

YANGON UNIVERSITY OF ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

**AN ASSESSMENT ON LOCAL KNOWLEDGE OF COMMUNITY
RESILIENCE IN DISASTER-PRONE AREA
(A CASE STUDY IN LABUTTA TOWNSHIP)**

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DEPARTMENT OF ECONOMICS/APPLIED ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

**An Assessment on Local Knowledge of Community Resilience in
Disaster Prone Area**
(A Case Study in Labutta Township)

A thesis submitted as a partial fulfillment of the requirement for the
degree of Master of Development Studies

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This is to certify that the thesis entitled “**An Assessment on Local Knowledge of Community Resilience in Disaster Prone Area (A Case Study in Labutta Township)**” submitted as a partial fulfilment towards the requirements for the degree of Executive Master of Development Studies has been witnessed by the Board of Examiners.

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ABSTRACT

This study assessed the local knowledge of community disaster resilience in Labutta Township. The objectives of the study are to find out local knowledge of community resilience regarding disasters in the Labutta Township and explore key factors contributing to good or bad responses and disaster preparedness for future disaster risk. The study used the descriptive method with primary (quantitative and qualitative) and secondary data. The survey found that storms and floods are the major disasters for Labutta Township. The primary responsibility of the State and Township Committees is to protect their communities and property from disasters. The key findings are that local communities' disaster resilience knowledge is limited, and the communities' needs require improvement. Local knowledge of community resilience is vital in the disaster management process at both the state and community levels. It is suggested to use proactive disaster preparation in the future as part of a community resilience approach in the future.

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LIST OF ABBREVIATIONS

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
AHA	ASEAN Coordinating Centre for Humanitarian Assistance on disaster management
ADPC	Asian Disaster Preparedness Centre
ASEAN	Association of Southeast Asian Nations
CSO	Civil Society Organization
DDM	Disaster Management Department
DMC	Disaster Management Center
DRR	Disaster Risk Reduction
DRR WG	Disaster Risk Reduction Working Group
FGD	Focus Group Discussion
GAD	General Administration Department
HAP	Humanitarian Accountability Partnership
IEC	Information, Education and Communication
IFRC	International Federation of Red Cross and Red Crescent Societies (IFRC)
INGO	International Non-Governmental Organization
KII	Key Informant Interview
MAPDRR	Myanmar Action Plan on Disaster Risk Reduction
MCCDDM	Myanmar Consortium for Capacity Development on Disaster Management
MoHA	Ministry of Home Affairs
MRCS	Myanmar Red Cross Society
MSWRR	Ministry of Social Welfare, Relief, and Resettlement
NAPA	National Adaptation Program for Action
NDMC	National Natural Disaster Management Committee
NGO	Non-Governmental Organization
RRD	Relief and Resettlement Department
UN	United Nations
UNDP	United Nations Development Programme

UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UN-Habitat	United Nations Human Settlement Programme
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WCDR	World Conference on Disaster Reduction
WCDRR	Disaster Risk Reduction

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

Resilience is an individual's, a community's, or a country's capacity to cope with, adapt to, and recover rapidly from the stress and shocks produced by a disaster, violence, or conflict. Resilience covers all stages of a disaster, from prevention (when possible) to adaptation (when necessary), and includes a positive transformation that strengthens the ability of current and future generations to meet their needs.

Myanmar experiences significant disaster-related losses, affecting communities and the local and national economies. Between 1980 and 2015, more than 5 million people in Myanmar were affected by disasters, which resulted in nearly \$5 billion in direct physical losses. According to modeling studies (GDP), long-term disaster losses in Myanmar amount to \$2.1 billion a year on average, or 3.23 percent of Myanmar's 2014 GDP, according to modeling studies (GDP). Many natural hazards can cause these disasters, and the types found in various parts of this country are determined by the location's geography, geology, and climate. Tropical cyclones and storm surges, earthquakes, riverine flooding, and landslides are dangers to people living in the coastal regions, especially the western coasts and the country's southern coasts.

People living in the central dry zone, which receives very little rainfall and has undergone large-scale deforestation, are also at risk of droughts and a lack of water supply. Disasters have large-scale and small-scale impacts, such as Cyclone Nargis in 2008 and the 2015 floods and landslides, cumulative consequences of many more minor, localized occurrences. In contrast to large-scale events, the effects of small-scale events tend to remain largely unnoticed because they have a long-term negative impact on the poorer households, smaller businesses, and marginalized members of a community, which can have a long-term negative impact on the community as a whole.

Cyclone Nargis was a Category 4 cyclone that made landfall in Labutta Township on May 2, 2008, with winds of at least 200 kilometers per hour, heavy rain, and a storm surge of 3.6 meters (12 feet). In Myanmar, at least 140,000 people died, with as many as 80,000 fatalities in Labutta. At least 37 townships were damaged by Nargis, with 2.4 million people thought to be severely affected out of the total population of 7.35 million living in these areas. The Disaster caused widespread destruction to homes and critical infrastructure, water supplies, food stocks, and agriculture.

In Myanmar, there is a direct relationship between disaster risk and socio-economic growth, exacerbated by significant events and "daily catastrophes" regularly. Labutta is a disaster-prone area hit hard by extreme disaster events. Therefore, people are concerned that they will be affected by natural disasters in the future. Disaster preparedness and response are essential to the local communities to reduce concerns and damage/losses. Therefore, this study aims to explore whether investing in strengthening local knowledge and capacities has the benefit of ensuring emergency response and management are efficient, effective, and sustainable, resulting in a reduction in the loss of lives and assets.

1.2 Objective of the Study

The objectives are to identify local knowledge of community resilience regarding disasters in the Labutta Township and examine critical factors contributing to the success or failure of the response and disaster preparedness for future disaster risk.

1.3 Method of Study

This study uses the descriptive method based on primary and secondary data. A household questionnaire survey was conducted as a requirement for quantitative and qualitative approaches. Two types of semi-structured interview questionnaires were prepared for Key Informant Interviews (KII) and Focused Group Discussions (FGD). Individual key stakeholders were approached with the Key Informant Interview (KII) method, while community groups were asked with a Focused Group Discussion (FGD) approach. Purposive sampling was used to identify responders who represented various levels and entities of preparedness and response.

Secondary data was collected from the Township General Administrative Department (TGAD), the District and Township Relief and Resettlement Departments, other related government departments, UN agencies and international NGOs, local NGOs, and CSOs.

1.4 Scope and Limitations of the Study

This study focuses on the community-level disaster preparedness and response in Labutta Township of Ayarwaddy Region after ten years of the Nargis cyclone. It was the largest Disaster and most dead, lost, and damaged in Myanmar in 2015. The study period is March to September 2020. A questionnaire survey was conducted for 100 respondents from the village and urban people in the Labutta township area. The first is for the critical informant interview (KII) for five people with local authorities, government departments, and other stakeholders. Second, it is for the focus group discussion (FGD) for 90 people with a sample of five villages (Thin Gan Gyi Village, Gone Nyin Tan Village, Pyin Htaung Twin Village, Gant Eik Village, and Labuttaloak Village) in Labutta Township. Finally, the study covers the analysis based on descriptive findings relying on the questionnaires, focus group discussions, vital informal interviews, and secondary data from Labutta Township.

1.5 Organization of the Study

This study consists of five chapters. Chapter I presents the introduction, the rationale, the objectives, method, scope and limitations, and the organization of the study. Chapter II describes the literature review. Chapter III states Disaster preparedness and response in Myanmar. Chapter IV is a survey analysis of community resilience concerning Disaster in the Labutta Township, and chapter V is the conclusion.

CHAPTER II

LITERATURE REVIEW

2.1 Disaster Resilience for Communities

The United Nations International Strategy for Disaster Reduction (UNISDR) says that a disaster is something that makes it hard for a community or civilization to function normally. Disasters have far-reaching human, material, economic, and environmental impacts that outstrip a community's or society's ability to manage its resources. A combination of hazard exposure and vulnerability leads to disasters. A disaster can cause death, injury, and sickness, among other severe effects on human physical, mental, and social well-being, as well as property damage, asset destruction, loss of services, social and economic disruption, and environmental degradation. A calamity occurs when a community's resources are depleted. (Quarentelli, 1985).

"Any occurrence (happening with or without warning) causing or threatening death, injury, or disease damage to property, infrastructure, or the environment that surpasses the affected society's coping capability," according to the definition of a disaster (Khanna & Khanna, 2010). As defined by Section 2(d) of the Disaster Management Act 2005, "a catastrophe," "mishap," "calamity," or "grave occurrence in any area," resulting in "substantial loss of life or human suffering," as well as "damage and destruction of property," or "environmental degradation," and is so big or bad that the community can't handle it.

The International Federation of Red Cross and Red Crescent Societies (IFRC) defines a community as "a group of people who share a culture, customs, and resources and may or may not live in the same territory, village, or neighborhood." In addition, communities are groups of people who face the same threats and dangers as individuals, such as disease, political and economic problems, and natural disasters."

Resilience is defined as the ability to cope with shocks and long-term structural changes while conserving societal well-being and future generations' heritage, according to the European Union's EU Research Hub - science and knowledge for Europe. As a result, our civilization must be long-term resilient. Even if no single

scientific definition of resilience exists, the European Commission's Joint Research Centre (JRC) assessed the available expertise to develop a shared framework for the purpose and measurement of resilience in collaboration with many Commission Services (Resil.net). This is a broad, united, and evidence-based shift in the European Union toward measures that boost societal resilience. The resilience narrative developed by the JRC takes a multidisciplinary and 360-degree approach. Creating a more resilient society requires strengthening shock absorption mechanisms and increasing adaptive capacity. Finally, it recommends a paradigm shift toward more long-term growth and societal development.

Community resilience has been defined and explored in various ways in the literature; nonetheless, most definitions share vital terms and concepts. Resilient cultures have effective stress management, good adaptation to new challenges, self-reliance, and social capacity. Neighborhoods, family and kinship networks, social cohesion, mutual interest groups, and mutual self-help organizations are critical social support systems in communities. Several assets should be considered when analyzing community resilience, including community members' skills, knowledge, experience, drive, and physical assets and their connections (Maguire & Cartwright, 2008). Internal community structure, history, and vulnerabilities must all be considered the community's resources and adaptive capacities (Longstaff et al., 2010). Subsystems like variety, robustness, connectivity, functional cross-scale linkages, and learning capacity can all be included in a systems approach to resilience (Keil et al., 2008).

The availability and robustness of critical infrastructures, such as flood mitigation systems, water supply, information technology, and buildings, should also be examined (Klein et al., 2003; Tierney & Bruneau, 2007; Keil et al., 2008; Frommer 2011; Fekete, 2011).

Nine essential characteristics of community resilience have been identified. These include local knowledge, community networks and relationships, communication, health, governance/leadership, resources, economic investment, readiness, and mental perspective. We compare the aspects included in well-referenced research, models, and community resilience indicators in the supplemental material. No previous models or measurements incorporated any of the reported elements and sub-elements.

The effects of a disaster, whether short-term or long-term, can be mitigated if a community is aware of its current vulnerabilities. These vulnerabilities are thought to

boost a community's resilience if addressed before a disaster. For example, Kennedy and colleagues emphasized the relevance of a community's vulnerability assessment and comprehension. There were three sub-elements discovered. Then there was the factual knowledge base of the community. Information, education, and experience gained concerning a tragedy were described as fundamental knowledge. This included particular disaster preparedness information, such as first-aid knowledge and broader disaster readiness, mitigation, response, and recovery topics.

Training and education were the second sub-elements. Moore and his colleagues discovered excellent community education practices such as incorporating public disaster education into regular education curricula, having early warning and public communications, collaborating with the media for general education and risk communication, and communicating with affected populations via newsletters. Moore and colleagues propose actions such as community training and exercises to improve local knowledge and capacity as a component of community resilience. Effective training and education should result in learning. For example, emphasize the need to understand how to respond effectively in an emergency.

