resilience is "a process linking network adaptive capacities (resources with dynamic attributes) to adaption after a disturbance or adversity" (Norris et al., 2008: 127). Resources with dynamic attributes are resources that are robust, redundant, or rapidly accessible. *Robustness* refers to the ability to withstand stress without suffering degradation. They characterize this as a resource strength, in combination with a low probability of resource deterioration. *Redundancy* is the extent to which elements are sustainable in the event of disruption or degradation. Communities relying on a narrow range of resources are less able to cope with changes that involves the depletion of that resource. *Rapidity* is the capacity to achieve goals in a timely manner to contain losses and avoid disruption. Resilience can fail when resilience-resources are themselves damaged or disrupted. Capacities or resources become adaptive capacities when they are robust, redundant, or rapidly accessible and thus being able to offset a new stressor, danger, or surprise (Norris et al., 2008). Resilience is about people's capacity going far beyond the minimum of being able to cope (Manyena, 2006).

To be able to build collective resilience, Norris et al. (2008) argues that communities must reduce risk and resource inequalities, engage local people in mitigation, create organisational linkages, boost and protect social supports, and plan for not having a plan. This requires flexibility, decision-making skills, and trusted sources of information.

3.5.2. The Resilience Framework (Norris et al. 2008)

Norris et al (2008) talks about resilience emerging from a set of capacities and community resilience emerging from a network of adaptive capacities. The Intergovernmental Panel on

Climatic Change (IPCC, 2001) defines adaptive capacity as "the ability of a system to adjust to climate change, including climate variability and extremes, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences". Norris et al. (2008) argue that resilience rests on both the resources themselves and the dynamic attributes of those resources (robustness, redundancy and rapidity) as uses the term *adaptive capacities* to capture this combination.

According to Norris et al. (2008), the adaptive capacities can be divided into four primary sets that provide a strategy for disaster preparedness. Figure 3.1 shows Norris et al. (2008) community resilience framework. The sets of adaptive capacities included in the framework are *economic development, social capital, information and communication,* and *community competence*.

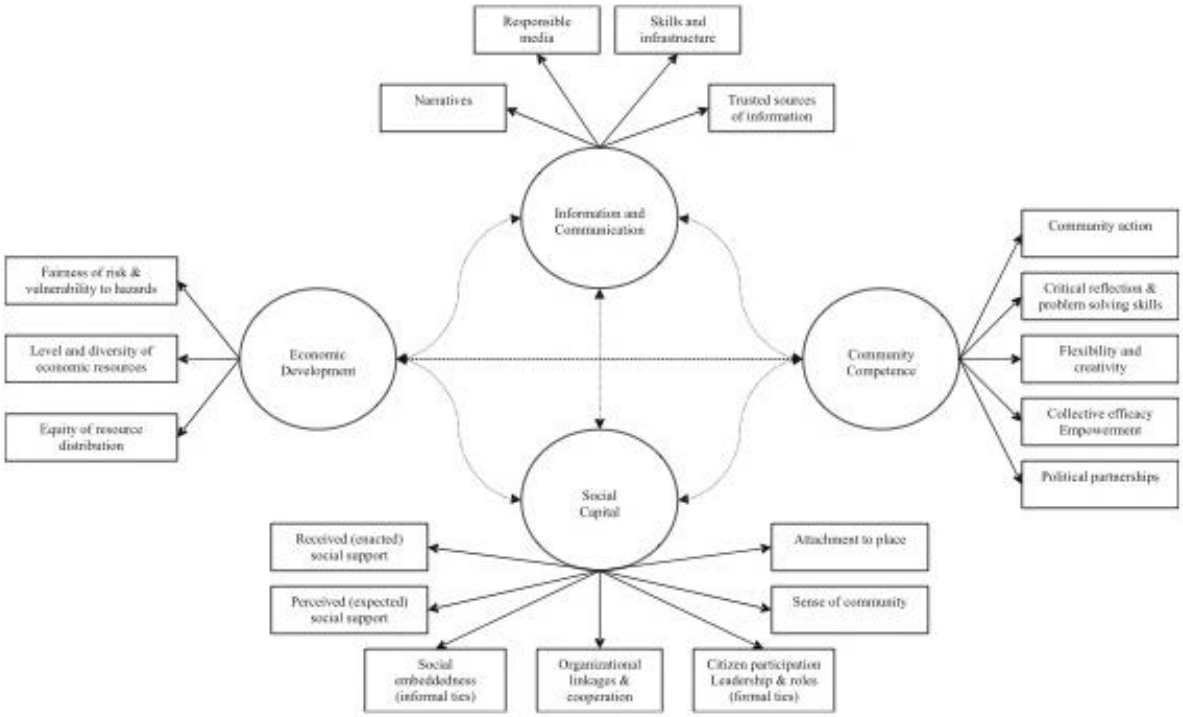

Figure 3.1: Community Resilience Framework – community resilience as a set of adaptive capacities (Norris et al., 2008: 136)

Economic development includes a fairness of risk and vulnerability to hazards, the level and diversity of economic resources and the equity of resource distribution. Natural disasters are especially likely to cause severe psychological distress when they occur in the developing world. The disaster location proves to be a stronger predictor of effects than either the type of

disaster or the sample type. Community resilience depends both on the volume of economic resources and their diversity. The essential resources for a resilient community includes land and raw materials, physical capital, accessible housing, health services, schools, and employment opportunities. Extreme events increase the risk of being dependent on a particular resource and therefor decrease resilience. Participants of lower socio-economic status (SES) often experience more adverse psychological consequences than do participants of higher SES (Norris et al., 2008).

Social capital are highly relevant when discussing community resilience. Individuals invest, access, and use resources embedded in social networked to gain returns. Whether or not people actively aim to increase their social capital or whether it arises from structural positions, families, and friendships are debated amongst theorists. Social support refers to the social interaction that provide individuals with actual assistance and that embed them into a web of social relationships perceived to be available when needed. There is a difference between the *received support* (enacted) and *perceived support* (expected) (Norris et al., 2008).

Social capital encompasses relationships between individuals and their larger neighbourhoods and communities. *Sense of community* refers to an attitude of bonding with other members of one's group or locale, including mutual concerns and shared values. This is characterised by a high concern for community issues, respect for and providing service to others, a sense of connection, and the fulfilment of needs. Norris et al. (2008) states that sense of community is assumed a dimension of community capacity, but also an attribute of resilient communities. *Place attachment* implies an emotional connection to one's neighbourhood/village/city apart from the people living there, which can prove to be especially important in disaster recovery. *Citizen participation* is the engagement of community members in formal organisations. This is believed to be a fundamental element of community resilience (Norris et al., 2008). Ganor and Ben-Leavy (2003) argues that community resilience depends on authentic, grassroots leadership (or *credibility*).

Information enables an adaptive performance and ***communication*** refers to the creation of common meanings, understandings and the provision of opportunities for members to articulate needs, views and attitudes. Information and communication is vital in emergencies such as disasters as accurate information about the danger and behavioural options are important for people to react in the best possible way. In addition, the information is required quickly, and if

the information is uncertain about the exposure of the hazard, consequences of exposure, or the risk involved with following the recommendation people may not react in the best possible way. It is also important that the sender of the information are trusted among the receivers as there, in cases of emergency, is little or no time to check the information. Communal narratives gives the experience shared meanings and purpose. Communities shared understanding of reality contributes to a sense of place and connectedness, which in turn affect resilience. The communication infrastructure and the involvement of media also plays an important role. The media shapes how a disaster is framed, and this influences the understanding of the event for the emergency managers (Norris et al., 2008).

Community competence is viewed by Norris et al. (2008: 141) as "the networked equivalent of human agency, and has to do with collective action and decision-making, capacities that may stem from collective efficiency and empowerment". Communities threatened by hazards must be able to learn the risk and their options, and should work together to solve problems (Norris et al., 2008).

> A competent community is one in which the various component parts of the community: (1) are able to collaborate effectively in identifying the problems and needs of the community; (2) can achieve a working consensus on goals and priorities; (3) can agree on ways and means to implement the agreed upon goals; and (4) can collaborate effectively in the required actions.
>
> (Cottrell 1976: 197, in Norris et al., 2008: 141)

Social capital and communication are prerequisites for community competence (Norris et al., 2008). Ganor and Ben-Leavy (2003) emphasizes the importance of a community's ability to take action (which they called *coping*). Collective action is complex and challenging when faced by environmental threats (Norris et al., 2008).

Norris et al. (2008) concludes their article by using the four adaptive capacities to provide a roadmap for enhancing community resilience to disasters. This roadmap includes five steps. First, to increase their resilience to disasters, communities must develop economic resources, reduce risk and resource inequalities, and attend to their areas of greatest social vulnerability. Second, to access social capital, one of the primary resources of any community, local people must be engaged meaningfully in every step of the mitigation process. Third, pre-existing organisational networks and relationships are the key to rapidly mobilising emergency and

ongoing support services for disaster survivors. Fourth, interventions are needed that boost and protect naturally occurring social support in the aftermath of disasters. Fifth, communities must plan, but they must also plan for not having a plan; this means that communities must exercise flexibility and focus on building effective and trusted information and communication resources that function in the face of unknowns (p. 143).

3.6. Reducing the Impact of Disasters: Mitigation and Adaptation

How to mitigate and adapt to future disasters is an important aspect of hazard research. Mitigation refers to measures that changes the loss of a disaster, which includes spreading the financial burden beyond the immediate victims through disaster aid and insurance programs. Developing countries does not have well established insurance programmes, neither governmental nor private, which results in a reliance on disaster aid. Disaster aid is the outcome of humanitarian concerns following severe loss. Disaster aid is being provided in the purpose of relief, rehabilitation and reconstruction, and most aid is triggered by appeals during the relief period. Developing countries like Malawi mainly rely on international aid, as the government cannot cover all the costs of the loss and damage following a disaster the size of the 2015 flood. Assistance is provided through allocation of bilateral aid and multilateral aid. *Bilateral aid* is donations direct between governments or indirect through NGOs, often for a specific use. *Multilateral aid* are not earmarked and are channelled through international bodies such as the EU, World Bank and UN agencies (Smith, 2004).

Societies do not allocate environmental risk equally, often making the poorest communities the weakest links in hazard mitigation. In a global perspective, differential risk is more striking because disasters are disproportionally likely to strike economically developing or poor countries (De Girolamo & McFarlane, 1996). Adaptation to the changed environment and preparedness for future events contributes to the strengthened resilience towards future disasters. Adaption refers to the human adjustment to damaging events, and covers community preparedness, forecasting and warning schemes, and land use planning (Smith, 2004).

Disaster preparedness is essential to ensure an effective response to a disaster and important measures includes the activation of temporary evacuation plans, the provision of medical aid and the preparation of emergency food and shelter (Smith, 2004). Smith (2004) argues that it is important to appoint a centralised control of the relief operation. However, he also states that training in self-help and that life-saving technique should be given to communities at risk. This

is important because it is other survivors, rather than aid workers, that rescue most disaster victims during a disaster event. Preparedness arrangements differ widely between countries – in some countries the task is devoted to existing bodies such as the Defence Force or the police, while other countries have dedicated agencies (Smith, 2004). During the 2015 flood, the Malawi Defence Force assisted in the search and rescue operations.

One of the main challenges is to implement effective preparedness schemes in developing nations through an understanding of the prevailing social and cultural conditions. Since 1998, the lead agency has been the UN Office for the Coordination of Humanitarian Affairs (OCHA). Specialist rescue and relief groups can supply equipment and transport when disaster strikes. The success of such arrangements depends on OCHA acting as an effective link between the donors and recipients of aid by holding a register of available expertise that can be quickly matched to the type of aid required (Smith, 2004).

Scientific advantages in weather forecasting and improvements in communication and information technology makes sophisticated *forecasting and warning systems* (FWS) available. *Predictions* are based on statistical theory and the historical record of past events. *Forecasts* depend on the detection and evaluation of a potentially hazardous event as it evolves, as the development in rainfall can say something about the likeliness of the occurrence of a flood. *Warnings* are messages advising people at risk about an impending hazards and informs them about what steps that should be taken to minimise losses (Smith, 2004). FWS consists of several stages: (1) threat recognition, (2) hazard evaluation, (3) warning dissemination and (4) public response. The effectiveness depends on the translation of the forecast into a warning, and an understanding of the social setting is important as the accuracy of the scientific information if the community responses are to be normal (Smith, 2004).

The main purpose of hazard-related *land use planning* is to zone land to steer away from dangerous areas. So far, land use planning has been adapted mainly in the wealthier countries but there is a strong case for a wider application in the developing countries (Smith, 2004).

According to Manyena (2006), the goal of disaster risk management is to guarantee minimal losses and to allow the affected community to return to 'normal' within the shortest possible time. The Government of Malawi (GoM, 2015b) argues that disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for

prevention, mitigation and preparedness. Individuals, communities and nations all have a degree of resilience. The goal of disaster resilience programmes is to enhance the fundamental values, assets and resources that can be applied to the process of adapting to adverse circumstances. Disaster resilience activities may lead to the enhancement of community coping strategies and livelihoods. Resilience could be viewed as the intrinsic capacity of a system, community or society to adapt and survive by changing its attributes and rebuilding itself (Manyena, 2006).

CHAPTER 4: METHODOLOGY AND THE RESEARCH PROCESS

4.1. Introduction

Research is the process of enquiry and discovery using research strategies and techniques. This chapter will look into the research methodology and methods used during this academic research during my fieldwork and analysis. I will discuss the choice of research participants and data collection techniques, followed by a section on data analysis and handling. The last part will include ethical and practical considerations, positionality and reflexivity, validity and trustworthiness, and research limitations.

A research design is a tool used by researchers to structure the research process and bases on decisions made by the researcher. As a first-time researcher on a project of this size, I had difficulties planning the research and encountered various challenges along the way. In my research design I included the research questions that were introduced in the introduction, a plan for how to conduct my fieldwork including the methods that would be used, what type of data I was looking for and how to manage it. In addition, I had also reflected upon the practicalities of the fieldwork and ethical considerations both during my fieldwork and when completing my thesis.

After deciding on the topic and the country in which I was conducting my fieldwork, the process of deciding methodology, appropriate methods and approach started. I was interested in gathering data from communities affected by the flood and the recovery efforts they or others have started in their villages. Being able to visit these villages and talk to the members of the community made me decide on a qualitative research approach for this study. Gathering knowledge about the experiences of the people in the communities were especially important to me, and the methods used in qualitative methodology appeared to be the most appropriate to obtain this information. As the aim of this research is to investigate the recovery process of water and sanitation facilities in disaster affected areas, using an example from Malawi, by looking at how the water and sanitation facilities are being reconstructed, by whom and when. Other important sources of information included the local government in the two districts I visited. Governmental representatives could provide me with plans for recovery, documents and reports, information regarding the funding of and the responsibility for the reconstruction,

in a way that the villagers could not. There will be a thorough explanation of the research techniques later in this chapter.

As I decided to look at an issue related to a single event during this research I chose to follow a case study approach, which involves to look at a phenomenon within its real-life setting (Kitchin & Tate, 2000). The case of this study is the water and sanitation recovery after the flood. By studying this particular example within time and space, I am studying this particular issue in depth. Kitchin and Tate (2000: 225) adopts Robsons (1993: 147) types of case studies and my research combines the categories *community studies* which refers to area defined studies of one or more local communities and *studies of events, roles and relationships* which focuses upon specific events or encounters.

Even though the case study approach gave me the opportunity to look closer at the water and sanitation recovery in the chosen fields of research, I can understand the criticism questioning the unknown generality of the case. The aim of the case study is to gather detailed information that may reveal general structures or relations that can be used to generate or modify models and hypotheses (Rice, 2010).

