

**YANGON UNIVERSITY OF ECONOMICS
MASTER OF PUBLIC ADMINISTRATION PROGRAMME**

**A STUDY ON EFFECTIVENESS OF
COMMUNITY BASED DISASTER RISK REDUCTION
ACTIVITIES IN MYANMAR
CASE STUDY: PUAKTAW TOWNSHIP, RAKHINE STATE**

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A thesis submitted in partial fulfillment towards the requirements for the Degree of
Master of Public Administration (MPA)

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ABSTRACT

The objective of this thesis is to analyze the effectiveness of the activities of Community Based Disaster Risk Reduction Programmes by Malteser International and the assessment on the hazard exposure and change, household level preparedness, community level preparedness and community engagement and feedback of the community in Pauktaw Township. This study uses a descriptive method. CBDRR programmes aim to reduce the vulnerability and enhance the resilience of communities to the adverse effects of natural hazards. A sample of 322 respondents was selected from 5 villages in Pauktaw Township. The project was effective in promoting advances in household preparedness. The sampled communities had sound early warning systems in place, and at least half of the original committee members were still active. This area requires further refining to ensure communities conduct their own simulations independently and regularly. There were some fencing issues, and cattle destroyed several mangrove plantations. The community had no systemic waste disposal and dumped most of their waste into the river, including plastics. School based disaster risk reduction could teach students about conservation and pollution.

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LIST OF ABBREVIATION

3DF	Three Diseases Fund
AA	Federal Foreign Office-German Humanitarian
AADMER	ASEAN Agreement on Disaster Management and Emergency Response
ACDM	ASEAN Committee on Disaster Management
ADH	German's Relief Coalition
ADPC	Asian Disaster Preparedness Center
AHA	ASEAN Humanitarian Assistance
AHTF	ASEAN Humanitarian Task Force
AIDS	Acquired Immune Deficiency Syndrome
ASC	ASEAN Standing Committee
ASEAN	Association of South East Asian Nations
BFA	Basic First Aid
BMZ	German Federal Ministry of Economic Cooperation and Development
CBA	Community Based Association
CBDP	Community Based Disaster Preparedness
CBDRM	Community Based Disaster Risk Management
CBDRR	Community Based Disaster Risk Reduction
CEC	Community Evacuation Centres
CERA	Community Empowerment and Resilience Association
DIA	Disaster Impact Assessment
DIPECHO	Disaster Preparedness Programme of European Commission
DPC	Disaster Preparedness Committee
DRM	Disaster Risk Management
DRMC	Disaster Risk Management Committee
DRR	Disaster Risk Reduction
EA	Europe Aid
ECHO	European Commission Humanitarian Office
EWS	Early Warning System
GDP	Gross Domestic Product
GF	Global Fund
HFA	Hyogo Framework for Action

HH	Household
HIV	Human Immunodeficiency Virus
	Humanitarian Aid & Civil Protection Department
HVCA	Hazard, Vulnerability and Capacity Assessment
IEC	Information, Education and Communication
IFRC	International Federation of Red Cross and Red Crescent Societies
INGO	International Non-Governmental Organization
MAPDRR	Myanmar Action Plan on Disaster Risk Reduction
MDGs	Millennium Development Goals
MI	Malteser International
MPDN	Myanmar Private Sector Disaster Management Network
MRC	Myanmar Red Cross
MRCs	Myanmar Red Cross Society
MSN	Mangroves Services Network
NDMC	National Disaster Management Committee
NGO	Non-Governmental Organization
PHC	Primary Health Care
PONREPP	Post-Nargis Recovery and Preparedness Plan
RCC	Recovery Coordination Centre
RCV	Red Cross Volunteer
RHC	Rural Health Center
RRD	Relief and Resettlement Department
RsHC	Rural Sub-Health Center
SC	Save the Children
TCG	Tripartite Core Group
UMFCCI	Union of Myanmar Federation of Chamber of Commerce and Industries
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNOPS	United Nations Office for Project Services

USD	United States Dollar
VDPC	Village Peace and Development Council
VHC	Village Health Committee
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme

CHAPTER 1

INTRODUCTION

1.1 Rationale of the Study

The ambitious development trajectory of Myanmar can be severely derailed in hours and days by a disaster, as country is prone to hydrological, meteorological, geological and industrial and technological hazards. The country bears average annual loss of about 3 percent of GDP, due to natural hazard induced disasters (MAPDRR,2017).The key development sectors were severely affected by disasters and the loss of two major disasters (Cyclone Nargis 2008 and Floods and landslide 2015) on key development sectors.

Myanmar is one of the poorest countries in the region and disasters push people further into poverty, damage infrastructure and the local economy, undermine the core development achievements and cause massive losses to human lives and poverty.

While the Union of Myanmar is striving for peaceful, modern and developed nation, natural disasters destroy the developmental gains and hinder the developmental interventions. The devastation caused by cyclone Nargis in 2008 revealed a lack of information, awareness and preparedness, and indicated the need for the development and implementation of comprehensive disaster risk reduction programmes. The preparedness and mitigation should be an integral part of the development plans and programmes.

Myanmar coastline has become increasingly vulnerable to cyclones, which have gone from an occasional event to a yearly occurrence over the past decade. Cyclone Nargis in 2008 was particularly devastating, causing 138000 fatalities and an economic damage of 4 billion USD (UNDP, 2017), while major cyclones struck the country again in 2009 (Cyclone Bijili) and 2010 (Cyclone Giri). Myanmar ranks among the world's top countries most at risk from the combined effects of climate change. The Global Climate Risk Index 2019 indicates Myanmar is the 3rd most

affected countries in the world. Sea level rise is also the most pressing concern in Myanmar (UN, 2015).

In Myanmar, Rakhine state is the most threatened by primary hazard; cyclones and floods. Nearly every year, Rakhine state is hit by the cyclones of different categories that from regularly as weather phenomena over the Bay of Bengal.

In the community level there is an urgent need to expand the community based disaster risk reduction activities especially in Rakhine state, and area with the highest probability of cyclone and repeated natural disasters in recent years.

DRR programmes aim to reduce the vulnerability and enhance the resilience of communities to the adverse effects of natural hazards. Investing in the disaster risk reduction protects lives, livelihoods and property and is critical for sustainable development, including the achievement of MDGs. It can significantly reduce the costs involved in response to disaster and can safeguard development gains by protection investment from being impaired or lost.

Governmental, international and local non-governmental organizations support various DRR programmes in Rakhine state Myanmar. CBDRR management is an integral part of Malteser International's programme in Myanmar. At the national level, Malteser International works with the focal department responsible for DRR. To enhance the communities and countries capacities in DRR management, Malteser International is engaging various stakeholders both at national and local levels. Integrated disaster preparedness measures, awareness raising, coastal resource management and capacity building of communities and local authorities aim to reduce the risks of disaster and protect lives and livelihoods in the context of natural disaster and expected effects of climate change.

1.2 Objective of the Study

The objective of this study is to analyze the effectiveness and impact of the activities of Community Based Disaster Risk Reduction Programmes by Malteser International in Pauktaw Township, Rakhine State, Myanmar.

1.3 Method of the Study

This study is used descriptive method. The primary data and secondary data were used to analyze the effectiveness of the activities of CBDRR programmes. The

basic information and data are collected from internet sources, the facts and figures from reports, baseline data and various issues of Malteser International, Ministry of Social Welfare, Relief and Resettlement, United Nations, World Bank, ASEAN, ADPC.

The survey used structured questionnaire for the primary data collection and purposive sampling method was used in targeted village selection. Two stage simple random sampling method was used in the collection of primary data and descriptive method was used in the survey. This survey has been conducted in 5 villages of Pauktaw Township in November 2018. The questionnaire included seven parts; 1) exposure and change, 2) household level disaster preparedness, 3) community level disaster preparedness and action, 4) community engagement and feedback, 5) General observation, 6) Sustainability and 8) Trust.

Questionnaires are provided in Appendix C.

1.4 Scope and Limitations of the Study

This study is to analyze the effectiveness of the CBDRR programmes In Rakhine state, Myanmar. The survey was collected in 5 villages out of 16 villages (the targeted area) in Pauktaw Township. This study does not take into an account of all CBDRR activities in Rakhine state by all key organizations. It is only emphasizing on the activities of Malteser on the period from 2010 to 2014.

1.5 Organization of the Study

The study is organized into five chapters. Chapter 1 introduces rationale, objective, methods, scope and limitations, and organization of the study. Chapter 2 represents literature review of the study, and includes definitions relating DRR, impact, effect and some issues of disasters and review of previous studies. Chapter 3 presents overview of the CBDRR programmes in Myanmar, Chapter 4 studies profile and analysis of survey in Pauktaw Township and Chapter 5 presents conclusion, highlighting key findings and recommendations.

CHAPTER 2

LITERATURE REVIEW

This Chapter provides a theoretical analysis of disaster management. It further discusses the necessity for disaster management, the effects of disasters on the community and economy, as well as issue and challenges in DRR. This chapter finally deals with disaster risk management (disaster risk reduction) processes.

2.1 Definitions Relating with Disaster Risk Reduction

The basic definitions on disaster risk reduction to promote a common understanding on the subject for use by public, authorities and practitioners. Key definitions and terminologies as follows:

2.1.1 Disaster

The serious disruption of the functioning of society, causing widespread human, material, economic or environmental losses, which exceed the ability of the affected communities to cope using their own resources. A disaster often results from the combination of hazard, vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk (Imelda Abarquez, Zubair Murshed, 2004).

2.1.2. Hazard

Hazard is a potentially damaging physical event, phenomenon or human activity that may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazard may therefore be natural events or they may be human induced. Natural hazards are often part of natural systems which shape the earth (e.g earthquakes, volcanic eruptions, tsunamis) or transfer heat energy between latitudes (e.g typhoon, monsoon rains) They are considered hazards because they have the latent potential to affect human activity (UNISDR,2009).

2.1.3. Vulnerability

Vulnerability refers to physical, social, economic, environmental and individual factors that increase the likelihood of loss from a hazard, Traits that increase vulnerability include: Poverty, Disability, Disease, Gender inequality, Age (elderly and young) (AusAID, 2009).

2.1.4. Capacities

The resources and skills people possess, can develop, mobilize and access, which allow them to have more control over shaping their own future and coping with disaster risks (Imelda Abarquez, Zubair Murshed, 2004).

2.1.5. Disaster Risk

Disaster risk arises when hazards interact with vulnerabilities. The potential for a hazard to become a disaster is determined by a complex relationship between a hazard and the vulnerability and resilience of the population (AusAID, 2009).

2.1.6. Disaster Risk Reduction

Disaster risk reduction is the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and poverty, wise management of land and the environment, and improved preparedness for adverse events.

Broadly, disaster risk reduction includes efforts to: a) Foster or support national, provincial or local prioritization and coordination of disaster risk reduction strategies, b) Collect data on natural hazard risks for use in improving early warning systems, c) Educate and raise awareness about disaster risk reduction, d) Mitigate the impact of natural hazards, through livelihood diversification, building reinforcement, environmental protection, microfinance, land-use planning and any other activities that increase resilience, e) Strengthen disaster preparedness, including contingency planning, emergency response and evacuation plans (AusAID, 2009).

2.1.7. Community

In the context of disaster risk management, a community can be defined as people living in one geographical area, who are exposed to common hazards due to their location. They may have common experience in responding to hazards and disasters. However, they may have different perceptions of and exposure to risk. Groups within the locality will have a stake in risk reduction measures (either in favor or against) (Imelda Abarquez, Zubair Murshed, 2004).

2.2 Disaster Management and Disaster Risk Reduction

Disaster risk reduction is a systematic approach to identifying, assessing and reducing the risks of disaster including awareness training, disaster risk mitigation, capacity building to community before the disaster occur while disaster management take part in all round sectors of before, during and after the disaster occur with the functions of prevention and mitigation, preparation, emergency response and recovery process. Disaster risk reduction will be part of disaster management in disaster management process before the disaster event.

Figure (2.1) Disaster Management Cycle



Source:<http://www.heritageemergency.org/initiatives/state-heritage-emergency-partnerships/resources/webinars/>

2.2.1 Prevention

Prevention mean that the outright avoidance of adverse impacts of hazards and related disasters. It includes measures taken to avert a disaster from occurring, if possible to impede a hazard so that it does not have any harmful effects.

2.2.2 Mitigation

Mitigation activities actually eliminate or reduce the probability of disaster occurrence, or reduce the effects of unavoidable disasters. Mitigation measures include building codes; vulnerability analyses updates; zoning and land use management; building use regulations and safety codes; preventive health care; and public education.

Mitigation will depend on the incorporation of appropriate measures in national and regional development planning. Its effectiveness will also depend on the availability of information on hazards, emergency risks, and the countermeasures to be taken. The mitigation phase, and indeed the whole disaster management cycle, includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure.

2.2.3 Preparedness

The goal of emergency preparedness programs is to achieve a satisfactory level of readiness to respond to any emergency situation through programs that strengthen the technical and managerial capacity of governments, organizations, and communities. These measures can be described as logistical readiness to deal with disasters and can be enhanced by having response mechanisms and procedures, rehearsals, developing long-term and short-term strategies, public education and building early warning systems. Preparedness can also take the form of ensuring that strategic reserves of food, equipment, water, medicines and other essentials are maintained in cases of national or local catastrophes.

During the preparedness phase, governments, organizations, and individuals develop plans to save lives, minimize disaster damage, and enhance disaster response operations. Preparedness measures include preparedness plans; emergency exercises/training; warning systems; emergency communications systems; evacuations plans and training; resource inventories; emergency personnel/contact lists; mutual aid agreements; and public information/education. As with mitigations

efforts, preparedness actions depend on the incorporation of appropriate measures in national and regional development plans. In addition, their effectiveness depends on the availability of information on hazards, emergency risks and the countermeasures to be taken, and on the degree to which government agencies, non-governmental organizations and the general public are able to make use of this information.

2.2.4 Response

The aim of emergency response is to provide immediate assistance to maintain life, improve health and support the morale of the affected population. Such assistance may range from providing specific but limited aid, such as assisting refugees with transport, temporary shelter, and food, to establishing semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in the response phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found. Humanitarian organizations are often strongly present in this phase of the disaster management cycle.

2.2.5 Recovery

As the emergency is brought under control, the affected population is capable of undertaking a growing number of activities aimed at restoring their lives and the infrastructure that supports them. There is no distinct point at which immediate relief changes into recovery and then into long-term sustainable development. There will be many opportunities during the recovery period to enhance prevention and increase preparedness, thus reducing vulnerability. Ideally, there should be a smooth transition from recovery to on-going development.

Recovery activities continue until all systems return to normal or better. Recovery measures, both short and long term, include returning vital life-support systems to minimum operating standards; temporary housing; public information; health and safety education; reconstruction; counseling programs; and economic impact studies. Information resources and services include data collection related to rebuilding, and documentation of lessons learned.

2.3 Community Based Disaster Risk Reduction (CBDRR)

Community Based Disaster Risk Reduction is a process of disaster risk reduction in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring, and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities. This means that people are at the heart of decision making and implementation of disaster risk reduction activities. Community participation is a must for effective Disaster Risk Reduction.

Community Based Disaster Preparedness (CBDP) approach, building on the existing traditional knowledge and skill will build aptitude for disaster risk management, a sine qua non for building a disaster resilient community.

Communities are engaged and empowered to manage and reduce disaster related risks. At risk communities being the first responder and more local familiarity with hazards and available resources, are in better position in planning and executing immediate rescue and relief actions.