The third sub-element was determined to be collective efficacy and empowerment. A community's collective conviction in its potential to overcome disaster-related suffering, such as via self-reliance, was defined. Even if a community is self-sufficient, what it knows and understands about its processes for surviving and responding to a crisis can be crucial in relief operations. This was underscored by Chandra and colleagues, who stressed the importance of enhancing personal and community preparedness, civic accountability, effective bystander responses, and self- and community reliance.

The concept of community resilience represents a once-in-a-lifetime opportunity for the International Federation of Red Cross and Red Crescent Societies (IFRC), as it encompasses everything the IFRC strives to achieve. Although their efforts may not have been labeled as "strengthening community resilience," many National Societies have been doing that for decades by assisting their local communities.

The IFRC's definition of community resilience has grown to embrace both communities' ever-changing and dynamic nature and the underlying vulnerabilities that threaten them. As a result, the IFRC's goal has been to combine humanitarian concerns about impending hazards with longer-term, sustainable measures and institutional building, which are commonly associated with development. By improving their ability

to adapt and manage disasters, crises, shocks, and pressures, communities can sustain and grow on their development successes while also addressing the repercussions of underlying vulnerabilities that threaten them. Because being resilient needs flexibility in the face of changing hazards, and climate change is progressively impacting risk patterns worldwide, climate change concerns are an essential aspect of the Framework for Community Resilience (FCR).

Individuals, communities, organizations, and countries exposed to disasters, crises, and underlying vulnerabilities can anticipate, prepare for, mitigate the impact of, cope with and recover from the effects of shocks and stresses without jeopardizing their long-term prospects, according to the International Federation of Red Cross and Red Crescent Societies. A resilient community is socially cohesive, has economic possibilities, has well-maintained and accessible infrastructure and services, and is connected. The FCR is broken down into three parts: 1) assisting communities in implementing risk-informed, comprehensive approaches to addressing underlying vulnerabilities; 2) Community resilience is a demand-driven, people-centered approach; and 3) being linked to communities by being accessible to everyone, everywhere, in order to prevent and alleviate human suffering.

The IFRC values performance measurement and evaluation because they support systematic learning, which allows for exchanging information, experience, and knowledge, and ultimately leads to improved programming. In contrast to more typical sector-based methodologies, community resilience measurement is relatively young and constantly improving. However, there is no consensus on defining it or a shared body of experience. Despite the IFRC's substantial ability and expertise in measuring and evaluating traditional methodologies, it is vital to acknowledge the limitations of the present method in monitoring community resilience strengthening. The distinction between assessing 1) a community's level of resilience, 2) the IFRC's impact on community resilience, and 3) the IFRC's contribution to the community's resilience is critical in measuring community resilience.

Table 2.1 Three Key Measures for Community Resilience

1. Measuring community Resilience	A synthesis of the various characteristics that make up community resilience.
2. Measuring IFRC's impact on community resilience	The contribution of the IFRC's work on community resilience is measured. What proportion of the measurable impact on community resilience is due to IFRC efforts versus other factors?
3. Measuring IFRC's contribution to community resilience	Measurement of specific activities that assist community resilience strengthening and their implementation. Whether we succeed in achieving the goals we set for community resilience.

Source: IFRC Framework for Community Resilience

2.2 Global Assessment of Disaster Risk Reduction

Natural disasters, conflict, and humanitarian crises, as well as man-made disasters, are increasingly affecting populations worldwide. These disasters frequently take on unexpected shapes, sizes, and locations, making prevention and response nearly impossible. Every year, hazard events and incidents occur in places around Australia, many of which are unanticipated, widespread, and have significant consequences for the communities involved. In 2009, the Council of Australian Governments (the country's highest intergovernmental organization) resolved to implement a national disaster management policy. This fits with the fact that the world is becoming more interested in building resilience instead of just responding to and recovering from emergencies.

The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) was the first major post-2015 development agreement, and it lays out concrete efforts for the Member States to protect development benefits from disaster risk. Other accords in the 2030 Agenda, such as the Paris Climate Agreement, the Addis Ababa Action Agenda on Financing for Development, the New Urban Agenda, and the Sustainable Development Goals, are supplemented by the Sendai Framework. The UN General Assembly endorsed the Third UN World Conference on Disaster Risk Reduction (WCDDR) in 2015, calling for a significant reduction in disaster risk and losses in lives, livelihoods, and health, as well as in individuals, businesses,'

communities, and countries' economic, physical, social, cultural, and environmental assets. It recognizes that the government bears the main duty for disaster risk reduction but that other stakeholders, such as local governments, corporations, and others, should share this obligation.

The Sendai Framework for Disaster Risk Reduction 2015-2030 lays out seven specific goals and four action objectives for preventing new disasters and reducing existing ones: understanding disaster risk; enhancing disaster risk governance to manage disaster risk; investing in disaster reduction for resilience; and increasing disaster preparedness for effective response and "Building Back Better" in recovery, rehabilitation, and reconstruction. It aims to drastically reduce disaster risk and losses in lives, livelihoods, and health, as well as in individuals, businesses, communities, and countries' economic, physical, social, cultural, and environmental assets, over the next 15 years. The Framework was adopted on March 18, 2015, in Sendai, Japan, during the United Nations World Conference on Disaster Risk Reduction.

While calamities continue to stymie economic growth and social progress, sustainable development is impossible. Natural disasters affect every country and industry, and many are growing more frequently antisense as a result of climate change. While catastrophe preparation is vital, it is insufficient. Governments and stakeholders have agreed that catastrophe risk reduction must be at the center of long-term development in order to realize the 2030 Agenda for Sustainable Development's transformative potential. The first post-2015 development agenda agreement was the Sendai Framework for Disaster Risk Reduction (2015-2030). It includes seven global targets as well as a comprehensive set of guiding principles for decreasing disaster impact while also addressing the underlying causes of disaster risk and maintaining current and future development progress.

Progress toward the Sustainable Development Goals is thus made by adopting the Sendai Framework. As a result of progress on the Sustainable Development Goals, people's and governments' resilience to catastrophes can be considerably increased. There are various targets relating to disaster risk reduction among the 17 Sustainable Development Goals. In contrast, the Sendai Framework's seven global targets are important to accomplishing the SDGs.

In September 2015, almost 190 world leaders signed the SDGs, vowing to help end extreme poverty, combat inequality, combat climate change, and build disaster resilience. While all of the Sustainable Development Goals are crucial for building a

more sustainable and resilient society, certain of them have targets for reducing disaster risk that is either directly or indirectly related. The Sendai Framework's goal of preventing new disasters, decreasing existing disaster risks, and improving resilience is helped by the Sustainable Development Goals.

2.3 Adaption of Climate Change

Clearly, the most serious global issue confronting us today is the danger that our current behaviors may make the earth much less habitable for humans and other biosphere members. Climate change or the global "greenhouse" effect are terms used to describe this phenomenon. The greenhouse's surrounding glass or plastic lets incoming sunlight pass through while trapping a part of reflected infrared radiation, which warms the greenhouse's interior above the outside temperature. GHGs in the atmosphere have the same purpose: they raise the temperature of the earth's surface, making it habitable. If there were no GHGs, the earth's surface would be roughly 30°C lower than it is currently, making human life impossible.

Prior to the industrial revolution, global GHG levels were in balance. Decomposing plant and animal matter emitted them, which were absorbed by forests and oceans. The Industrial Revolution, one of humanity's greatest cultural achievements, entered this precarious equilibrium. That event was essentially an energy revolution, featuring a tremendous increase in energy extraction from fossil fuels—first coal, then petroleum, and finally natural gas. Fossil fuel use, together with deforestation and a few other activities, has resulted in significant increases in emissions and a 40% increase in carbon dioxide (CO₂) concentration in the atmosphere since the beginning of the Industrial Revolution. It has increased by 15% in just the last three decades, and many scientists predict that by the middle of the twenty-first century, it will have doubled. The most important greenhouse gas is CO₂, although it is far from the only one. Another example is methane, which is 22 times more potent as a greenhouse gas than CO₂. According to ice core analysis, atmospheric methane concentrations have never exceeded 750 parts per billion in the last 800,000 years. It is currently around 1,800 parts per billion.

GHG accumulation has coincided with an increase in global mean surface temperatures. According to temperature data, the composition of long-lived glaciers, and other sources, the world has warmed by about 0.5°C (1°F) over the previous 100 years. Temperatures could rise 1.5°C to 4.5°C over the next century, according to

certain scientific predictions. Every decade, the pace of warming is expected to be roughly 0.5°C. This may not appear to be a substantial change, but historical studies show that during prior cycles of warming and cooling, agricultural communities endured massive dislocations, and climate change occurred at a rate of just roughly 0.05°C per decade. In other words, today's rate of change is expected to be much faster than those faced by humans in the past.

Due to the expansion of seawater, the melting of glaciers, and possibly the collapse of polar ice sheets, global warming is predicted to cause a general rise in sea level. Although there is a worldwide rise, the effects on tidal and current patterns will differ locally. Changes in weather patterns will also differ widely between places. Polar regions in the northern hemisphere will warm quicker than equatorial zones; continental landmasses' centers will dry up faster than their peripheries, and so on. Our capacity to foresee these shifts will improve as atmospheric scientists' global climate models improve.

Despite the fact that this is a global issue, the consequences for individuals and the environment will vary greatly from country to country and place. Rising sea levels would have a significant impact on certain groups, such as those on Pacific islands or those living in low-lying river deltas. The effects will be limited in countries where development is directed to the interior. Flooding of coastal wetlands around the world might have major ramifications for fisheries and, as a result, for people that rely heavily on marine resources. Increased ocean acidification owing to greater amounts of atmospheric CO₂, which reacts with water to generate carbonic acid, is another big potential impact. Ecosystems and individual plant and animal species will be significantly impacted, not just by the quantity of change but also by the rate of change, which will be quick by evolutionary standards. During prior ice ages, weather changes were slow enough to allow plants and animals to move and thrive.

Many creatures may be unable to adapt to changing habitats due to the projected rapid rate of change in the greenhouse phenomenon. It will also put a lot of pressure on species that live in small ecological niches because even tiny changes in weather patterns can damage the environments they rely on.

Changing climate patterns' effects on agriculture and forestry will have some of the most severe human consequences. This is where things become complicated, not just because weather patterns will be affected differently around the world but also because crops and farming systems' ability to withstand temperature and water

availability vary widely. It is widely expected that the consequences of global warming on agriculture will be more severe in developing countries than in industrialized countries. The brunt of the effects is expected to fall on African countries. Crop development and technological developments, according to some research, could help agriculture adapt to future climatic fluctuations. Others, on the other hand, fear that many developing countries will be able to do so because many of their crops are already reaching their tolerance limits for higher temperatures. Scientists will be challenged by study into the greenhouse effect for many years to come.

2.4 Measuring Indicators of Disaster Preparedness and Responses

All activities, programs, and procedures that can be implemented prior to, during, and after a disaster with the purpose of preventing a disaster, decreasing its impact, or recovering from its losses fall under the umbrella of disaster risk management. The key measuring indicators of disaster management are recurrent events with four phases: mitigation, readiness, response, and recovery. At any one time, all communities are at some stage of disaster management.

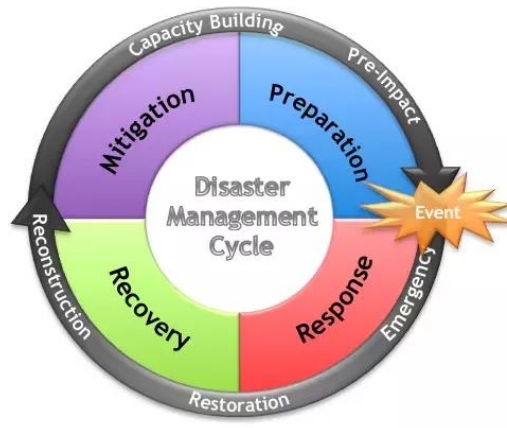
2.4.1 Disaster Management

The purpose of disaster management is to minimize or eliminate possible losses from risks, give fast and appropriate aid to catastrophe victims, and achieve rapid and successful recovery. The disaster management cycle represents the continual process by which governments, corporations, and civil society prepare for and mitigate disasters, respond during and shortly after a disaster, and recover after a disaster. Appropriate actions at all points in the cycle result in increased preparedness, improved warnings, reduced susceptibility, or disaster prevention in the following cycle iteration. The establishment of public policies and programs that either modify the causes of catastrophes or reduce their consequences on people, property, and infrastructure are all part of the disaster management cycle.