4.2. Choice of Research Participants

Key research participants were chosen from the local district government. In Phalombe district, this included the District Water Officer (DWO), the Assistant District Disaster Risk Management Officer (ADDRMO) and the Director of Planning and Development (DPD). To get access to the communities in Phalombe, I had to contact one of the Traditional Authorities leaders (in TA Mkhumba). A Traditional Authority is a defined area with a traditional leader. Both the area and the leader are referred to as Traditional Authority (TA)[4]. In this case, TA Mkhumba is both the area of traditional authority and the person in power. In the following chapters covering the discussion and analysis (chapter 5 and 6), TA Mkhumba refers to the area and Traditional Authority Mkhumba refers to the person. The TA gave us permission to conduct the fieldwork in her area, gathered individual members from two villages and helped us to

[4] The Traditional Authorities, together with the Group Village Headmen (GVH) and the Village Headmen (VH) provide the main link between the District Government and the rural communities (GoM, 2009-2012). The TAs are involved in development management through the Area Development Committee (ADC) and Village Development Committees (VDC). The TAs are also members of the District Assembly as ex officio members, meaning that their memberships is based on their positions as Traditional Authority leaders.

gather various members of the Area Development Committee (ADC) to participate in a focus group discussion. Her blessing and actions worked as a gatekeeper into the communities.

I went to Nsanje district together with an organisation called CARD (Churches Action in Relief and Development) who worked in Nsanje. I got in contact with CARD through Stein Villumstad, the land representative from the Norwegian Church Aid in Lilongwe. Mr. Michael Mwale at CARD invited me to come with him to Nsanje, and both he and other colleagues from their offices in Nsanje and Bangula assisted me during the stay in Nsanje. They were now my gatekeepers, and put me in contact with the DWO, a member of the District Civil Protection Committee (DCPC) and the Disaster Risk Management Officer (DRMO). They also went with me to two different villages, Chilwekha Village were located close to the Nsanje BOMA and Alufandika Village are located close to Bangula Trading Centre, and talked to the village headmen asking for permission to interview them and some members of their villages. See appendix III for a list of all research participants and their characteristics.

The choice of research sights were decided in collaboration with Dr. Evance Mwathunga at Chancellors College, University of Malawi. His local knowledge complemented my limited knowledge, and he assisted me with finding a research assistant and get in touch with representatives from the local government. The choice of participants in the two district are based on snowball sampling, a technique which is based on a number of initial contacts who are asked for information of any other people who might fulfil the sampling requirements (Kitchin & Tate, 2000).

4.3. Data Collection Techniques

There are different qualitative research techniques, where interviews and observation are the primary examples. Qualitative techniques emphasize quality, depth, richness and understanding (Clifford, French & Valentine, 2010). My personal experience and knowledge in using interviews in addition to allowing me to produce a rich and varied data set in a less formal setting, made me chose interviews as my main research method. I wanted to supplement my findings through interviewing by also using observations from the field and secondary data in the form of reports and statistics on the field of recovery and water and sanitation in the areas of study. I will further justify the choice of the research techniques and their advantages and disadvantages in the following sections.

4.3.1. Individual- and Group Interviews

As mentioned, the choice of using interviews as my primary research technique was based on my knowledge and experience of using this technique in addition to the belief that the interviews would generate rich and valuable information.

I decided to use semi-structured interviews both when interviewing representatives from the local government and the communities. The reason for this is that I am interested in hearing their stories and thoughts without me as a researcher limiting their answers. In the villages I emphasized the informal, conversational, tone between myself, the assistant (or translator) and the participants to make the participants feel comfortable and able to speak freely. The interview questions were developed to fit the participant in question. When interviewing local government representatives, the questions were related to the overall damage, struggles and structures in the district, while the interviews in the villages were related to the flood damage and how they were coping and recovering, all related to the water and sanitation situation. The interview guides are attached in Appendix IV.

I refer to Kitchin and Tate (2000) when I describe the advantages of this technique as being able to provide rich sources of data on people's experiences, opinions, aspirations and feelings. However, interviewing can be a complex social encounter.

4.3.2. Focus Group Discussion (FGD)

In Phalombe, a focus group were planned with members of the Area Development Committee (ADC). In addition to this, some of the interviews with villagers both in Phalombe and in Nsanje were group interviews (or focus groups) with four to 10 people. Whereas the focus group with the ADC was based on their common membership of the ADC. The focus group with the village members were not as planned and made the group consist of both males and females in various ages. This is not ideal as the focus group aims at gathering as homogeneous members as possible. However, I wanted to talk to all the people who had gathered to participate just in case they could provide some additional information but also to avoid being rude as they had taken a break from their tasks to participate in my research.

Longhurst (2010: 105) defines the focus group as 2a group, usually consisting of between 6 and 12 people (as homogeneous as possible) who meet in an informal setting to talk about a particular topic".

In Nsanje, I conducted two interviews in each village visited. One individual interview with the village chief and one group interview with participants from their villages. The decision to interview the village members in groups were also here based on the time aspect as my time in Nsanje was limited. Kitchin and Tate (2000) explains how a group discussion sometimes can be a useful supplement to the individual interviews and that the dynamics of a group discussion may bring out feelings and experiences that may not have been articulated in an individual interview. The challenge for the researcher here is to keep the conversation flowing and try to involve all group members. Like in a focus group discussion, it could be an advantage to choose individuals with the same background and with the same characteristics (Kitchin & Tate, 2000).

4.3.3. Observation

I include observation as a research technique despite the fact that I did not experience the flood when it happened. However, my topic focuses on the recovery or reconstruction of damaged water supply systems and sanitation facilities in which I was able to observe when I was there. I was able to see the village water points and the damage to the water and sanitation facilities. In one village, I was also able to see the reconstruction of one latrine and a shower room.

Observation relies on the observer's ability to interpret what is happening (Kitchin & Tate, 2000). This made me rely on the interviews as the primary source of information with the observation in the villages only being used as a supplementary technique. I was not conducting observation in the sense of observing people in a contemporary setting or the landscape; I wanted to observe the destructions and the recovery efforts in the areas.

4.3.4. The Use of Secondary Data

I uses Whites (2010: 61) definition of secondary data as "information that has already been collected for another purpose but which is available for others to use". During this research, I have used a series of secondary data to underpin and as a supplement to own findings in my analysis. The secondary data used includes district administrative documents, local and international reports and national statistics. Secondary data has also been used in the area description.

4.4. Data Handling and Analysis

The majority of my data collected were through interviews and focus group discussions that were transcribed into transcripts. Text-based materials such as transcripts are rich in information but present the researcher with unique challenges of interpretation and representation (Cope, 2010). I also used a broad spectre of secondary data, mainly including district reports, needs assessments and plans, and statistical data.

4.4.1. Data Analysis

I used *coding* when I were analysing my data. Coding is a way of evaluating and organising data in an effort to understand meanings in a text, and helps identify categories and patterns. By identifying categories and patterns, we can begin to make more sense of the data and start to ask new questions (Cope, 2010).

I red trough my data and began to categorize the data in a timeline, leading from the flood event through the day of my visit and towards further recovery plans. I tried to categorise the data into the situation before the flood, the flood event, response, relief, returning home, permanent reconstruction and plans forward. The data were also divided between sanitation issues and water issues. Since I had been visiting four villages in two different districts, I tried to identify any differences and similarities between the villages both within the same district, and between the districts.

In order to give meaning to the collected data, I have interpreted the data in relation to relevant theory. I struggled for a long time to categorize my findings, and decided that a timely structure were the most appropriate when looking at a process (recovery) following an event (flood). The aim of the analysis and discussion chapters (chapter 5 and 6) is to present the findings in a timeline starting from the flood event through the response and relief phases of the disaster recovery which included the time when the affected people were staying in the displacement (or emergency) camps (chapter 5). The reconstruction or long-term recovery phase follows as people were moving back to their villages (chapter 6).

4.4.2. Handling the Gathered Data

As mentioned, all interviews and focus group discussions were taped and transcribed. The data were kept on my computer that I either took with me or locked away. All data will be deleted

after the end of the project[5]. I have tried to keep my informants anonymous to the extent I found possible. No names are used, but the village, district and position are included.

4.5. Ethical considerations

"Research ethics are concerns with the extent to which the researcher is ethically and morally responsible to his/her participants, the research sponsors, the general public, and his/her own beliefs" (Kitchin and Tate, 2000: 35). General research ethical considerations includes privacy, confidentiality and anonymity. When conducting a scientific or academic research, it is important that the researcher weigh potential benefits of the study against negative consequences to the individual participants (Kitchin &Tate, 2000). The individual participants plays an important role in data gathering in qualitative research, making the protection of the participants especially important. To behave ethically is a question of moral behaviour. How to act ethically is ultimately up to the researcher (Hay, 2010), and the researcher have to take full responsibilities for decisions made during the study.

Being a Norwegian student, I am obligated to follow Norwegian research ethics issued by the Research Council of Norway and the Norwegian National Research Ethics Committees. The Norwegian National Research Ethics Committees has issued some general principles for research that includes respect, good consequences, fairness and integrity (Norwegian National Committees for Research Ethics, 2014). In addition, the National Research Ethics Committee for Social Sciences and Humanities (NESH) has developed more specific guidelines for research within the subjects of social sciences and humanities. These guidelines focus on the respect for individuals, including the obligation to respect human dignity, integrity, freedom and participation, avoid injury and severe burdens, inform research participants and obtain free and informed consent. In addition, this chapter mentions the importance of research license and obligation to report. You should also respect individuals' privacy, confidentiality, and restrict reuse. Other aspects of this guideline of particular relevance to my research project includes the study in other cultures, scientific integrity, the student-supervisor relationship, and the use of research results and the right to publish (National Research Ethics Committee for Social Sciences and Humanities, 2006).

[5] The end of the project means after the oral presentation that will be held within three months after the submission deadline that is 10 May 2016.

In addition to have to follow Norwegian standards for ethical research, conducting my fieldwork in Malawi also obligates me to follow the Malawian standards. "The Framework of Requirements and Guidelines for Research in the Social Sciences and Humanities in Malawi", issued by the National Commission for Science and Technology, includes a chapter on ethical principles and obligations. This chapter highlights the importance of informed consent, privacy and confidentiality, accountability and transparency, obligations to others, responsibility to the public, to colleagues and fellow researchers and to students and trainees, non-discrimination, avoidance of conflict of interest, objectivity, integrity, and coercion and undue influence (National Commission for Science and Technology, 2011).

In order to get my research licence approved I had to show through my research proposal that I have red and understood the ethical guidelines listed. This included developing an informed consent form for all participants to sign (either with signature or with a thumbprint) to make sure that they all knew the nature of the research project and their rights as participants. By Norwegian standards, this information can be given to the participants and an oral consent is enough.

It is important that the research participants fully understand the nature of the study, that their participation is voluntary and that they have the opportunity to withdraw participation at all times during the study. This information was provided through the informed consent forms (see Appendix V) I issued all participants in the villages I visited. Other participants in the local government was given the information, gave me an oral consent and were left with the contact information in which they could contact with any questions or the desire to withdraw participation. By giving an informed consent, participants confirms their participation in the study and that they have understood their rights.

Working with other languages also leads to ethical reflection. By working in Malawi where English is the official language but the majority of the people living outside the major cities only speaking Chichewa, I needed to hire a research assistant to help me conduct interviews with people who do not speak English. The discussion on the issues of working in a different culture, a different language and with a research assistant will follow in the next section.

4.6. Practical challenges

While developing your research design you try to plan the practicalities of your fieldwork, including the "who, what, when, where and for how long". You shape the choices of aims, method(s), sample size and the amount of data we have time to collect, analyse and manage (Clifford, French & Valentine, 2010). You need to look at your timetable and budget, access to the field, the field environment and the limitations of your study.

Timetable and budget are related to the size of the study, the time and resources available, and the physical costs of undertaking the study. You need to assess the viability of your study given these constrains (Kitchin and Tate, 2000). For this research, the fieldwork was restricted to two months (August to October 2015) with a following writing process finishing in May 2016. The research were self-funded through loan from the Norwegian Loan Board (Lånekassen).

Another issue is the access. Data generation often requires access to documents, people and/or institutions. The access may be ensured through a *gatekeeper* by asking for permission to carry out the research (Kitchin and Tate, 2000). The gatekeepers in my research included the National Resource Council, Local Government representatives, traditional authorities and village chiefs.

4.6.1. Research in a Different Culture

Another practical challenge was conducting fieldwork in another culture. Bullard (2010) writes about health and safety in the field and mentions how the aspects of location, background information (how to act, dress and behave), risk assessments, climate (hazards and risks), customs, political issues and religious can affect the ways in which a researcher conducts their research and how people react to the project. As a researcher, you should aim at minimizing the risk of offense. When conducting research in another culture you should acquire the necessary background information about the country and culture you are visiting by using country guidebooks and other resources. You should also notify your embassy or consulate about your business and plans for the fieldwork. Norway has an embassy in Lilongwe that I visited in the beginning of my fieldwork.

When working on cross-cultural research and using other languages, you may encounter several challenges. It is important to be aware of and reflect upon these challenges to be able to justify your decisions during the fieldwork and analysis.

> [Cross-cultural research] requires a sensitivity to cultural similarities and differences, unequal power relations, fieldwork ethics, the practicalities and politics of language use, the position of the researcher, consideration of collaborative or participatory research, and care in writing up the research
>
> (Smith, 2010: 157)

Cross-cultural research is the term used to describe researching 'other' cultures using other languages. As geographers, we have the responsibility to reflect about how we conduct fieldwork in different cultures. Differences and similarities between cultures needs to be considered, the uneven and unequal power relations and to move away from an *ethnocentric* approach to fieldwork (Smith, 2010).

4.6.2. Doing Research in Different Languages

There are a series of challenges tied to a researcher working with different languages. You may use both translation and interpretation during such a research. During data collection and fieldwork you need to consider what language are being used, are you using written translation or working with interpreters, and how might this affect the research and data collected (Smith, 2010)? English is the official language in Malawi. However, there are many people without higher education, especially outside the larger cities, which can neither speak nor understand English. I therefore had to hire a research assistant to be able to conduct interviews in the villages.

Even when you know and speak a language fluently, awareness of language use and translation remains important. Even though you may be aware of the details of what is being discussed, it can be challenging to translate the meaning between different contexts (Smith, 2010). It is important that geographers adopt a critical approach to translation and the understanding of the political and cultural impact of the loss of meanings for key terms when they are being translated between languages (Smith, 2010: 164 [Muller, 2007]).

4.6.3. Using a Research Assistant

In the context of undergraduate research, finding an interpreter with suitable language skills and that you can afford to pay may be a challenge and you might have to negotiate carefully about the expectations you have of the interpreter and that they have of you. Interpreting is a challenging process for the person doing it, but it can also lead to frustrations between different members of the research team (Smith, 2010).

Rather than assuming interpreters are neutral, almost invisible transmitters of meaning between the researcher and research participants, it is worth considering their active role in the research. Would an outside interpreter being less bias, or lack local knowledge? Does a local interpreter understand the issues better? Might they introduce bias by tending to guide you to interview people they already know? Does their gender, class, ethnic or age position mean access to some participants is easier or more problematic? Remember that in many situations those who have the skills to act as interpreters may also be the more educated or affluent people in a society. Thus, it is useful to consider how interpreters are involved in meaning-making in the research (Smith, 2010).

To be able to use a research assistant and still follow the Norwegian Ethical Guidelines, we had to sign a "Data Processor Agreement" (see Appendix VI).

4.7. Positionality and Reflexivity

The issues of positionality and reflexivity relates to the more general questions of difference, unequal power relations and the position of the researcher. Geographers have to consider a range of practical responses that illustrates the challenges and possibilities of a research. The issue of position and reflexivity is, if possible, even greater in a cross-cultural research like mine.

The research can never escape the power relations shaping the situations in which we research. A strategy for addressing inequalities is to recognise and take account of our own and our research participants positions (Smith, 2010).