Community's involvement in the preparedness phase is based on their needs, capacity and perception of risk towards various natural disasters. Their involvement not only increases the likelihood of coordinated-action to mitigate the risks but also brings the community together to address the issue collectively. It would further help in setting up of a linkage between the first responders (community) in its geographic areas of interventions and public delivery system (existing government system). The challenges such as lack of understanding of risk in community, prioritization of other basic livelihood needs Community Based Disaster Risk Management (CBDRM) and the need for strengthening the national CBDRM strategy to make it sustainable would be achieved during the course of implementation of the activities.

2.4 Impact of Disasters on Communities

The impact of natural or man-made disasters is extensive and practically immeasurable. Natural disasters result in deaths, displacement of people, destruction of houses and other infrastructure, and isolation of vast areas of the country due to destruction of vital social and economic infrastructure, including bridges, roads, power stations, water supply systems, hospitals and schools. Disasters contribute to the retardation of development in the affected regions. The impact of disasters at the household level, disrupts normal livelihoods, displaces families, destroys infrastructure and disentangles social and community networks. The disasters can

seriously disrupt development initiatives in several ways, including loss of resources, interruption of programmes, impact on the investment climate, impact on the non-formal sector and political destabilization. This suggests that the budget for development initiatives such as housing construction can be deviated or channeled to respond to other areas affected by disasters. Furthermore, disaster impacts can cause social activism resulting in political disruption, especially during interminable period of disaster recovery.

2.5 Effect of Disasters on Economies

The economic effects of disasters as direct, indirect and secondary, they define direct effects as the economic damage to property and the loss of income. Direct effects may be in the form of the destruction of sites of production such as factories or farms. The example of direct effects are loss of capital (housing and farm land), loss of stocks, costs of emergency relief and repairs, and production loss (poor harvests, destruction of crops, death of livestock). Indirect economic effects may be caused by direct losses, which result from the decline in production and the provision of services, for example, a reduction in the activity of suppliers.

Furthermore, both direct and indirect effects may result in secondary effects which appear sometime after the disaster. The secondary effects include an increase in disparity between individual and family income, ecological changes or negative changes in the balance of payments. The aforementioned impacts may cause spillovers at the macro-economic level, as fiscal and external pressures can lead to imbalances that spark economic crises and an increase in the incidence of poverty can create social unrest. The secondary effects of a disaster include inflation, balance of payment problems and increases in fiscal expenditure and decrease in monetary reserves.

Natural disasters are detrimental to the economic development of developing countries as they may be accompanied by a reduction in the Gross Domestic Product (GDP), increase in imports, and deterioration in fiscal balances.

Sudden fast onset disasters such as floods have been particularly costly, both in terms of loss of human life and financially. The disasters especially when they have occurred repeatedly within a short period of time, have a negative impact on the incentive for further investment. Investors need a climate of stability and certainty to be encouraged to risk their money.

2.6 Some Issues and Challenges in DRR

2.6.1 Priorities

It is unrealistic to expect progress in every aspect of DRR; capacities and resources are insufficient. Governments and other organizations have to make what are in effect ‘investment decisions’, choosing which aspects of DRR to invest in, when, and in what sequence. This made more complicated by the fact that many of the interventions advocated are developmental rather than directly related to disaster management. Most existing DRR guidance³ sidesteps this issue. One way of focusing is to consider only actions that are intended specifically to reduce disaster risk. This would at least distinguish from more general efforts towards sustainable development. The concept of ‘invulnerable development’ attempts this; In this formulation, invulnerable development is development directed toward reducing vulnerability to disaster, comprising ‘decisions and activities that are intentionally designed and implemented to reduce risk and susceptibility, and also raise resistance and resilience to disaster’.

2.6.2 Partnerships and Inter-organization Co-ordination

No single group or organization can address every aspect of DRR. DRR thinking sees disasters as complex problems demanding a collective response. Co-ordination even in conventional emergency management is difficult, for many organizations may converge on a disaster area to assist. Across the broader spectrum of DRR, the relationships between types of organization and between sectors (public, private and non-profit, as well as communities) become much more extensive and complex. DRR requires strong vertical and horizontal linkages (central-local relations become important). In terms of involving civil society organizations, it should mean thinking broadly about which types of organization to involve (i.e., conventional NGOs and such organizations are trades unions, religious institutions, amateur radio operators (as in the USA and India), universities and research institutions).

2.6.3 Communities and Their Organizations

Traditional emergency management/civil defense thinking makes two misleading assumptions about communities. First, it sees other forms of social organization (voluntary and community based organizations, informal social

groupings and families) as irrelevant to emergency action. Spontaneous actions by affected communities or groups (e.g., search and rescue) are very viewed as irrelevant or disruptive, because they are not controlled by the authorities. The second assumption is that disasters produce passive ‘victims) who are overwhelmed by crisis or dysfunctional behavior (panic, looting, self-seeking activities). They therefore need to be told what to do, and their behavior must be controlled; in extreme cases, through the imposition of martial law. There is plenty of sociological research to refute such ‘myths’.

An alternative viewpoint, informed by a considerable volume of research, emphasizes the importance of communities and local organizations in disaster risk management. The rationale for community based disaster risk management that it responds to local problems and needs, capitalizes on local knowledge and expertise, is cost-effective, improves the likelihood of sustainability through genuine ‘ownership’ of projects, strengthens community technical and organizational capacities, and empowers people by enabling them to tackle these and other challenges. Local people and organizations are the main actors I the risk reduction and disaster response in any case.

2.6.4 Governance

The DRR approach requires redefining the role of government disaster reduction. It is generally agreed that national governments should be main actors in DRR; they have a duty to ensure the safety of citizens, the resources and capacity to implement large-scale DRR, a mandate to direct or co-ordinate the work of others, and they create the necessary policy and legislative frameworks. These policies and programmes have to be coherent. More research is needed into why some governments are more successful than others in disaster management. There is still no general consensus on what drives changes in policy and practice. The shifting relation between central government and other actors is another area requiring research.

2.6.5 Accountability and Rights

The principle of accountability lies at the heart of genuine partnership and participation in DRR. It applies to state institutions that are expected to be accountable through the democratic process and to private sector and non-profit organizations that are not subject to democratic control. Accountability is an emerging

issue in disaster reduction work. Accountability should be primarily toward those who are vulnerable to hazards and affected by them.

Many organizations working in international aid and development are now committing themselves to a 'rights-based' approach. This tends to encompass human rights and other rights that an agency believes should be accepted as human rights. In such contexts, the language of rights may be used vaguely, with a risk of causing confusion. Security against disaster is not generally regarded as a right although it is addressed in some international codes, usually indirectly. The idea of a 'right to safety' is being discussed in some circles.

2.6.6 Policy and Investment

In a June 2012 study, researchers at the Overseas Development Institute highlighted the need for more focus on disaster risk management (DRM) in the international policy frameworks to be agreed in 2015. Economic costs of disasters are on the rise, but most humanitarian investment is currently spent on responding to disasters, rather than managing their future risks. If this pattern continues, the researchers argue, then 'spending on reconstruction and relief will become unsustainable'.

Further papers also highlighted the need to for strong gender perspective in disaster risk reduction policy. Studies have shown that women are disproportionately impacted by natural disasters. Following the 2004 tsunami in the Indian Ocean, 77% t and 72% of the deaths in districts of North Aceh and Ache Besar, Indonesia, were female. And in India 62% of people who died were female. A gender-sensitive approach would identify how disasters affect men, women, boys and girls differently and shaped policy to people's specific vulnerabilities, concerns and needs.

2.7 Public Administration and Disaster Risk Reduction

Public Administration in Myanmar is regarded as contributing to both economic development and disaster management. Myanmar is a country that highly prone to natural disasters. The perpetual occurrence of natural disasters has forced the country into a permanent "state of emergency". Myanmar has adopted a strategic, systematic approach to proactively cope with disasters. The government plays a pivotal role in the development of effective strategies and operational activities to combat natural disasters. Myanmar has adopted and implemented some key

approaches/pillars in disaster mitigation, which are; institutional, organizational, human resources and financial perspectives. Additionally, early warning systems and flood prevention mechanisms have been put into place. Myanmar's experiences convey the message that committed political leadership and collaboration between, and among, state institutions, including public administration, plays a significant role.

Disaster can be defined as "loss or suffering caused either by a sudden or progressive calamity, misfortune or misdeeds". There is always a causal relationship before any disaster occurs. Therefore, if hazards are mitigated or reduced, disaster vulnerability automatically goes down. Disasters can be categorized as 3 types, namely: natural, human-induced and complex. Of the three, people are most vulnerable to complex disasters as they cause devastating effects within the country. Under complex type of disasters, poverty, brain-drain and capital flight, which have adversely affected the socio-economic progress of many of the least developed countries. Public administration plays a significant role in reducing vulnerability to these types of disasters through formulating sound policies and programs, and implementing them effectively. Public administration plays a crucial role in managing disaster through technical and administrative measures. If effective policies are formulated and executed, they help minimize disaster risks to a greater extent.

2.8 The Millennium Development Goals and DRR

The Millennium Development Goals, which are agreed targets set by the world's nations to reduce poverty. Disaster risk reduction efforts can help support these goals as followed; (UNDP, 2017)

(a) Eradicate extreme poverty and hunger

Disaster increase poverty and hunger by destroying livelihoods, such as farming. This can cause food insecurity and unemployment, and push people into long-term poverty. Protecting and diversifying livelihoods helps build resilience to cyclical hazards such as floods and drought.

(b) Achieve universal primary education

School attendance can fall after a disaster, due to damaged school building, displacement of families, and loss of income. Children may need to perform extra

chores or even seek employment instead of attending school. Safe, structurally sound and accessible building means all children are protected while at school, and they minimize disruption to operation after a disaster. Schools or health centres can double as cyclone shelters and safe evacuation buildings.

(c) Promote gender equality and empower women

Women and girls suffer most from the impacts of disasters. Because of the breakdown of services after a disaster, their workloads often increase and they are more vulnerable to domestic violence and sexual abuse. The situation is often worse for women and girls with disability. Girls are more likely to be withdrawn from school and enter the workforce and women often eat or drink less to save rations for their family. Reducing disaster risk alleviates the impact of additional burdens that befall women as a consequence of disasters.

(d) Reduce child mortality

Children are more likely to be killed by sudden events such as floods, landslides and earthquakes. They can also become orphaned, homeless or vulnerable to injuries, impairment or illness as family structures break down or change significantly. Disease can spread due to unsafe water and sanitation. Preventing the destruction of health, water and sanitation infrastructure is critical in protecting children from death, disease and disability.

(e) Improve maternal health

Pregnant women are at high risk of death, injury, illness and disability during and after a disaster. Hospitals and health clinics may be damaged and safe-birthing environments are rare or absent. Pregnant women may also experience increased stress, workloads and responsibilities. Community early warning systems allow pregnant women to move to safety before a disaster. Protecting or diversifying livelihoods so that families have a year-round income ensures pregnant women's nutritional needs are better met. Availability of safe-birthing environments can prevent complications during childbirth.

(f) Combat HIV/AIDS, malaria and other diseases

Contagious diseases such as malaria can spread quickly in the wake of a disaster. Treatment can be disrupted if health clinics and hospitals are destroyed. Poverty that is exacerbated by a disaster may force more women into sex work and men into transient professions which can increase their risk of HIV infection. Risk reduction will reduce the possibilities for spread of contagious diseases following disasters. Livelihood security will avoid impoverishment and vulnerability to sex work or displacement.

(g) Ensure environmental sustainability

Disasters can cause widespread environmental damage. Crops can be affected by pollutants and rebuilding of houses can exacerbate deforestation. Restoration of ecosystems such as mangroves, coral reefs and forests reduce the impact of and exposure to hazards. Securing livelihoods can protect natural environments and decrease the rate of migrations to urban centers. Effective land-use planning helps people identify safe areas to live and environmentally sound places to grow crops.

(h) Develop a global partnership for development

The Hyogo Framework for Action has built consensus internationally, and led to new partnerships between governments, international and regional organizations, non-government and civil society organizations and the private sector to ensure development is more sustainable through reducing disaster risk.

With disaster risk increasing globally due to increasing vulnerability natural hazards, it has become obvious that the MDGs will require a risk-sensitive approach to ensure their accelerated achievement and sustainability. It is vital that development strategies incorporate measures to strengthen community resilience through economic development, income diversification, drought and flood resistant cropping strategies, hazard resilient infrastructure (schools, hospitals, bridges, jetties, roads, etc.), early warning systems, as well as through protection of ecosystems.

The 2010 MDG summit process provides a powerful vehicle to strengthen disaster risk reduction as an important cross-cutting policy area that will not only have a positive multiplier effect for the achievement of the MDGs, but is also a prerequisite to ensure their sustainability.

2.9 Review of Previous Studies

Ko Ko Aung (2011) studied the historical disaster events of Myanmar and the characteristics of Myanmar. Furthermore, the case study of Nagis recovery, the damages and losses of disaster impacts and awareness on disaster preparedness programme of Myanmar. His study finds that there is a need to integrate information across many disciplines, organizations, and geographical regions and disaster information involves more than just data and several interconnecting steps are typically required to generate the type of action-oriented products that are needed by the disaster management community.

Aye Aye Khine (2011) studied the profile of community perception and analysis of disaster risk reduction activities in Kyon Pyaw Township undertaken by Myanmar Red Cross Society. And she found the community knowledge, awareness and perception on natural disasters in terms of flood and also attitudes towards disasters and risks in Ayeyarwaddy Region. The study emphasized three key components, which are community based disaster preparedness activities, community based prevention and mitigation activities and school based disaster risk reduction activities.

Nu Nu Lin (2013) also studied to support studies on local/national expression of volunteerism for development under the scope of MRCS activities and assessed the effectiveness of disaster reduction activities in the study area. Her study found out the good knowledge and the majority of villages practice the preparedness plan.

Sai Zar Nee Hlwan (2015) analyzed the key achievements on the work plan of the disaster risk reduction program of MRCS in Ayeyarwaddy Region and strength, weakness, opportunities and constraints of DRR program. And he found that the knowledge on disaster of villagers have improved after the project and community practice better than before the DRR project intervention. Furthermore, he found of the community members satisfy with current disaster preparedness system and effectiveness of DRR program.

This study is different from above mentioned studies and this study access the hazard exposure and change, household level preparedness, community level preparedness, community engagement and feedback in general observation, sustainability and trust among villagers. The study targeted community people who are living in Pauktaw Township, Rakhine State, Myanmar.

CHAPTER 3

OVERVIEW OF CBDRR PROGRAMMES IN MYANMAR

Myanmar is prone to almost all types of hazards, which include fire, forest fire, earthquake, strong wind/cyclone, storm surge, tsunami, landslide, floods, drought and industrial/technological hazards. In recent years, the country is also witnessing a spate of localized disasters such as lightning and riverbank erosion. In 2014-2017, lightning led to the loss of 175 lives. During the same period, Myanmar also experienced loss of 261 and 782 lives due to riverbank erosion and strong wind respectively. The 2015 floods caused damages and losses amounting to USD 1.5 billion, while the 2008 Cyclone Nargis led to USD 4.1 billion. Since comprehensive multi-hazard risk assessment of Myanmar needs to be done at the national level.

3.1 Hazard Profile of Myanmar

Cyclone: Myanmar is prone to cyclones and April, May and October to December are considered to be cyclone months as per last 100 years record. In the last four decades, six major cyclones hit Myanmar; 1968 (Sittwe cyclone), 1975 (Patheingyi cyclone), 1982 (Gwa cyclone), 1994 (Maundaw cyclone), 2006 (Mala cyclone), 2008 (Nargis cyclone) and 2010 (Giri Cyclone). The Sittwe cyclone led to a loss of 1037 lives, Patheingyi cyclone claimed 304 lives and Nargis, the most devastating in the living memory of Myanmar, resulted in 84,537 deaths, 53,836 persons missing, affected 2.4 million population, and damage & loss of approximately 11.7 trillion Kyats (4.1 billion USD).