The mitigation and readiness periods occur as disaster management measures are implemented in advance of a disaster event. Concerns about development and resilience are crucial in helping a community reduce and prepare for a disaster. As soon as a disaster occurs, disaster management players, notably humanitarian organizations, become involved in the immediate response and long-term recovery phases. The four stages of crisis management described above do not always, or even often, occur in this

order. A disaster's intensity determines how long each phase of the recovery process takes.

Figure (2.1) Disaster Management Cycle



Source: The Disaster Management Cycle (BYJU'S, 2016)

When assessing the "quality" of a catastrophe response, many different groups have different definitions. Quality and accountability standards have been produced by international organizations, particularly those that work in numerous countries and have an extended institutional capacity based on their years of experience. Because most other vital elements, such as governance structure, human resource guidelines, compliance systems, are in the beginning phases of development, and so on, local organizations face substantial obstacles in creating such knowledge and procedures/principles.

Almost all international NGOs and UN organizations use SPHERE standards as a reference guide for disaster response technological requirements. The minimum criteria establish the conditions that must be followed in any humanitarian response for catastrophe victims to survive and recover in a secure and dignified environment. Like humanitarian organizations, we believe that all people affected by tragedy or conflict have a right to protection and assistance to provide the necessities for a decent life. International law's principles are founded on humanity's core moral principle: all human beings are born free and equal in dignity and rights. Based on the humanitarian imperative and the principle of humanity, humanitarian agencies should acknowledge the rights of all individuals affected by disasters—men and women, boys and girls. These include international humanitarian law, human rights law, and refugee law's rights to protection and aid.

International law recognizes the right to a dignified life, especially human rights laws that protect the right to life, a basic standard of living, and freedom from torture and other cruel, inhuman, or humiliating treatment or punishment.

The right to life includes the obligation to protect life when threatened. Respect for the whole person, including individuals' and affected groups' values and beliefs, and respect for their human rights, such as liberty, freedom of conscience, and religious observance, is required for dignity. The right to humanitarian assistance is a necessary component of the right to a decent life. This includes the right to a decent standard of living, which is explicitly protected in international law and includes adequate food, water, clothing, shelter, and healthcare needs. Where states or non-state actors cannot provide such assistance, they must allow others to. Any such service must be provided following the concept of impartiality, which states that it must be provided solely based on need and in proportion to that need.

This is consistent with the broader principle of non-discrimination, which states that no one should be maltreated based on their age, gender, race, color, ethnicity, sexual orientation, language, religion, handicap, health status, political or other beliefs, or national or social origin. The right to safety and security is based on international law, resolutions of the United Nations and other intergovernmental organizations, and governments' sovereign responsibility to protect all those under their jurisdiction. Humanitarian concerns include people's safety and security during disasters or crises and the protection of refugees and internally displaced people. As the law recognizes, certain people are more vulnerable to abuse and discrimination due to their position, such as age, gender, or ethnicity, and may require additional protection and assistance. If a country cannot protect its citizens in certain situations, it must seek international assistance (Darcy et al., 2011).

2.4.2 The Fundamental Principles of the International Red Cross and Red Crescent Movement

The International Red Cross and the Red Crescent Movement follow the seven main principles laid out in their Fundamental Principles in their disaster response operations. Humanity: In its international and national functions, the International Red Cross and the Red Crescent Movement attempt to avoid and relieve human suffering wherever it may be encountered. It was built on the desire to treat the wounded on the battlefield without discrimination. Its purpose is to save lives and health while

maintaining human dignity. It promotes mutual respect, friendship, cooperation, and long-term peace among all people. In terms of nationality, color, religious beliefs, socioeconomic status, and political beliefs, it is unbiased. Its goal is to reduce individual suffering by focusing entirely on their needs and the most acute cases of misery. The Movement must never take sides in confrontations or engage in political, racial, religious, or intellectual issues in order to maintain public trust. The Movement is self-contained. National Societies must constantly maintain their independence in order to work in accordance with the Movement's values while functioning as auxiliaries in their governments' humanitarian services and subject to the laws of their respective nations. Voluntary service is a self-organized assistance activity that is not driven by compassion. The International Red Cross and Red Crescent Movement is an international organization in which all nations are equal and have the same responsibilities and duties in aiding one another. (International Federation of Red Cross and Red Crescent Societies, 2015).

2.4.3. Humanitarian Accountability Partnership (HAP)

HAP standards are followed by almost all INGOs since they are simple and uncomplicated. The following is a summary of the six benchmarks: Setting and keeping promises: the organization establishes the commitments for which it will be held responsible, as well as how those commitments will be satisfied. Employee competency: the organization ensures that employees have the skills required to achieve the organization's objectives. The organization guarantees that the people it is attempting to assist, as well as other stakeholders, receive timely, relevant, and clear information about the organization and its activities. When making program decisions, the organization pays attention to the people it is trying to help and considers their ideas and analyses. The organization provides a simple, effective, and secure process for the people it seeks to assist and other stakeholders to make complaints and receive a response. (Humanitarian Accountability Partnership, 2010) The organization improves its performance by drawing on what it has learned from the past.

In December 2011, the Principals of the Inter-Agency Standing Committee (IASC) endorsed five Commitments to Accountability to Affected Populations (CAAP), agreeing to incorporate them into their organizations' policies and operational guidelines, as well as promote them with operational partners, as such as Humanitarian Country Teams and cluster members. These principles are followed by UN agencies

and their partners, particularly in disaster response activities. The following are the pledges: Leadership/Government: Incorporate feedback and accountability mechanisms into country strategies, program proposals, monitoring and evaluations, recruitment, staff inductions, training and performance management, partnership agreements, and reporting to show their commitment to affected populations' accountability. Provide timely and accessible information to affected populations about organizational procedures, structures, and processes that affect them so that they are capable of making sound decisions and choices and facilitate a dialogue between an organization and its affected populations about information provision.

Feedback and Complaints: Actively seek feedback from affected populations to improve policy and practice in programming, ensuring that feedback and complaints mechanisms are streamlined, appropriate, and robust enough to handle complaints about policy breaches and stakeholder dissatisfaction (communicate, receive, process, respond to, and learn from). Establish clear standards and practices to effectively engage impacted individuals, ensuring that the most marginalized and affected are represented and have a say in decision-making processes that affect them. Design, Monitoring, and Evaluation: (Inter-Agency Standing Committee, 2012): Develop, track, and evaluate program goals and objectives with the help of the people who will be affected by them. Regularly share what you've learned with the organization and report on the results of the process.

The study demonstrates how climate change would exacerbate existing significant barriers and erode community disaster resilience expertise. It has a higher poverty rate than the national average, as well as social development indices and an economy that is dependent on climate-sensitive industries. Environmental challenges stymie growth due to man-made degradation, exposure to catastrophic natural events, and the early consequences of climate change. Despite the fact that mangroves provide numerous essential functions, including fish habitat and storm and wave protection, mangrove coverage has been rapidly declining as a result of home-scale cutting and some clearance for agriculture and agro-industry. Data and awareness of the observed impacts of climate change, estimates of predicted changes, and preliminary local knowledge of community resilience to climate change risks and susceptibility in sectors such as agriculture and the natural environment are increasing at the national level. In multi-sectoral development, there is a lack of data on the predicted impacts of climate change on the ground and local knowledge of community resilience.

Most evaluations include questions about the timeliness, effectiveness, and efficiency of the disaster preparedness plan and response efforts; meeting technical standards; community knowledge and awareness; coordination and collaboration among various stakeholders; and plan and response sustainability. The mitigation and readiness phases occur as disaster management is improved prior to a disaster. Developmental factors play an important role in disaster mitigation and preparedness. As soon as a disaster happens, people involved in disaster management, especially humanitarian groups, get to work on the immediate response and long-term recovery.

2.5 Review on Previous Studies

Myo Tint (2009) investigated disaster management and preparedness. It looked into Myanmar's National Disaster Preparedness Central Committee's role, plans, and actions, as well as the importance of disaster resilience in nations and communities. According to the report, disaster management and response coordination and teamwork between the government and the community have improved.

Ko Ko Aung (2011) reviewed the matter of Nargis recovery, disaster impacts, and disaster preparedness. It was emphasized that a full disaster management system must allow access to a wide range of information at different levels and at different times. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) says that local and indigenous knowledge for community resilience: reducing the risk of hydro-meteorological disasters and adapting to climate change in coastal and small island communities. This article talks about the results of research done in Indonesia, the Philippines, and Timor-Leste between 2011 and 2013 as part of a UNESCO project on local and indigenous knowledge about hydro-meteorological risks and climate change. The research was done in the Philippines, Indonesia, and Timor-Leste. Each element of the book, particularly the policy briefs, is constructed so that the reader can read only the areas that are of relevance to them.

Myat Htet Aung Min (2017) used the 2015 floods in the Magway region as a case study to investigate the quality and accountability of humanitarian interventions in Myanmar. The study's objectives are to assess how well various stakeholders carried out the 2015 floods response initiative, particularly in terms of quality and accountability practices, as well as to investigate and document key factors that contributed to the response's success or failure for future disaster responses. All quality and accountability variables were assessed positively by all disaster responders and

beneficiaries as a result of goodwill and hard work rather than it the institutional competence of the organizations, according to the findings of this study. The success is due to the activation of national-level reaction systems, the openness of information exchange, and the extensive usage of social media.

CHAPTER III

DISASTER PREPAREDNESS AND RESPONSE IN MYANMAR

3.1 Overview of Disaster in Myanmar

Floods, cyclones, earthquakes, landslides, and tsunamis are among the natural phenomena that affect Myanmar. Myanmar is situated on a central earthquake fault line and is frequently impacted by small tremors. In mountainous areas, landslides are common. According to forecasts, climate change and environmental deterioration will exacerbate water-related disasters. Droughts and floods are expected to become more frequent and severe. Temperatures, rainfall, and runoff are projected to rise; heavy rain is expected to become more common, and dry monsoon periods are possible. More than simply physical exposure to geological and hydro-meteorological hazards is required to understand and quantify disaster and climate risks. People's ability to plan for, respond to, and recover from disasters is as important as the built environment's position and exposure. Disasters disproportionately affect the poor and vulnerable, particularly women, children, the elderly, and those with disabilities. Because of the high level of poverty in Myanmar's rural areas, even minor disasters significantly impact families. The poor in rural areas are often isolated and live in inadequate housing, with limited access to essential services and local infrastructure, limiting their ability to respond to disasters (Government of the Union of Myanmar, 2015).

According to the Regional Consultative Group on Humanitarian Civil-Military Coordination for Asia and the Pacific (together with Bangladesh, Indonesia, Nepal, and the Philippines). Natural disasters wreak havoc on the country, which is also plagued by ongoing conflict and large-scale human displacement. In addition, poverty and poor infrastructure heighten Myanmar's vulnerability to natural catastrophes. In Myanmar, natural hazards such as earthquakes, tsunamis, tropical cyclones, storm surges, floods, landslides, droughts, forest fires, and industrial and technological threats are all widespread. According to historical data, natural disasters of medium to large magnitude are expected to occur every couple of years.