Smith (2010) uses Tracey Skeltons (2001: 89) definition of positionality:

> "By positionality I mean things like our 'race' and gender […] but also our class experiences, our levels of education, our sexuality, our age, our able-ness, whether we are a parent or not. All of these have a bearing upon who we are, how our identities are formed and how we do our research. We are not neutral, scientific observers, untouched by the emotional and political contexts of places where we do our research".

Positionality is the awareness of how aspects of our own identities are significant in different contexts. To some extent, we are always working with 'different' cultures and must negotiate the power relations of similarity and difference in our research whether these cultures are significantly different or close to our own (Smith, 2010).

Coming to Malawi as a young, white, female researcher, I feared that my origins could compromise my study. I felt that my age in particular could be an issue as I have been given the opportunity to achieve higher education in such a young age. I was aware of the fact that I am definitely an outsider in the communities in which I was doing my research. I tried to adapt to local culture and customs by learning some polite phrases in Chichewa and using a "chitenge" (a 'sarong', worn by women and wrapped around the chest or waist, or to carry things or babies) and a long skirt when visiting the villages.

Even by bringing a "local", we were still outsiders. My research assistant, despite being Malawian, were not from the research areas and had higher education. We also had a car and a driver, making our situation very different from the situation of people living in the communities visited. Even though I could be an insider in the research area, I was able to reflect on how our differences might affect my research.

Despite such major differences, I was left with the feeling that the participants were more than willing to participate in my study. However, they may have believed that I was in the position to generate some assistance to their communities despite making them sure that I was conducting an academic research independent from either local, national or international actors.

4.8. Validity and Trustworthiness

Validity related to theory includes *content validity*, referring to the content and definitional strength of terms in a field. *Face validity* concerns the justification for study and refers to the practical or theoretical relevance to real-world situations and scenarios. *Conceptual validity* relates to the right combination of theory and methodology, referring to a research being philosophically sound and adapts appropriate methodologies for data generation and analysis (Kitchin & Tate, 2000).

Validity also relates to practice through *construct validity* and *analytical validity*. Construct validity concerns whether the data generation techniques are telling you what you want to know.

Analytical validity is concerned whether you have chosen the correct method or technique, leading to results truly representing the data. Choosing the wrong method might lead to drawing inappropriate conclusions (Kitchin & Tate, 2000).

Ecological and *internal validity* both relate to the integrity of the drawn conclusions. Ecological validity is concerned with the inferences that can be made from the research results – can characteristics of individuals' aggregate data referring to a population? Internal validity concerns whether different people can interpret the research results in different ways and draw different conclusions (Kitchin & Tate, 2000).

4.9. Limitations

All studies have limitations. The study being a master thesis, limits the scope of the study both in time and financially. The fieldwork was limited in time, two months in Malawi, and through my finances as it is a self-funded study. Bullard (2010) lists time and weather conditions as limitations related to the fieldwork. My time in the field was indeed limited, and was further limited when I fell sick with Malaria. This resulted in not being able to conduct all the interviews I had planned.

It takes time to organise practical issues, establish contact, and conduct interviews. However, fieldwork is all about facing challenges and doing things you might not normally do (Bullard, 2010).

CHAPTER 5: RESPONSE AND RELIEF

Both Nsanje and Phalombe District experience floods from time to time. These events result in disrupted livelihoods, forcing people to adapt to this situation instead of focusing on development progress in their village, area or district. As already discussed, people may have to temporary or permanently relocate, they suffers from diseases connected to use of unprotected water, low food availability, their livelihoods are disrupted and their homes are damaged. Phalombe experience small-scale floods in close proximity of the rivers during the wet season. The floods in this district is normally associated with the rivers in the district exceeding their boundaries, especially the Phalombe River that is one of the outlets of Lake Chilwa. In 2015, even people who were living far from the rivers were affected, as the smaller rivers were also experiencing flooding, the flat terrain of the district and deforestation. The floods in Phalombe and other district located on the Shire highland has been characterized as *flash floods*, referring to intense rainfalls in a relatively short period of time (Bryant 2005). The flash floods in the Higher Shire were probably also the cause of the extent of the flood experienced in the Lower Shire as the flooding water drains that way, causing severe flooding in Nsanje District.

The following analysis and discussion is divided into short-term recovery (this chapter) and long-term recovery (chapter 6). I have applied the terminology presented by Haas, Kates and Bowden (1977) in their post-disaster recovery model presented in chapter 3. The focus of this chapter is the emergency response and relief – the short-term recovery efforts. The chapters will follow the timeline, starting with the background of the disaster event, followed by the response and relief efforts in the displacement camps. The next sections will cover the development of Needs Assessment Reports and the administration of relief and recovery efforts through the cluster system. The chapter ends when the displaced people returns to their home villages or decides to resettle in safer areas. This is when the response and relief efforts phases out and the more permanent reconstruction and long-term recovery efforts take over.

5.1. Background of the Disaster

The flood was caused by heavy rain during the first weeks of January 2015, in which the Southern Region, and the Districts of Nsanje and Phalombe was some of the most affected areas. In addition to cause extensive damage to crops, livestock and infrastructure, the flood resulted in a large number of displaced people accommodated in temporary emergency camps.

Gurzau et al. (2009) argues that the size and characteristics of the displaced population, specifically the proximity to safe water and functional latrines, their nutritional status and access to healthcare services is associated with the risk for communicable disease transmission after disasters. In Malawi, there was a growing concern for disease prevention in the emergency camps given the poor sanitary and drainage conditions (DoDMA, 2015c).

The whole district of Phalombe was affected by the flood, including the Traditional Authority (TA) Mkhumba and Nazombe and the Sub-Traditional Authorities (STA) Jenala, Kaduya and Chiwalo (Appendix I shows a sketch map of Phalombe District). People had to evacuate their homes and seek refuge in schools and churches on higher ground: *"When the rain started to fall heavily, people started panicking as water levels started rising and people would seek refuge in schools or churches on higher land"* (Traditional Authority Mkhumba, Phalombe).

In Nsanje, the flood affected seven of the nine TAs, including TA Mlolo, Mbenje, Tengani, Malemia, Ngabu, Nyachikadza and Ndamera (see Appendix II). The villagers in Alufandika described the flood starting around midnight on 12 January as the Main Shire River flooded. People were taken unawareness as the water just flooded the entire village of Alufandika, which is located between the Shire River and the M1 road that runs through the district. The people in the village were taking rounds to wake each other so that they all could leave the village and find shelter on higher grounds. *"People were running for their lives from the flooding area, so most of them were standing on the roads. That means that […] houses were collapsing. And their belongings, like livestock were swept away"* (Group interview, Alufandika Village, Nsanje). The Nsanje District mobilised resources for response operation with assistance from the Malawian Defence Force, and established and managed the emergency camps.

The displaced population were seeking refuge in schools, churches and market places. There were 62 emergency camps established in Phalombe, of which 39 were located in schools. In Nsanje, the District Council established 19 camps – six in the east bank and 13 in the west bank. The 19 camp were reduced from 24 camps that were operating as of 27 January (DoDMA, 2015d), as efforts were made to move the displaced population away from schools (DoDMA, 2015e). Displacement can be temporary or permanent, voluntary or involuntary, and may be a response to physical, economic or environmental danger or harm (Levine, Esnard & Sapat, 2007).

5.2. Response and Relief in the Camps

As people were settling temporary in the displacement camps, short-term response and relief efforts on water and sanitation were seen as essential to prevent any outbreaks of communicable diseases (DoDMA, 2015a). The first priority is to provide an adequate quantity of water, even if the quality is poor, and to protect water sources from contamination (Gurzau et al., 2009). Providing clean water and building temporary sanitary facilities were acknowledged needs in the displacement camps both in Nsanje and in Phalombe. Safe water was provided either through existing safe water supplies, from contaminated sources (cleaned with chlorine or other water treatment chemicals), from water bowsers (tank trucks) or bottled water. The sanitation situation were relying on existing facilities and temporary structures built by organisations working in the camp. Improvement and expanding the sanitation situation is especially important in the campsites where people are crowding to prevent any outbreak of communicable diseases. The temporary situation in the camps were relying on outside assistance from the district government and affiliated humanitarian organisations, as large-scale flood disasters in developing countries overwhelm available local resources (Smith, 2004).

In Nsanje, there were a need for standardised assembled non-food items (NFI) kits and for increased site management actors. Shelter were needs as people were crowding schools that needed to reopen (DoDMA, 2015d). As is was decided to move the displaced people from the schools into alternative sites, the insufficient shelter and no access to water and sanitation were the major challenges. In addition, water were not treated in the majority of the sites as there were a lack of chlorine or other forms of water guard (chemical water treatment) (DoDMA, 2015e; DoDMA, 2015f).

As people were settling in temporary displacement camps, response and relief were essential to prevent outbreaks of communicable diseases in the camps through the provision of clean water supplies and sufficient sanitation facilities. Some stayed in the camps for up to six months. Crowding is common in populations displaced by natural disasters and can facilitate the transmission of communicable diseases (Gurzau et al., 2009). Most of the response and relief was given to the affected people living in relocation camps after the flood. Reports from Phalombe stated that people were moving back and forth between their homes and the camps as they were starting to rebuild their houses and cultivate the fields (DoDMA, 2015g). The participants from Alufandika Village, Nsanje, told a similar story as they were living in a

displacement camp close to their home village and were able to go there during the day to rebuild damaged infrastructure and grow the seeds they was given in the camps.

In Nsanje, safe water supplies were a challenge. Water was supplied to the camps from both water bowsers, existing schemes and boreholes. UNICEF provided some fund for water purification in camps. The district used a mobile water treatment for treating contaminated water and supplying it to the affected people in the camps. There were also some challenges in relation to water storage when water is supplied to the camps from water bowsers, because water-handling tools like buckets were washed away during the flood. The Médecins Sans Frontières (MSF) were assisting the situation by providing some water tanks to store the water. Camps were connected to existing water schemes with the assistance from MSF. Water Mission International used funds from UNICEF to install solar pumps in a few areas.

> What we have also done this year to look ahead is that we have tried to reticulate some of the boreholes instead of maybe people just coming on that borehole, we have used submissive water pumps using solar power and then the water is pumped from the boreholes to a tank and distributed. There are taps that goes to specific places. So what we intend to do as part of our recovery is to extend these pipes to those villages that do not have at the mean time. Also bearing in mind the capacity of that particular water point. It looks like it is working, we are just moving into that state now (Water, Sanitation and Hygiene Specialist, UNICEF).

In Nsanje, these solar pumps were used in at least four areas. In addition, the Norwegian Church Aid assisted the district with water purifying tanks to the Bangula Camp, which was one of the largest camps in the district. As of 6 February, one drop-hole covered 150 people (DoDMA, 2015h). To prevent the spread of cholera to the camps, MSF were doing some maintenance to some boreholes in the areas of the camps, as cholera gradually became an issue in the district. The NGOs GOAL Malawi and the MSF were constructing some toilets and shower rooms in some of the camps in the areas where cholera were threatening.

> The district mobilized resources in the rescue operations, conducted a district flood disaster assessment and compared district reports that is a situation report. Moreover, we established and managed those camps. The district managed to provide mobile clinics, psychosocial support to traumatized people and provision of food and non-food items to displaced communities. We do appreciate the external support we received, because the Malawian Defence Force actually supported us, the Marine in providing search and rescue equipment such as boats. Also NGOs, FGOs, Civil Society also assisted in the

> provision of both food and non-food items. A UN Emergence Operation Centre was also established in the district to coordinate and assess the camps and management (Member of the Nsanje District Civil Protection Committee).

In Phalombe, the main response focus was to provide latrines, water and water treatment in the camps. UNICEF supported the district by providing temporary latrines, especially in the schools used as displacement camps or evacuation centres. Assistance on sanitation was provided to the camps as the camps had few toilets and bath shelters, and pressure on the latrines was evident as many people were now using the facilities. Both Timotheus Foundation and CADECOM (Catholic Development Commission in Malawi/Caritas Malawi) were assisting the district with the construction of temporary latrines. To meet the poor quality water who needed treatment, chlorine was provided. Safe water was also provided from water bowsers. Water handling tools like buckets and cups were also provided.

The risk of and outbreak of communicable diseases after a disaster is associated with the proximity of safe water and functioning latrines, and access to health care services. The greatest risk of an outbreak is associated with the transmission of faecal pathogens due to inadequate sanitation, hygiene and the protection of water sources. Access to these facilities may be jeopardized in a disaster situation. The risk of outbreaks following a disaster is higher in developing countries than in industrialized countries (Gurzau et al. 2009). Access to WASH services including shower and latrine facilities and dignity kits were a challenge in the displacement sites (DoDMA, 2015i), and additional staff were to assist with the supervision of cholera centres which were established (DoDMA, 2015b).

Health sector interventions in the camps was identified as one of the top priorities as there were a need to undertake health assessment in the districts considering the potential risk of water borne diseases (DoDMA, 2015e). In Phalombe, two or three cases of cholera was reported, but the situation was never a threat. In Nsanje on the other hand, cholera were becoming an issue with the 34 cases and two deaths as of 24 February (DoDMA, 2015i) increased to 159 cases and 3 deaths by 31 March (DoDMA, 2015g). The cases was reported close to but not inside the some of the camps. The District Heath Officer in conjunction with humanitarian partner was working hard to contain the disease through awareness trainings and campaigns (DoDMA, 2015g).

5.2.1. Stories from the Affected People – the Camp Situation

The two villages I visited in Nsanje, Chilwekha and Alufandika Village, was both displaced during the flood. People from Chilwekha Village, originally located at the East Bank of the Shire River, were staying in Mota Engil Displacement Camp in Nsanje BOMA after being evacuated from the flood. They received a relocation site in close proximity to the Nsanje BOMA, between the Shire River and the M1 Road that runs through the district. The people from the other village I visited, Alufandika, were staying in Mlonda School, because the District Civil Protection Committee had allocated all the flood victims of that area into the one camp at Mlonda School. Everything was swept away, and assistance were needed. In the camp, they received assistance from several NGOs including the Malawi Red Cross, Action Aid and CARD while they were staying in the camp. This village had stayed in the camp from January 13 to August (8 months).

Some of the affected people described the situation in the camps in Phalombe as bad. In the Mota Engil site, where the people from Chilwekha village were staying, a fatal accident took place on 14 February as a woman died after falling into a five-meter deep pit latrine (DoDMA, 2015j).

> At a school for example, toilets were available but these were not adequate for the large numbers of people camping there. We did not have proper camps that could accommodate us, and our presence […] disrupted teaching and learning in the schools because we took shelter in some of the classrooms. At times when we were cooking, the children would get distracted and watch what we were doing instead of paying attention in class. […] It took a long time for us to get assistance from the government and NGOs, and it was not enough. Sometimes they would bring us water to drink but it wasn't enough because for instance each family would get 10 or sometimes 20 litres and that was for a whole month so we had to supplement with water from the river or walk long distances to find other water sources (Traditional Authority Mkhumba, Phalombe).

5.3. Post-Disaster Needs Assessment Reports (PDNA)

De Ville de Goyet (2012) argues that there are many types of assessments following natural hazards, which includes damage (or impact) assessments, needs assessment and economic valuations. Damage assessments estimates the immediate physical and social impact, while the needs assessments determines what is required or missing to assist the affected population, and the economic valuation places a cost on the direct and indirect impact in different sectors.

Needs assessments are carried out to map out the needs of the affected population and areas within different sectors, to monitor the situation and to be able to ensure that response efforts are carried out as planned, with a timely indication of problems and unsatisfied needs. The needs assessments was developed at both national and district level in Malawi after the flood to map the damage and needs of the affected population and communities as part of disaster management. In the districts, the Needs Assessment Reports are developed at a local scale to identify the needs, damage and resources available at the district level to be able to respond appropriately and with maximum impact (Gurzau et al., 2009). In the Malawi Post-Disaster Needs Assessment (PDNA), the recovery refers both to the short-term and the long-term recovery needs. On WASH-related issues, the PDNA includes sanitation and hygiene promotion, provision of relief sanitation facilities and emergency water supplying mechanisms as the aspects of water and sanitation recovery (GoM, 2015a).