Storm surge: The coastal regions of Ayeyarwady Region and Rakhine State are prone to Storm surge. During Cyclone Nargis, 90 percent of deaths were caused as a direct consequence of the storm surge.

Floods: Flooding has always been one of the major hazards in Myanmar, accounting for 11% of all disasters, second only to fire. Floods in the past, led to loss of lives and properties, damage to critical infrastructure, economic loss and health related problems such as outbreak of water borne diseases when lakes, ponds and reservoirs get contaminated. Myanmar receives practically all its rainfall between mid-May and October, during which flooding is common. The riverine floods are common in the river delta while the flash floods and landslides are frequent in upper reaches of the river systems, which are normally the mountainous areas. In the cities and towns, localized floods occur from time to time.

Landslide: The landslides of various scales occur in mountainous regions especially in the Western, Southern and Eastern Highland of Myanmar. The Western ranges have experienced all types of landslide and earth movement such as rock falls, rock slides, soil avalanche and mud flow. Due to sparse population, the direct impact of landslide in this region damaged infrastructure rather than human settlement.

Earthquake: Myanmar can be divided in 3 seismically active regions namely the Northwestern Region, the Central Lowland and the Shan Plateau-Yunnan Region. During the 20th Century, at least 18 large earthquakes had happened along the Central Lowland where the well-known Sagaing Fault (1000km) passing through. Another large seismogenic fault called Kyaukkyan Fault about 500 km long is in the western part of the Shan Plateau. The largest measured earthquake in Myanmar is 8.0 Richter Scale, which occurred on the northern segment of this fault on 23 May 1912.

Tsunami: The 2,400 kilometers coastline of Myanmar can be divided in three regions namely Rakhine coastal area in northwest, Ayeyarwaddy Delta in middle, and Taninthayi coastal area in the south. The intensity of the tsunami in terms of round-up and the extent of the inundation were comparatively lower than other countries during 2004 Indian Ocean Tsunami as indicated by the computed tsunami amplitudes. The amplitudes are slightly larger off the Ayeyarwaddy delta, because the shallow delta extending offshore caused increment of tsunami wave amplitude.

Dry zone/Drought: The Dry zone of Myanmar is located in central part of the country in Magway, Mandalay and Sagaing Regions (lower part) across 54

Townships in 13 Districts and covers approximately 10 percent of total area of the country. It falls under arid to semi-arid zone and the average annual precipitation is below 1000mm.

Fire: The Fire hazard is the most frequent hazard in Myanmar. The high incidences of fire cases are concentrated mainly in Yangon, Mandalay, Ayeyarwaddy, Sagaing and Bago, which accounts for 63 percent of the total fire cases. January to May is the high season for fires and average annual fire cases are 900, which leads to loss of lives and properties.

Forest Fire: The forest fires in Myanmar are normally surface fire, most frequent during the dry season, starting around December until May. It occurs in almost all States and Regions though sporadic, however more common in upland regions namely Bago, Chin, Kayah, Kachin, Mandalay, Rakhine and Shan. It causes haze problem which leads to negative impact on the community.

3.2 Hazard Risks of Myanmar

The natural hazard risks map of the country. Geographically, the northern hill areas of the country are susceptible to earthquakes and landslides; the central area commonly known as 'dry zone' is vulnerable to droughts; and the western and southern coast are prone to cyclones and floods.

The Bay of Bengal which is situated to the west of Myanmar and the 2400 km coastline along its borders is a common place for the formation of tropical cyclones. Cyclones once formed here move generally westward to India and if there is slight re-curvedure, they head towards Bangladesh. But if the re-curvedure is sudden, the cyclones can move eastwards towards the Myanmar coast and there is a high probability of entering the coast of Myanmar at lower latitudes. Annually, there are approximately 10 cyclones in the Bay of Bengal from April to December. Severe cyclones occur during the pre-monsoon period of April to May and post-monsoon period of October to December. Hence, the Bay of Bengal has two cyclone seasons annually- for about a month before and three months after the South-West monsoon.

3.3 Community Based Disaster Risk Reduction Policy in Myanmar

The Ministry of Social Welfare, Relief and Resettlement will be lead drafting of the development of Community Based Disaster Risk Reduction Policy. The Objective of this policy is to create an enabling framework for community based disaster preparedness and risk reduction and guide future CBDRR projects. An inter-ministerial Task Force including CBDRR shall be constituted to draft CBDRR policy. It will study the similar policies of other ASEAN countries, with support from regional and international organizations like ASEAN, ADPC and UN Agencies, which pioneering the application of CBDRR concept in the region. The CBDRR Policy will reflect and capture the concern, needs and requirements of all stakeholders. The policy will be presented to the NDPCC for its approval and enforcement.

3.4 National Community Based Disaster Risk Reduction Programme

The goal of the National CBDRR Programme is to provide a unified interface for CBDRR programs nation-wide. This is planned to achieve through clear definitions of roles and responsibilities of each government ministry in support of CBDRR implementation in the country. The programme will emphasize on the importance of networking and information sharing among various agencies (both government and non-government) and will offer practical tools for such purpose. The Ministry of Social Welfare, Relief and Resettlement will lead this sub-component and it will align with the Development of CBDRR policy sub-component with strong support from experienced partners such as Myanmar Red Cross Society (MRCS), UN agencies, INGOs.

3.5 Legislative and institutional arrangements for disaster risk management

The legislative and institutional setup for disaster risk management is evolving in Myanmar. The country enacted Disaster Management Law and Rules in 2013 and 2015 respectively. The Law provides legal basis to set up Disaster Management bodies at various roles and defines its roles and responsibilities and creation of fund for Disaster Management. The provisions of law empower the Disaster Management bodies in smooth discharge of duties and define areas of accountability.

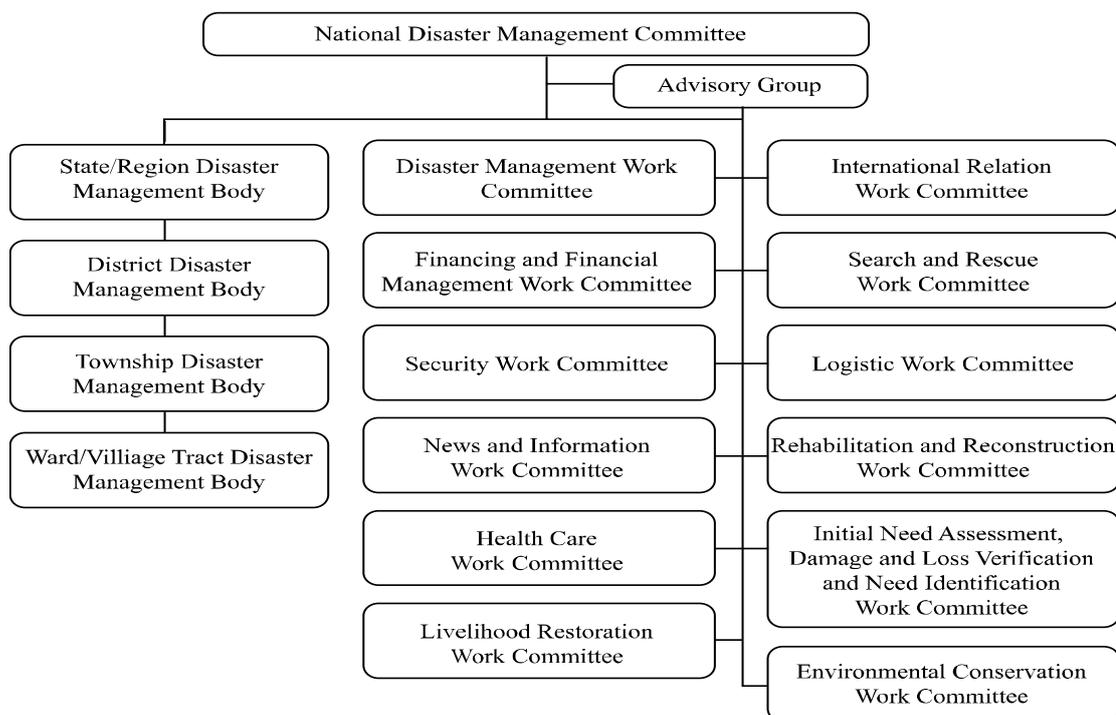
3.5.1 Government's National and sub-national DRM arrangements

The National Disaster Management Committee (NDMC) under chair of Vice President (2) is the apex body for disaster risk management. Twelve work committees related to specific theme of disaster risk management and an advisory committee has been constituted under the NDMC. The organogram is at Figure 3.1

At region/state, self-administered zone, district, township, ward and village tract levels, Disaster Management bodies are being constituted, as per provisions of the Disaster Management Law, 2013.

Relief and Resettlement Department (RRD) is the nodal department for disaster risk management and focal point of Myanmar for the ASEAN Committee on Disaster Management. RRD has established Disaster Management Training Centre in Hinthada, an institute dedicated to training, education and research on risk reduction. Other ministries and departments such as Ministry of Construction; Ministry of Agriculture, Livestock and Irrigation; Ministry of Health and Sports; Ministry of Planning and Finance; Department of Meteorology and Hydrology; General Administration Department and Fire Services Department play an important role in disaster risk management. Some of the departments have created disaster risk management focal point /section.

Figure (3.1) Organogram of Disaster Management Bodies in Myanmar



Source: Relief and Resettlement Department

3.5.2 Disaster risk reduction networks

Disaster risk reduction Working Group: The DRR working group was established in 2008 to support Cyclone Nargis recovery and reconstruction on risk reduction issues. It serves as a platform for information sharing and strengthened coordination among development partners working on disaster risk reduction issues. Working groups have been also constituted at sub-national level in selected regions and state e.g. in Mon state, Kayin state, Rakhine state, etc. to coordinate sub-national risk reduction activities. UNDP is chair of the DRR working group at national level and the Swiss Development Cooperation, the Community Development Association and the International Organization for Migration chair the DRR working group of Chin State, Kayin State and Rakhine State respectively.

Myanmar Humanitarian Country Team (HCT): It is a strategic humanitarian coordination and decision-making body that seeks to optimize the collective efforts of the UN, other international and national organizations, non-governmental organizations and the Red Cross Movement. It is convened under the leadership of the Humanitarian Coordinator and UNOCHA serve as Secretariat. It oversees the development of sector/cluster response plans and provides oversight and advice to the cluster/sector leads and humanitarian-focused geographic and subsidiary groups. It also leads decision making on inter-agency coordination in regards to assessments, joint monitoring and evaluation missions.

Non-Government Organizations: A number of international and local non-government organizations, community based organizations, professional societies such as Myanmar Engineering Society and Myanmar Geosciences Society and Red Cross system are working on disaster risk management, including community level disaster preparedness.

3.5.3 Private sector

The private sector role in disaster management especially risk reduction is evolving and it played an important role in the Cyclone Nargis 2008 and the floods and landslides 2015 response and recovery. The Union of Myanmar Federation of Chamber of Commerce and Industries (UMFCCI), in partnership with UNDP and

UNOCHA, have established the Myanmar private sector disaster management network (MPDN-Network). Its objectives are:

1. To establish and maintain coordination architecture which would serve as a clear entry point for the private sector in the broader national coordination led by the Government
2. To strengthen the capacity of businesses and business associations in Myanmar to increase its resilience to return to normalcy as soon as possible after disasters:

The MPD Network is in infancy stage and it has started getting engaged at global, regional and national levels, which includes membership of the Task force on the Myanmar Action Plan on Disaster Risk Reduction, 2017; Disaster Management Subsector coordination group under DACU, etc.

3.5.4 Association of Southeast Asian Nations (ASEAN)

The ASEAN Committee on Disaster Management (ACDM) was established in early 2003 following the decision of the ASEAN Standing Committee (ASC). The ACDM consists of heads of national agencies responsible for disaster management of ASEAN Member States. The ACDM facilitates the overall responsibility for coordinating and implementing the regional activities.

In pursuing a region of disaster-resilient nations and safer communities, ASEAN has developed and enacted the Agreement on Disaster Management and Emergency Response (AADMER), which the Union of Myanmar is a signatory and current the chair of ACDM. The Agreement is expected to provide a framework for the development of operational procedures to respond collectively and expeditiously to disasters. The Agreement includes provisions for knowledge management, movement of relief assistance, expedited customs and immigration clearance, and utilization of military and civilian assets in disaster relief. An ASEAN Humanitarian Assistance Centre on disaster management (AHA Centre) will be established to facilitate cooperation, knowledge exchange, and coordination among the Parties, and with relevant UN and international organizations, in promoting regional collaboration. It also includes provisions for setting up an ASEAN Disaster Management and Emergency Relief Fund. Within the framework of the Agreement, joint simulation exercises will be conducted to test emergency responses on a regular basis.

In December 2009, AADMER has entered into force unveiling an ASEAN Regional Work programme to facilitate disaster risk reduction initiatives in the region. The work programme provides a framework for cooperation for the period of 2010-2015. It outlines ASEAN's regional strategy on disaster management, as well as priority areas and activities for disaster risk reduction.

In Myanmar, the AADMER work programme will be facilitated by the focal person from the Ministry of Social Welfare, Relief and Resettlement who is aware to link this proposed action to its regional and national DRR activities. The activities of this proposed action is envisaged to initiate the acceleration of AADMER work programme implementation in Myanmar.

3.5.5 Tripartite Core Group - Recovery Coordination Centre

Following the Cyclone Nargis that struck Myanmar on 2-3 May 2008, the Association of Southeast Asian Nations (ASEAN) Foreign Ministers' Meeting on 19 May 2008 established an ASEAN-led coordinating mechanism and set up an ASEAN Humanitarian Task Force (AHTF) for the Victims of Cyclone Nargis to facilitate effective distribution and utilization of assistance from the international community. For the purpose of day-to-day operation, a Yangon-based Tripartite Core Group (TCG) consisting of ASEAN, the Government of the Union of Myanmar and UN was instituted. ASEAN also established a Recovery Coordination Centre (RCC) in Yangon to serve as a secretariat and operational center to the AHTF and the TCG. The 41st ASEAN Ministerial Meeting in Singapore on 27 February 2009 decided that the ASEAN-led coordinating mechanism, including the TCG, would be extended until July 2010.

The ASEAN-led coordinating mechanism, consisting of the AHTF and the Yangon-based TCG, has succeeded in achieving a high degree of donors' confidence in the first year of the post-Nargis efforts. At the launch of the Post-Nargis Recovery and Preparedness Plan (PONREPP) in Bangkok on 9 February 2009, many donors stated that their continued support for Nargis recovery efforts would be contingent on the extension of the TCG. Thus, donors eagerly welcomed the extension of the TCG's mandate until July 2010, a decision announced at the 14th ASEAN Summit in Cha-am Hua-Hin, Thailand, in late February 2009. The extension of the mechanism also demonstrated the Government of the Union of Myanmar's confidence in the work of

the TCG in facilitating and coordinating Cyclone relief and recovery efforts by a wide range of stakeholders and partners.

The post cyclone Nargis Coordinating Office for the ASEAN Humanitarian Task Force (AHTF) relief and recovery efforts facilitated by the AHTF and the TCG have brought about an unprecedented level of international cooperation in Myanmar. The PONREPP lays out a plan for conducting coordination at both strategic and operational levels. It proposes appropriate recovery strategies, and presents outcomes and the outputs across eight sectors (ranging from Livelihoods to DRR and Protection and Vulnerable Groups). It also proposes an innovative coordination architecture that builds on the good experience gained in the emergency response phase, making adjustments so as to better adapt to the emerging recovery phase, in which local capacity building and closer coordination with Township authorities are central. At the same time, the PONREPP recognizes the importance of linking the post-Nargis relief and early recovery with medium-term recovery and long-term development.