Earthquake and Tsunami

Myanmar occupies a significant portion of the Himalayan foothills and the Indian Ocean's eastern shore. As a result, the country is vulnerable to powerful earthquakes and tsunamis. The Himalayan orogeny is still active tectonically, producing earthquakes of varying magnitudes. Because of the collision of the India and Burma plates, Myanmar's western region is also seismically active, with shallow and moderate earthquakes occurring often. The Sagaing Fault and the Sunda subduction megathrust zone are the two primary sources of earthquakes and tsunamis in Myanmar. The four destructive zones are Bago-Phyu, Mandalay-Sagaing-Tagaung, Putao-Tanaing, and Kale-Homalin. Although the latter two have significant earthquake risks, their risk is limited due to their tiny population. MMI 8 places the Rakhine Coast in the Strong Zone, while MMI 7 places the Ayeyarwady Delta and Tanintharyi beaches in the Moderate Zone. (Note: The Modified Mercalli Intensity Scale (MMI) is used to determine the magnitude of earthquake shaking.)

Drought

A drought affects about 51 townships in the Magway, Mandalay, and Sagaing (lower) regions. Extreme El Nio conditions may exacerbate droughts in Southeast Asia. Agriculture, food production, freshwater supply, and fisheries are vulnerable areas of society and the economy due to drought. Most of the Sagaing Division, Mandalay Division's western and middle sectors, and most of Magway Division are in the dry zone. Water is essential in this harsh environment with limited flora and wind-beaten ground. Chronic poverty is being exacerbated by hotter dry seasons and more frequent and more prolonged droughts, posing severe difficulties in the lives of many rural populations.

Forest Fires

In Myanmar, forest fires are one of the most common risks. Between 2007 and 2016, 12,000 instances were reported, predominantly in Yangon, Mandalay, Ayeyarwady, Sagaing, and Bago.

Landslide

Landslides are general in mountainous areas, particularly in western ranges and some areas of the eastern highlands. Rock falls, rockfalls, soil avalanches, and mud floods have all been reported in the west of fields.

Floods

Flooding is most likely between June and October, with August being the most dangerous month due to monsoon rains. The central part of the Ayeyarwady region, in particular, is prone to flooding. Every year, the monsoon floods parts of Myanmar. In 2015, flooding killed 100 individuals and forced 200,000 people to flee their homes. Following monsoon rains in central and southern Myanmar, ten people were murdered and 100,000 displaced in 2018. In 2019, flooding caused by the seasonal monsoons hurt more than 230,000 people, and 75 people died.

Tropical Cyclones and Storm Surges

Myanmar is particularly vulnerable to tropical cyclones and storm surges in April, May, and October. Tropical cyclones frequently form in the middle of the monsoon season, albeit they rarely reach their peak power. Tropical cyclones are likely to become more dangerous due to climate change. According to government data, Cyclone Nargis hit Myanmar's Ayeyarwady Delta in May 2008, claiming the lives of 84,500 people. However, some estimates put the death toll far higher.

Industrial and Technological Hazards

At least 51 industrial parks exist in Myanmar, most of which are centered in the Yangon and Mandalay regions. However, most businesses are small to medium-sized businesses that do not have catastrophe risk management or business continuity plans. Therefore, industrial and technical dangers must be profiled more centered.

Deforestation

Myanmar is working to rebuild mangrove forests along the shore. But the effects of the storm surge from Cyclone Nargis in 2008 were made worse by the fact that this important habitat along the coast had been cut down.

In recent years, Myanmar has been hit by many natural disasters, including earthquakes, cyclones, floods, droughts, and landslides. Cyclone Nargis in 2008 had the most significant impact on disaster management and disaster risk reduction in the country. Cyclone Nargis, a category four storm, struck Myanmar's Irrawaddy Delta in 2008, killing 140,000 people, displacing 800,000, and causing widespread devastation. The initial government response was slow, resulting in millions of people being injured without food, clean water, or shelter. ASEAN reached a deal allowing international organizations to supply food and other help to Myanmar under force from regional leaders and the international community. Due to this tragedy, Myanmar has

implemented laws aiming to establish a national, state, and local disaster response structures.

Additionally, the political situation altered, allowing the United States, Japan, the Myanmar Red Cross, the United Nations, and other humanitarian organizations to enter the nation. In recent years, the government has made significant progress in disaster preparedness, including signing international accords to increase its disaster resiliency and joining various regional storm risk-reduction programs, including the Paris Climate Agreement. The following are some of the country's most recent calamities.

Table (3.1) List of Medium and Large-Scale Natural Disasters Cyclone that Occurred in Myanmar (2003-2017)

Date	Type of Hazard	Location	No. of Death	No. of Highly Affected
April 2006	Cyclone Mala	Rakhine State	37	-
May 2008	Cyclone Nargis	Ayarwaddy Delta	140,000	2.4 million people
October 2010	Cyclone Giri	Rakhine State	45	360,000 people
May 2016	Cyclone Roanu	Chin State and Sagaing Region	14	27757 people affected
May 2017	Tropical Cyclone Mora	Rakhine State		11,700 houses damaged

Sources: Myanmar Disaster Management Reference Handbook, March 2020, UNOCHA, 2013, World Food Program, 2005, Center for Excellence in Disaster Management & Humanitarian Assistance, 2017

Table (3.2) List of Medium and Large-Scale Natural Disasters Flood that Occurred in Myanmar (2003-2017)

Date	Type of Hazard	Location	No. of Death	No. of Highly Affected
December 2014	Indian Ocean Tsunami	Kawthaung, Labutta and Ngaputaw Ts	65	1300 houses damaged/destroyed
June 2010	Floods and Landslide	Rakhine – North	68	29,000 families
October 2011	Floods	Magway Region	-	30,000 people
August 2012	Floods	Across Myanmar	-	287,000 people
August 2013	Floods	Across Myanmar	-	20,000 people
July 2015	Floods	Across Myanmar	132	1.7 million people
August 2016	Floods	Six states	2	377,000 people
July and August 2017	Floods and Landslides	Across Myanmar	8	320,000 people displaced and affected
June 2018	Floods and Landslides	Across Myanmar	11	8,000 houses damaged, 23,000 people temporarily evacuated, 12,000 acres of farmland damaged
July 2018	Floods	Bago Region, Kayin State and Mon State	16	268,000 affected

Table (3.2) Continued

July-September 2019	Flooding and Landslides	Across Myanmar	75	Over 231, 000 people
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Sources: Myanmar Disaster Management Reference Handbook, March 2020, UNOCHA, 2013, World Food Program, 2005, Center for Excellence in Disaster Management & Humanitarian Assistance, 2017

Table (3.3) List of Medium and Large-Scale Natural Disasters Earthquake that Occurred in Myanmar (2003-2017)

Date	Type of Hazard	Location	No. of Death	No. of Highly Affected
September 2003	6.8 Magnitude Earthquake	Taung Dwin Gyi	7	-
March 2011	6.8 Magnitude Earthquake	Tarlay Township, Shan State	74	18,000 people
November 2012	6.8 Magnitude Earthquake	Shwebo, Sagaing	16	400 households
August 2016	6.8 Magnitude Earthquake	Chauk, Bagan	-	Many ancient temples damaged
March 2017	5.8 Magnitude Earthquake	Taik Kyi Township	-	Some houses, public buildings and government buildings

Sources: Myanmar Disaster Management Reference Handbook, March 2020, UNOCHA, 2013, World Food Program, 2005, Center for Excellence in Disaster Management & Humanitarian Assistance, 2017

Myanmar's government released a National Adaptation Program for Action (NAPA) in 2012 with the goal of examining the historical and future consequences of climate change in Myanmar and determining priority adaptation strategies. According to NAPA, the following factors have been noticed in Myanmar's climatic variability and change over the previous six decades: a general increase in total rainfall over most

regions (0.08°C per decade), with notable decreases in some areas (e.g., Bago Region); a decrease in the duration of the southwest monsoon season as a result of late-onset and early departure times; and increases in the occurrence and severity of extreme weather events, including cyclones and strong winds (Government of the Union of Myanmar, 2015).

In July and August 2015, floods and landslides impacted 12 of Myanmar's 14 states, affecting 1,676,086 people and killing 132. Homes, railways, roads, bridges, schools, health facilities, and monasteries, as well as the agriculture industry, were all damaged by floods and landslides. The worst-affected areas are in the country's central and western regions. Myanmar has a tropical climate with three different seasons: the monsoon/rainy season (May–October), the cold season (November–February), and the hot season (March–May) (March and April). Upper Myanmar receives more than 500 cm of rain during the monsoon season, lower Myanmar and Yangon receive more than 250 cm, and central Myanmar and Mandalay both receive about 76 cm. The rains began on July 16, 2015, saturating the earth. Cyclone Komen made landfall in Bangladesh on July 30, bringing severe winds and heavy rainfall to the Chin and Rakhine states, as well as the Sagaing, Magway, and Bago regions. The rains were very severe, and rainfall and river discharge rates in the country's central and northern mountains reached previously unheard-of levels. For example, water levels in the Mone Dam reservoir in the Magway Region, for example, were 1 meter below the crest.

3.2 Government agencies for Disaster Preparedness and Response

In Article 11 of the Natural Disaster Management Law, Myanmar's president declared a state of emergency in the Sagaing Region, Magway Region, Chin State, and Rakhine State on July 31, 2015, designating them as disaster-affected zones. The Recovery Coordination Committee (RCC) was formed on August 10, 2015, to lead recovery efforts, including developing a recovery strategy and establishing a Recovery Coordination Center to provide operational and information management support to the National Natural Disaster Management Committee (NDMC) and the RCC. Chaired by the Minister of Construction (MOC), the RCC consists of 28 members from respective line ministries (Government of the Union of Myanmar, 2015). The Recovery Coordination Committee (RCC) held a series of sector recovery planning consultation workshops in Nay Pyi Taw in September 2015.

The seminars covered infrastructure, social services, agriculture, and livelihoods. The goal was to design, consult, and discuss for the National Recovery Framework the various Ministry sectorial recovery plans. Throughout the discussion, ministries reported on ongoing and planned efforts, while foreign partners shared their suggestions and concerns, including improving data and information management coordination, gender issues, and how to "build back better" during the recovery phase (National Natural Disaster Management Committee, Republic of the Union of Myanmar, 2015). The government had spent K 28.8 billion on flood relief activities as of October 4, 2015. According to the Myanmar government and the UN Financial Tracking Service, nearly K 187 billion has been pledged to response activities. The government has set aside K 42.2 billion from the President's Reserve Fund, K 6.5 billion from the national government, and K 22.3 billion from state and regional governments, and private sector and civil society contributions (Government of Myanmar, 2015). Local organizations are also crucial in the flood relief effort. Hundreds of thousands of flood victims were aided by local response operations, according to the UN Office of the Coordination of Humanitarian Affairs (OCHA) Humanitarian Bulletin. The Myanmar Red Cross Society (MRCS) was instrumental in the first response to the floods, assisting around 380,000 people with evacuations. MRCS also distributed food, and non-food items such as blankets, mosquito nets, kitchen sets, family and hygiene kits, tarpaulins, and shelter tool kits to nearly 70,000 people. They supplied life-saving first aid as well as other medical treatments. Local NGOs and civil society groups (CSOs) played an important role in the reaction.

In the Magway, Sagaing, and Ayeyarwady regions, for example, the Network Activities Group (NAG) assisted nearly 163,000 individuals in collaboration with INGOs and the commercial sector. Food and livelihood assistance, hygiene kits, cooking utensils, clean water, and oral rehydration salts were among the activities, as were water source cleaning, toilet provision, and cash giveaways. Another example is the Chin Committee for Emergency Relief and Rehabilitation (CCERR), which coordinates flood response and recovery efforts in Chin State by overseeing coordination, advocacy, and information sharing and collection for a great network of civil society organizations and other partners (United Nations Office for the Coordination of Humanitarian Affairs, 2015). Myanmar requested international humanitarian help on August 4 to aid in effective flood response. The ASEAN Emergency Response and Assessment Team (ASEAN ERAT) and the Disaster

Emergency Logistic System for ASEAN (DELSA) were dispatched by ASEAN member states through the AHA Centre to help Myanmar's government during the crisis. Myanmar's government had received US \$18.2 million in monetary and in-kind contributions from ASEAN and 20 other countries, as well as the private sector, as of October 6, 2015. According to the Financial Tracking Service, \$35.6 million had been contributed or pledged for projects in Myanmar's flood response plan as of October 5, 2015, including contributions from ASEAN member states, the UN's Central Emergency Response Fund, multilateral institutions, private companies, and individuals (Government of Myanmar, 2015).