In Phalombe, the District Needs Assessment were conducted on 13 to 14 January led by the District Council with the team comprised the Malawi Red Cross, NGOs and Phalombe District Council Officers. The needs assessment indicated a number of gaps in the water and sanitation sector, including large infrastructural damage, the collapse of sanitation facilities in communities and in public infrastructure (schools, health centres etc.). Most camps and affected communities were not having access to safe water and people were lacking water storage utensils. The distance to the water-points were on average one kilometre. The personal hygiene in the camps and affected villages were poor due to the lack of shower rooms. The camps had inadequate pit latrines in terms of numbers and condition, which forced people to share the facilities or practice open defecation or “dig and burry”. The needs assessment recommended the construction of temporary latrines and shower rooms in all camps, and the provision of chlorine in all camps and affected communities. In addition, adequate attention to health and hygiene in camps and in affected communities, provision of water handling utensils (buckets and cups) to ease the handling of drinking water, and provide plastic sheeting for the construction of temporary sanitary facilities were also recommended. The needs assessment also stated that the first priority in a disaster situation should be to provide enough water for the affected population, even if the quality of the water is poor (Phalombe District Council, 2015).

The major damage to the water supplies was damages to the water supply schemes, in which one had experienced damage to the intake, demanding greater reconstruction. Another water scheme were only requiring minor maintenance after the flood, which had been done by the

time of my visit. The District Water Office had applied for funding to reconstruct the water scheme intake, and had received information that the funds were ready. In addition to these two water schemes being damaged, an additional 50 boreholes were also affected. The boreholes was not structurally damaged, but contaminated requiring chemical treatment before consumption. So water was available, but of poor quality. Another issue were the lack of availability to water handling tools, most of which were damaged or lost in the flood.

On WASH-related issues, the needs assessment showed a need to repair and maintain damaged water and sanitation facilities in the camps where people were gathering to reduce the health impacts of the flood. The risk for communicable diseases transmission after disasters is associated primarily with the size and characteristics of the displaced population, specifically the proximity of safe water and functioning latrines, the nutritional status of the displaced population, the level of immunity to vaccine-preventable diseases and the access to healthcare services (Gurzau et al., 2009).

> That was what was mainly found to be damaged after the flood. After that assessment, we started responding to the needs. We programmed, working through clusters. The water and sanitation cluster was made to meet the immediate needs as opposed to long-term needs. So based on the gaps, they had to provide toilets, mainly because people moved to the camps, where we had few toilets and bath shelters; they went there to provide this. To meet the poor quality water, who needed to be treated, mainly they just provided chlorine. They also supplied plastic buckets and cups. In some areas, people had limited access to water because of few water sources, so the cluster also made it possible to provide safe water to those communities (Assistant Disaster Risk Management Officer, Phalombe).

In Nsanje, the flood affected water supply systems, which compromised the access to safe water. Most boreholes were washed away, submerged, scoured or contaminated, and some pipelines in some water supply schemes was washed away. This is the structural damages a flood can cause these facilities. If a borehole is washed away, parts or the whole structure are missing. The floodwater can also submerge the boreholes, meaning that the entire structure is covered with water. If a borehole is scoured, the soil around the borehole has been washed away and the sub-structures of the borehole is visible. Finally, contamination happens if the water source is mixed with polluted water that can make people sick. Contamination are more common in open water sources, but can also happen to groundwater facilities like boreholes. The worst effect were the fact that affected people were relocated to areas that had low access to water due to unavailability or inadequate safe water points leaving them vulnerable to water

borne diseases like cholera. Table 5.1 show the numbers of damaged water supply systems including boreholes, kiosks, and piped water supply systems.

Table 5.1: Number of water supply systems damaged including boreholes, kiosks, piped water supply systems and the number of households affected by the lack of functional water supply systems (Nsanje District Council, 2015).

TA	Vulnerable population	Number of Boreholes affected	Number of water supply schemes affected
Mlolo	23,000	125	0
Mbenje	16,000	62	0
Tengani	19,000	75	1
Malemia	11,000	42	1
Ngabu	8,000	29	0
Makoko	2,000	18	0
Chimombo	9,000	32	0
Ndamera	18,000	69	1
Nyachikadza	4,000	0	0
Total	**110,000**	**452**	**3**

In addition, several latrines and shower rooms collapsed or were washed away. This put the displaced people at risk of contracting diarrhoea-related diseases. All displaced households have their latrines and shower rooms damaged. There was the need for assistance in the reconstruction of toilets in the areas of relocation. Those returning to their original homes should be encouraged to reconstruct sanitary facilities as a means of promoting hygiene among the flood victims (Nsanje District Council, 2015).

5.4. Administrating the Relief and Recovery Efforts - The Cluster System

The recovery process after a large-scale disaster such as the 2015 Malawi flood was far beyond the capacity of the Malawi Government. Affected governments and communities in developing countries rely on outside assistance based on humanitarian concern following severe loss (Smith, 2004), making the recovery process dependent on a third party to assist in the reconstruction. In developed countries, disaster relief can be achieved by spreading the financial load throughout the tax-paying population of a nation. In developing countries however, assistance is commonly provided through allocations of *bilateral aid* (donated either directly from one government to the affected government or indirectly through NGOs, often for a

specific purpose) and *multilateral aid* (donations channelled through international bodies such as the EU, World Bank and UN agencies) (Smith, 2004). The affected governments are occupied with providing emergency services whereas the international community supports the recovery process through provision of assistance in the form of financial and physical assets (Jigyasu, 2012).

In Malawi, the affected people needed multi-sector humanitarian assistance (DoDMA, 2015d), which was coordinated through the cluster approach. The Government through the Department of Disaster Management Affairs (DoDMA) leads the Cluster System in Malawi, and works as the central coordinating body. Under the coordinating body we find the different sectors (or clusters), which includes a WASH cluster. The main responsibilities for each of the clusters are to coordinate all efforts that are being undertaken starting from preparedness, response and recovery or mitigation. The clusters also do a resource mapping; who does what and what are they going to do. The various affiliated agencies are required to give reports to the cluster regarding what they are doing. The Cluster System helps to standardize how the preparedness, response and recovery should be approached.

The Ministry of Water Development and Irrigation leads the WASH cluster with the co-led of UNICEF at the central level. Other actors in the WASH cluster include different NGOs and international humanitarian organisations working on WASH-related issues. In the districts, the cluster leads are up to the District Commissioner. For example, in Phalombe, the District Environmental Health Office leads the WASH cluster with assistance from UNICEF. In the districts, all clusters have to report to the District Commissioner.

> After noticing about the damage, the cluster also organised itself as recovery. What I have to tell you first is that for Phalombe, the disaster of 2015 it was the whole district that was affected. Not just a few TAs, almost the whole district. The cluster therefore organised itself as to how to reach out everywhere. During the first three months they had specific organisations that were working with the TA, each TA had their own organisation that were working there on WASH issues, as a lead in that particular team. Just to mention, during that time we had the example of the Red Cross working in TA Mkhumba and Kaduya. CADECOM working in part of TA Kaduya, TA Chiwalo and TA Nazombe. Concern Universal working in TA Jenala. So on WASH related issues; this was how they were organised during the response. All these organisations were getting their resources from UNICEF (Assistant Disaster Risk Management Officer, Phalombe).

> We are in the process of recovery – we have some partners that are assisting us in parts of recovery – for example, Red Cross (T/A Mkhumba) on the gravity fed system and maintained some boreholes in some areas. We also have Concern Universal; they have done maintenance of some boreholes, and Inter Aid, focusing on the area of TA Jenala, also maintaining some boreholes. Apart from them, we also had some partners that came for the period of response. There were Timotheus Foundation, in their case, not maintaining and drilling new boreholes but just providing clean water through mobile vans, just to ensure that people were taking clean water. There were also Concern Universal also doing the same, having very huge tanks carrying water around supplying around. I think we also had support from the Government, especially from the Department of Disaster (Director of Planning and Development, Phalombe).

In the districts experiencing floods, the first priority of the affected population was to escape the flooding water and seek refuge in the upland areas. The flood damage and needs of the affected population are reported to the District Commissioner through the Village Civil Protection Committees (VCPC) and the Area Civil Protection Committees (ACPC).

> We have committees responsible for disaster management at group-village headman level and TA level and these coordinated with the district council to provide updates on the situation, telling them what problems people were facing and where they were seeking refuge (Traditional Authority Mkhumba, Phalombe).

The main entry points for the clusters were the camps, making the support or assistance mainly targeting the camps. In the first three months after the flood, the support provided were mainly immediate assistance covering short-time needs. This included the provision of water, chemicals to treat contaminated water (called water guard) and water handling tools, and constructing and maintaining sanitation facilities in the camps where people were resettling. After the first three months, the needs assessment was carried out to map the support needs related to water and sanitation in the communities. The more long-term efforts included maintaining damaged water points in the affected communities and the provision of hygiene promotion information to the affected communities. A hygiene promotion programme that works with the affected population to respond to disasters in order to reduce risk, increase resilience and mitigate the impact of disasters on health (Gurzau et al., 2009).

Previously, the humanitarian organisations and other actors working on the disaster response were just working through sectors just coordinating based on the desires of the different actors. There was a need for a dedicated coordinator who should coordinate the disaster response

efforts. In Malawi, Government Officers in the Departments and in the Districts were used as cluster coordinators, a position which adds to their workload as they have additional duties besides the cluster coordination.

After the flood, UNICEF assisted in districts where they were already engaged (like Nsanje), but also in districts that they were not previously engaged (like Phalombe). In addition to UNICEF, the WASH cluster also includes other actors linked to the response and recovery efforts on water and sanitation. In Phalombe, the major actors were the Malawi Red Cross, CADECOM (Catholic Development Commission/Caritas), Concern Universal and PSI Malawi. In Nsanje, the major actors in addition to the ones also working in Phalombe were the Médecins Sans Frontières (MSF).

The positive aspects of the Cluster System are that the actors within the clusters tend to agree in the issues as they all have the same focus and competence on a specific sector. The clusters are developing standards that all actors need to follow. In the previous systems, the different actors were doing things the way they wanted and found reasonable, not including other actors working on the same issues. The clusters help coordinate the efforts, making the sectors more effective. As an example, if an item is needed, like a water bowser (a tank truck supplying water), the cluster looks at which actor is in the better position to get this bowser, making the most appropriate actor responsible for that. The cluster helps to register the needs of the specific sector in the specific districts, and the actors working within the sector, in addition to their resources and capacities. The Cluster System made it possible to put people with the same expertise in the same cluster to avoid confusion. This made the response work and allocation of resources and the collaboration between the different actors easier.

The major efforts of the WASH clusters was directed to the camps and damaged public facilities in schools, health clinics and trading centres. Their main focus in the affected communities were to maintain damaged water supplies and provide hygiene promotion.

In disaster response, it is important to review the efforts from time to time to ensure that the response remains relevant to the needs and resources of the affected communities (Gurzau et al., 2009). By using clusters, it is easy to look at the efforts within the cluster and to evaluate whether or not the effort has been satisfactory. If not, the cluster is in a good position to look at closing the gaps using the resources that they keep within the cluster. The clusters regularly

conduct meetings where they review the efforts of the clusters. During my fieldwork, a meeting in the national WASH cluster stressed the need to do another stakeholder analysis to find out if there were any new players and to look at what they eventually were doing.

> They also provided water in areas where water was not available, so they were using water bounces (a tank truck who supplies water). We had also, because some areas there were also providing hygiene promotion to the affected villages and camps. That type of support was mainly provided in the first 3 months as immediate support. The main entry points were camps where people moved to soon after the disaster. Therefore, support mainly targeted the camps (Assistant Disaster Risk Management Officer, Phalombe).

5.5. Returning Home or Permanently Relocate

When the benefits of living close to a river are perceived to outweigh the negative impacts of flooding, it is difficult to convince people to leave their land permanently for higher and safer areas (Schmuck, 2012).

Natural hazards typically results in temporary displacement and rarely in permanent relocation (Levine, Esnard & Sapat, 2007). Since Nsanje is especially prone to floods, the Government advised people to relocate to safer areas permanently. Bryan (2005) states that in almost all cases of natural disaster, people want to go back and resettle in the same place they were living before. In Phalombe, people returned to their home villages after the displacement camps closed, and started to rebuild their homes. Also in Nsanje, the people from Alufandika village had decided to move back to their original home village instead of resettling in a new area assigned to them, whereas the people from Chilwekha village were relocated to another area.

> We do not want those people crying out from time to time "flood". We want them to resettle in upper lands. Red Cross, CARE Malawi, those development partners have helped us actually in drilling boreholes in those areas. Because what we are looking is to have those new resettlement areas as friendly places. Which means basic necessities should be there. Because if water is not there, toilets are not there, whatever is not there, people will go back to the flood prone areas (Member of the Nsanje District Civil Protection Committee).

An example showing the positive aspects of relocation involves two large floods in Malawi's neighbouring country Mozambique in 2000 and 2007. The 2000 flood affected 4.5 million people (which estimated about 20 percent of the country's population at that time) and around 800 people died (Wisner et al., 2004: 258). In the 2007 flood, on the other hand, no more than

300,000 people were affected despite the same water levels as in 2000. Explanations to the difference in the number of affected people were argued to be the result of the efforts by the government and national and international NGOs. In addition to lessons learnt regarding response, population awareness and improved co-ordination of stakeholders were the fact that many of the people affected by the 2000 flood had resettled in higher and safer areas (Schmuck, 2012).

A loyalty to locale history and a commitment to a locality draw people back to the disaster area, in addition to religious beliefs and morals sometimes being used to dismiss the hazardousness of an area (Bryant, 2005). Schmuck (2012) refers to a study of relocation in Mozambique, which shows that despite the government establishing resettlement areas and provides construction materials, people prefer to return to the risk zones because these areas had fertile soils, their ancestors were buried there, and their rituals took place in these localities.

The people of Alufandika Village in Nsanje decided to move back to their original home village instead of resettling in a new area assigned to them. They reasoned their choice with the fact that they could not see any opportunities in the new area. They found it hard to continue their agricultural production and to access needed services such as water supply. In addition, they would have to start all over again. In their original village, they were able to rebuild the damaged houses and facilities and continue their lives as before. The reconstruction of their village happened while they were still living in the displacement camp as this were located close to their village, which made it possible for people to go back and forth between the camp and the village. Evacuation can mean a loss of assets, by returning, people can at least salvage something (Bryant, 2005).

> Every year we experience some types of problems. We are not receiving enough assistance and we are now going towards another rainy season that may cause problems because people have not been assisted enough. They were encouraged to go to safer areas, however the problem is that in those areas there is not enough done to assist them, so some people are going back to their previous areas where there is very dangerous again. I do not know, maybe it is because of us as the government, or NGOs, we are failing to assist them. Because we are advising them to go to this area but the area does not have anything, does not have water points for example, so people are going back to where they were. The new rainy season is only two months away and it is dangerous (District Water Officer, Nsanje).

The people of this village had managed to rebuild almost all houses to the way they were before the flood, and they had just moved back the month before my visit (August 2015). There are psychological benefits of reconstructing at the site of a disaster. By rebuilding as fast as possible, people can forget the actual event. They keep busy at something they are familiar with, and can master. This keeps their minds off the disaster, builds self-esteem and overcome the feelings of hopelessness and despair (Bryant, 2005).