This proposed action will contribute in achieving the outcomes for the Disaster Risk Reduction component of the PONREPP, particularly on the following points:

Communities are engaged and empowered to manage and reduce disaster related risks; and Community and institutions have mechanism and capacity to disseminate and act on early warnings through an end-to-end early warning system.

However, TCG mandate will expire by July 2010. In the meeting of the ASEAN Foreign Ministries in Danang, Vietnam last January 2010, it was made clear that TCG should come to an end on said date. RCC office in Yangon and respective recovery hubs in Pyapon, Bogale, Yangon and Labutta will be closed. Since the PONREPP needs to proceed until 2011, mechanism on how the recovery coordination efforts should continue is still under discussion among the various working groups. The Ministry of Social Welfare, Relief and Resettlement, however, confirmed that said organization will take care of the coordination efforts post TCG mandate.

3.5.6 International NGOs/ DRR Working Group and National NGOs

Cyclone Nargis exposed the gaps in capacities for DRR in the country at all levels – government, non-government, civil society and communities. There was also limited knowledge for the integration of DRR into various development sectors. Prior

to cyclone Nargis, there were a number of international and national agencies such as UNDP, World Vision, Oxfam, Lutheran World Federation, SC, Myanmar Red Cross Society (MRCS) and a number of local NGOs working in the country but their focus was largely on service delivery and poverty reduction. It was only after cyclone Nargis that DRR gained importance but there is still a big gap in proper understanding of DRR among a majority of implementing agencies.

They have led a range of disaster management activities on prevention, preparedness and mitigation measures and post disaster relief operations. Capacity building on hazards, vulnerability and capacity assessments, community disaster risk reduction planning, evacuation, emergency transportation and communication, and provision of shelter, water and sanitation and health care have been initiated.

There have been DRR training initiatives undertaken for government officials by various donor and international organizations to help them understand the usefulness of DRR. At the community level, a few good models on community based DRR (CBDRR) have been demonstrated by inter/national organizations but the quick growth of CBDRR has also raised concerns about the quality of programmes being implemented at the community level. At the national level, the DRR Working Group has been set up to perform the tasks; Act as information clearing and sharing hub on various DRR related issues for all stakeholders, Formulate common strategy for DRR interventions at various levels, Act as a hub center for knowledge networking and sharing of good practices, Facilitate coordination of intervention in different levels, i.e. community, institutional and policy levels, Facilitate various policy and advocacy activities, Play a key role in ensuring coordinated response in emergency situation, Serve as a platform for technical exchange and support information sharing and Implementation of DRR sector plan and mainstreaming under PONREP.

In 2009, to help roll out the programme implementation in support to PONREPP, the DRR Working Group had developed an action plan.

3.6 Malteser International

Malteser International is the worldwide relief agency of the Sovereign Order of Malta for humanitarian aid with the status of a non-governmental organization. Malteser International is a German based Non-Governmental Organization which was founded in 1953 to provide humanitarian assistance worldwide with its headquarters

in Cologne (Germany).The relief service has more than 50 years of experience in humanitarian relief and currently covers around 200 projects in about 20 countries in Africa, Asia, Europe and the Americas.

Malteser International provides assistance in all part of the world without distinction of religion, race or political persuasion. Christian value and humanitarian principles such as neutrality, impartiality and independence are the foundation of its work. Malteser International seeks to alleviate human suffering, reduce vulnerability and poverty by providing emergency relief and facilitating the link towards rehabilitation and sustainable development for a healthy life with dignity.

Malteser International is mission to; 1) Provide emergency response and to implement reconstruction and rehabilitation measures with a community focus, 2) Establish and promote Primary Health Care (PHC) services and contributes to better health by providing nutrition related programmes, 3) Contribute to better health and dignified living conditions by providing access to drinking water, sanitation and hygiene (WASH), 4) Implement livelihood measures and social programs to ensure the access of people to income security and reduce their vulnerability and poverty and 5) Establish and promote DRR activities, especially on a community level.

3.6.1 Malteser International in Myanmar

First activities were started with ECHO support in Thongwa Township, Yangon Region. Since then Malteser extended its activities in: 1) Yangon Region: Sector WASH, Health; previously funded by ECHO and the German Government, currently supported by Malteser own funds, 2) Northern Rakhine State: Sector Health, WASH; previously funded by ECHO, currently supported by EA, UNHCR, UNOPS-3DF, WFP,GF, 3) Rakhine State: Sector CBDRR, WASH, Health; funded by the German Government, UNHCR, UNESCO, ADH, AA, BMZ, DIPECHO, 4) Wa Special Region II and IV: Sector Health, WASH; funded by ECHO, UNOPS-3DF, German Government, GF, BMZ and 5) Ayeyarwaddy Region (Labutta Township): Sector Health, WASH, CBDRRS; previously supported among others by ECHO, German Government, Caritas, own funds.

3.6.2 Community Based Disaster Risk Reduction Activities by Malteser International

CBDRR programmes aim to reduce the vulnerability and enhance the resilience of communities to the adverse effects of natural hazards. Investing in disaster risk reduction protects lives, livelihoods and property and is critical for sustainable development. It can significantly reduce the costs involved in response to disasters and can safeguard developments gains by protecting investment from being impaired or lost.

(1) Formation of the Disaster Risk Management Committee (DRMC)

The first step for activity CBDRR is the formation of a DRMC. Malteser International set up the DRMC which consists of 4-5 members in each village. The chairman/secretary of the Village Peace and Development Council (VPDC) acts as the chief of the DRMC and he takes the role of an early warning and evacuation officer. Another member of the committee takes the responsibility for first aid. A third member contributes as a psychosocial counselor, and the last member as DRR initiator. The DRMC is empowered to ensure DRR tools and approaches are being implemented and advocated among the villages. It is a vital resource for community local knowledge and sharing of good practices.

(2) Hazard, Vulnerability, and Capacity Assessment

The HVCA is the foundation of all succeeding DRR activities. It is a semi-structured interview assessment with 15 to 20 key community members of different age ranges and gender. The overall purpose of HVCA is to understand the nature and level of hazard and risks that the community have to face, where these risks come from, what and who will be the worst affected, what is available at all levels to reduce the risks and what needs to be further strengthened. It is also the task to develop imaginative programme to turn weakness into strength, problem into solution.

The participants took part in participatory exercises during this analysis through the preparation of maps, transect walks, historical profiles (can be used to obtain data about occurrence of the past disaster), seasonal calendars (can be used to map occurrence of different disasters in different months of a year), and the assessment of risk, vulnerability, hazard and capacity, the development of community based evacuation plans, community based early warning systems and the identification of community evacuation centres (CEC). This assessment is often facilitated by the

DRMC to empower them to take leadership and to promote sustainability. The aim is to improve disaster risk management capacity of communities through training of DRR committee, conduct of participatory hazard, vulnerability and capacity assessment and development of Disaster Risk Management plans at community level.

1132 participants (557 male and 575 female) were participated in hazard vulnerability capacity assessment during 2010-2014. (Malteser International 2010-2014)

(3) Disaster Preparedness Committee (DPC)

Disaster Preparedness Committee (DPC) was established by Malteser International in each village. The committee member should be nominated and may constitute of village chief, representatives from health post, education institutes, women development committee, village development committee, youth clubs/ local NGOs/CBAs. The committee members familiarized themselves with the concept of community based preparedness planning and help the rest of the community to understand the importance of the CBDP. Each DPC was also divided into 7 sub-committees namely: (1) Early warning, (2) Mitigation (3) Evacuation (priority and others), (4) Search & Rescue (5) Evacuation Centre Management (Food & Health), (6) Networking & Public Information and (7) Training and Education according to their roles and functions required in time of disaster. 878 members (443 male and 435 female) were included in Disaster Preparedness Committee during 2010-2014.

(4) Evacuation Planning

Evacuation planning is a crucial component in developing an effective early warning system. Based on the results of the HVCA and the field visits by the DRMC members and Malteser, a suitable evacuation plan is developed together with the community and under the guidance of the chairman/secretary of the VPDC. Evacuation planning is a combination of disaster preparedness training and construction of evacuation routes.

The community identifies a suitable evacuation route and mobilizes 10 to 15 community members for small scale community project on safeguarding evacuation routes through improvement of roads, jetties and bridges. As a complement to the evacuation routes, disaster preparedness trainings are also convened to foster awareness on disaster risks and how they could address them as a community. 270

participants (128 male and 142 female) were participated in Search and Rescue and 200 participants (101 male and 99 female) were participated Early Warning training in target area (2010-2014). 16 pathways, 2 jetties, 8 retaining walls and 3 culverts were constructed in the target area (2010-2014).

(5) Community Evacuation Center

The community should identify safe community shelter. If not, the community should select some resistant buildings among the existing buildings in the area to be used as evacuation center for the community members in case of a cyclone. These evacuation centers could be government offices or public buildings, like Schools, Rural Health Centre, Religious Center, community halls, or privately owned buildings. The consent of the owner of the building should also be sought in advance. The safe routes to the shelters should also be identified. Malteser constructed and renovated the schools, RHC, RsHC and religious centers were identified by the community as relocation points or evacuation centres attached with Rain Water Collection Tank, Latrines and overhead tank.

(6) Preserving Mangroves for a Safer Future and Safeguarding Mangrove Ecosystems for Livelihood Security

Mangroves protect the coastal area from storm surge and wind which accompanied with cyclones. The tangle of branches slows the flow of water. Community participation in the mangrove plantation could be organized by the local authorities, NGOs or the community itself. Mangroves also help in erosion-control and coastal conservation.

The villagers used the forestry products such as fire wood, thatch for roofing, bamboo, timber and wood poles for construction of house. Many trees and forests were destroyed by storms and shrimp farmers were cleaned the forest to construct the traditional shrimp ponds. The villagers were left helpless with the high air pressure, strong wind, bank erosion, scarcity of fuel woods, housing materials and lower fish catch due to degradation of mangrove forests.

Malteser organized the training of trainers for the mangrove nursery establishing and fuel efficient stove making training conducted by Mangroves Services Network (MSN). The training focused on the mangrove nursery technique,

planting technique, planting season and species of mangrove. Malteser aim; a) to promote environmental conservation through community participation not only in mangrove but also in any environment where the assistance is needed; b) to establish village forest nursery; c) to achieve appropriate tree planting technique; d) to sustain their environment and natural resources; e) to gain technical skills and knowledge on efficient use of different energy technologies among local grass roots; f) to make local people aware of natural resource maintenance and development through conservation and g) after gaining the skills, knowledge and awareness on sustainable coastal ecosystem and resources management and utilization local community is expected to apply them in their daily livelihoods for upgrading living condition.

As the survey results, average 1 HH expended 10,000 kyats per months for the fuel wood by using of three stone stove. The materials for making of efficient fuel stove can easily collect in every village and the villagers can easily make themselves when they need the new one. As the comparison of using the efficient fuel saving stove and three stones stove, 4 litres of water boiled by using with 1 kg of fuel wood, the efficient fuel saving stove can boil after 18 mins from the starting and remain 0.363 kg of fuel wood. And the local three stones stove can boil after 22 mins from the starting and remains 0.039 kg. Therefore, using of efficient fuel saving stove save more than 30% of usage fuel wood, save the cooking time and expenditure of the household. Malteser distributed 31,625 mangrove plants and 8,000 fresh water plant to grow in the villages as a secondary line of the protection from storm waves and flooding while mangroves provide the front line of protection along the river.

(7) First Aid Training for CBDRR

Approximately 4-6 members from each DPC took part in the “Training of Trainers” and “First Aid Training” organized by Myanmar Red Cross Society MRCS. The aim of the training focused on early warning and the different levels of storm severity, and what actions should be taken at each. Malteser International provided first aid kits, radios and batteries, megaphones, sirens, whistles, IEC materials, life jackets, torch lights, weather color code card, household preparedness cards village map boards to the early warning committees. The mentioned trainings address the following topics; Dangers of Hazards, How to understand weather forecast news, Potential impact of wind intensity to the community, How to respond to the weather

forecast news using the evacuation plan, When to evacuate, How to evacuate, Where to evacuate and Who are the prioritized persons in evacuation

Moreover, during the mentioned trainings the participants are given the chance to act as lay counselor, medical responder, disaster risk reduction initiator, and community evacuation officer to demonstrate the roles of the community in an event of an evacuation. The training involves: Psychosocial processing, Identification of the most common natural hazards in their villages, Participatory risk assessment and analysis, Formulate village action plans, Develop a functional people-centers, gender-responsive, and vulnerability-inclusive early warning system for disaster preparedness. Table 4.6 shows the participants of the First Aid training. Malteser International provided 26 First Aid kits, 27 sets of radios and batteries, 27 megaphones, 162 raincoats, 75 whistles, 45 shovels, 16 sirens, 5 stretchers, 44 ropes, 30 sets of IEC materials, 320 life jackets, 30 sheet of weather color code, 5,790 household preparedness cards and 16 village map boards to the early warning committees during 2010-2014. 188 participants (96 male and 92 female) were participated in First Aid Training in target area (2010-2014)

(8) Mock Drill

Drills or simulation exercise should be arranged before the cyclone season. It can be organized for the Community-based Organization on Disaster Risk Reduction as well as for the community as a whole. Mock drills should ensure a well-prepared community with well-defined roles and responsibilities of various stakeholders. The strength and weakness of the community preparedness for a cyclone can be found in a drill then the necessary activities and changes should be updated from time to time. Mock drills can also serve as an effective tool for public awareness on cyclone and community preparedness on it. 2,631 people (Male 1,059 and Female 1,572) participated from 15 villages in 15 campaigns.

(9) School Based Disaster Risk Reduction Activities

School Based Disaster Risk Reduction Activities are related preparedness of targeted schools in at-risk areas is strengthened through planning, knowledge and awareness mechanisms. Processes are followings;

Mobilization for School Headmasters and Teachers on DRR Concepts, Process:

The DRR Program will be introduced at school level through awareness workshops or sessions. The implementation of this activity needs approval and support from targeted Township Education Officers. The objective of this activity is to increase targeted school headmaster's awareness regarding DRR mechanisms. On other hand, headmasters and teachers constitute the central core of the educational system thus; increasing their awareness will have great impact in community behaviors and mindsets.

Different DRR components and initiatives will be developed in these awareness sessions (alert and evacuation protocols, awareness about how to act and react from watching to all clear phases, etc.). The aim here is to diversify the entry points at school level through adapted and useful DRR mechanisms.

Mobilization of School Committee Members: The objective of this activity is to identify key persons who will be in charge of DRR activities within targeted schools. The creation and mobilization process will be coordinated by the Risk Education Officer and Trainers with the support of RCVs, targeted community and township leaders, Township Education Officers. The committee will be composed of school headmasters and teachers and also interested parents and students in order to maximize mobilization and involvement.

School Risk Assessment by School Committee Members: This activity intends to highlight the different characteristics and specificities of target schools. From building safety to DRR components in the academic program, all aspects will be assessed. The objective here is to point out existing DRR mechanisms, level of preparedness and awareness, identify weaknesses/difficulties regarding past events, etc. The assessment will be conducted through a Safe School checklist which will conclude with a general brainstorming. This activity will permit cross checking of gathered data and information and verification of their validity. The process will be coordinated and assisted by the Risk Education Officer and Trainers with the support of RCVs and targeted school committees.

School Preparedness Plan Set Up: The School Preparedness Plan is a proactive plan developed to facilitate disaster preparedness, emergency and aftermath response at

school level. This plan intends to organize school headmasters and teachers and community leaders to better cope with disaster impacts and consequences on children's safety and education.