The Ministry of Social Welfare, Relief, and Resettlement (MSWRR) is the federal government's disaster management agency. Some of the most important things it does are coordinate and help the National Disaster Preparedness Working Committee, help people in times of disaster, and teach people how to deal with disasters. The Ministry of Home Affairs (MoHA) coordinates search and rescue activities and serves as vice-chair of several committees, including security.

Search and rescue, humanitarian help, transportation and logistics, relief and rehabilitation, health assistance, security, and preparedness are all actions carried out by Myanmar's Armed Forces. The National Natural Disaster Management Committee (NDMC), the Disaster Management Centre, and the Search and Rescue Work Committee all have military representation.

During disasters, the Ministry of Foreign Affairs (MoFA) contacts Myanmar embassies, consulates, foreign embassies, ASEAN, the UN, and international relief groups. The Ministry has been given responsibilities during normal times, before and after disasters, and during rehabilitation. It has a limited role when a disaster strikes. In terms of preparedness and reaction, the Ministry of Health and Sports serves as the focal point for health facilities and health services.

The Minister of MoHA and the Minister of MSWRR co-chaired the National Search and Rescue Committee, which was established on May 3, 2016. As is the case with NDMC (Republic of the Union of Myanmar, President's Office, 2016). Vice President II convened the National Natural Disaster Management Committee (NDMC) on May 31, 2016, which was co-chaired by Union Ministers of MSWRR and MoHA. The Secretary of NDMC is the Permanent Secretary of MSWRR. The NDMC is comprised of 12 work committees: the National Natural Disaster Management Working Committee; the International Relationship Working Committee; the Financing and

Fund Management Working Committee, the Search and Rescue Working Committee; the Security Working Committee; the Transport Working Committee; the News and Information Working Committee, the Rehabilitation and Reconstruction Working Committee; the Health and Management Working Committee; the Initial Need Assessment, and the Damage and Lost Confirmation Working Committee (Center for Excellence in Disaster Management & Humanitarian Assistance, 2017).

3.3 Disaster Management Law

Myanmar has made significant progress in disaster management policy initiatives, plans, and procedures since Cyclone Nargis devastated the country in 2008. Myanmar's government has changed its organizational structure, established new authorities, and planned to improve disaster management effectiveness at all levels (Center for Excellence in Disaster Management & Humanitarian Assistance, 2017).

Myanmar's government passed the Natural Disaster Management Law in July 2013, followed by the Disaster Management Rules in 2015. The Disaster Management Law's goals are as follows:

1. to thoroughly and quickly implement natural disaster management programs in order to reduce disaster risks;
2. to establish a National Committee and Local Bodies to carry out natural disaster management programs in a methodical and timely manner;
3. to coordinate natural disaster management actions with national and international government agencies and organizations, social groups, other non-government organizations, international organizations, and regional organizations;
4. to protect and repair natural disaster-affected environments;
5. to provide health, education, social, and livelihood programs to victims in order to improve their living situations.

So that natural disasters don't cause as much damage and loss as possible, the Natural Disaster Management Law also set up the following functions:

1. measures to prepare for and prevent natural disasters during the pre-disaster phase;
2. during a natural disaster, emergency responses include search and rescue;

3. rehabilitation and reconstruction activities for better living quality in the post-disaster period, as well as environmental conservation in disaster-affected areas (The Republic of the Union of Myanmar, 2013).

The Relief and Resettlement Department of the Ministry of Social Welfare is the principal government department in disaster relief (MSWRR). This is the disaster management department of the federal government.

3.4 Disaster Management and Risk Reduction in Myanmar

The Ministry of Agriculture and Irrigation in Rakhine State initiated risk reduction initiatives on storm shelter embankments in the aftermath of the 1968 storm, while the Ministry of Forestry in central Myanmar launched the Dry Zone Greening Project for the Nine Critical Districts in 1994. As a result, it is critical to profile past and current DRR projects, which will aid in the identification of future intervention areas in terms of geographical distribution, DRR sub-themes, and chronology. Regarding a list of 58 agencies that are involved in disaster management projects, including 24 ministries or departments, 10 UN Agencies, ASEAN, 22 NGOs, and two professional groups, there have been 88 projects profiled in all. Past and continuing initiatives have been grouped into seven categories, and the table below shows an overview of projects by theme (Ministry of Social Welfare, Relief, and Resettlement, 2012). Table (3.4) presents a summary of Myanmar's past DRR projects.

Table (3.4) Overview of Past DRR Projects in Myanmar

No.	Theme	Lead Agency			Total Projects	Timeline
		Govt	UN Agencies	INGO/ NGOs/ PA*		
1	Policy, institutional arrangements and further institutional development	8	1	2	11	2009 - 2012
2	Hazard, vulnerability and risk assessment	2	2	4	8	2009 - 2012
3	Multi-hazard early warning systems	9	2	2	13	2009 - 2012

Table (3.4) Continued

4	Preparedness and response programmes at the national, region/state, district, and township levels	8	-	6	14	2009 - 2012
5	Mainstreaming of disaster risk reduction into development	7	2	9	18	2009 - 2012
6	Community-based disaster preparedness and risk reduction	-	1	7	8	2009 - 2012
7	Public awareness, education and training	9	2	5	16	2009 - 2012
	Total	43	10	35	88	2009 - 2012

Source: MAPDRR (2009-2012). *PA: Professional Associations

Myanmar has endorsed a number of international and regional agreements and declarations related to disaster management and risk reduction. Myanmar has signed the Hyogo Framework for Action (HFA), the outcome document of the 2005 World Conference on Disaster Reduction (WCDR) in Kobe, Japan, along with 168 other countries. It is committed to implementing the HFA's five Priorities for Action in order to reduce losses disaster in terms of lives, social, economic, and environmental resources. Myanmar also endorsed The Sendai Framework for Disaster Risk Reduction 2015-2030 as part of the HFA, demonstrating its commitment to address disaster risk reduction and disaster resilience building with renewed urgency within the situation of sustainable development and poverty eradication and to integrate, as appropriate, both disaster risk reduction and disaster resilience building into policies, plans, programs, and budgets at all levels to consider (United Nations, 2015).

Myanmar is a regular participant in the Asian Ministerial Conferences on Disaster Risk Reduction (AMCDRR), which brings together Disaster Management Ministers from Asia and the Pacific to reaffirm their commitment to HFA

implementation. Myanmar is a member of the ASEAN Committee on Disaster Management (ACDM), which was formed in 2003. Myanmar hosted the 13th ACDM meeting in February 2009 in Nay Pyi Taw, Myanmar, as Chair of the ACDM 2009. The ACDM established, constituted, and deployed its ASEAN Emergency Rapid Assessment Team (ERAT) for the first time in the aftermath of Cyclone Nargis. The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) establishes a regional framework for strengthening disaster prevention, monitoring, and mitigation measures in order to reduce disaster losses in the area. Myanmar signed the AADMER in July 2005, and it was later ratified.

Myanmar is a member of the newly formed United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) Committee on Disaster Risk Reduction and was present at the first meeting in March 2009. Since its inception in 2000, Myanmar has been a member of the Asian Disaster Preparedness Center's Regional Consultative Committee on Disaster Management (RCC). It is one of the 26 RCC member countries that adopted the Hanoi RCC-5 Statement on mainstreaming disaster risk reduction into Asian development in 2005, which controls the RCC's disaster risk reduction program in Asia (Ministry of Social Welfare, Relief, and Resettlement, 2012).

3.4.1 Climate Change Policy and Strategy

Myanmar has a tropical climate with three seasons: a cold winter from November to February, a hot summer from March to April, and a rainy season from May to October, all of which are influenced by the southwest monsoon. The Central Dry Zone has the lowest mean annual rainfall (500–1,000 mm/year); the Eastern and Northern Hilly Regions have higher mean annual rainfall (2,500–5,500 mm/year); and the Southern and Rakhine Coastal Regions have the highest mean annual rainfall (2,500–5,500 mm/year) (Egashira and Aye, 2006). Temperatures in Myanmar fluctuate widely depending on the season. The Central Dry Zone's temperatures range from 40–43°C in the hot/dry season to 10–15°C in the cool/relatively dry season, with highlands temperatures plummeting to –1°C or 0°C. In the south of the country, seasonal temperature differences are negligible (Egashira and Aye, 2006). Critical challenges confronting Myanmar were examined, including natural hazard risk, historical and projected climate change consequences, as well as vulnerability, exposure, and sensitivity.

The Myanmar Climate Change Policy, as well as the related Myanmar Climate Change Strategy and Master Plan (2018-2030), are hereby adopted as a guiding policy and strategic framework. Long-term measures must be taken to ensure that concrete and coordinated action. Long-term to transform Myanmar into a low-carbon and resilient country capable of sustainable development.

The objective of the Myanmar Climate Change Policy is to create a climate-resilient, low-carbon society that is sustainable, wealthy, and inclusive for the benefit of current and future generations. The purpose of this policy is to provide long-term advice and direction for:

- (a) adapting to and mitigating climate change in Myanmar;
- (b) incorporating climate change adaptation and mitigation concerns into Myanmar's national priorities in an iterative and progressive way across all levels and sectors; and
- (c) make decisions that will benefit everyone by creating and maximizing chances for sustainable, low-carbon, climate-resilient development.

3.4.2 Myanmar Sustainable Development Plan

The Myanmar Sustainable Development Plan (MSDP) envisions a peaceful, wealthy, and democratic Myanmar in the long run. The purpose of this MSDP was to bring together the policies and institutions necessary for real, inclusive, and transformational economic growth. The MSDP is a dynamic document that lays out practical and actionable steps to address development difficulties while allowing Myanmar's residents to reach their full potential as individuals and citizens. It is the result of collaboration between numerous Myanmar authorities and individuals, as well as active engagement with a varied set of stakeholders. The MSDP has taken advantage of both current and proposed sector and thematic plans and strategies. In this respect, the MSDP is intended to provide a whole-of-government development framework that ensures that existing strategic documents are consistent and implemented in accordance with macro-level national development priorities.

As an outcome, the MSDP is a collection of previous plans and goals. Furthermore, by integrating MSDP action plans into global SDG targets, the MSDP serves as a bridge between local developmental needs and the global agenda for sustainable development. This MSDP contains three pillars, five goals, 28 strategies, and 251 action plans. All of this is in line with the SDGs, the Union of Myanmar's 12-Point Economic Policy, and a number of regional commitments made by Myanmar as

part of the Greater Mekong Sub region (GMS) Strategic Framework, the ASEAN Economic Community (AEC), and other agreements.