The other village, Chilwekha, were staying in a displacement camp far away from their original village, making it harder to go back. They had attempted to go back to their original homes; however, the government had encouraged them to go to this resettlement area assigned to them located close to the Nsanje BOMA. Tents were built at the new site, so they decided to go there. They had started to mould bricks to be able to construct more permanent houses, but the process was slow. The survival strategies in the new site were to go to the Shire River to find a plant they called Nika, which they eat for survival. Some people also go to the forest to fetch firewood to sell others were doing casual labour.

Moving elsewhere after a disaster may be disruptive to a wider segment of society. The evacuation of large numbers of people represent a major task that can put pressure on housing, government, and consumer supplies in the areas of resettlement (Bryant, 2005). This connects to the issues of placing affected peoples in temporary displacement camps, but also when the government decides to resettle people permanently into new areas, like in the case of Chilwekha Village.

CHAPTER 6: RECONSTRUCTION AND RECOVERY

The long-term recovery involves a reconstruction of the damaged infrastructures and livelihoods. This phase includes permanent rebuilding and any improvements. Even though this study focuses on the water and sanitation facilities, I have discovered that the reconstruction of these facilities is highly dependent on government funding, NGO assistance and the assets and resources of the affected community. This chapter focuses on the long-term recovery efforts in the affected communities, the actors involved and the challenges faced.

> People are mostly associated with finding food, and not doing anything on development. You will not have much success on just doing development work or supporting development activity without any attached food or monetary benefit, because people are trying as much as possible to get food into their homes. That is why it is a setback for most development projects because people are searching for food (Assistant Disaster Risk Management Officer, Phalombe).

6.1. Water Supply and Sanitation Damage in Phalombe and Nsanje

> If water is clean and our pit latrines are hygienic we do not get sick so we are able to take part in development projects to develop our area. […] There are not enough toilets so some people are still relieving themselves in the bush, this can be breeding ground for diseases and then people have to go to the hospital, taking up time that could have been spent on development projects. In terms of water, development projects that could have taken just a few days to complete are taking months because the people that are supposed to participate are busy looking for water for their households. These days it is not just the women fetching water; even men get on their bicycles in search of water as women are doing the same so this is affecting participation in development projects (Focus Group Discussion with the Area Development Committee, Traditional Authority Mkhumba, Phalombe).

When discussing infrastructural damage to the water supplies and sanitation facilities as a direct cause of the flood, in Nsanje, there were more damage to the water supplies than in Phalombe, and there were similar damages to the sanitation facilities. As mentioned, the need assessment in Phalombe indicated that the flood had caused severe damage to the sanitation facilities, with 40,779 basic latrines in the communities were collapsed and eight permanent latrines. Severe damage to the private sanitation facilities were probably the biggest WASH concern in Phalombe after the flood. In addition, two water schemes were also damaged and over 50 boreholes were affected.

> Water is life so if we have clean water our lives can be developed. […] The problem is that activities that could have taken a short time take longer because people have to travel far to get water. Development projects stall as people wait to get water. […] It (water and sanitation issues) affects development because instead of working on development projects, people are forced to stay home sick because they are drinking unsafe water (Focus Group Discussion with the Area Development Committee, TA Mkhumba, Phalombe).

> In the past, some two villages would depend on one borehole. Villages that were better off could have two boreholes serving the community. This was also dependent on the availability of underground natural water sources in the area. Now because of the floods some of the boreholes were damaged so people have to rely on boreholes in neighbouring villages and this means covering long distances to find water so things are different now (Traditional Authority Mkhumba, Phalombe).

In Nsanje, most boreholes were affected either through structural damage or due to contamination. The structural damage to the water supplies included boreholes being washed away, submerged or scoured, meaning that the dirt around the water pump is washed away; leaving the substructure of the water pump is exposed. In addition, some pipelines and water supply schemes were washed away (Nsanje District Council, 2015).

In addition to the structural damage to the water supplies in the two districts, the flood also displaced the affected people. In Nsanje, some people were also permanently relocated to safer areas. This movement of people both temporary and permanently results in an additional pressure on the existing water point in the areas where people are being relocated.

6.1.1. Direct Damage to Water Supplies versus the Actual Effect on People

However, it is important to remember that the direct damage to the infrastructure is not the only damage caused by the flood. Water points and sanitation facilities are affected by floods in two ways; direct impacts to the facilities and the actual effect on people. The direct impact on facilities includes the structural damage and contamination of water sources. If the source is contaminated, an alternative source should be sought or the water should be chlorinated before consumption until the source is being disinfected and protected (Gurzau et al., 2009). Structurally damaged water supply installations, like boreholes and water schemes needs to be repaired or reconstructed. On the other hand, the actual effect on people includes the fact that floods displace people. WASH services are not mobile but static, resulting in the displaced population utilizing or over-utilizing the services that is in the area of relocation.

> It is as if you have come into my house where I am comfortable, with our two toilets and one tap, whatever services that we had; now we are 10 on the same (Water, Sanitation and Hygiene Specialist, UNICEF).

Therefore, the services in the location of resettlement that are now being over-utilized by the displaced population. If the water point were supposed to last for another five years, it may just last a year due to being overuse caused by the displaced population. This causes an indirect impact to the water and sanitation facilities in the areas where people are relocated.

> I think mostly for the taps, the pipes, due to the flooding, most of the pipes, taking water from the mountains, bursed. For the boreholes, I say mostly the superstructure, the hand pumps mostly were damaged compared to the substructure parts. (Director of Planning and Development, Phalombe).

However, water points are affected by floods in two ways; direct impacts to the facilities and the actual effect on people. The direct impact on facilities includes the structural damage and contamination of water sources. If the source is contaminated, an alternative source should be sought or the water should be chlorinated before consumption until the water source is being disinfected and protected (Gurzau et al., 2009). Structurally damaged water supply installations, like boreholes and water schemes needs to be repaired or reconstructed.

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> It is as if you have come into my house where I am comfortable, with our two toilets and one tap, whatever services that we had; now we are 10 on the same (Water, Sanitation and Hygiene Specialist, UNICEF).

So the services that are now being used by so many people are being overused. If the water point were supposed to last for another five years, it may just last a year due to being overused over a long period. This causes an indirect impact to the water and sanitation facilities in the areas where people are relocated.

6.2. Reconstruction and Recovery in Phalombe and Nsanje

The needs assessment showed that the reconstruction needs, especially on the water supply infrastructure, were higher in Nsanje than in Phalombe. This however does not mean that the people in Phalombe do not have any issues related to their water supplies. My participants in the villages in Phalombe expressed their concern for the unstable water supply and its effect. The water situation was difficult even before the flood; some boreholes were damaged without being addressed, and the water schemes were not working properly. They stressed the need for an improvement to the water supply systems in the district, especially the gravity fed water systems. However, relying on donors funding the recovery and reconstruction of damaged infrastructure and facilities may make any long-term improvements difficult. In addition, the local and national government cannot allocate funds for the upgrading of the existing infrastructure.

It is the local government, with assistance from their partners, who is responsible for the reconstruction of the damaged water supplies and public sanitation facilities, including latrines in schools, hospitals, health clinics, trading centres and so on. They also provide the affected communities with hygiene promotion where they go to the communities to motivate them to practice good hygiene. The communities get information on why latrines are important to their health, and are encouraged to construct their own. This issue of hygiene promotion will be discussed further later in this chapter.

6.2.1. Recovery of the Water Supply Systems

In Phalombe, the reliable water sources in Phalombe are boreholes and gravity fed water systems with taps. Due to the flood, one of the oldest water schemes in Phalombe suffered damages to the water intake and the pipelines. It is a substantial damage to the scheme as the water intake that supplies the scheme with water was damaged, and this affected the entire scheme. This damage let to the entire scheme, with its 200 taps, being out of service. The district was looking for funds to rehabilitate the scheme, and the District Commissioner was just allocating some funds from the District Development Fund when I visited the district in August 2015. The aim of the rehabilitation were just to put the scheme back into service, not to do any additional improvements to the aging scheme that is now under dimensioned for the growing population relying on the scheme.

> Floods affect our access to clean water and sanitation facilities because the natural environment affects these two. So for us to get clean water for example, the taps come from the rivers so if there is flooding the pipes may be damaged and when this happens it takes a while for them to be replaced so we are forced to use unclean water as we wait for the pipes to be restored (Traditional Authority Mkhumba, Phalombe).

Issues with the water schemes were mainly related to people tapping on to the schemes. The water schemes includes both private and community taps and most of them were constructed in the 1970s using small plastic pipes. The water schemes were not dimensioned for the growing population now using the water schemes. In addition, some of the schemes are large, like the Phalombe Major Water Scheme, which includes over 2000 taps. Since the gravity fed water schemes are relying on the natural pressure from the intake to the taps, not using any water pump to push the water through the scheme, people living far away from the water source can experience the taps run dry because others are using the taps further "upstream".

The District Officers emphasized that much in relation to the water supply coverage will depend on what would be done on recovery, as the time of recovery has the opportunity to lead to an improvement of the facilities and infrastructures making it more robust towards future disasters. A recovery plan were being developed, which included several issues related to water and sanitation. The challenges were related to allocate the funds for the recovery. Partners were invited to look at which parts of the recovery plan they were able to assist. The plan was not yet out as of September 2015, but it was in the finalising stage. When it comes to the distribution of the water supplies, the district would take advantage of the recovery process to be able to address this issue. *"As of now, we got plans, but not recovery plans. On the damaged scheme, we can talk about recovery. But to other schemes we are talking about extension and rehabilitation*" (District Water Officer, Phalombe).

The district and their donors had also put together Water Resource Boards for the water schemes because there were so many problems associated with the water schemes. In addition, 16 area mechanics were just finishing their training to ensure a better maintenance of the boreholes in August/September 2015.

In addition to the water schemes, Phalombe also have about 700 boreholes, of which some were contaminated due to the flood, but did not require rehabilitation. Concern Universal, the Malawi Red Cross and Water Mission International conducted minor maintenance to some of the

boreholes in the district. This was not as part of the recovery, as the boreholes in general were not affected in any way. However, some boreholes were broken down prior to the flood because of missing spare parts or for other reasons. Some of the boreholes were drilled without training proper borehole committees. In addition, the committees were relying on the District Water Office who was suffering as they were understaffed.

The communities are responsible for the maintenance of the boreholes, as the boreholes are located within the communities. The water schemes, on the other hand, supplies water for several hundred kilometres, stretches over numerous villages and communities, and thus relies on other players. The District Water Office is responsible for the water schemes depending on the severity of the breakdown. The communities themselves could conduct simple maintenance to the schemes.

> It is the policy of the Government of Malawi to empower the communities to make sure that the maintenance of the water facilities within the communities themselves. On boreholes, we have mechanics, who are responsible for the maintenance of the boreholes. Even on the schemes, we empower the communities to have boards, we employ the scheme manager, to ensure that there are provision of water at all times. This office has the responsibility of monitoring and supervising the communities, just because the government are not providing enough staff members as of now. People are retiring etc. This is why the government are empowering the people, making sure that there are people from their areas are trained in the maintenance of the boreholes. We are provided with funds from InterAID to come up with area mechanics across the district. They have been trained in this office just 2 weeks ago; we now have 16 area mechanics in the district, which means that we are in a better situation as of now. Understaffing is a problem at the moment, only 5 people at the office. The area mechanics makes us sure that the functionality of the boreholes will be better. The gravity schemes, we have 8, at least 2 are funded by the African Development Bank, one is funded by the Red Cross, and 2 schemes funded by Concern Universal/Australian Aid. We are coming up with better capacity buildings and donors taking care of the water schemes (District Water Office Employee, Phalombe).

The districts are encouraged by the National Government to construct a Recovery Plan including all sectors. In Nsanje, the Recovery Plan is with the District Commissioner. The district received assistance from some NGOs regarding the compromised water and sanitation situation. In Nsanje, the issues with damaged water facilities were more substantial than in Phalombe and in need of extensive rehabilitation.

> Some other areas where we will need new water pumps are in the areas where people have gone, where they are shifting from the camps to new areas where they are resettling. Some of these areas do not have water points, so we need to construct new water points. Because of these people have moved to new sites, there are people already living there. So there are people moving from the camps and the existing people living together, creating an increased pressure on the existing boreholes, hence there is need for rehabilitation of boreholes and new boreholes (District Water Officer, Nsanje).

NGOs want to assist in the recovery by using the Recovery Plan. UNICEF has allocated funds to rehabilitate a few boreholes, and possibly to construct some new boreholes as well. UNICEF is also assisting in the hygiene promotion programme. The hygiene promotion is followed up in already triggered villages, but there is a need for more assistance to expand the programme. The recovery efforts in Nsanje are mostly NGO or humanitarian funded. The district depends on NGOs. Direct support from partners is rare as the donors are pumping their aid through the NGOs. The Malawi Red Cross were constructing 15 boreholes in three of the Traditional Authorities; nine in TA Mlolo, two in TA Mbenje and four in TA Ndamera. CADECOM (Catholic Development Commission) were also constructing 15 boreholes – 12 in TA Tengani and 3 in TA Mlolo.

6.2.1.1. Water Situation in the Villages

Mkhumba and Mulike Villages in Phalombe district both had one borehole each that the villagers could draw water in addition to taps from one of the water schemes. The water supply situation was considered to be adequate but with some challenges. In Mkhumba Village, there were originally three boreholes but two of them were not working. The damage to these boreholes had occurred prior to the flood without being addressed. Some were forced to walk long distances to get water. One participant mentioned that they had difficulties with crossing one of the rivers, Mwimbi River, to get water from a safe water source on the other side. Figure 6.1 shows a photo of a working borehole in Mkhumba Village. The Malawi Red Cross had repaired one of the boreholes, making the task of fetching water easier for the population. In Mulike village, they only have one borehole that was damaged some time back, but the Malawi Red Cross came in to restore the borehole. They used to have piped water from the taps, but since the flood had destroyed the pipes, they had to rely on the one borehole. Even though the water supplies did not suffer substantial damage due to the flood, the situation was still difficult for the people affected by the flood.

Figure 6.1: Photo showing the borehole in Mkhumba Village, Phalombe. This is the standard water pump found in both Phalombe and Nsanje (Photo: author).

> We had necessary materials to fetch water but since the flood hit we have lost these materials so it is difficult for us. It is difficult because we do not have what we need and are not able to replace them (Villager, Mulike Village, Phalombe).

The first village I visited in Nsanje, Chilwekha Village, had been advised not to return to their own village and were assigned a new area to relocate. Their original village had shallow wells within the village where they could draw water. The water was treated with chlorine and was safe to drink within a couple of minutes.

The new area did not have a borehole, so the villagers had to walk to the next village (Chingwe Village) and had to pay to get water from their borehole. Figure 6.2 shows the borehole in Chingwe Village. The money they paid were going to be used to restoration of the borehole because of the additional pressure causing the borehole to wear out faster than originally. The people in Chilwekha Village were able to pay for the water because of its importance. However, since the borehole belonged to some other village they were the last people in line to draw water, which meant that they sometimes had to go to the Shire River to draw water. They knew that this water was not safe to drink, but they were using it for bathing and washing. Just the week before my visit a woman had been attacked by a crocodile, so the people in the village were scared and some of them were now back to just get water from the borehole. They had lost all of their belongings in the flood and had just the clothes on their backs when they arrived in the new site. After arrival, they had only received one bucket per household to use to get water, and they were expressing the issue regarding a lack of buckets for drawing water. When

people lack the necessary tools for collecting water this leads to them having to take several trips a day to get water as they may use the same bucket for drawing and storing water.

Figure 6.2: Photo showing the borehole in Chingwe Village that the people in Chilwekha Village pays to draw water from (Photo: Author).

The people of Chilwekha Village also wanted their own borehole. The process of drilling new boreholes is expensive, so the Local Government and NGOs wants to be sure that the relocates people are going to stay in the new area before they drill new boreholes. Both the local government representatives I interviewed and UNICEFs Water, Sanitation and Hygiene Specialist want to make the new areas friendly places by providing the basic necessities so that people want to stay there instead of returning to the flood prone areas. At the same time, they do not want to drill boreholes and build latrines just to find that the people that were staying there have moved back regardless of the efforts made to keep them in the safer areas.