Based on school risk assessment results and findings, the school committee will work on the development of a School Preparedness Plan. The school committee will be supported by the Risk Education Officer and Trainers but also the RCVs.

The development process will be launched after the School Preparedness Plan initiation session. This activity will be carried-out by the Risk Education Officer and Trainers and will highlight the different steps to be followed. During this initiation session, brain storming will be organized around past events in order to point out difficulties faced by school teachers, students and parents. Scenarios will be drafted according to identified difficulties and solutions will be considered for each of them. The plan will compile related activities and needed resources for each solution and key persons will be identified to endorse roles and responsibilities. At the end, the different phases will be scheduled from plan activation to action implementation.

Once the School Preparedness Plan is completed, it will be presented to the entire community and township authorities, Education Officer in order to achieve a widespread understanding. The plan's key persons will be also presented to community leaders and members. This phase is necessary to bring reassurance to parents that when a disaster occurs, the school will respond appropriately. The final document will be laminated to make it waterproof.

Risk Education Sessions for Students by Teachers; The aim of this activity is to increase students' awareness level regarding potential hazards inherent to their environment. The interest here is to act on students' risk culture and advance mentalities and behaviors within vulnerable communities. Students constitute a linkage between institutions and parents but also actual and future Generations.

The objective here is to permit them to teach students with appropriate knowledge. In the case that the teachers need more assistance to manage this activity, they can request extra support from the Risk Education Officer, Trainers and RCVs.

The DRR games developed or adapted by the DRR programme will be used as awareness and education materials. The goal here is to achieve a good pedagogical level according to students' understanding and capacities.

First Aid Training or Refresher Courses for Headmasters and Teachers: In areas at risk, different problems are exposed when a disaster occurs. Regarding this situation, it is of prime importance to diversify first aid skills within vulnerable communities. In this respect, having skilled persons in basic first aid is very important.

The training will principally target headmasters and teachers living within the targeted communities. Disasters can happen any time and people can also face injuries at any period thus, the objective is to maintain the knowledge within targeted vulnerable communities.

The BFA training facilities will be organized by the Risk Education Officer, Trainer and RCVs. MRCS, BFA Instructors from Headquarter will train targeted Townships Branches instructors. Thus, the training of headmasters and teachers on BFA will be conducted by MRCS Townships' instructors. Township and village authorities will be informed and approval will be requested from them.

Realization of a Simulation Drill for Each Targeted School by the School Committee members: The goal is to make all school level stakeholders familiar with the school Safety Plan. Besides, the simulation drill will also permit the identification of malfunctions and gaps within the plan. Thus identified difficulties can be revised in order to find appropriate processes. After the simulation drill organized during the DRR Programme, regular simulation drills will be needed to keep the plan on track and to improve it.

Donation of First Aid Kit and IEC DRR Material's for Each Targeted School: This materials donation intends to equip targeted schools with tools permitting them to put vested knowledge and skills in practice. Alert material (radios and megaphones) will be also donated to targeted schools. Thus, donated materials will facilitate the continuity of the DRR Programme's activities after the closure of the programme.

Emergency kits for school safety are donated 16 schools in targeted area in Pauktaw Township as radios with battery, megaphone, siren, whistles, torch light with battery, metallic boxes.

3.7 Myanmar Action Plan on Disaster Risk Reduction (MAPDRR) components and Disaster Risk Reduction projects (2009-2015)

3.7.1 Goals and Objectives

The Goal of MAPDRR is ‘To make Myanmar Safer and more Resilient against Natural Hazards, thus Protecting Lives, Livelihood and Developmental Gains’.

In order to achieve the Goal, the objectives of MAPDRR are as follows:

1. To build a more resilient and safer community through conceptualization, development and implementation of appropriate disaster risk reduction programs and culture of safety;
2. To provide a framework for implementing Myanmar’s DRR commitments at the global and regional levels, under HFA and AADMER;
3. To provide a mechanism where the disaster risk reduction initiatives of all Government Ministries and Departments, supported by UN organizations and other stakeholders, can be coordinated and monitored;
4. To provide a conducive environment for mainstreaming DRR into development plans, and programs at the National, State, Region, Township, and Village Tract levels; and
5. To support mutually beneficial partnerships between the Myanmar Government and their development cooperation partners in DRR programs.

3.7.2 Overview of MAPDRR Components

The MAPDRR has 7 components, which align with the five Hyogo Framework for Action (HFA) Priorities and with the Articles of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER). Each component has 4 to 13 subcomponents/ projects and in total 64 priority projects have been identified. Details are at Table 3.1.

Table (3.1) Component-wise numbers of projects and its linkage to HFA &AADMER

Sr.	Component	HFA Priorities	AADMER	No. of Projects
1	Component 1: Policy, Institutional arrangements and further institutional development	Priority 1	Article 6, 10	4
2	Component 2: Hazard, vulnerability and risk assessment	Priority 2	Article 5	8
3	Component 3: Multi-hazard Early Warning Systems	Priority 2	Article 7	10
4	Component 4: Preparedness and Response Programs at National, State/Region, District & Township levels	Priority 5	Article 6, 8	9
5	Component 5: Mainstreaming of Disaster Risk Reduction into Development	Priority 4	Article 6	13
6	Component 6: Community based Disaster Preparedness and Risk Reduction	Cross-cutting	Article 6, 7	9
7	Component 7: Public Awareness, Education and Training	Priority 3	Article 6, 7	11

Source: Relief and Resettlement Department, 2009

3.7.3 List of Disaster Risk Reduction Components and Sub-Components/ Project

Component 1: Policy, Institutional arrangements and further institutional development

In accordance with guideline of the National Disaster Preparedness Central Committee, each Ministry issues instructions to its departments for the preparation of natural disaster management plans. In order to promote greater and more effective undertakings of disaster risk reduction initiatives, complementary policies, guidelines and institutional arrangements will be developed under this component. All the Sub-Components target primarily at enhancing the capacities of existing institutions and to lay the foundation for future undertaking. The sub-components are 1) Development of

National Disaster Management Law, 2)Enhancement of Disaster Risk Reduction Mandates of Ministries and Departments, 3)Implementation of Standing Order and 4)Strengthening and Capacity Building of Disaster Management Focal Points in each Ministry and Region/State, District, Township Disaster Preparedness Committees.

Component 2: Hazard, vulnerability and risk assessment

Any effective disaster management planning including preparedness and mitigation require specific information on hazard, the underlying vulnerability and the associated risks in relation to communities, infrastructure, livelihood, etc. The component aims to prepare hazard specific risk maps, using latest scientific methodology for whole country at various levels. The nine common natural hazards of Myanmar namely cyclone, drought, earthquake, fire, flood, forest fire, landslide, storm surge and tsunami will be prioritized. The planned sub-components are 1) Vulnerability and Risk Assessment at various levels, 2) Hazard and Vulnerability Atlas of Myanmar, 3)Landslide Hazard Zonation Map, 4)Flood Risk Map, 5)Drought Prone Area Map, 5)Cyclone and Storm Surge Map, 6)Seismic Zonation of Myanmar and 7)Wider usage of Fire Hazard Zonation Map.

Component 3: Multi-hazard Early Warning Systems

The objective of setting up an early warning system is to alert the population under threat in time so that they can take timely protective actions. For successful establishment of an early warning system in Myanmar, proper arrangements need to be made at national and sub-national levels down to grass-root level not just in transmission of warnings but also in capturing the timely hazard information. The subcomponents proposed here are designed in such a way as to augment the monitoring and warning capacities and the multi-layer information dissemination system through extension and improvement of the existing systems. The planned sub-components are 1)Upgrading of Existing Early Warning Center, 2)Multi-hazard end-to-end warning dissemination system, 3)Improved Metrological Observation and Forecasting, 4)Enhanced Flood Monitoring and Forecasting Capacities at Township level, 5)Landslide Study and Monitoring, 6)Drought Study and Monitoring, 7)Cyclone Tracking and Storm Surge Forecasts, 8)Seismic Monitoring, 9)Oceanic and Tsunami Monitoring System and 10)Oceanic and Tsunami Monitoring System.

Component 4: Preparedness and Response Programs at National, State/Region, District & Township levels

The preparedness activities are usually undertaken to ensure setting up of necessary arrangements, policies, equipment and training in order to deliver efficient response and relief. Under this component, the preparedness and response interventions recommended range from national level initiatives to community level activities, tackling such issues as preparing for response and building the capacities of response service providers with shared resources from government and non-government agencies. The proposed sub-components will take advantage of the existing systems and arrangements and the ongoing programs and projects. The planned sub-components are 1)Multi-hazard Preparedness and Response Plan for Quick deployment of Resources, 2)Multi-hazard Response Plan for Region/State, District and Township, 3)Emergency Operation Center, 4)Strengthening Emergency Support Functions, 5)Review and expansion of Rapid Response Team, 6)Cyclone Contingency Program for Delta and Coastal Region, 7)Provision of Safe Shelter, 8)Development of School Disaster Preparedness Program and 9)Preparedness and response program for psychosocial impacts, epidemic and disease control in the aftermath of natural disasters.

Component 5: Mainstreaming of Disaster Risk Reduction into Development

The development interventions do not necessarily reduce risk to natural hazards, but unintentionally it can create new risk or augment the existing ones. In the event of disasters, not only additional resources are used for recovery but the developmental gains lost. The identified sub-components envisage to encompass DRR into housing, infrastructure, education, health, land-use planning, agriculture, urban planning and over and above in project appraisal process. This component calls for strong linkages with ongoing development projects such as Dry Zone Greening, etc. The planned sub-components are 1)Updating and Enforcement of Development Committee Law, City Municipal Acts and Building By-laws and Codes of Practices, 2)National Land Use and Physical Planning Policy, 3)Sustainable Coastal Development to Protect Against Natural Disaster, 4)Landslide Mitigation in Risk prone Areas, 5)Integration of Disaster Risk Reduction in Housing Sector, 6)Integration of Disaster Risk Reduction in School and Health Facilities, 7)Integration of Disaster Risk Reduction in Infrastructure Facilities, 8)Sustainable Development in

Dry zone area to Protect/Mitigate Against Drought, 9)Flood Mitigation Plan for Agricultural Sector, 10)Urban Earthquake Vulnerability Reduction Program, 11)Risk Transfer and Sharing Mechanism, 12)Introducing Disaster Impact Assessment (DIA) as part of the Planning and approval Process of Development Programs and 13)Promoting Sustainable Development in the Mountainous Areas.

Component 6: Community based Disaster Preparedness and Risk Reduction

Communities are not only first responders to disasters but also understand local hazards and resources, and are in the best position to execute immediate rescue and relief actions, hence a well-prepared community is of pivotal importance in Disaster Risk Reduction. A comprehensive community based disaster preparedness and risk reduction approach is required. This component aims to create an enabling CBDRR framework as well as identify community level disaster preparedness and risk reduction activities. The planned sub-components are 1)National Policy on Development of Community Based Disaster Risk Reduction, 2)National Program on Community based Disaster Risk Reduction, 3)Promoting Community based Disaster Risk Reduction Volunteerism, 4)Establishing Community based Disaster Risk Reduction Resources Centers, 5)Preparedness and Mitigation through Small Grants Program, 6)Micro Finance Schemes, 7)Integration of Community based Disaster Risk Reduction into Community Development Projects, 8)Development and implementation of Community based Natural Resource Management Programs and 9)Documentation of Community Based Disaster Risk Reduction Good Practices.

Component 7: Public Awareness, Education and Training

Public awareness on Disaster Management is important as simple Do's and Don'ts of disaster can save many lives during disaster. It is important that the content of awareness message should be consistent, lucid and context specific and it should be conducted at regular intervals so that the knowledge is kept alive in the community to pass on from generation to generation and ensure that the disaster risk reduction become an integral part of the culture and everyday life of the community. The subcomponents aim to deepen and inspire greater interest in disaster innovative interventions and anchor the principles that strengthen the DRR commitment. The planned sub-components are 1)Awareness through Disaster Safety Day, 2)National Public Awareness Program, 3)Awareness through School and School Curriculum,

4)Awareness through University Curriculum, 5)Expansion Plan for Disaster Management Training, 6)Training for Emergency Preparedness and Response at Township Level, 7)Enhancing Training Capacities, 8)Special Awareness Program, 9)Establishment of Disaster Management Training School, 10)Research and Development in Disaster Risk Reduction and 11)Regional Networking and Knowledge Sharing on Disaster Risk Reduction.

CHAPTER 4

SURVEY ANALYSIS

The Asia Pacific region is also the most disaster-prone and vulnerable region in the world. Climate change adds to the risk, and is highly likely to increase the frequency and severity of weather-related hazards, which accounted for over 76 percent of natural disaster over the last two decades. In any disaster situations the community is the first responder and the first few hours it is the community who responds to any eventualities through their existing coping mechanisms. Thus it is important that the Community Based Disaster Preparedness (CBDP) is the core and key of any Disaster Risk Reduction initiatives taken up at any level by any organizations or individuals. As the community is well informed and acquainted about the local geo-physical locations, safe evacuation routes, existing strengths and weakness within itself, thus the entire initiatives of DRR revolves around effective community response and preparedness measures. It can only be possible through full participation and contribution of the community in the decision-making process and leading in this initiative to achieve the real objective of the community based preparedness and effective response.

Thus there is a strong need to build the community resilience to various disasters and build their capacities and provide them technical knowhow in order to effectively respond to any disaster in a more scientific and organized manner. This can only be achieved through community based risk assessments, resource mapping and development of disaster preparedness and response plans through consultative process and identifying the key strengths and resources within the community.

4.1 Survey Profile

Rakhine State borders the People Republic of Bangladesh and Chin State in the North-West, Magway and Bago Region in the East, Ayerwaddy Region in the South-East and the Bay of Bengal in the West. Sittwe is the capital of Rakhine State. The socio-economic importance of Rakhine increased during the last years as a result

of the ongoing development efforts in parts of the area. Tourism is slowly developing in two areas of the state, and in addition, the continuous expansion of offshore gas and oil rigs and the planning of a new deep sea harbor in Sittwe indicate the economic potential of Rakhine state. It needs to be assumed, that only few areas benefit from these developments as an enduring humanitarian crisis with limited options for development remains the status quo in most of the townships.

The climate in Rakhine is tropical-monsoon with one of the highest average rainfalls worldwide (2006: 5734 mm). Areas along the numerous rivers are regularly flooded during rainy season, while remoter areas face significant water shortages during dry season. Rakhine, Chin, Bamar and other ethnic groups settle in Rakhine State. Dominant religions are Buddhism and Islam with a small Christian minority.

4.1.1 Pauktaw Township Profile

Pauktaw Township is located Minbya township in East, Sittwe and Ponnagyun townships in West, Bay of Bengal in South and Mrauk-U township in North. The area is 928 sq-miles and population density is 157.3 persons per sq-km. The township general administration department profile 2017 stated that the population size is 187,000. It has 5 wards in urban and 177 villages in 53 village tracts at rural area. It has 1 Station Hospital, 1 Township Hospital, 7 RHC, 35 RsHC. It has 152 Primary Schools, 7 Middle School and 5 High School. The population in this township is heavily dependent on agriculture. People are either working as farmers directly or make a living as workers in the agricultural sector.

4.1.2 Situation of Disaster Risk Reduction in Pauktaw Townships (2005)

Systematic early warning systems do not exist in the region. As many villages are very remote a warning only reaches them some hours if not days later, due to a lack of means of communication and other infrastructure (e.g. electricity, access routes, boats). If at all, disaster warnings spread in form of rumours in the region. Frequent misinformation leads to the fact that warnings over this mechanism are rarely taken seriously. In this regard competent contact persons are missing.