(a) Natural Resources & the Environment for Posterity of the Nation (Goal:5)

Protecting Myanmar's natural environment is vital to ensure that current and future generations can benefit from Myanmar's development. Goal 5 concerns with the legal, institutional, and policy frameworks that are required to better protect and manage our natural environment and ecosystems, such as increased conservation efforts, better development, and infrastructure planning, and increased enforcement of illegal natural resource-related practices, pollution, and other harmful activities. Strategies and action plans include things like encouraging good water use practices, increasing renewable energy generation, mitigating climate change, increasing green investments, protecting biodiversity, improving waste management, promoting sustainable urban development, and mainstreaming environmental considerations into policies, plans, and national accounting systems. The following six tactics are included in goal 5:

1. Strategy 5.1: Ensure a healthy and functional ecosystem as well as a clean environment
2. Strategy 5.2: Rise climate change resilience, reduce catastrophe and shock exposure while safeguarding livelihoods, and facilitate the transition to a low-carbon growth path.
3. Strategy 5.3: Ensure environmental sustainability by providing safe and equitable access to water and sanitation.
4. Strategy 5.4: Using an appropriate energy generation mix, provide inexpensive and reliable energy to communities and enterprises.
5. Strategy 5.5: Improve land governance and resource-based industry management to ensure that our natural resources dividend benefits all of our people.
6. Strategy 5.6: Effortlessly and sustainably manage cities, towns, historical and cultural centers

(b) Rise climate change resilience, reduce exposure to disasters and shocks while protecting livelihoods, and facilitate a shift to a low-carbon growth pathway (Strategy 5.2)

Myanmar has enormous growth potential, but there is still a significant infrastructure gap. Myanmar's ability to maintain the high rates of development

required for economic take-off may be limited without significantly increased investment in a variety of modern infrastructure from a variety of funding sources. On the other hand, Myanmar, continues to be one of the most vulnerable countries to climate change and natural catastrophes. However, meeting our country's immediate infrastructure requirements must not come at the expense of future generations. Myanmar will so embark on a low-carbon, green economic development path that emphasizes natural resource efficiency.

To ensure that infrastructure development produces the most potential benefit to the country, strategic infrastructure planning that includes social, environmental, and economic costs and benefits will be required. This will avoid the negative repercussions of badly planned infrastructure, such as deforestation, pollution, and other negative social implications, which would impair Myanmar's people's critical benefits from their natural environment.

Healthy ecosystems will be able to defend our infrastructure by minimizing their vulnerability to natural hazards, including landslides, flooding, and erosion. Myanmar will also work with individuals and communities at all levels to improve natural resource management and minimize, if not reverse, the effects of climate change by incorporating climate-sensitive measures into current laws and planning processes. Nine Action Plans will carry out this strategy.

3.4.3 Myanmar National Framework for Community Disaster Resilience and Myanmar Action Plan on Disaster Risk Reduction

The Myanmar National Framework for Community Disaster Resilience strives to create people-centered, inclusive, and sustainable socio-economic growth in the face of natural disasters and climate change. The framework expresses a common understanding, recommends a cohesive approach, and identifies potential prospects for Myanmar communities to become more resilient. A disaster-resilient community in Myanmar is well-informed about natural hazards and disaster risks and can use that information to make daily decisions. Such a community employs an inclusive planning approach to identify and implement structural, ecosystem-based, and nonstructural interventions, some at the household level and others at the community level, to reduce catastrophic risk. By soliciting the aid of community members and local organizations as soon as possible, they are better prepared and can withstand the effects of a disaster.

Because of the continuity of services, social welfare aid, and financial resources, they can quickly recover from any disaster.

Myanmar's ongoing governance reforms provide a solid foundation for catastrophe resilience in the context of local development. People-centered planning, funding allocation for local goals, enhanced decision-making at the local level for development and service delivery, and strengthened vertical linkages between different levels of government are among the reforms. Across Myanmar, entrance points for building community catastrophe resilience can be found in a wide range of industries and themes. The entry points vary depending on the community's features, such as socioeconomic profile and catastrophe risk setting, as well as the larger mission of sectors and themes, and may change and evolve over time. Myanmar's disaster risk management policy landscape lays the groundwork for enhancing community catastrophe resilience.

DRM in Myanmar has benefited from legislation, implementing laws, action planning, funding mechanisms, institutional structure, capacity building, and volunteer networks in recent years. The actions for communities in the MAPDRR are to identify the natural hazards that exist in the area, the households, assets, and livelihoods that are vulnerable to the hazards, and the society's physical and economic vulnerability. Incorporate hazard and forecast data into decision-making processes to guarantee that personal and community assets and livelihoods are built to better resilience standards. To reduce the danger of a disaster, make investments in your home and neighborhood. Strengthen disaster preparedness measures in the home and in the community. Enhance disaster youth volunteer capacity in DRM, including early warning distribution, search and rescue. Engage with the village tract or ward administration, local civil society organizations, and microfinance institutions to gain access to resources (both financial and human) for resilience building.

Actions for village tract or ward administration include ensuring that the village DRM planning process (as mandated by the Natural Disaster Management Law of 2013) employs participatory methodologies to identify disaster risk-related requirements of various interest groups (e.g., poorer households, vulnerable populations, marginalized groups, local private sector). Strengthen the connections between local development planning and DRM planning. Ensure that disaster resilience requirement are included in the village development plan and are sponsored through local development funds, sector programs, or civil society projects, as well as

addressing the underlying risk factors. At the township level, push for village resilience-building initiatives.

Under the leadership of the National Disaster Management Committee (NDMC), the Myanmar Action Plan on Disaster Risk Reduction (MAPDRR) 2017 has laid out a long-term goal for strengthening resilience by 2030. It has paved the way for realizing the vision through a series of tangible measures. The 32 high-priority tasks chosen for 2016-2020 implementation are ambitious yet attainable. The implementation will necessitate close collaboration and coordination among government agencies, development partners, the private sector, and the general public. The NDMC is dedicated to MAPDRR 2017 and has already begun taking steps to implement it.

Disasters can wipe out decades of development advances in a matter of hours or days, as the floods of 2015 and the Cyclone Nargis of 2008 in Myanmar revealed. From earthquakes to floods, cyclones to fires, the country is vulnerable to practically all forms of catastrophes. If not addressed in a comprehensive and methodical manner, climate change and imbalanced development can multiply the present risk. MAPDRR 2017 is a comprehensive and unified disaster risk reduction action plan for Myanmar that includes priority initiatives till 2020. It has established a long-term aim for 2030, taking into account deep-rooted underlying factors of disaster risk. Its goal is to offer a foundation for mobilizing and utilizing national and external resources, primarily to achieve result-oriented objectives.

Under the four pillars of risk information and awareness, risk governance, risk reduction, and preparedness for reaction, rehabilitation, and reconstruction, the action plan has selected 32 high-priority initiatives. Each priority action has goals, activities, outcomes, a timeline, and a lead ministry or department. Other departments and partners who will assist the main agency have also been identified. The key initiatives are aimed at strengthening the policy framework and systems in order to reduce long-term risk. A number of development policies and interventions are in the early stages of development, providing a window of opportunity for disaster and climate risk-informed development to minimize the creation of new risks. Preparedness for disaster response, rehabilitation, and reconstruction is critical for reducing risk.

MAPDRR Pillars

The Myanmar Disaster Risk Reduction Action Plan is divided into four pillars, each with six to nine prioritized actions. The four pillars correspond to the Sendai

Framework for Disaster Risk Reduction's four priority actions. There are various suggestive activities for each priority action. Each priority action has a lead department or many lead departments in some circumstances. Priority actions/projects have been estimated in terms of cost. The cost estimates provided are estimates only, as some of the tasks in priority actions require more specifics, such as location, coverage, and so on. Due to the intricacies and technicalities involved in the priority action, certain of the priority activities require high-level technical inputs and time to estimate cost.

The Myanmar Action Plan on Disaster Risk Reduction (MAPDRR) 2012 was created and implemented by the Myanmar government. The action plan was produced by an Inter-Agency Task Force chaired by the Director-General of the Relief and Resettlement Department (RRD), which included 25 agencies from 12 ministries, seven development partners, and an ASEAN representative as an observer. 'To build Myanmar safer and more resilient to natural hazards, therefore protecting lives, livelihoods, and developmental gains,' was the main purpose. The major goal was to make Myanmar safer and more robust to natural disasters, therefore saving lives, livelihoods, and developmental benefits. It identified 65 priority projects, which were divided into seven categories:

Table (3.5) Number of Projects under MAPDRR 2012

S/N	Component	No. of Projects
1	Component 1: Policy, institutional arrangements, and further institutional development	4
2	Component 2: Hazard, vulnerability, and risk assessment	8
3	Component 3: Multi-hazard early warning systems	10
4	Component 4: Preparedness and response programmes at the national, region/state, district, and township levels	10
5	Component 5: Mainstreaming of disaster risk reduction into development	13

Table (3.5) Continued

6	Component 6: Community-based disaster preparedness and risk reduction	9
7	Component 7: Public awareness, education and training	11
	Total	65

Source: MAPDRR 2017

From 2013 to 2017, the Myanmar Consortium for Capacity Development on Disaster Management (MCCDDM) worked to strengthen the DRM capacity of a wide variety of stakeholders through long-term partnerships in order to create safer and more resilient communities.

The Myanmar Program for Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) was initiated in 2015. The Myanmar BRACED Alliance received a £5 million project grant from the UK Department for International Development (DFID) for a three-year program from 2015 to 2018. Action Aid, World Vision, BBC Media Action, Myanmar Environment Institute (MEI), and UN-Habitat are part of the BRACED Alliance, which is led by Plan International. The initiative prioritized women and children as essential drivers of community resilience and sustainable development and aimed to help around 350,000 disadvantaged people become more resilient to climate extremes and potential calamities. In Rakhine, Kayin, Mon, and the Shan States, as well as Mandalay, Yangon, and Ayeyarwady, the alliance has executed community resilience programs in 158 villages across eight townships.

Comprehensive DRR and CCA, as well as safe schools and resilience programs, help local communities prepare for, respond to, and recover from extreme climate events. Around 2,000 Myanmar government personnel will be trained in resilience-building ideas and tools as part of the initiative. The BRACED Alliance also worked with other stakeholders and networks involved in resilience building, such as the Disaster Risk Reduction Working Group (DRR WG), to influence regulations and policy in order to help vulnerable communities become more resilient to natural disasters and climate change impacts.

The Myanmar Country Programming Framework of the Food and Agriculture Organization (FAO) contains four primary focus areas: 1) Agricultural production to ensure food and nutrition security is sustained, and rural livelihoods are strengthened;

2) food safety and quality is improved; 3) land and natural resource management is improved, and 4) disaster preparedness and mitigation is improved.

Myanmar has been receiving help from the Asian Development Bank (ADB) for a climate change project under the Capacity Development Technical Assistance (CDTA) 'Strengthening Climate and Disaster Resilience of Myanmar Communities', which is funded by the Canadian government. The initiative supports the building of national institutional capacity as well as local pilot testing of novel techniques. Because of government priorities, as well as significant catastrophe risks, possible climate change impacts, socio-economic vulnerabilities, and reliance on climate-sensitive livelihoods, the Ayeyarwady Region was chosen for the pilot testing. The pilot testing will take place at the community level in the Ayeyarwady Region, with activities taking place in Patheingyi and Ngazun townships to guarantee synergies with existing microfinance institutions and ongoing programs.

The CDTA is in line with the Myanmar National Framework for Community Disaster Resilience's agricultural, rural development, and financial inclusion aims. In consultation with various ministries, the ADB, and the DRR Working Group, the Disaster Management Department (DDM), MoSWRR led the preparation of the framework – as Chair of the National Disaster Management Working Committee of the National Disaster Management Committee – and "seeks to achieve people-centered, inclusive, and sustainable socioeconomic development in the face of disasters triggered by natural hazards and climate change." The framework articulates a shared concept, suggests a unified approach, and highlights potential opportunities for communities in Myanmar to become more resilient.'

In Myanmar, the United Nations Development Programme (UNDP) completed a five-year 'Environmental, climate change, energy, and disaster risk reduction project' in 2017. The DDM, the Forestry Department, the Energy Planning Department, and the Department of Rural Development were the key partners. The goal of the project was to encourage local communities to participate in CCA, disaster preparedness, and mitigation. Gender-responsive policy advice on climate change, catastrophe risks, energy, and the environment was provided by local, regional, and national government bodies. Gender was considered in the environmental impact analysis, environmental standards and processes, and multi-hazard risk assessment. The initiative also aims to strengthen the life skills and capacities of local communities, CSOs, and institutions in

order to create DRM networks. The northern forest areas, the delta and coastal regions, and the Central Dry Zone were also studied.