Figure 6.3: Photo showing the borehole used by the people from Alufandika Village (Photo: Author).

In the last village I visited, Alufandika Village, they had only one borehole that they were sharing with three other villages. UNICEF constructed the borehole only three years ago (figure 6.3 shows a photo of the borehole), before that, they were using water from the river. The maintenance of the borehole was the responsibility of a water committee trained by the Ministry of Health. Now, since they only have one borehole for four villages, people only uses the water from the borehole for drinking and cooking, and they are still using the water from the river for bathing and washing. People in the village may go up to six trips a day to get water. The water is stored in big clay pots, and fetched in plastic buckets that holds 20 litres. The borehole in Alufandika Village were submerged during the time of the flood, but were not destroyed.

6.2.2. Reconstructing Damaged Sanitation Facilities

In both Phalombe and Nsanje, the sanitation infrastructure had suffered severe damage and great efforts to recover latrines were necessary. In Phalombe, the needs assessment indicated that the district suffered extensive damage to the sanitation facilities, including an almost total collapse of latrines in the communities and some damage to the public latrines in schools and health clinics. Over 40,000 basic latrines and eight permanent latrines had collapsed. The government and their partners reconstructs the damaged public sanitation infrastructure, and provides the affected communities with hygiene promotion where they are engaged to reconstruct or build new latrines and practice good hygiene.

> In the past, almost every household had a pit latrine. After the floods, they were washed away. In the low-lying areas, the latrines just filled with water and were eventually washed away. If we were able to construct stronger latrines from the ground, they might be able to withstand disasters such as floods but we cannot afford to do this. We simply dig the pit, put some sticks then build a wall so when the rain comes the latrine is washed away and then people have to relieve themselves in the bush or ask to use a neighbour's latrine that may have survived (Traditional Authority Mkhumba, Phalombe).

The District Government and its partners assist the recovery of public sanitation facilities in schools and health clinics. It is mainly UNICEF and Concern Universal who contributed to this in Phalombe. The public sanitation facilities are mainly VIP-latrines (Ventilated Improved Pit-Latrines). These pit latrines have an improved ventilation system as a continuous airflow through a ventilation pipe ventilates the smell and a flyscreen acts as a trap for flies as they escape towards the light. Despite the simplicity of the latrine, well-designed VIP-latrines can

be completely smell free which minimizes the attraction of flies (Tilley et al., n.d.), and are more pleasant to use than the traditional pit latrine.

> The district has for six years [worked on the issues of water and sanitation]. Therefore, these organisations [partners] are now doing hygiene promotion as part of [the] recovery. They construct permanent latrines in public infrastructures, mainly in schools (Assistant Disaster Risk Management Officer, Phalombe).

The actual reconstruction of the private latrines is in the hands of the communities themselves. The Government assists in the promotion and information regarding the importance of using latrines and good personal hygiene. Prior to the flood, the District Government in Phalombe had focused on water and sanitation for six years, and one of the Traditional Authorities, TA Kaduya, were declared an Open Defecation Free (ODF) Authority prior to the flood. The District Government is aiming to continue this work and to regain the status within the next 12 months (before September 2016).

> TA Kaduya was declared an Open Defecation Free (ODF) Authority, it was even verified by a national ODF task team – they came, they verified and they declared. People are now not using the bush they are using latrines. Then, with the floods, I think that coverage have dropped as the latrines, most of them has collapsed. Now, we are in the process of reclaiming that status. Concern Universal, with global sanitation support, are assisting us in ensuring that the TA is back at that status. What we use is Community Led Sanitation – we are not providing any subsidies, we are only providing information to the community why the use of latrines is so important. It is up to them to reconstruct the toilets on their own (Director of Planning and Development, Phalombe).

> Our standing policies, we can construct and support institutions, for instance a health clinic and schools, so we can construct a latrine for that particular one. We cannot go to your house and construct a latrine (Water, Sanitation and Hygiene Specialist, UNICEF).

Nsanje also experienced severe damage to its sanitation facilities. The situation in Nsanje is similar to the one in Phalombe, meaning that the communities have the responsibility of reconstructing their own latrines motivated by the hygiene promotion given by the District Government and its partners.

Regarding sanitation, CADECOM were constructing some latrines in some schools. In addition, the Malawi Red Cross and CADECOM were also assisting the District Government

on their hygiene promotion programme where they were encouraging the people in the district to construct latrines to improve based on the health benefits these facilities constitutes. The hygiene promotion is called Community Led Sanitation, and is providing the communities with the information on why and how to construct latrines for their households. The aim of the hygiene promotion programme was to change the behaviour of the people in the district by encouraging them to construct their own private latrines.

> You know, previous days, the governments and NGOs were giving subsidies to the communities, but what we found was that people were not using the toilets. So now, the approach has been changed. NGOs should assist us through the Community Led Sanitation, where we are triggering communities to construct their own toilets, so that they can use the toilets. Because, previously when we were giving subsidies to communities they were not using the toilets. Therefore, it is NGOs now assisting us in the soft part of it. We have also the School Led Sanitation, changing the behaviour of schoolchildren (District Water Officer, Nsanje).

This hygiene promotion is the major part of the private sanitation recovery efforts in both the districts in addition to the assistance in reconstructing the latrines in schools, health care facilities and market places. Hygiene promotion both in the camps, but also after people have returned to their original villages or resettled in new sites are important in the rural districts where the sanitation coverage is generally low.

6.2.2.1. Sanitation Situation in the Villages

In Phalombe, there was no doubt that sanitation was important to prevent diseases from spreading and to keep people healthy. The villagers I talked to were fully aware of the benefits of having their own pit latrine within the household. They have certainly received the information from the Government and its partners regarding the hygiene promotion programme. This is also evident in the numbers of people with access to improved sanitation facilities. In Phalombe, two thirds of the population had access to improved sanitation before the flood according to the Integrated Household Survey (IHS3) 2010/2011 (NSO Malawi, 2012). This is slightly below the national level of 72.4 percent. If we compare to Nsanje, where only about one third of the population had to improved sanitation, the levels in Phalombe is inspiring.

> As people living in the rural areas we are trying our best to do our part in ensuring that we have access to clean water and toilets but there are some things that we can’t afford, for instance this is a low lying area so our toilets don’t survive when

> floods hit. But if we had things like cement this would not be a problem. If there was some assistance in terms of providing us with cement, we could build stronger latrines so that they are not damaged because of flooding (Traditional Authority Mkhumba, Phalombe).

People in Phalombe were struggling to find money to spend on latrines that are more permanent. The latrines they had before the flood were traditional pit latrines that were washed away during the flood. They just dig a pit and use mud to construct the walls. By using such a simple structure, it is not surprising that all latrines collapsed during the flood. The people were aware of the importance of having a latrine, but due to the situation where people lack both food and money, some have just put up some temporary structures. They were missing stronger materials like cement and wood to be able to construct stronger latrines that were more flood resistant.

> We do not have much in terms of income so we cannot afford cement and if some organisations could help us we would be able to build stronger latrines. Even if they could give us loans that would help because it is difficult for people like me who do not have a source of income (Male participant, Mkhumba Village, Phalombe).

There is a need for finding ways to construct better, more permanent, latrines that can withstand floods.

> We need to come up with the technology so when we know the type of flooding that happens there we can start building upwards a bit, so that when flooding comes, the water can go around and then it goes there but it is still up. But we will see how that works (Water, Sanitation and Hygiene Specialist, UNICEF).

During the ADC Focus Group Discussion, one of the participants mentioned that they wanted someone to come and teach them to construct harvest latrines. Harvest latrines are latrines built up by bricks on flat land, where an opening at the back is constructed so that they could empty the latrine whenever it is full and use the content as manure in their gardens.

In one of the villages I visited in Nsanje, Alufandika Village, some sanitation and hygiene facilities were reconstructed at the time of my visit. The people in this village explained that they had been thought how to stay healthy while they were located in the displacement camp and that they had brought this knowledge back to the village when they moved back. They were thought to use chlorine to treat their water, and that they should at least have one latrine/toilet

per house. Hygiene promotion campaigns in the camps left people with leaflets, and a committee were developed with members of Alufandika village, so the hygiene practices they were thought and followed in the camps are also being followed in the village. "*Without hygiene and water people cannot stay alive, so these two are some of the most important recovery things*" (Village Chief, Alufandika Village, Nsanje).

Figure 6.4: Photo showing a collapsed pit latrine in Alufandika Village, Nsanje (Photo: Author).

Figure 6.5: Photo of a reconstructed pit latrine with some washing equipment outside and a shower room – Alufandika Village, Nsanje (Photo: Author).

Most of their latrines had collapsed, so they were now in the process of repairing them. They are all responsible to dig a new latrine even though it may just stand for a year since a new flood may come and the latrines may collapse again. Sanitation and the health of the villagers were considered as the first priority in this village. Figure 6.4 shows one of the damaged pit latrines

in Alufandika Village, while figure 6.5 shows the new pit latrine, shower room and washing equipment constructed in Alufandika Village after the flood. The latrine were being constructed on the own initiatives of the villagers, and based on the capacity of the villagers, some of the hygiene facilities were being rebuilt while they were still living in the camp.

In the other village I visited in Nsanje, Chilwekha Village, there were no sanitation facilities and the people were just using the bush to relieve themselves. The area between the tents they were staying in and the river was used for this, which resulted to contamination of the water being that faeces leaked out into the river. Cases of diarrhoea were common in the village. In their original village, they explained that they had many sanitation facilities, including latrines, bathrooms and places to dry their clothes. They were expressing a desire for some organisation or others to come to their village and construct latrines. It did not seem like they were going to focus on building the latrines themselves, as they had nothing left and had to prioritize their time, money and resources on other activities they found more important, like finding food or generate an income.

6.3. Strengthening the Community Resilience

Building and maintaining resilience in flood-prone communities requires that attention be given to local capacity and knowledge, differences in wealth or property, gender relations, and local participation (Sok et al., 2011). The mitigation and survival of any hazard ultimately depends upon the individual, family or community. In the end, the individual, family unit or local community endures the most of a disaster in the form of property loss, injury, loss of friends or relatives, or personal deaths. If these small social units could recognise the potential for hazards in their environments, and respond to their occurrence before they happened, then there would be minimal loss of life and property. Unfortunately, not everyone heeds advice or recognises warning signs, not necessarily because of stupidity, but for vary important personal and socio-economic reasons (Bryant, 2005).

> Clean water is associated with good health, so if you have healthy people, development should accelerate, because you have healthy people who can participate in these activities. Apart from that, efforts are directed to important development activities, you do not focus on WASH all the time, now I think we possibly are well covered, and we now maybe focus on other issues such as agriculture and food security and other issues (Director of Planning and Development, Phalombe).

Community involvement and empowerment is very important in successful and effective recovery projects. Identifying community agencies as partners for externally funded recovery efforts is essential to ensure the long-term sustainability of the project and the development and recovery the project aims for (Khosa, 2014).

6.3.1. Disaster Management: Mitigation and Adaptation

How you prepare for a disaster has become an important part of disaster mitigation in developing countries. Some rely on the routine of civil emergency arrangements such as the Civil Protection Committees in the Districts of Malawi, including voluntary organisations and the armed forces to combat flood losses. However, there has been an increased use of forecasting and warning systems in specialised flood preparedness programmes (Smith, 2004).

> A good thing is just to be prepared. Yeah, cause as of now, the meteorological services department for Nsanje has released the seasonal forecast for 2015/2016. It is from that forecast we are developing our plans, especially our response plan. Because if they say we will receive above normal rains, than definitely the lower shire we anticipate that we would have flooding. Then we have to start mobilising resources. Only the challenge that we have at the district level is that we have no funds for response. We rely on partners for mobilizing resources for initiatives. We mobilize as a district resource for response but that is from stakeholders, NGOs that are working within the district. As a government at district level, we do not have that budget for response (Disaster Risk Management Officer, Nsanje).

Flood forecasting and warning schemes exist widely and are most effective for large rivers. Flood hydrology has now developed to the point where storm rainfall and runoff condition can be modelled to high levels of accuracy (Smith, 2004). Even the act of warning of an imminent flood cannot rely alone on formal mechanisms because informal warnings and neighbourly gossip often supersede and are seen as more credible than official warning channels. Flood risk reduction requires working with communities to understand their needs in a participatory manner, which will cover vulnerabilities, existing capabilities, and capacities that are desired but that require improvement (Schmuck, 2012).

It can be argued that areas that experience seasonal floods, like both Phalombe and Nsanje does to different extents almost each year, is in a better position to predict and mitigate against floods. However, the magnitude of the 2015 floods were beyond any forecasts and predictions. In addition, the flood happened during the night. If a sudden increase of water levels occurs during

the night when people are sleeping, it is different from during the day when people can observe the event (Schmuck, 2012).

Flash floods present different problems because warnings and forecasts are not always accurate, timely or observed in small river basins. They also provide short lead times, combined with the possibility that the flash flood impacts can be felt further downstream from where the rain occurs (Schmuck, 2012), as they experiences in the Districts located in the Lower Shire Valley, which includes Nsanje. During the 2015 floods, Nsanje experienced that the flooding water stayed for several days, which can be explained by the massive amounts of water being drained through the Shire and Ruo Rivers down to the Lower Shire where the districts is located. In addition, the district is quite flat and as the Shire River goes into the Zambezi River in Mozambique, the area experienced what is called "back-flow", making the water moving slowly as the Zambezi River was also flooding.

The difficulties of forecasting and warning often lie in the dissemination and response phases and include the facts that many people may not receive the warning. Moreover, even when warnings are received, the response rate is likely to be poor, especially amongst disadvantaged groups. Lessons taken from the 2015 disaster in Nsanje were that it was actually the youth and the elderly who tended to respond more positively to early warning signs than others. The government had an awareness campaign whereby the District Council provided a vehicle going around from the east bank. The fact that people responded to this campaign resulted in a better scenario than if they were not responding. Most of the affected areas were in the Marsh Area, where most people responded to the warnings and moved out.

Another part of disaster mitigation and adaption is land use planning. According to Hufschmidt (2011: 633), recovery should include adaptation activities based on learning from previous experience and anticipating future hazards. Some areas close to rivers that tend to flood, like in Nsanje, are more flood-prone than other areas further from the river or on higher grounds. Flood risk mapping, which includes water depth, flow velocity and duration, is an important planning tool (Smith, 2004). In Phalombe, the district was aiming to finish dike constructions to reduce the issues with Phalombe River flooding during the rainy season, with focus on two sections. They were also looking into further capacity building in the communities. Some communities had civil protection committees, so they would aim to build capacity on how to respond to issues of disasters and preparing for any disasters in the communities. In Phalombe, issues of

land use included deforestation, which contributes to the severity of a hazard. They want people to know how to use the land properly to try to avoid disasters.

As this thesis has shown, the Government of Malawi relied on disaster aid following the 2015 flood. Government relief following a disaster are common, but there is recognition that in developing countries, international aid is an important factor in flood mitigation. Large-scaled floods in these countries overwhelm local resources. The tax system in most developing countries does not cover the disaster relief in the same way as in developed countries. In addition, flood insurance in developing countries is rare. Flood insurance, both private and governmental programs, is an important loss-sharing strategy in developed countries (Smith, 2004).

When it comes to water and sanitation, specific mitigation and adaption strategies include both short-term and long-term initiatives. In Nsanje, the short-term mitigation included the provision of water bowsers and the treatment of water to the displaced people located in the evacuation camps, drilling boreholes in some of the evacuation camps, and the provision of bottled water (Nsanje District Council, 2015).