Systematic emergency plans are not developed. Information about safety zones in an emergency or possible places for first aid lack completely or the respective facility doesn't exist. Decentralised action plans are neither formulated nor established. Thus the Myanmar Red Cross did train volunteers as replicators on

village level, but they did not get in contact with the village community concerning disaster preparedness. Moreover there MRC volunteers are not in every village. Muslim village communities and population groups are completely ignored and depend on the aid of international NGOs. In practice the people are not prepared for natural disaster or sensitized for possible options of action in case of disaster.

The families live in bamboo huts. Partly those don't even resist to cyclones of the lowest category. Rising tide levels moreover lead to an increased flood susceptibility of the bamboo huts, which are mostly built on stilts. In the coastal region of Bangladesh shelters were built in the course of the years for those that couldn't protect themselves in their homes from cyclones. Statistics show a drastically decrease of victims of natural disaster in the vulnerable coastal and delta regions. Programmes for the improvement of the homes of vulnerable population groups in Myanmar do not exist and are not approved from the government.

Furthermore no shelters are built in Rakhine State (the border area to Bangladesh). With very short early warning periods hundreds if not thousands are helplessly exposed to disaster in their homes. Regarding the protection from flood waters, the few dams dating from the colonial times are not apt to save the population from a flood disaster. The continuing destruction of mangrove forests for socio-economic reasons adds to a continuously decreasing protecting from flooding.

A system of trained first aiders practically doesn't exist in the target area, in spite of the efforts of MRC. Also another sufficiently operational basic health care doesn't exist in the target area as health posts and health centres, as well as hospitals in the target area cannot ensure the replenishment with medical equipment, consumables even in the normal case.

The MRC (with support from the IFRC) built a central camp with medication and medical consumables in Sittwe after the cyclone 2004. But there available amounts are insufficient for a major disaster. Moreover neither the MRC nor the local health authorities have the financial and technical potential to keep those camps ready for operation in the long term.

In addition there is a lack of basic sanitary facilities and of sufficient storage capacities for safe drinking water, leading to the risk those communicable diseases after a disaster cost many lives. This counts even more as the target group doesn't have the necessary knowledge to avoid diseases (not only in case of disaster). The high, above-average threat and vulnerability of the population in the target region lead

to a considerable disaster risk. The lacking capacities, institutions and mechanism for disaster prevention raise the risk drastically. The proposed project starts at this point. Decentralized and target-oriented measures for disaster preparedness shall reduce the disaster risk.

4.1.3 Overview of Project

In early 2010, Malteser International (MI) began addressing these issues, aiming to enhance the disaster preparedness of communities and to promote adaptation to climate change.

Activities included the formation of disaster risk management committees, enhanced early warning and evacuation systems, promotion of household preparedness, small-scale mitigation projects and mangrove afforestation, amongst others.

The Project “Strengthening of DRR capacity and community-based management of the mangrove forest ecosystem for adaption to climate change in high-risk areas of Rakhine state, Myanmar” was implemented by Malteser International and its partner Community Empowerment and Resilience Association (CERA) and covered 66 disaster-prone coastal villages across five townships in Rakhine State, Myanmar.

The project aimed to develop a replicable and community-based model in order to strengthen local capacities for climate change adaption. It included the development of disaster preparedness plans and of early warning systems (EWS), and integrated for improved coastal protection.

In each location, the process of community engagement started with a hazard, vulnerability and capacity assessment (HVCA). This served as a basis for planning of small-scale mitigation measures such as jetties, retaining wall and footpaths.

Mangrove afforestation was a key activity, mangrove forest serve to reduce the exposure to storm surges and strong winds on coastal communities. Local Committees and Sub-committees maintain mangroves and alert villagers on upcoming storms and other hazards.

Table (4.1) Village lists of the selected area in Pauktaw Township

Sr.	Village Tract	HH	Male	Female	Total Population
1	Hin Kha Yaw	334	790	852	1,642
2	Kyein Kha Maw Chaung Wa	80	151	185	336
3	La Pan Pyar	490	1,240	1,320	2,560
4	Ma Naw Thi Ri	180	464	469	933
5	Nga khu Chaung	170	442	558	1,000
6	Nga Pray Kyun	120	362	356	718
7	Nga Wa Swe	350	1,000	1,300	2,300
8	Ngwe Twin Dway	460	1,055	1,051	2,106
9	Pray Tha Kyun	80	248	253	501
10	Sa Kay Chaaung	126	379	401	780
11	Sar Pyin	320	815	970	1,785
12	Ta Laing Chaung	100	277	271	548
13	Taung Fu	297	757	815	1,572
14	Tha Yet	200	520	775	1,295
15	Tha Yet Taw	407	1,254	1,238	2,492
16	Zay Ya Wadi	90	300	385	685
Total		3,804	10,054	11,199	21,253

Source: Malteser International (2010-2014)

4.2 Survey Design

For the quantitative study, 5 villages (one third of the project area) were randomly selected as the population. The sample design was two stages simple random sampling method. The sample size for each 100 person in a village, 5 person from different household would be selected and interview. The selection of respondents in each village was carried out non-scientific manner; however it was ensured that there was equal representation between women and men. After calculation, the total number of 322 respondents would select for this survey and this constitute 5% of the total population.

The questionnaire was developed to cover household and community level disaster preparedness, as well as aspects of community engagement and feedback. The questions were added on change and attribution (i.e whether certain conditions had changed over time, and to what extent the project had contributed to that change). The questionnaire is available at Appendix A.

Table: (4.2) Populations and Samples Size of Target Villages

Village	Number of Households	Population	Sample Size (5% of population)	Percentage
Ma Naw Thi Ri	180	933	47	14.6
Nga Pray Kyun	120	718	36	11.2
Pray Tha Kyun	80	501	25	7.8
Sar Pyin	320	1,785	89	27.6
Tha Yet Taw	407	2,492	125	38.8
Total	1,107	6,429	322	100

Source: Survey Data (November, 2018)

4.3 Survey Result

Survey results included the components on profiles of respondents, community knowledge and awareness on hazard exposure and change, household level preparedness, community level preparedness, community engagement and feedback.

4.3.1 Profiles of Respondents

With regard to gender, the respondents were nearly equally divided between Female and Male. Out of a total of 322 interviewed, 162 were Male (50.3%) and 160 were Female (49.7%).

Respondents from all age group were covered under the study as to understand knowledge of DRR across a cross-section of the population. Young people learn about DRR from various sources while older age group understands DRR from their experiences. All 322 respondents, a majority were from 17-60 age groups (84.8%), while older persons (above 60 years) constituted nearly 6% of the total.

A majority of the respondents came from a family size of less than and equal to five members. The most common size was 4 and 5. At this point, big families need to prepare and discuss more for disaster in terms of family level preparedness and restoring family link, including the identification of the points/ places where to meet family members after hazard hit.

Table (4.3) Characteristics of the Respondents

Gender	Number of Respondent	Percentage
Male	162	50.3
Female	160	49.7
Total	322	100
Age Group	Number of Respondent	Percentage
<10 years	4	1.2
11-16 years	26	8.1
17-25 years	40	12.4
26-40 years	131	40.7
41-60 years	102	31.7
>60 years	19	5.9
Total	322	100
Family Size	Number of Respondent	Percentage
Less than equal to 5	204	63.4
More than 5	118	36.6
Total	322	100
Education	Number of Respondent	Percentage
Has not attended	28	8.7
Primary School	102	31.7
Middle School	106	32.9
Secondary School	43	13.4
College	31	9.6
Others	12	3.7
Total	322	100
Occupation	Number of Respondent	Percentage
Daily Wage Labour	33	10.2
Farmer	127	39.4
Fisher-folk	9	2.8
Livestock	4	1.2
Own Business Shop	46	14.3
Job (Government)	16	5.0
Job (Private)	4	1.2
Job-NGOs	38	11.8
Unemployed	35	10.9
Others	10	3.1
Total	322	100

Source: Survey Data (November, 2018)

The survey has showed that 28 respondents (8.7%) had not attended school and more importantly, women were found to constitute this majority (6.9% women and 1.8% men). More women had not received or attended schools or received any form of formal education.

Regarding the occupation of respondent, 75.8% can earn money in which about 39.4% are farmers, 14.3% work their own business, 11.8% work for employee at NGOS, government staffs involves only 5% and 2.8% works for fishery. Among respondents, 14% cannot earn income such as the unemployed, students, dependents, housewives and retired people, and 10.2% are wages labours who depend on their daily wages. Generally, people who cannot earn money and daily workers are more vulnerable to disasters than people with regular income. Table (4.9) represents the also respondent's occupation by number of respondent and percentage.

Given the geography of the township, a majority of the respondents were farmers, amongst both men and women. In most cases, women supported their husbands in farming as well as in fishing. There were more women unemployed with 25 respondents as compared to 12 men. Women could be seen as more in business than man that the women owned and ran small shops as compared to men.

4.3.2 Hazard Exposure and Change

The considerable level of hazard exposure amongst respondents indicates 59% had been badly affected by a hazard prior to 2010 when the project started.

Most respondents experienced damages and losses related to their houses (88.2%) and house contents (65.2%). More than one-third encountered the loss of livestock (41.0%) and damages to their fields and harvests (37.3%). By comparison, only very few respondents were affected by injuries or deaths as a result of the hazard (1.6%).

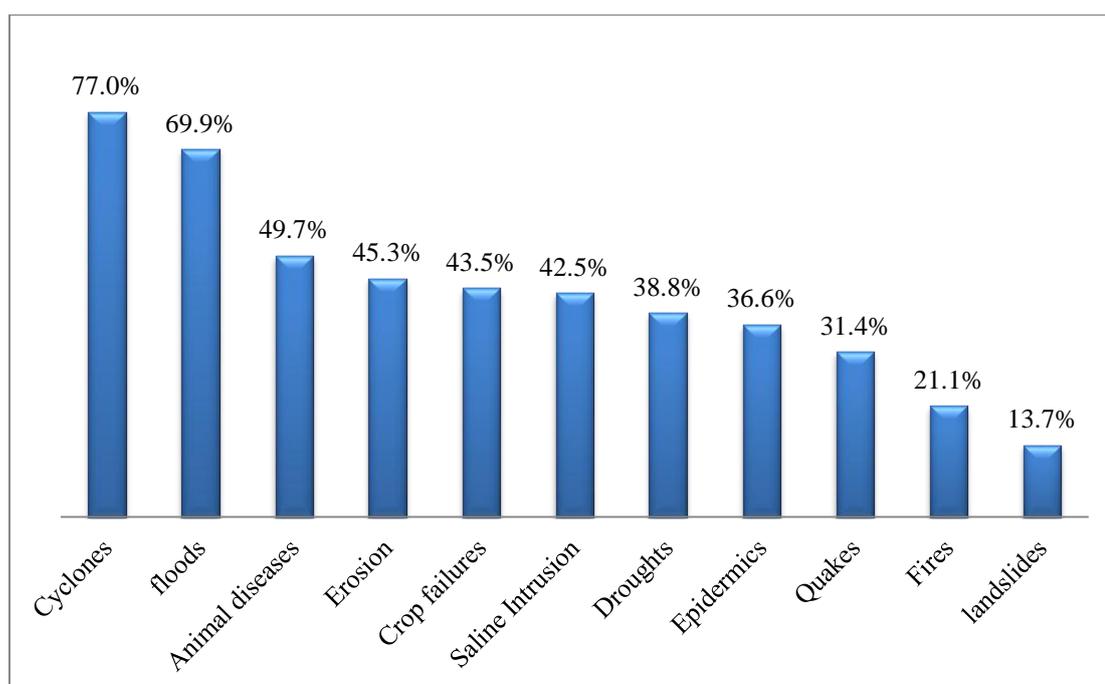
Asked to estimate the variation of damages and losses if the same hazard struck now, more than two-thirds (67.1%) say that losses would be lower - citing mainly better early warning systems, greater household-level preparedness, and improvements in the way communities generally prepared for disasters. Meanwhile, 23.3% said that losses would be higher - mainly because there was now more to lose, given economic development over recent years.

Table (4.4) Respondents' answers to Hazard Exposure and Change

Household has been badly affected by hazard in the before time 2010	Number of Respondent	Percentage
Yes	190	59.0
No	132	41.0
Total	322	100
The damage and losses that had affected by most severe incident	Number of Respondent	Percentage
House	284	88.2
House contents	210	65.2
Livestock	132	41.0
Fields	120	37.3
Assets	60	18.6
Other	30	9.3
Injuries	5	1.6
The level of damages and losses from the past event, if the same hazard event happened again	Number of Respondent	Percentage
Losses would now be lower	216	67.1
Losses would now be the same	14	4.3
Losses would now be higher	75	23.3
I don't know	17	5.3
Total	322	100
The reason of losses be higher	Number of Respondent	Percentage
More to lose	268	83.2
Other factors	66	20.5
Less prepared	44	13.7
I don't know	8	2.5
The reason of losses be lower	Number of Respondent	Percentage
Better early warning	240	74.5
HH better prepared	210	65.2
Community better prepared	144	44.7
Less to lose	40	12.4
Other factors	32	9.9
Less exposed to hazard	10	3.1

Source: Survey Data (November, 2018)

Figure (4.1) Type of Natural Hazards affected to the area



Source: Survey Data (November, 2018)

Asked about the type of hazard that had affected them most severely, 77% listed cyclones and 69.9% floods. In terms of current hazards that are seen as a risk to communities, cyclones and floods remain the key concerns. The analysis shows strong exposure to agriculture-related hazards such as animal diseases, erosion, crop failures and insect infestations, saline intrusion, and droughts. Earthquakes and epidemics are seen lesser concerns; fires and landslides are seen as the lowest risk.

4.3.3 Household Level Disaster Preparedness

The project is seen as effective in promoting advances in household preparedness: almost all respondents (94.1%) say that they adopted preparedness measures over the past ten years. Asked about the type of measures they adopted, respondents mainly referred to actions they took in the lead-up to hazard events, rather than permanent improvements. These included house reinforcements, securing valuable assets, evacuations (‘moving to a safer place’), and the preparation of supplies. Few people adjusted their livelihoods, saved money as buffers, or took other measures. Adoption of household preparedness measures increased considerably. Almost all respondents say they took measures either fully or partially due to the project (97.5%)

Table (4.5) Respondents' answers to household level disaster preparedness

Household better prepared by respondent for disaster than over the past ten years	Number of Respondent	Percentage
Yes	303	94.1
No	19	5.9
Total	322	100
Type of measures adopted by respondent	Number of Respondent	Percentage
Reinforce house	278	86.3
Secured valuable items	224	69.6
Moved to safer place	176	54.7
Prepared supplies	135	41.9
Prepared safer livelihood	40	12.4
Saved money	24	7.5
Other measures	28	8.7
The reason adopted the measures by respondent	Number of Respondent	Percentage
Factors solely related to the project	162	50.3
Factors partially related to the project	152	47.2
Factors not related to the project	8	2.5
The level of household preparedness for disaster	Number of Respondent	Percentage
Very Prepared	130	40.4
Rather prepared	177	55.0
Rather unprepared	15	4.6
Very unprepared	0	0.0
I don't know	0	0.0
Change of household preparedness has developed over the past ten years	Number of Respondent	Percentage
Improved	300	93.2
Unchanged	22	6.8
Declined	0	0.0
I don't know	0	0.0
The role of the project played in this change	Number of Respondent	Percentage
Sole role	140	43.4
Main role	132	41.0
Minor role	45	14.0
Not role	0	0.0
I don't know	5	1.6

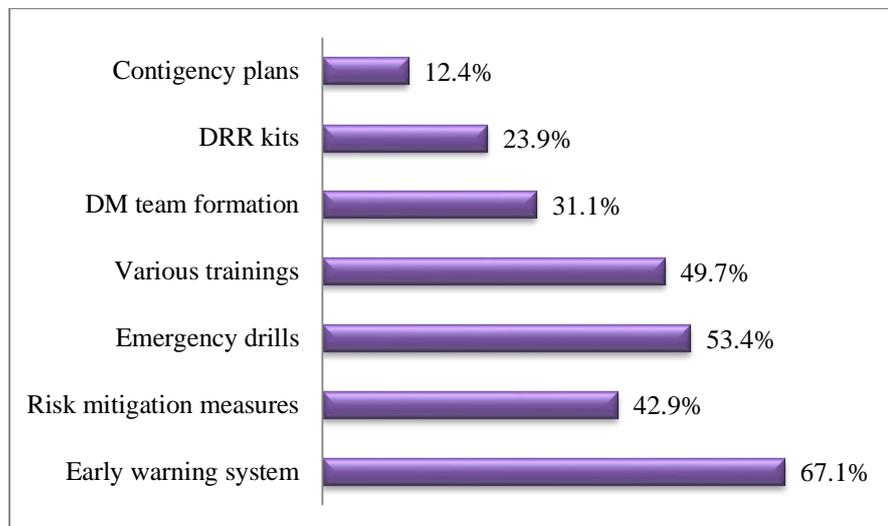
Source: Survey Data (November, 2018)

Most households now feel very prepared (40.4%) or rather prepared (55.0%) for disasters. Almost all (93.2%) see their level of preparedness improved compared to ten years ago. The respondents who see their level of preparedness improved attribute this change completely (43.4%) or mainly (41.0%) to the project.