The UK government's Department for International Development funds the Humanitarian Assistance and Resilience Programme (HARP). The effort is intended to address humanitarian problems in Myanmar and near its Thai border. From 2016 to 2020, it intends to provide long-term solutions to conflict-related crises and to respond to natural disasters. The strategy employs a number of instruments, including delivery grants for direct humanitarian assistance, a rapid response fund, enabling grants, innovation, knowledge, and learning grants, and capacity enhancement grants, all of which are channeled through international and local non-governmental organizations.

3.4 History of Disaster in Delta and its impact

Cyclone Nargis hit Myanmar's delta coast on May 2 and 3, 2008, before moving inland across the Ayeyarwady and southern Yangon regions. Winds gusted to 240 km/h in the Delta, with storm surges of 3-4 meters in the southern part of the region. Cyclone Nargis is thought to have killed 84,537 people, left 53,836 people missing, and injured another 33,754 people. One-third of the area's estimated total population of 7.35 million people was severely hit by the hurricane. Since the storm, the Myanmar government and people, as well as the international world, have worked relentlessly to help residents of the Delta reconstruct their lives.

Cyclone Nargis was a Category 4 cyclone that made landfall in Labutta Township on May 2, 2008, with winds of at least 200 km/h, heavy rain, and a storm surge of 3.6 meters (12 feet). In Myanmar, at least 140,000 people were killed, with up to 80,000 of those slain in Labutta. "The disaster caused widespread destruction to dwellings and key infrastructure, including roads, jetties, water and sanitation systems, fuel supply, and electricity," according to the Post Nargis Joint Assessment from July 2008. Many water supplies were contaminated, and food supplies were damaged or destroyed. The gusts tore down trees and electricity lines, and the storm surge flooded dozens of settlements."

Storms with higher winds and exceptionally heavy rains disrupt people's movement and access to basic services, as well as destroy agricultural products. Mangrove deforestation for rice fields and firewood exposes people to storm surges and erosion. Because of the shorter monsoon season and greater temperatures, there is less time to gather rainwater and faster evaporation, resulting in water shortages for

agricultural and drinking water. Infiltration of seawater increases salinization, which affects nitrogen cycling in the soil and reduces rice crop output.

Table (3.6) List of Natural Disasters and Affected in Ayarwaddy Region/Delta

Date	Type of Hazard	Location	No. of Death	No. of Highly Affected
May 2008	Cyclone Nargis	Ayarwaddy Delta	140,000	2.4 million people
December 2014	Indian Ocean Tsunami	Kawthaung, Labutta and Ngaputaw Ts	65	1300 houses damaged/destroyed
August 2012	Floods	Across Myanmar	-	287,000 people
August 2013	Floods	Across Myanmar	-	20,000 people
July 2015	Floods	Across Myanmar	132	1.7 million people
August 2016	Floods	Six states including Ayarwaddy Delta	2	377,000 people
July and August 2017	Floods and Landslides	Across Myanmar	8	320,000 people displaced and affected
June 2018	Floods and Landslides	Across Myanmar	11	8,000 houses were damaged, 23,000 people were temporarily evacuated, and 12,000 acres of farmland damaged

Sources: Myanmar Disaster Management Reference Handbook, March 2020, UNOCHA, 2013, World Food Program, 2005, Center for Excellence in Disaster Management & Humanitarian Assistance, 2017

CHAPTER IV

Survey Analysis

4.1 Survey Profile

Labutta Township is in the Ayeyarwady Region's Labutta District. Labutta is a Mon word that means "water cross" and refers to crossing two rivers. Labutta Township currently has one township, three towns, seventeen wards, and sixty-five village tracts. There are 505 villages in this township. Labutta Township stretches 23.2 miles from east to west and 36.063 miles from north to south. Bogale Township is located to the east of Labutta Township. The Andaman Sea borders it in the south. It is bordered on the west by Ngaputaw Township and on the north by Myaungmya Township. Wakeman Township and Mawlamyinegyun Township are its neighbors. Except for a few flat hills below 50 feet north of the township, Labutta is a delta region with many rivers. Labutta Township is surrounded by waterways. The Ayeyarwaddy River, Pyar Ma Look River, Away River, and Thet Kal Thaung River are the most notable rivers. Ships and boats can navigate these rivers. The elevation of Labutta Township is 5 feet above sea level. The climate in Labutta Township is hot and humid. The maximum temperature was 39 degrees Celsius, while the lowest was 14 degrees Celsius. The rainy season will last 124 days in 2019, with a total rainfall of 121.83 inches. Pinned (Indian jack fruit), Mangrove (*Sonneratia caseolaris*), Black Mangrove (*Avicennia officinalis*), Pynma (*Lagerstroemia speciosa*), Phoenix pludosa (Thin Pawn), and *Rhizophora candelaria* are some of the natural plants found in Labutta Township. The current woodland cover is 10.03 percent.

Karen, Burmese, and Rakhine ethnic groups live in Labutta Township. According to the 2019 census, there are 6882 dwellings and households in the downtown area. There are 7030 dwellings and ten wards, one of which is 3 miles from Myothit. In 505 villages throughout 65 village tracts, 65947 dwellings and 70649 households are located. According to the Township General Administration Department, the total population is 329,910. (Male: 169,357; Female: 160,553) Every

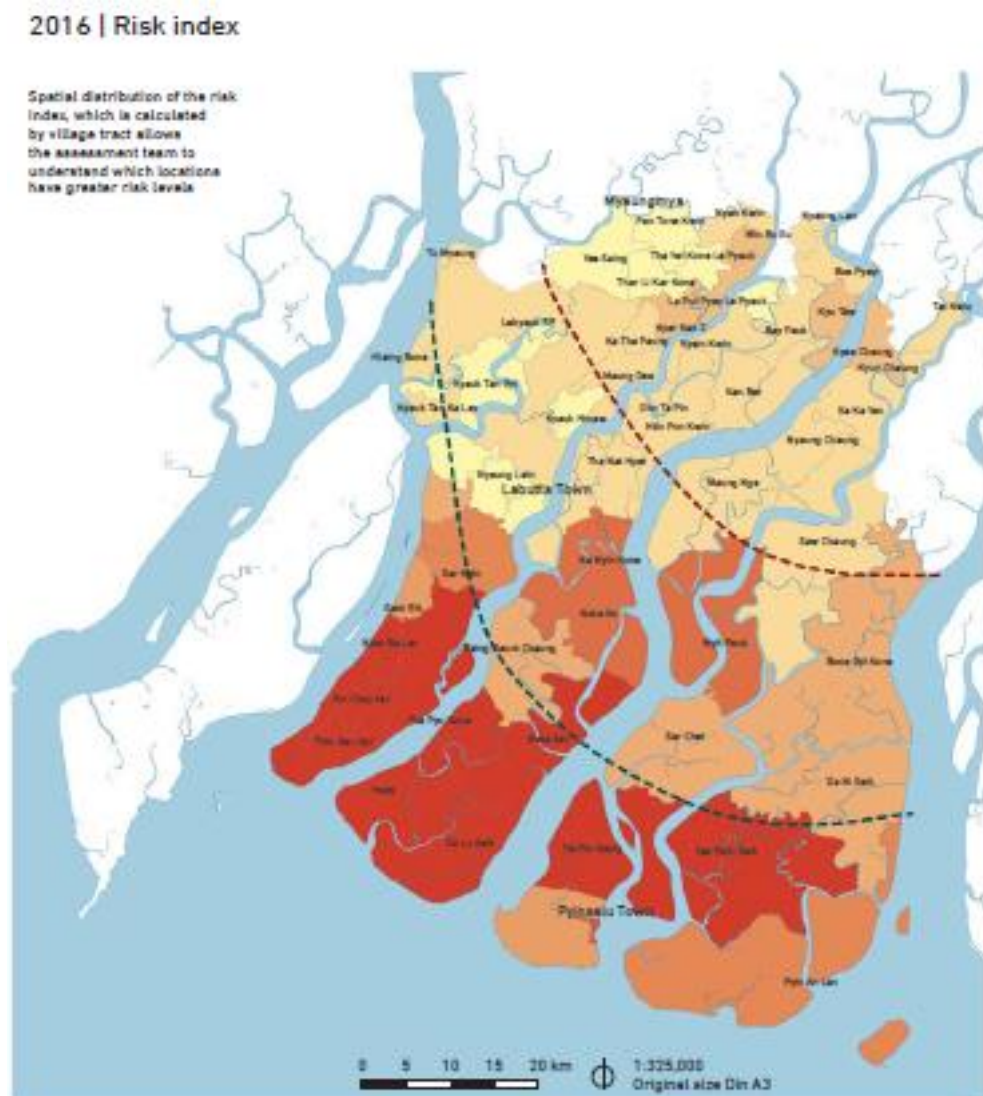
year, the population increases by 0.23 percent. Township administration office, 13 ward administration offices, and 65 village tract administration offices in Labutta Township. Labutta Township is a delta community with a thriving economy. Agriculture, livestock, salt manufacturing, and fishing are the primary industries of the township. Labutta Township has excellent road and river transportation. The township's majority of settlements are only accessible by water. Rice, paddy, fish paste, dry fish, prawns, and dried prawns are the primary products of the township.

Yangon Region and Upper Myanmar manufacture and export salt, coconut, crab, and betel nuts. Labutta Township's demographic and socioeconomic characteristics reveal several difficulties that render the township sensitive to shocks, regardless of climate change or climate-related hazards. They are expected to exacerbate the effects of climate change in the future. The demographic pyramid of Labutta Township from the 2014 census depicts inhabitants of various genders in each age category. The number of people aged between 15 and 19 is decreasing, whereas the population between 25 and 29 is increasing. The distribution is then normalized. This is due to two key factors. First, this is due to the disproportionate number of children caused by Nargis and the displacement of young people in pursuit of work or school. There is an unwritten perspective on gender and migration. Men made up 73 percent of Labutta's migrant employees in 2014. Only 38% of the township's population is under 18, which is a rather high number of young people. Women head 14 percent of families in Labutta Township, slightly lower than the national average of 15.1 percent.

Labutta has a far lower urbanization rate than the rest of Myanmar. Only 10.6% of residents in Labutta Township live in the city, even though 30% of Myanmar's population lives in cities. Ninety-seven percent of traditional houses in Labutta Township are composed of non-durable construction materials. Strong winds and flooding can also cause damage to homes. This is because they are poorly constructed and vulnerable to the spread of severe natural catastrophes, and they rely mainly on ecosystem services. Eighty percent of the population's drinking water comes from unprotected water sources such as lakes, rivers, and streams. Water storage capacity is lacking in rural towns, schools, health clinics, and other public buildings (reservoirs and water tanks). Due to a lack of water storage and management at the community level, access to drinking water will deteriorate. Saltwater infiltration into freshwater is a problem for today's water supply and irrigation systems. The coverage of natural catastrophes and climate-resilient infrastructure is minimal. Approximately ten percent

of the township's population is housed in cyclone shelters. The current transportation system is highly vulnerable to calamities and restricts public access. People in the area are more likely to be hurt by disasters because there isn't enough planning on how to use the land to deal with the effects of climate change on future disasters.

Figure (4.1) Risk Index of Labutta Township



Source: Risk index 2016 (Climate Change Vulnerability Assessment of Labutta Township)

According to figure (4.1), the whole township of Labutta is extremely vulnerable to natural disasters. These natural disasters have not only intensified over the past decade but also have greater potential. These include floods and inundation; strong winds and hurricanes or cyclones; and heavy rains; these include saline intrusion

and landslides due to the risk of sea-level rise. The economy of Labutta Township is so vulnerable that no other jobs are available, and the infrastructure is not resilient to disasters. Labutta's ecosystems are also deteriorating.