The Nsanje Post-Disaster Needs Assessment (Nsanje District Council, 2015) also provided a recovery framework, which included the drilling of new boreholes, and installations of solar pumps in areas where these mechanisms were damaged by the flood, rehabilitate and maintain boreholes and pipelines, and to disinfect water points.

The Nsanje District Contingency Plan shows that the district is prepared before the disaster occurs. They have also learnt from this flood that by allocating all rescue equipment to the east bank, which were most, affected, they did not have any boats to use down the Shire River. "*We have seen that we should preposition rescue and search equipment such as boats. Which means that any area should have an engine boat that will assist us in the response*" (Member of the Nsanje District Civil Protection Committee). Another plan involves the mobilisation of resources to develop a Disaster Risk Plan, because as of September 2015, such a plan did not exist in the district.

The cluster approach was also revised as a good strategy for disaster response, relief and recovery because people with the same expertise were put into one cluster to prevent any

confusion. Civil Protection Committee members were included in the clusters, which proved beneficial in monitoring the situation, the distribution of relief items and the conduction of assessments. In Nsanje, they are looking at conducting coordination meetings from time to time as a forum for information and experience sharing. They emphasise that the cluster should not only meet during and after a disaster.

In Nsanje, disaster resistant structures were valued, and an example of a bridge that were built 50 years ago and were still standing, while another had only lasted for two years. As part of their recovery efforts, Nsanje District plans to build resilient communities. Emphasizes is on the people living in the flood-prone Marsh Areas to resettle in other areas.

CHAPTER 7: CONCLUDING DISCUSSION

A disaster event includes the four stages, prevention, preparedness, reaction and recovery. This can be divided into the pre-disaster protection and post-disaster recovery (Smith, 2004), in which this study have been focusing on the post-disaster recovery stages including how to prepare for future events. This study has sought to investigate the recovery process related to water and sanitation reconstruction after the 2015 Southern African Flood in Phalombe and Nsanje Districts, Malawi.

This study acknowledges that the risk of outbreaks of communicable diseases after disasters are associated with population displacement (Watson et al., 2007). The importance of water and sanitation in such a situation has been the argument for the focus on WASH recovery following the disaster. The availability of safe water and sanitation facilities, the degree of crowding, the underlying health status of the affected population, and the availability of healthcare services all influence the risk for communicable disease outbreaks and deaths among the affected population (Watson et al., 2007). The magnitude of the flood and the extent of the damage led to people staying in camps for a long time – some stayed in camps for over six months. The Local Governments with assistance from partners and NGOs manged the camps and provided the necessary assistance while working through the cluster system. This will be further discussed when the second research question is being answered later in this chapter.

The structural (or direct) damage to the private sanitation facilities, which mainly consisted of traditional pit latrines, were extensive in both districts in this study, and there were some difference in the level of reconstruction between the four villages at the time of the fieldwork in September 2015. In Alufandika Village, the reconstruction of some damaged latrines and shower rooms were already finished, and they were planning for even more facilities being reconstructed as they knew the importance and benefits of improved sanitation. In the relocation site where the people from Chilwekha Village were staying, no sanitation facilities were being built, and there were no immediate plans regarding this issue. In Mkhumba and Mulike Villages in Phalombe District, people were struggling to find money and materials to reconstruct the facilities even though people knew the importance of improved sanitation and good hygiene. Regarding the water supplies, there were some difference in the direct damage to the facilities in the two districts. In Phalombe District, the boreholes were not damaged but two water supply schemes were damaged. One of the schemes had only minor damages that had already been

fixed in September 2015, while the other scheme were more severely damaged and needed extra funds to be able to reconstruct. The funds had been allocated and the reconstruction were planned to start in the nearest future. In Mkhumba and Mulike Village, people were relying on one borehole in each village, there were previously taps available but they were not working at the time and needed to be fixed. The general water supply situation were adequate, but the people in the villages were vulnerable if one of the boreholes would stop working. In Nsanje District, the situation were a bit different. The district relies on water provided from boreholes, which suffered extensive damage. Some boreholes were submerged or contaminated others were washed away. NGOs assisted the District Government in the recovery of the water supplies.

One of the key findings in this study is that the water and sanitation facilities not only suffers from direct damage to the structures, but also indirectly from overuse of the remaining boreholes and latrines that were not damaged during the flood, as people are temporary relocated in displacement camps. The existing facilities in these areas suffers from overuse, which can lead to damages or an early collapse of these facilities. The UNICEF WASH-specialist used a good metaphor: "*It is as if you have come into my house where I am comfortable, with our two toilets and one tap, whatever services that we had; now we are 10 on the same*".

The 2015 flood was characterised a disaster, referring to the occurrence of a hazard event that exceeds the affected communities/nation's ability to cope without external assistance (GoM, 2015b: 13). The magnitude of the impact of a hazard is linked to the vulnerability of the affected country/area/community, which is defined as "the potential to suffer harm or loss" (Benson & Clay, 2004: 5). Another dimension of vulnerability is the capacity to adopt (Adger, 2006). Natural hazards has occurred at all times, and will continue to occur in the future. The popular perception is that the increased frequency and intensity of floods results from global warming and climate change (Wisner et al., 2004), which makes hazard mitigation and adaptation important aspects of disaster risk management. Mitigation refers to the measures that changes the loss of a disaster. Mitigation aims at managing the risk of hazards and reducing the costs of a disaster. Since this study focuses on what happens after the occurrence of a hazard event, the most relevant aspect of hazard mitigation is the cost reduction, which includes spreading the financial burden of a disaster beyond the immediate victims (Smith, 2004). Through the discussion in the two previous chapters of this thesis, I have tried to uncover how the losses,

damage and costs of the flood is managed. The roles of the contributing actors will be discussed below when the three research questions are being answered.

Adaptation to a changing environment and preparedness for future disasters are especially important in countries like Malawi, which frequently experiences different hazards that sometimes results in large-scale disasters like the 2015 flood, and contributes to a strengthened resilience towards future disasters. Adaption refers to human adjustments to damaging events, and includes community preparedness, forecasting and warnings, and land use planning (Smith, 2004). In Nsanje District, where floods occur regularly in the most flood prone areas close to the rivers, efforts are being made to relocate the most vulnerable communities to safer areas on higher grounds. The two villages in Nsanje visited during the fieldwork for this study showed the challenges with relocation. People from Chilwekha Village were staying in a relocated area, and they were struggling to find food, money and to build more temporary homes. They lacked their own water point and did not have any sanitation facilities. The other village, Alufandika, had returned to their original village in the flood prone area close to the Shire River because the people in this village did not see any opportunities in the relocated area they were given, so they decided to go back regardless of the risk of future floods. Efforts was made to reconstruct damaged infrastructures to be able to return to pre-disaster state, while the people from Chilwekha village even struggled to mould bricks, let alone find food or employment.

The following part will focus on the research questions asked in Chapter 1. By linking the empirical evidence in this study to the theory presented in chapter 3, the research questions will be discussed and answered in the following section. The recovery process has been investigated by looking at both short-term response and relief and more long-term reconstruction and recovery efforts (covered by research question 1), the actors contributing in the recovery process in the two districts (research question 2), and the role of the affected population (research question 3).

1. What are the differences between short- and long-term recovery on water and sanitation?

Recovery includes addressing economic, political and social needs of the affected people in addition to rebuilding houses and infrastructure (Wisner et al., 2004). This study has focused on the reconstruction and recovery of both direct and indirect damage to the water and sanitation infrastructure, in addition to look at the capacities and ability to contribute to the recovery

process. The greatest waterborne risk to health in most emergencies is the transmission of faecal pathogens, due to inadequate sanitation, hygiene and protection of water sources, which can lead to outbreaks of infectious diseases including diarrhoea, typhoid fever, cholera, dysentery and infectious hepatitis (Gurzau et al., 2009). Immediately after the flood event, efforts are related to response (search and rescue) and short-term relief in the displacement camps. Crowding is common after a natural disaster, like in the displacement camps following the 2015 flood, and can lead to transmission of communicable diseases (Gurzau et al., 2009). The main goal related to water and sanitation were to provide enough water to cover the need of the affected population living in the camps and to improve existing sanitation facilities and to build new ones to cover the number of people living within the camp. Gurzau et al. (2009: 54) argues that the first priority following a disaster is to provide adequate quantities of water and to protect contaminated water sources. The short-term WASH efforts included the provision of safe water to the affected population staying in the displacement camps and to reconstruct damaged sanitation facilities and build additional facilities where this was needed.

The more long-term efforts on water and sanitation were associated with the reconstruction of damaged water sources outside the camps and public sanitation infrastructure. Regarding private sanitation facilities, hygiene promotion were encouraging the affected population to reconstruct or build sanitation facilities in their households. The importance of improved water supplies and sanitation facilities are highly recognised as an important aspect of individual development due to the health benefits. Lack of sufficient access to clean water can lead to weakness and pain through diarrhoea and other water-related diseases (WWAP, 2015) and lack of sanitation facilities may lead to contamination of water sources in proximity to the areas where people defecate. The importance of improved water and sanitation for overall development have been acknowledged both in the Millennium Development Goals and in the newly established Sustainable Development Goals (UN/MDG, n.d.; UN/SDG, n.d.). It is during the long-term reconstruction and recovery phase that any improvements to the existing facilities and infrastructure that can lead to a better adaption and resilience towards future events.

2. What are the nature of the involvement and the responsibilities of the different actors who contributes to the recovery process?

The scope of the disaster in both magnitude and damage resulted in the plea for international assistance. Malawi had to rely on international aid, as the government could not cover all the costs of the loss and damage following the flood. Assistance is provided through allocation of

bilateral aid (direct assistance between governments or indirect through NGOs) and multilateral aid (channelled through international bodies like the EU, World Bank and UN agencies) (Smith, 2004). Assistance following the 2015 flood were coordinated through the cluster system in Malawi, which the coordination and management of assistance into different sectors. The Malawi Government through the Department of Disaster Management Affairs (DoDMA) leads the Cluster System, which includes a WASH cluster. In the districts, the District Government managed the clusters by using different Officers in the management position, coordinating the efforts within the cluster. The Ministry of Water Development and Irrigation led the central WASH cluster, while in Phalombe the Environmental Health Officer led the cluster. The WASH cluster (both nationally, and locally both in Phalombe and Nsanje) were co-led by UNICEF and included various other organisations working on WASH-related issues. In Phalombe, the major actors in the WASH cluster included Malawi Red Cross, CADECOM (Catholic Development Commission/Caritas), Concern Universal and PSI Malawi. In Nsanje, the same organisations were present in addition to the Médecins Sans Frontières (MSF).

3. What are the role of the affected population or communities?

Following the flood, the affected population are expected to contribute to the recovery process in different ways. The affected people were responsible for recognising the damage to the water supplies and to pass this information over to the District Government, so that they could coordinate the reconstruction efforts to these facilities in the best possible way. As previously discussed, assistance were provided through reconstruction and recovery of the water supply facilities both in the camps and among the affected communities. Regarding sanitation, assistance on reconstruction included an improvement in the camps and reconstruction of damaged public facilities in schools, health clinics, trading centres and so on. Reconstruction of private sanitation were left to the communities. They were only provided with the information on how to build latrines and the importance of improved sanitation and good health. The affected people had to access their own resources to reconstruct the facilities. The major issue here is that people both in Phalombe and Nsanje District is generally poor, which leads to a lower priority of sanitation reconstruction. People are focusing on finding food and employment to earn money rather than recovering their latrines regardless of their knowledge on the importance of improved sanitation.

We have seen that hazard studies have also increasingly focused on community participation and resilience. Resilience refers to the recovery after a disaster or event that disrupt people's

livelihood patterns. Concepts like bouncing back and building back better has been commonly used, but also being questioned or criticised. The concepts imply that we can use the devastating event as an opportunity for improvement. Recovery is focusing on community participation and responsibilities. Community resilience refers to recovery with minimal outside assistance. If communities are resilient, the recovery process will not be as long and costly. Resilience is a measure of the capacity to absorb and recover from the impacts of the hazardous event (Norris et al., 2008). Some countries, communities and individuals are more resilient to hazard events than others. As discussed in chapter 3, resilience rests both on the resources used to recover from an event, but also the dynamic attributes of the resources (robustness, redundancy and rapidity). Norris et al. (2008) uses the term adaptive capacities to capture the combination between the resources and the dynamic attributes, and divides these into four sets, including economic development, social capital, information and communication, and community competence. They argues that resilience is a process that leads to adaptation in their conclusion. "In order to have 'recovered', a household should have not only re-established its livelihood, physical assets and patterns of access, but should be more resilient to the next extreme event" (Wisner et al., 2004: 359). It is not enough to restore damaged facilities, but these facilities in addition to the people utilizing them should be more resilient towards future events. Only if this is accomplished, the hazard mitigation and adaptation has been a success.