4.3.4 Community Level Preparedness

Almost all respondents are aware of the Malteser project (97.8%), and many could list key project activities, such as the improvement of the early warning system (67.1%), risk mitigation measures (42.9%) and emergency drills (53.4%). People were less familiar with the disaster management committees, DRR kits, and contingency plans. Meanwhile, almost all respondents (97.8%) said they were aware of communal climate change adaption plan.

Figure (4.2) The key project activities aware by respondents



Source: Survey Data (November, 2018)

Table (4.6) Community level preparedness and role of Project

Knowledge of respondent that have been any activities over the past ten years to improve the way the community prepares itself for disaster risks	Number of Respondent	Percentage
Yes	315	97.8
No	7	2.2
Total	322	100
Awareness of respondent in a climate change adaptation plan in the community	Number of Respondent	Percentage
Yes	300	93.2
No	22	6.8
Total	322	100
Community's level of disaster preparedness	Number of Respondent	Percentage
Very Prepared	130	40.4
Rather prepared	182	56.5
Rather unprepared	3	0.9
Very unprepared	0	0.0
I don't know	7	2.2
Change of community level of preparedness developed over the past five years	Number of Respondent	Percentage
Improved	316	98.1
Unchanged	4	1.2
Declined	0	0.0
I don't know	2	0.6
Total	322	100
The role of the project played in this change	Number of Respondent	Percentage
Sole role	157	48.8
Main role	132	41.0
Minor role	33	10.2
Not role	0	0.0
I don't know	0	0.0
Total	322	100

Source: Survey Data (November, 2018)

Nearly all respondents (96.9%) see their communities 'very' (40.4%) and 'rather' (56.5%) prepared for disasters. And almost all (98.1%) see their community's level of preparedness improved. The respondents who see the level of preparedness improved attribute this change completely (48.8%) or mainly (41.0%) to the project.

Table (4.7) Community level preparedness and actions on the community evacuation planning

Early warning system in respondent's village	Number of Respondent	Percentage
Yes	310	96.3
No	12	3.7
Total	322	100
The community evacuation plan	Number of Respondent	Percentage
Yes	322	100.0
No	0	0.0
Total	322	100

Source: Survey Data (November, 2018)

Knowledge of early warning systems (96.3%) and evacuation plans (100.0%) is as good as it gets. Regarding risk mitigation, knowledge of project supported measures is universal, and all respondents say that they benefited from these measures: 88.2% recognize direct benefits (those that materialize in everyday life), and 41.0% see protective measures.

Table (4.8) Community level preparedness and actions on climate change adaptation plan, mangrove afforestation

Awareness of mangrove afforestation activities in the community	Number of Respondent	Percentage
Yes	280	87.0
No	42	13.0
Total	322	100
Participation in mangrove planting and/or maintenance	Number of Respondent	Percentage
Yes	121	37.6
No	201	62.4
Total	322	100
The benefits of mangrove afforestation	Number of Respondent	Percentage
Protects storm surges	310	96.3
Prevents erosion	224	69.6
Increases aquamarine life	60	18.6
Absorbs greenhouse gases	64	19.9
Other	40	12.4
Management and regulations of the use of natural resources by the committee	Number of Respondent	Percentage
Yes	250	77.6
No	72	22.4
Total	322	100
The statements applies best to the community, in terms of the use of natural resources	Number of Respondent	Percentage
Rules, enforced	141	43.8
Rules, not enforced	72	22.4
No rules exist	81	25.2
I don't know	28	8.7
Total	322	100
The community level/quality of natural resources to rely on with the current usage patterns of natural resources in five year time	Number of Respondent	Percentage
Yes, certainly	120	37.3
Yes, likely	62	19.2
No, unlikely	55	17.1
No, certainly not	60	18.6
I don't know	25	7.8
Total	322	100

Source: Survey Data (November, 2018)

A particular aspect in terms of mitigation concerned mangrove afforestation (87.3%) of respondents are aware of this activity and more than one-third (37.6%) participated in planting or maintenance.

Knowledge of protective benefits of mangrove forests is high; benefits in terms of improved aquamarine life and greenhouse gas absorption is less well-known.

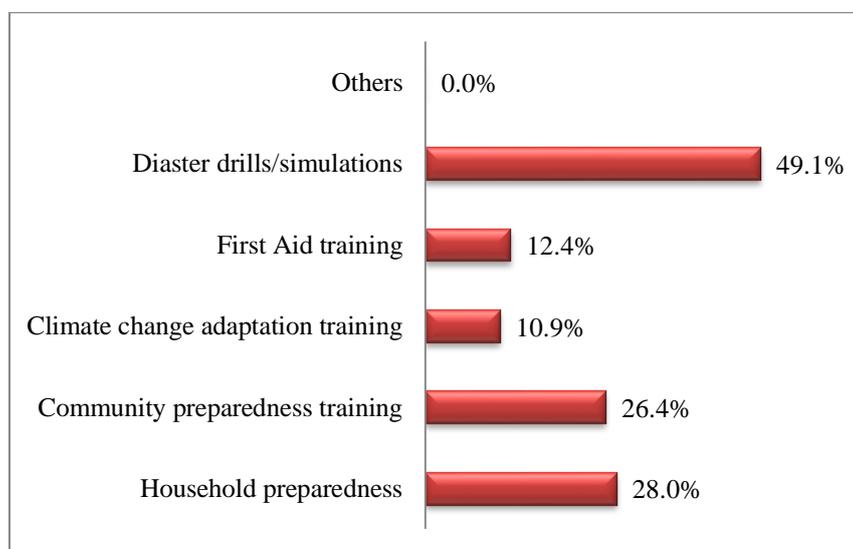
Mangroves are also the link to wider natural resource management. Three-quarters (77.6%) say their community has a committee that regulates the use of natural resources. Two-thirds (66.2%) say that rules on the use of natural resources exist - overall, almost half (43.8%) think that such rules are actually enforced.

Regarding the perceived sustainability of natural resources (based on current patterns), 35.7% thinking that it is rather unlikely that the current level of resource management may be required. Please see table (4.9).

4.3.5 Community Engagement and Feedback

Generally the project was well known by 99.1% of respondents and 61.2% of respondents were engaged in some of the project activities. Most notably, almost half (49.1%) took part in an emergency drills/simulation exercise. 215 respondents (66.8%) knew how to raise concerns related to the project (if they have any). In almost all cases, these concerns were addressed to respondents' satisfaction.

Figure (4.3) The activities taken part by respondent



Source: Survey Data (November, 2018)

Table (4.9) Respondents' engagement and feedback on the activities of DRR

Awareness of activities by MI in the village	Number of Respondent	Percentage
Yes	319	99.1
No	3	0.9
Total	322	100
Participation of the activities	Number of Respondent	Percentage
Yes	197	61.2
No	125	38.8
Total	322	100
The knowledge of respondent, how to raise concerns related to the project activities	Number of Respondent	Percentage
Yes	215	66.8
No	107	33.2
Total	322	100
Sharing of concerns related to the project activities	Number of Respondent	Percentage
Yes	226	70.2
No	106	32.9
Total	332	103
Respondent's satisfaction related to the project activities	Number of Respondent	Percentage
Yes	315	97.8
No	7	2.2
Total	322	100

Source: Survey Data (November, 2018)

4.3.6 General Observations, Sustainability and Project Outcomes and Trust among Villagers

The final block of questions aimed to explore general feedback and elicit observations on sustainability of project outcomes.

Table (4.10) General Observation on project outcomes

The statements that agreed or disagreed by the respondent	Strongly agree	Rather agree	Neutral	Rather disagree	Strongly disagree	Mean
Improvement of overall situation of this village	142	167	10	3	0	1.61
Linkage of village to the government and other actors	64	242	13	3	0	1.86
People in the village work together more than you used to ten years ago	44	260	13	5	0	1.93
The engagement of MI project team with respondent in the assessment of capacities and needs	103	209	6	4	0	1.72

Source: Survey Data (November, 2018)

Respondents make very favorable general observations; almost all (strongly/rather) agree (a) that their village is better off than it was, (b) that it is better linked to external actors, (c) that villagers work together better than they did, and (d) that the project team engaged them in needs assessments.

Table (4.11) Sustainability on project outcomes

The statements that agreed or disagreed by the respondent	Strongly agree	Rather agree	Neutral	Rather disagree	Strongly disagree	Mean
Willingness to pursue practice and retain skills	142	167	10	3	0	1.61
Ability to pursue practice and skills	64	242	13	3	0	1.86
Willingness to maintain infrastructure	44	260	13	5	0	1.93
Ability to maintain infrastructure	103	209	6	4	0	1.72

Source: Survey Data (November, 2018)

Regarding the sustainability of project outcomes, respondents have similarly positive view, with most agreeing that they are willing and able to sustain both software- and hardware-related outcomes. Only in terms of the enabling environment

(i.e. whether communities know how to access external support), respondents are somewhat less certain.

Table (4.12) Trust among villagers

The statements that agreed or disagreed by the respondent		
Trust and support of people in the community	Number of Respondent	Percentage
Strongly agree	70	21.7
Rather agree	229	71.1
Neutral	23	7.2
Rather disagree	0	0.0
Strongly disagree	0	0.0
Total	322	100
The level of trust between people over the past ten years	Number of Respondent	Percentage
Has increased	292	90.7
Has stayed the same	26	8.1
has decreased	4	1.2
Total	322	100
The reason of change in trust	Number of Respondent	Percentage
Factors solely related to the project	150	46.6
Factors partially related to the project	169	52.5
Factors not related to the project	3	0.9
Total	322	100

Source: Survey Data (November, 2018)

Finally, levels of mutual trust are seen as high and according to 90.7% of respondents improved. Almost all attribute this improvement to the project.

CHAPTER 5

CONCLUSION

5.1 Findings

The project targeted extremely poor and disaster prone areas. All sampled villages lacked basic infrastructure. Although they had their own coping mechanisms to face storms and hazards before the project, these were not systematic. Communities faced significant losses and negative effects due to these recurrent events.

Rakhine State is highly prone to disasters. The survey shows that (59.0%) have been badly affected by hazards in the time up to 2010. Amongst those, almost all listed cyclones as the most severe hazard they had been affected by (96.0%), while a minority listed floods (4.0%). Damages and losses were considerable; 88.2% had their houses damaged or destroyed, 65.2% their house contents damaged, while 41.0% encountered losses to livestock and 37.3% to agricultural fields. Deaths and injuries were reported by 1.6% of respondents.

The project did well to design household preparedness into the intervention, as 88.2% indicated that houses were lost or damaged in previous disasters. The other two major issue identified was livelihoods losses, both livestock and damage to agricultural land. To some extent, this was addressed by the project with community members reporting that they safely stored paddy seeds, tied up fishing boats and protected fishing equipment, and moved livestock to higher ground in the preparation phases.

The project was effective in promoting advances in household preparedness. Overall adoption of household preparedness measures increased considerable. Almost all respondents say they took these measures either fully or partially due to the project. During the trend analysis, villagers reported that they now listen to early warning would prioritise and move vulnerable people first and would also move livestock, assets and important documents to safer place.

The qualitative study confirmed that sampled communities had sound early warning systems in place, and at least half of the original committee members were

still active. Simulations had been conducted effectively, and people knew evacuation procedures. Despite these impressive results, less than half the committees plan or conduct simulations without the project team support.

The objective of the project was to develop a community based, replicable model to strengthen local capacities for climate change adaption through the development of disaster preparedness plans and the introduction of early warning systems in combination with the reforestation of mangroves for improved coastal protection. The project linked disaster risk reduction with the conservation of ecosystem. Community capacities were to be built to protect their livelihood from the consequences of climate change and to prepare for potential extreme climate events and natural hazard.

Mangrove afforestation was a key element of the project to boost and conserve the eco-system and to protect coastal villages against storm surges, strong winds and erosion. The project planted the mangrove in targeted area. This element of the project was effective where the community was committed to the protection of the mangrove plants during the first three years of plantation. There were some fencing issues, and cattle destroyed several mangrove plantations. During the focus group discussion, one out of 5 villages where the mangrove plantations had failed, mainly due to the fencing and cattle eating the younger plants.

With the construction of small scale infrastructure, many access barriers for persons with disabilities were removed. Although this was not the primary aim of the infrastructure, it was an expected outcome. The construction of pathways and jetties assists in daily mobility through villages that would otherwise be muddy with uneven surfaces that can be big barriers for people with physical disabilities. It allows materials to be transported with trolleys and also provides ease of movement in times of storms or disaster.

Access barriers during emergency evacuations were addressed through the project. By prioritizing vulnerable people and designating the search and rescue team to help them move to evacuation centres, this contributed to improved access and inclusion.

The project commendably encouraged women's participation in village affairs and development. The project set an impressive target 50% female participation in committee task forces, which was achieved in all villages.

5.2 Recommendations

In terms of current hazards that are seen as a risk to communities, cyclones and floods remain the key concerns. The project chose to work in disaster risk reduction and climate change adaptation with some livelihood protection elements. This focus was extremely relevant.

The future project should continue to focus on disaster risk reduction and climate change adaptation. They are delivering to satisfactory standards in these fields. To further enhance relevance, it could include a wider assessment during the hazard, vulnerability and capacity assessments (HVCAs) at project inception. The assessment could consider at all sectors, not just the focus area.

This would garner information on the priority areas for communities. If there are priority issues in communities that the project team cannot assist with, they could provide links other actors to provide specialist input. This would increase resilience of the communities.

The community safely stored the paddy seeds, tied up fishing boats and protected fishing equipment, and moved livestock to higher ground. However, the more can be done to avoid livelihood losses through community rice banks, low interest loans for rice for vulnerable groups and protective measures like introducing flood resistant paddy or insurance for livestock and crops.

This area requires further refining to ensure communities conduct their own simulations independently and regularly.

The additional fund was needed for the mangrove when communities had to replace fencing each year (barbed wires rust in salt water) and patching was also required.

Although the communities displayed some awareness of the link between environmental conservation, planting trees link between environmental conservation, planting trees and extreme weather, much potential remains to deepen this understanding. All sampled communities in the qualitative study reported that they had no systemic waste disposal and dumped most of their waste into the river, including plastics. Since there is an environmental committee that looks after mangroves, it is a small step to give them more information about the environment conservation and how to further manage and protect their natural resources (water, forests, and marine life, etc.). This could begin with addressing community and household waste management system. School based disaster risk reduction could

teach students about conservation and pollution. Ultimately, the environment committee could be empowered with more responsibilities around managing natural resources in their surrounding areas.