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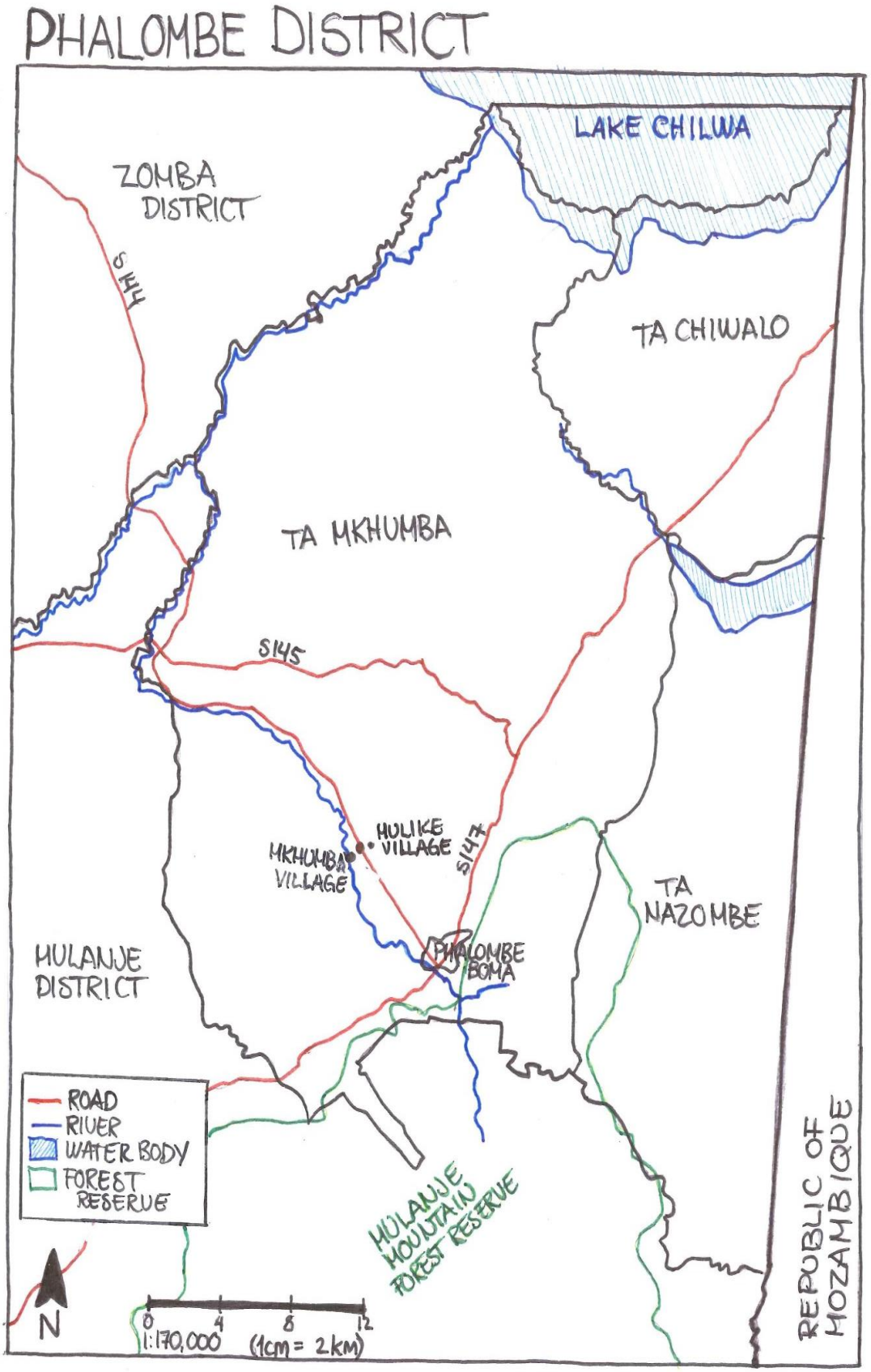
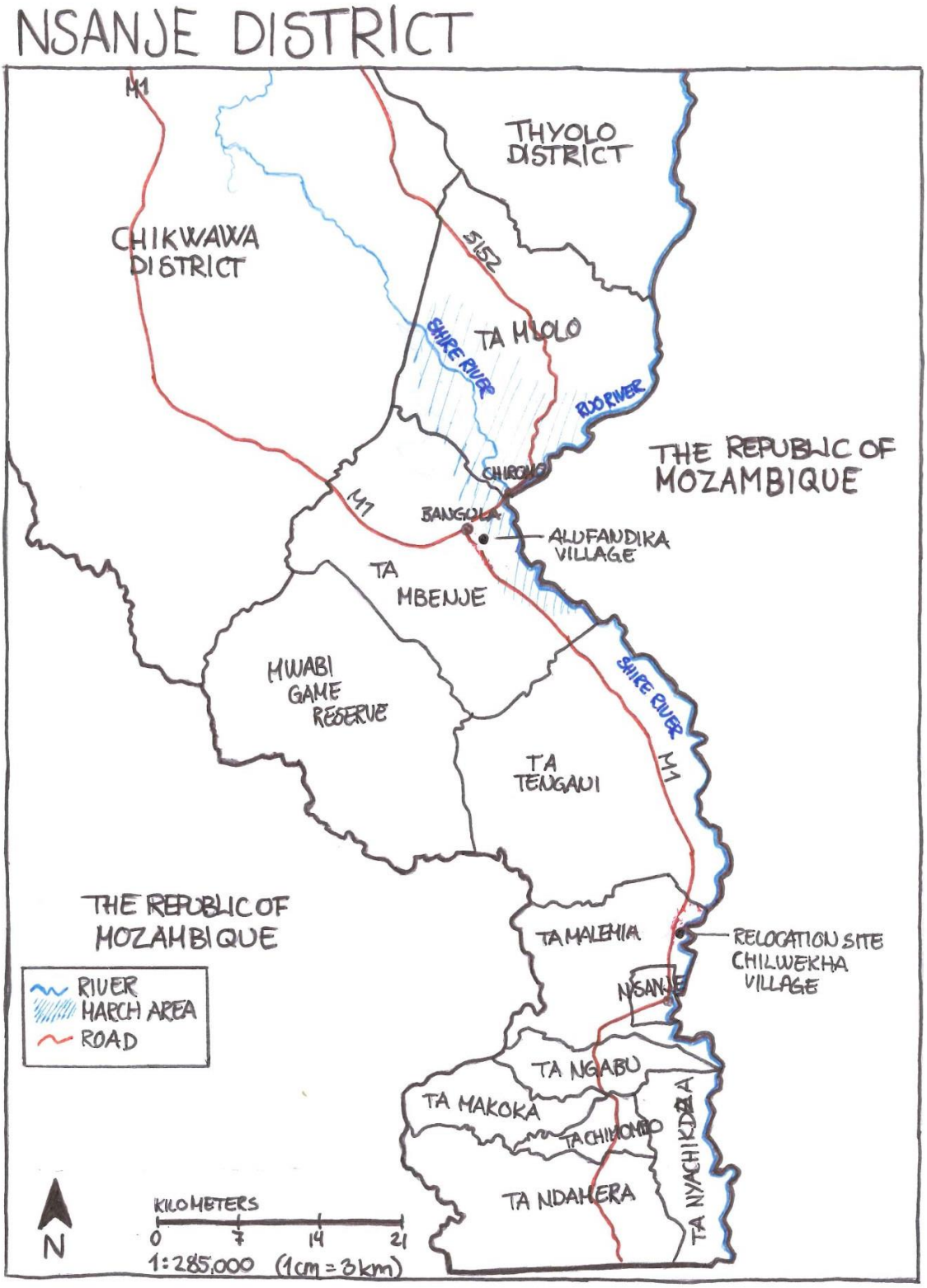
APPENDICES

Appendix I: Sketch Map of Phalombe District



Appendix II: Sketch Map of Nsanje District



Appendix III: List of Research Participants and their Characteristics

Participant	Sex	Characteristics	District	Method	Time and Place
Assistant District Disaster Risk Management Officer (ADDRMO)	Male	Local Government	Phalombe	Individual interview	Phalombe BOMA, 24.08.2015
Director of Planning and Development (DPD)	Male	Local Government	Phalombe	Individual interview	Phalombe BOMA, 14.09.2015
District Water Officer (DWO)	Male	Local Government	Phalombe	Group interview	Phalombe BOMA, 14.09.2015
District Water Office Employee	Male	Local Government	Phalombe		
Traditional Authority (TA) Mkhumba	Female	Traditional Authority	Phalombe	Individual interview	Mpasa Trading Centre, 24.08.2015
Villager	Male	Mulike Village	Phalombe	Individual interview	Mpasa Trading Centre, 24.08.2015
Villager	Female	Mulike Village	Phalombe	Individual interview	Mpasa Trading Centre, 24.08.2015
Villager	Male	Mkhumba Village	Phalombe	Individual interview	Mpasa Trading Centre, 24.08.2015
Villager	Female	Mkhumba Village	Phalombe	Individual interview	Mpasa Trading Centre, 24 August 2015
Villagers	50/50	Mulike and Mkhumba	Phalombe	Group interview	Mpasa Trading Centre, 24.08.2015
Area Development Committee (ADC)	-	T/A Mkhumba	Phalombe	Focus Group Discussion (FDG)	Mpasa Primary School, 25.08.2015
District Water Officer (DWO)	Male	Local Government	Nsanje	Individual interview	Nsanje BOMA, 09.09.2015
District Disaster Risk Management Officer (DDRMO)	Male	Local Government	Nsanje	Group interview	A School in Chikwawa District (close to the Nchalo Sugar Estate), 09.09.2015
Member of the District Civil Protection Committee (DCPC)	Male	Local Government	Nsanje		
Village Chief	Male	Chilwekha Village	Nsanje	Individual interview	Relocation site (in TA Malemia), 09.09.2015
Villagers	Females	Chilwekha Village	Nsanje	Group interview	Relocation site (in TA Malemia), 09.09.2015
Village Chief	Male	Alufandika Village	Nsanje	Individual interview	Alufandika Village, 09.09.2015
Villagers	3 Male/2 Female	Alufandika Village	Nsanje	Group interview	Alufandika Village, 09.09.2015
Water, sanitation and hygiene (WASH) specialist	Male	UNICEF	Lilongwe	Individual Interview	UNICEF Office, Airtel Complex, Lilongwe, 18.09.2015

Appendix IV: Interview Guides

INTERVIEW GUIDE LOCAL GOVERNMENT

WATER AND SANITATION ORIGINAL POSITION – BACKGROUND INFO

- How was the water and sanitation coverage in the district before the flood?
- What types of water supplies exist? (Boreholes, pumps, taps…)
    - Who constructed of these?
    - Who have the restoration responsibility?
- What types of sanitation facilities are available? (Latrines, pit holes…)
    - Who constructed these?
    - Who has the restoration responsibility?

PHALOMBE FLOODS

- Can you tell me briefly how Phalombe District has been affected by floods over the last (5) years?
- Which other disasters threatens the District?
- Can you say something about the impact of the recent floods on the water and sanitation infrastructure in the District?
- What measures does the government and the population take to cope and recover from these floods?

RECOVERY PROCESS – WATER AND SANITATION

- What is required to rebuild the water and sanitation infrastructure?
- To what extent have the water and sanitation facilities been restored
- Which institutions were involved in the recovery work? (Funding and implementation)
- How is the water and sanitation situation being recovered? (Back to the original position or improved?)
- Did the district receive adequate assistance (from ex. NGOs or others)?
    - What kind of assistance was provided? (National Government, NGO assistance etc.)
- How long did the reconstruction process take?
- Did you encounter any particular challenges during the recovery work?

DEVELOPMENT PLANNING

- How does the continuing floods affect the Districts Development work/strategies?
- What role does clean water and decent sanitation play in the overall Development Strategies?
    - Can you share your opinion on the importance of water and sanitation?

Do you have anything other to add to the information you now have provided us?

Thank you so much for your time and contribution!

INTERVIEW GUIDE VILLAGES

BACKGROUND INFORMATION:

- What kind of water supply do you have in this village/community/area?
    - Who initially made this system?
- What kind of sanitation facilities do you have?
- Are this village/area normally affected by floods each year?
- What kind of damage is caused by these annual floods? (Death or injury of livestock, failed crops, poor water quality etc.)
- How bad was this flood compared to recent years floods?

THIS YEARS FLOOD – DAMAGE TO WATER AND SANITATION:

- How damaged was the water supply after the flood?
- Was the water contaminated?
    - Did people get sick from the water? (cholera)
    - Do you believe this has any connection to the dirty (contaminated) water?
- What about any damage to your sanitation facilities?
    - Did you make any provisional/temporary arrangements to the situation?
- What needed to be fixed? (Pipes, wells, water pumps etc.)
- How important is water and sanitation to a quick recovery process?
    - What else is more important than water and sanitation?

RECOVERY/RESTORATION:

- Who started the reconstruction of the water supply and/or sanitation facilities? (local or outside initiatives)
    - Why?
    - If local initiatives: did you receive any outside assistance from any organisations etc.?
- Who contributed?
- How was it funded?
- Are you finished/when did you finished?
    - Not finished? When will it finish?
    - What do you need to finalize?

Do you have anything to add?

Thank you for your contribution!

INTERVIEW GUIDE ORGANISATIONS

BACKGROUNF INFORMATION

- What is your position and how long have you had this position?

WASH CLUSTER:

- Can you describe the tasks of the WASH cluster during and after the flood?
- How it is organized?
- Is the cluster still operating?
    - Recovery vs. response and relief.
- What is your organisations role in the WASH cluster?
- What other organisations or partners have been part of the WASH cluster?
- Why do you work with WASH issues in your organisation?

2015 FLOOD:

- How would you characterize the flood damage to water and sanitation facilities?
- Can you compare this flood to previous floods?

Do you have anything to add?

Thank you for your time!

Appendix V: Informed Consent Form

INFORMED CONSENT FORM - RESEARCH STUDY ON:

"Water and Sanitation Reconstruction after the Flood"

RESEARCH PURPOSE AND PROCEDURES:

The study is part of an academic research project led by the Master Student, Marte Steiro. The institution responsible for this study is **the Norwegian University of Science and Technology (NTNU)**, affiliated by Chancellors College, University of Malawi, Zomba.

The study will investigate the damage on the water and sanitation facilities affected by the flood in general and the recovery process of these facilities in particular, by looking at the water and sanitation infrastructure in this district, how it was damaged during the flood and how it being reconstructed.

We will use qualitative methods involving an interview session where you answer the questions we have in the best way that you can. This will take you approximately 20-40 minutes.

RISKS AND DISCOMFORTS OF THE RESEARCH STUDY:

There should not be any, or minimal risk or discomfort following the participation of this study. Risks here refer to any physical, psychological, social, or economic risks.

POTENTIAL BENEFIT OF THE RESEARCH STUDY:

Your contribution will help strengthen the study and its outcome.

CONFIDENTIALITY AND ANONYMTY:

We will need your name, age, profession and home village to categorise the participants. This information will only be used for administrative purposes. Participants will be kept anonymous in the final report, meaning that no individuals could be recognised in the final report.

This information is only available to my research assistant and myself. This information will be kept confidential and deleted at the end of the project.

Expected end date is 18 June 2016.

VOLUNTARINESS IN PARTICIPATION AND THE RIGHT TO WITHDRAW PARTICIPATION:

Involvement and participation in this study is voluntary. You will not receive any penalty for not participating. You have also the right to withdraw your participation at any time without a reason and without any penalty.

Date/place: _____ Thumb Print:

Name: _____ Witness signature:

Signature: _____ _____

TURN THE PAGE FOR CONTACT INFORMATION!

CONTACT INFORMATION:

If you have any questions about the study or want to withdraw your participation, please contact:

Researcher:

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emwathunga@yahoo.co.uk

Appendix VI: Data Processor Agreement

Data processor agreement

in accordance with Section 13, cf. Section 15 of the Personal Data Act and Chapter 2 of the Personal Data Regulations

by and between

MARTE STEIRO

(controller)

and

REBECCA PHWITIKO

(processor)

1. Intention of the agreement

The intention of the agreement is to regulate rights and obligations pursuant to the Act of 14 April 2000 No. 31 relating to the processing of personal data (the Personal Data Act) and the Regulations of 15 December 2000 No. 1265 (the Personal Data Regulations). The agreement shall ensure that personal information relating to the data subjects is not used unlawfully or comes into the hands of a third party.

The agreement concerns the processor's use of personal data on behalf of the controller, including collection, recording, alignment, storage and disclosure or a combination of such uses.

2. Purpose

Personal data such as participants name, age and profession will be gatheredduring interviews to categorize the research participants.

The processor will have full access to all of this information as it will be transcribed and translated before handed over to the researcher/controller.

The purpose for this agreement is to establish the framework for the processor on how to manage this information according to the Personal Data Act and Personal Data Regulations.

3. The processor's obligations

When processing personal data on behalf of the controller, the processor shall follow the routines and instructions stipulated by the controller at any given time.

The processor is obliged to give the controller access to his written technical and organizational security measures and to provide assistance so that the controller can fulfil his responsibilities pursuant to the Act and the Regulations.

Unless otherwise agreed or pursuant to statutory regulations, the controller is entitled to access all personal data being processed on behalf of the controller and the systems used for this purpose. The processor shall provide the necessary assistance for this.

The processor must observe professional secrecy in regard to the documentation and personal data to which he has access in accordance with this agreement. Any information may not be shared with anyone except the controller. This provision also applies after the agreement has been discontinued.

4. Security

The processor shall fulfil the requirements for security measures stipulated in the Personal Data Act and the Personal Data Regulations, in particular Sections 13 – 15 of the Personal Data Act and Regulations thereto. The documentation shall be available upon the controller's request.

The processor shall report to the controller all discrepancies according to Section 2-6. The controller is responsible for reporting the discrepancy to the Data Inspectorate.

5. Security audit

The implementation of regular security audits for systems etc. covered by this agreement shall be agreed by the controller and processor. This includes a review of routines.

6. Duration of the agreement

The agreement is valid for as long as the processor processes personal data on behalf of the controller.

In the event of breach of this agreement or the Personal Data Act, the controller can instruct the processor to stop further handling of the information with immediate effect.

7. Termination

Upon termination of this agreement, the processor is obliged to return all personal data received on behalf of the controller and covered under this agreement.

The parties shall agree that the processor shall delete or destroy in a secure and definite/irreversiblemanner all documents, data, diskettes, CDs, etc. that contain information covered under this agreement. This also applies to any back-up copies.

The agreement should specify in which manner deletion or destruction is to take place upon termination of the agreement.

The processor shall document in writing that deletion or destruction has taken place in accordance with the agreement within a reasonable period of time after termination of the agreement.

***

This agreement has been drawn up in 2 – two copies, of which the parties retain one copy each.

Place and date

Zomba, Malawi 21/05/2015

Controller

Marte Skåra
(signature)

Processor

(signature)