The cook stoves are important to help reduce the cutting of trees for firewood. However, the study revealed many issues with this model that were too small for bigger families, not smoke free, disliked, and not used. Therefore, recommended that the project team test a number of different model eco-stoves with a small group of villages before rolling them out in communities, to see if people like them, use them and identify any barriers to using them. Look for smoke-free options and link them to the environmental committees.

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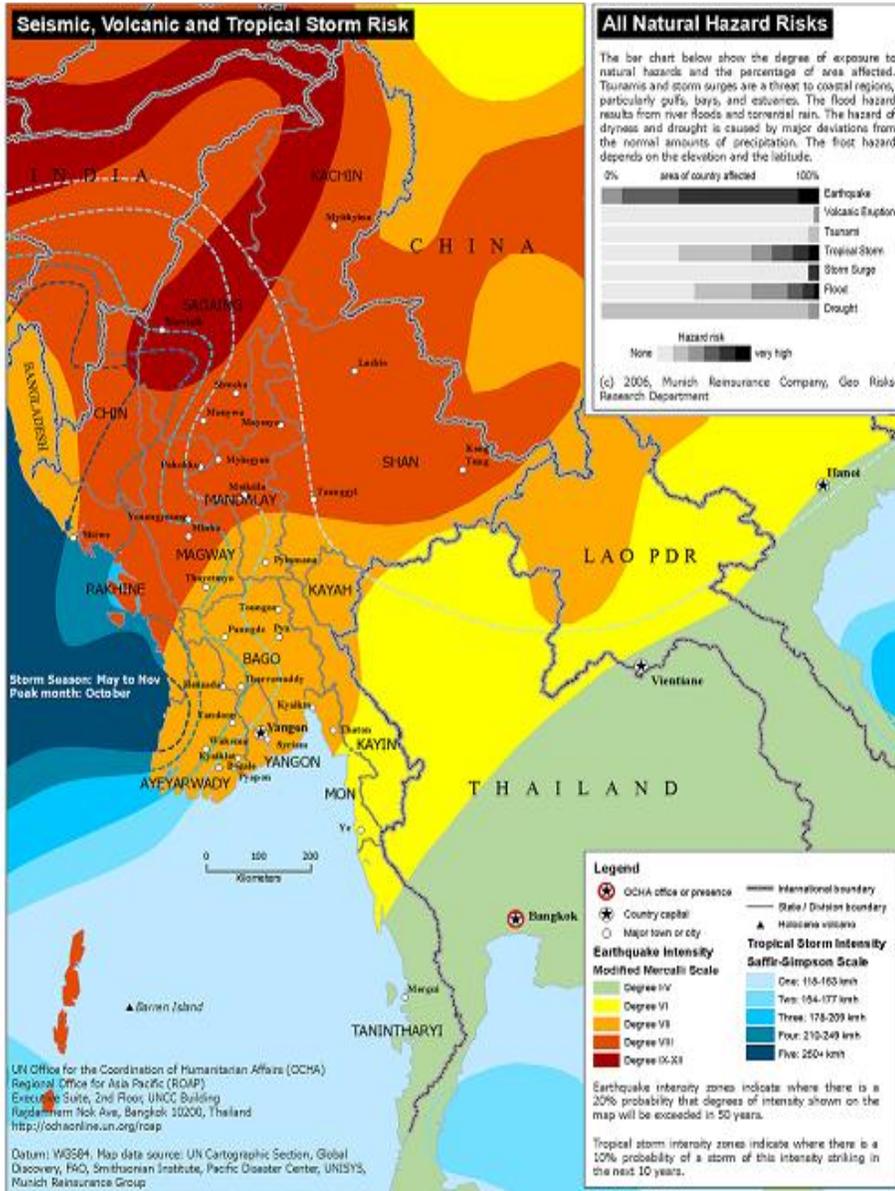
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Appendix A- Hazard Risk Map of Myanmar

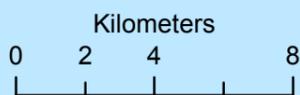
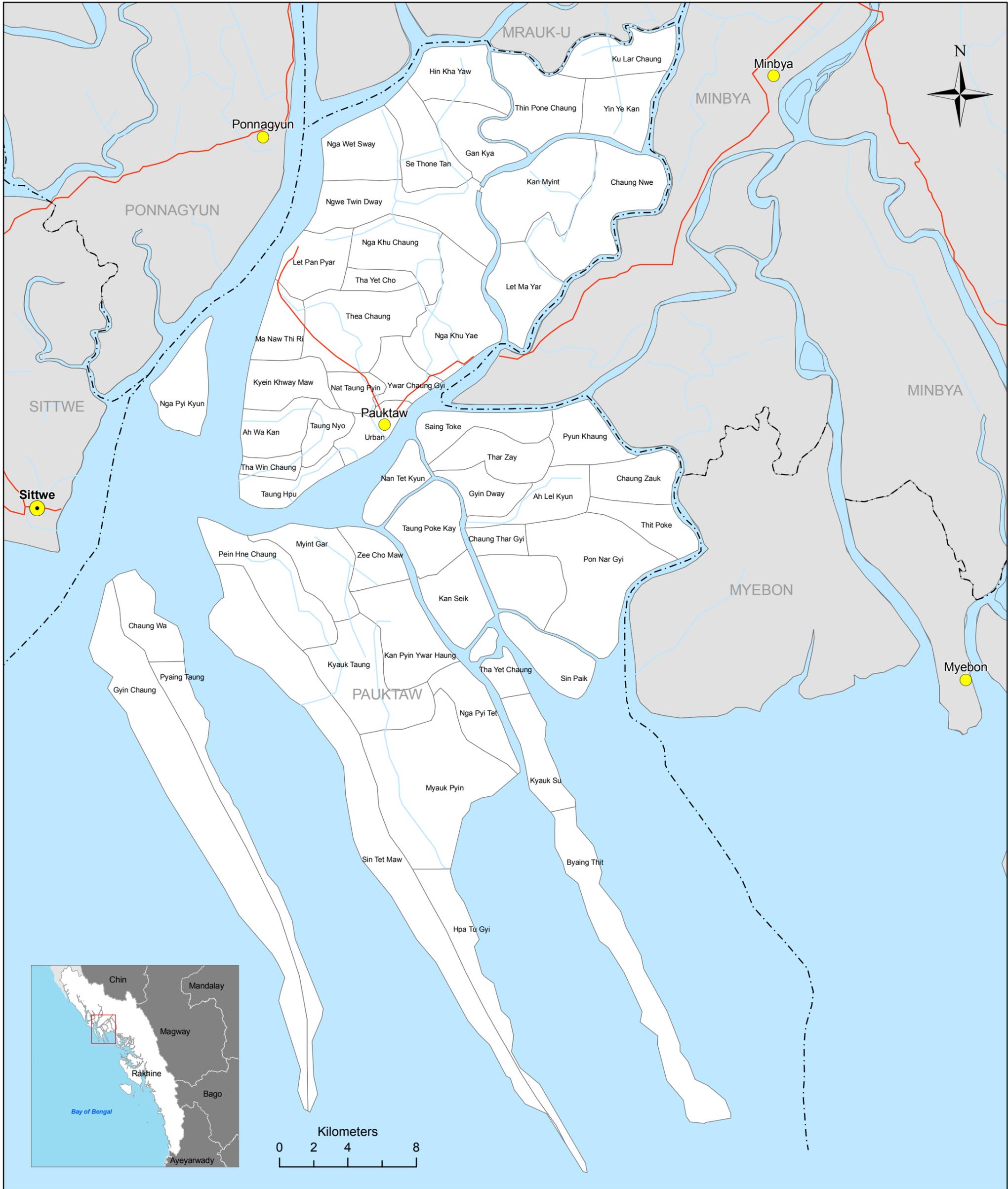
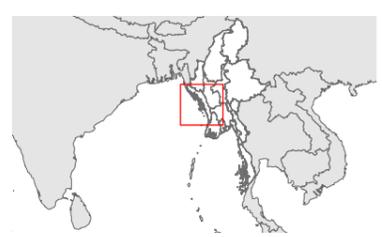


Source: UNOCHA, 2007



Myanmar Information Management Unit

Village Tracts of Pauktaw Township Rakhine State



Map ID: MIMU250v01
 GLIDE Number: TC-2010-000211-MMR
 Creation Date: 22 November 2011. A3
 Projection/Datum: Geographic/WGS84

Map produced by the MIMU - info.mimu@undp.org
 Website : <http://www.themimu.info>

- State Capital
- Main Town
- Other Town
- Road
- River and Stream
- Township Boundary
- District Boundary
- State Boundary
- Village Tract Boundary
- Water Bodies

Data Sources :
 BASE MAP - MIMU
 Boundaries - WFP/MIMU/UNICEF
 Place names - Ministry of Home Affairs (GAD) translated by MIMU

Appendix C: Survey Questionnaire

Date of Survey:	Survey ID No.:
Name of interviewer:	Village Name:

Profile of the Respondent			
1	Gender	1	Male
		2	Female
2	Marital Status	1	Unmarried
		2	Married
3	Age Group	1	<10 years
		2	11-16 years
		3	17-25 years
		4	26-40 years
		5	41-60 years
		6	>60 years
4	Number of Family Member	1	Less than equal to 5
		2	More than 5
			Male
			Female
			Total
5	Religion	1	Buddhist
		2	Muslim
		3	Christian
		4	Hindu
		5	Other-----
6	Education	1	Has not attended
		2	Primary School
		3	Middle School
		4	Secondary School
		5	College
		6	Other-----
7	Occupation	1	Daily Wage Labour
		2	Farmer
		3	Fisher-folk
		4	Livestock
		5	Own Business Shop
		6	Job (Government)
		7	Job (Private)
		8	Job-NGOs
		9	Unemployed
		10	Other-----
Location of the house			
Any other information			

Section A- Hazard Exposure and Change			
No.	Question	Answer (tick answer of the respondent)	
1	Has your household been badly affected by any hazard in the before time 2010?	1	Yes
		2	No
2	How were you affected? (most severe incident)	1	House
		2	House contents
		3	Livestock
		4	Fields
		5	Assets
		6	Injuries
		7	Others-----
3	If the same hazard event happened again now, how would the level of damages and losses from the past event you referred to?	1	Losses would now be lower
		2	Losses would now be the same
		3	Losses would now be higher
		4	I don't know
3a	Why would losses be higher?	1	More to lose
		2	Other factors
		3	Less prepared
		4	I don't know
3b	Why would losses be lower?	1	Better early warning
		2	HH better prepared
		3	Community better prepared
		4	Less to lose
		5	Other factors
		6	Less exposed to hazard

Section B- Household Level Preparedness

1	Over the past ten years, have you adopted any measures to make your household better prepared for disaster?	1 2	Yes No
2	What measures did you adopt?	1 2 3 4 5 6 7	Reinforce house Secured valuable items Moved to safer place Prepared supplies Prepared safer livelihood Saved money Other measures-----
3	What made you adopted these measures?	1 2 3	Factors solely related to the project Factors partially related to the project Factors not related to the project
4	How would you describe your household's level of disaster preparedness?	1 2 3 4 5	Very Prepared Rather prepared Rather unprepared Very unprepared I don't know
5	How would you describe your household's level of disaster preparedness?	1 2 3 4	Improved Unchanged Declined I don't know
6	What has the role of the MI project played in this change?	1 2 3 4 5	Sole role Main role Minor role Not role I don't know

Section C- Community Level Preparedness			
1	To your knowledge, have there been any activities over the past ten years to improve the way the community prepares itself for disaster risks?	1 2	Yes No
2	Are you aware of a climate change adaptation plan in your community?	1 2	Yes No
3	What activities are you aware of?	1 2 3 4 5 6 7	Early warning system Risk mitigation measures Emergency drills Various training DM team formation DRR kits Contingency plans
4	How would you describe your community's level of disaster preparedness?	1 2 3 4 5	Very Prepared Rather prepared Rather unprepared Very unprepared I don't know
5	How has your community level of preparedness developed over the past five years?	1 2 3 4	Improved Unchanged Declined I don't know
6	What has the role of the MI project played in this change?	1 2 3 4 5	Sole role Main role Minor role Not role I don't know
7	Do you have early warning system in your village?	1 2	Yes No
8	Do you know the community evacuation plan?	1 2	Yes No
9	Are you aware of any mangrove afforestation activities in your community?	1 2	Yes No
10	Are you participate in mangrove planting and/or maintenance?	1 2	Yes No

11	In your view, what are the benefits of mangrove afforestation?	1 2 3 4 5	Protects storm surges Prevents erosion Increases aquamarine life Absorbs greenhouse gases other-----
12	Does your community has a committee that manages or regulates the use of natural resources?	1 2	Yes No
13	In terms of the use of natural resources, which of the following statements applies best to your community?	1 2 3 4	Rules, enforced Rules, not enforced No rules exist I don't know
14	With the current usage patterns of natural resources, would you say that in five years time, the community would still have the same level/quality of natural resources to rely on?	1 2 3 4 5	Yes, certainly Yes, likely No, unlikely No, certainly not I don't know

Section D- Community engagement and feedback			
1	Are you aware of any activities by MI in this village?	1 2	Yes No
2	Have you taken part any of these activities?	1 2	Yes No
3	If you had any concerns about the project would you know away to share these concerns with?	1 2	Yes No
4	Have you ever shared any such concerns?	1 2	Yes No
5	In your view, were these concerns addressed to your satisfaction?	1 2	Yes No

Section E-General Observation

Section E-General Observation			
To what extent do you agree or disagree with the following statements?			
1	Over the past ten years, overall situation of this village has improved?	1 2 3 4 5	Strongly agree Rather agree Neutral Rather disagree Strongly disagree
2	Your village is now better linked to the government and other actors?	1 2 3 4 5	Strongly agree Rather agree Neutral Rather disagree Strongly disagree
3	People in your village work together more than you used to ten years ago?	1 2 3 4 5	Strongly agree Rather agree Neutral Rather disagree Strongly disagree
4	The MI project team engaged you in the assessment of capacities and needs?	1 2 3 4 5	Strongly agree Rather agree Neutral Rather disagree Strongly disagree

Section F- Sustainability

To what extent do you agree or disagree with the following statements?

1	Are you willing to pursue practise and retain skills?	1	Strongly agree
		2	Rather agree
		3	Neutral
		4	Rather disagree
		5	Strongly disagree
2	Are you able to pursue practice and skills?	1	Strongly agree
		2	Rather agree
		3	Neutral
		4	Rather disagree
		5	Strongly disagree
3	Are you willing to maintain infrastructure?	1	Strongly agree
		2	Rather agree
		3	Neutral
		4	Rather disagree
		5	Strongly disagree
4	Are you able to maintain infrastructure?	1	Strongly agree
		2	Rather agree
		3	Neutral
		4	Rather disagree
		5	Strongly disagree
5	If you encounter any difficulties, do you know how the get necessary support?	1	Strongly agree
		2	Rather agree
		3	Neutral
		4	Rather disagree
		5	Strongly disagree

Section G-Trust

Which of the following statements do you agree with the most?

1	People in your community generally trust and support each other.	1 2 3 4 5	Strongly agree Rather agree Neutral Rather disagree Strongly disagree
2	Over the past ten years, the level of trust between people-	1 2 3 4	Has increased Has stayed the same has decreased I don't know
3	What contributed to this change in trust?	1 2 3 4	Factors solely related to the project Factors partially related to the project Factors not related to the project I don't know