Village tracts closer to the coast are more vulnerable than those living inland. It is clear that this is due to the less accessible access to fresh water for drinking water and irrigation and transportation problems. At the same time, their income, housing structures, labor force participation, and access to cyclone shelters are poor compared to other parts of the township. Some villages are even worse off. In the meantime, while drought, heatwaves, and cyclones can affect the township, storm surges, salinity, and flooding are all likely to have a negative impact on coastal areas of the township more than the inland areas. This means that, according to the Vulnerability Index, the coastal areas of the township are currently facing a greater risk of climate-related disasters. But, if it is beneficial for the people living in these areas, it indicates that climate resilience construction should be the main focus for these areas.

4.1.1 Background of Labutta Township on Disaster Management and Resilience

Under the National Disaster Management Law of the Union Government, disaster management action plans are established for village tracts and villages.

Labutta Township Disaster Management Plan

Based on the Labutta Township Disaster Preparedness Plan, the changing needs of the region and the plan are drawn up in consultation with all stakeholders. Moreover, according to the type of disaster that may occur in the township before the disaster, during the disaster, duties, and responsibilities are described in three sections. Disaster mitigation and preparedness before natural disasters, early warning system, emergency relief, response, recovery, and reconstruction work is carried out according to this plan, the damage will be minimal, and the situation will be recovered quickly. The Labutta Township Disaster Management Plan is being developed by UN-HABITAT with technical guidance and expertise, led by the Department of Relief and Resettlement, and participated by relevant government departments, INGOs, NGOs, Local CSOs, and Building Resilience Adaptation to Climate Extremes and Disasters (BRACED Alliance Myanmar) since 2016.

In case of natural disasters in Labutta Township, the disaster management plan is designed to streamline recovery efforts to be able to systematically carry out preparatory work, rescue, and take care and mitigation activities. Moreover, this is the

plan to minimize the damage. The township disaster management plan was identified based on past natural disasters and their effects information on previous disasters in Labutta Township, including vulnerability to natural disasters and available resources in the township. The purpose of the plan is to include disaster risk reduction in any development projects in Labutta Township.

Labutta Township was devastated by Cyclone Nargis, and this disaster management plan aims to minimize casualties in future natural disasters. In addition, it was designed as a precautionary measure to prevent the destruction of natural resources, forests, livelihoods and property of the community, productive material, housing, and animals based on past experience. The Township Disaster Management Committee and 10 working committees under it have been formed for the systematic and effective implementation of disaster management activities in Labutta Township. The Secretary of the Township Disaster Management Committee is the main focal person and responsible for coordination and cooperation with UN agencies and local and foreign non-governmental organizations for disaster management activities.

Table (4.1) Formation of Township Disaster Management Committee

No.	Position Title	Department	Role of Committee
1.	Township Administrator	Township General Administration Department	Chairman
2.	Township Police Chief Officer	Myanmar Police Force	Member
3.	Executive Officer	Township Municipal Committee	Member
4.	Township Chief Officer	Township Rural Development Department	Member
5.	Township Chief Officer	Township Farm Land Management and Statistics Department	Member
6	Township Chief Officer	Township Irrigation and Water Resources Utilization Department	Member
7.	Township Chief Officer	Township Department of Industrial Agriculture	Member

Table (4.1) Continued

8.	Township Chief Officer	Township Agriculture Department	Member
9.	Township Chief Officer	Township Livestock Breeding and Veterinary Department	Member
10.	Township Chief Officer	Township Forest Department	Member
11.	Township Chief Officer	Township Immigration and National Registration Department	Member
12.	Township Education Officer	Township Education Department	Member
13.	Township Chief Officer	Township Planning Department	Member
14.	Township Manager	Myanmar Agricultural Development Bank	Member
15.	Township Chief Officer	Township Fishery Department	Member
16.	Township Manager	Inland Water Transport Department	Member
17.	Township Chief Officer	Department of Roads	Member
18.	Township Electric Engineer	Township Electricity Distribution Department	Member
19.	Township Medical Officer	Township Public Health Department	Member
20.	Responsible Person	Myanmar Telecommunication Enterprise	Member
21.	Chair	Township Maternal and Child Welfare Association	Member
22.	Chair	Myanmar Women's Affairs Federation	Member

Table (4.1) Continued

23.	Township Chief Officer	Township Internal Revenue Department	Member
24.	Law Officer	Township Law Office	Member
25.	Township Chief Officer	Township Co-operative Department	Member
26.	Manager	Myanmar Economic Bank	Member
27.	Deputy Chief Officer	Township Information and Public Relations Department	Member
28.	Township Auditor Officer	Township Auditor Office	Member
29.	Township Chief Officer	Township Trade Promotion Department & Consumer Affairs Department	Member
30.	Township Officer	Township Red Cross Brigade	Member
31.	Township Judge	Township Court Office	Member
32.	Town Administrator	Pyin Salu Town	Member
33.	Township Chief Officer	Local Cargo Office	Member
34.	Township Chief Officer	Township Fire Department	Secretary

Source: Labutta Township Disaster Management Plan (2016)

According to Table (4.1), the Township Disaster Management Committee was formed with a total of 34 people from the representatives of 34 relevant township level departments and township level local NGOs.

Figure (4.2) Formation of Labutta Township Working Committees

Formation of Labutta Township Working Committees	
1. Search and Rescue Working Committee	2. Emergency Relief and Shelter Working Committee

Figure (4.2) Continued

Formation of Labutta Township Working Committees	
3. Damage Confirmation Working Committee	4. Health Care Working Committee
5. Transport and Route Clearance Working Committee	6. News Information and Emergency Communication Committee
7. Security Working Committee	8. Recovery and Resettlement Committee
9. Fundraising and Procurement Working Committee	10. Training and Documentation Working Committee

Source: Labutta Township Disaster Management Plan (2016)

In Figure (4.2), ten working committees are under the Labutta Township Disaster Management Committee. There are the Search and Rescue Working Committee; Emergency Relief and Shelter Working Committee; Damage Confirmation Working Committee; Health Care Working Committee; Transport and Route Clearance Working Committee; News Information and Emergency Communication Committee; Security Working Committee; Recovery and Resettlement Committee; Fundraising and Procurement Working Committee; and Training and Documentation Working Committee.

4.2 Survey Design

Survey questionnaires were prepared with assessment questions and comprised six components to achieve the study's objectives. The first component of the study is to look into the demographic characteristics of residents in five villages in Labutta Township, which includes questions about sample profiles and disaster resilience. The second component includes questions that assess local knowledge of community catastrophe resilience for multi-hazard disaster preparedness in the study area. The third component is to evaluate community strategies for responding quickly during a crisis, and the fourth component is to evaluate community response for disaster recovery and rehabilitation. The fifth component involves evaluating community practices for disaster risk reduction and mitigation plans based on their experience and lessons learned from previous disasters. Based on previous experience, the final component is

to identify problems and challenges related to their preparedness, reaction, recovery, and mitigation. Then there were proposals from the community for future catastrophe preparedness and disaster resilience. The questionnaire was created using references from online community disaster resilience papers as well as consultations with disaster resilience supervisors and experts.

In the study, it has chosen both a quantitative and qualitative case study approach, which is needed to understand what the representatives of the local community think about local knowledge and experience in disaster management and community disaster resilience in five villages of Labutta Township. Of the five designated villages, two are coastal villages bordering the Andaman Sea; these villages are the most vulnerable and high-risk. The other two villages are located beside the bigger and wider rivers, so these villages are high-risk areas. Moreover, another village is the closest village to Labutta and is a type of inland village. Primary data consists of a household survey questionnaire from the community of Labutta and information collected through focus group discussion (FGD) from village leaders and stakeholders. And then, a key informant interview (KII) collected focal points from disaster-related Township Departments and local organizations.

Secondary data has been collected and published in documents from the Government Department, Township General Administration Department (GAD), United Nations Organizations (UN), International Non-Government Organizations (INGO), and INGO Project Community-based Assessment, etc. Survey data is collected from 3 respondents of key informant interviews, 104 respondents of individual interviews, and 45 respondents of focus group discussions from the urban and rural areas of five villages in Labutta Township. The researcher conducted five FGDs and three KIIs. The interviewees who take part in KIIs are town-level, and FGDs are village-level group discussions with ten representatives per village.

4.3 Survey Findings

Social and demographic factors such as age, education, gender, and occupation compositions influence disaster awareness, preparedness, response, mitigation, and experience. Social and demographic factor includes age, education, and occupations. The male (62) and (42) respondents answered survey questions, and women's participation was lower than men's participation, over 40 percent, showing the respondent had nearly a gender balance and women could express their opinion.

4.3.1 Characteristics of Respondents

The respondents' percentage of gender, age group, education, occupation, roles of village disaster management are presented in Table 4.2.

Table (4.2) Demographic Characteristics of Respondents

Gender	No. of Respondents	Percentage (%)
Male	62	59.6
Female	42	40.4
Total	104	100
Age Group	No. of Respondents	Percentage (%)
Under 18 years old	1	1
Between 18 and 24	5	4.8
Between 25 and 34	21	20.2
Between 35 and 44	38	36.5
45 years old and above	39	37.5
Total	104	100
Education Qualification	No. of Respondents	Percentage (%)
Middle School Education	39	37.5
High School Education	17	16.3
Attending university	6	5.8
Any Graduate	37	35.6
Post Graduate	5	4.8
Occupation/ Type of Business	No. of Respondents	Percentage (%)
Students	3	2.9
Government staff	6	5.8
Private Company staff	4	3.9
Own Business	17	16.5
NGO/INGO/CBOs	14	13.6
Dependence	10	9.7
Others (Farming, Fishery and Small shopping)	50	47.6
Total	104	100

Source: Survey data, November 2020

According to the above Table (4.2), 40.4 percent of total respondents are women, while 59.6 percent are men. Therefore, in the survey, the interview comprised slightly more males than females, and studies show that men are taking the role of disaster management and resilience in the community, while women are more vulnerable to disasters than men.

The majority of respondents were 37.5 percent of those aged 45 and over, and 36.5 percent of those between the ages of 35 and 44 had the maturity level for this study. The other largest group was between 25 and 34 years old, accounting for 20.2 percent. 4.8 percent of respondents aged 18 to 24 were responsible. Only 1% of the people surveyed were under the age of 18 years old.

According to the level of education of the respondents, the majority had basic education in high school, middle, and lower levels, 53.8 percent. 46.2 percent have a university diploma or a college education. Thus, basic education level; the higher percentage of high, middle, and primary school students is due to the low level of education of the people in the village. The survey found that the percentage of basic education level is higher than university graduates, which was slightly higher. In the villages, it is considered that there are people with basic education, high school, middle school, and primary school. However, this survey does not reflect the experiences of people in local villages because it is a study of knowledge and the current situation of the villages.

Of the respondents, 47.6 percent of the respondents were in the village of agriculture, livestock, fishing, and small shopping and trading. Then 16.5 percent are self-employed in villages. 17.5 percent of the respondents were private company employees, NGOs, and social organizations in this survey, and 5.8 percent were government employees. 9.6 percent of them are dependent on others. This is the classification of the occupation of the respondents, which includes businesses in the villages and town, and how to increase the disaster management and resilience of businesses by putting together disaster preparedness and mitigation plans in more effective ways. This percentage of respondents was mostly from village-based businesses, mainly for seasonal agriculture and fishing.

4.3.2 Local Knowledge of Preparation on Community Disaster Resilience

Regarding the preparation process, which is an important part of community disaster resilience, Overall, it found that local knowledge and experience, resource

preparatory status, access to information, networking, and the existence of community-based social organizations were all affected by these survey results.

Table (4.3) Experience of Disaster in Labutta Township

Disaster experience	No. of Respondents	Percentage (%)
Yes	101	97
No	3	3

Source: Survey data, November 2020

According to Table (4.3), more than 97% of all respondents had experienced a disaster, meaning almost all of the respondents were affected by the disaster in Labutta Township, and only about 3% had never experienced it. Many respondents to Cyclone Nargis in 2008 said that the worst and most devastating thing in Myanmar was that, in addition to other disasters such as floods and fires, they also suffered from tsunamis and the COVID-19 pandemic.

Table (4.4) Most Concern Disaster to the Community

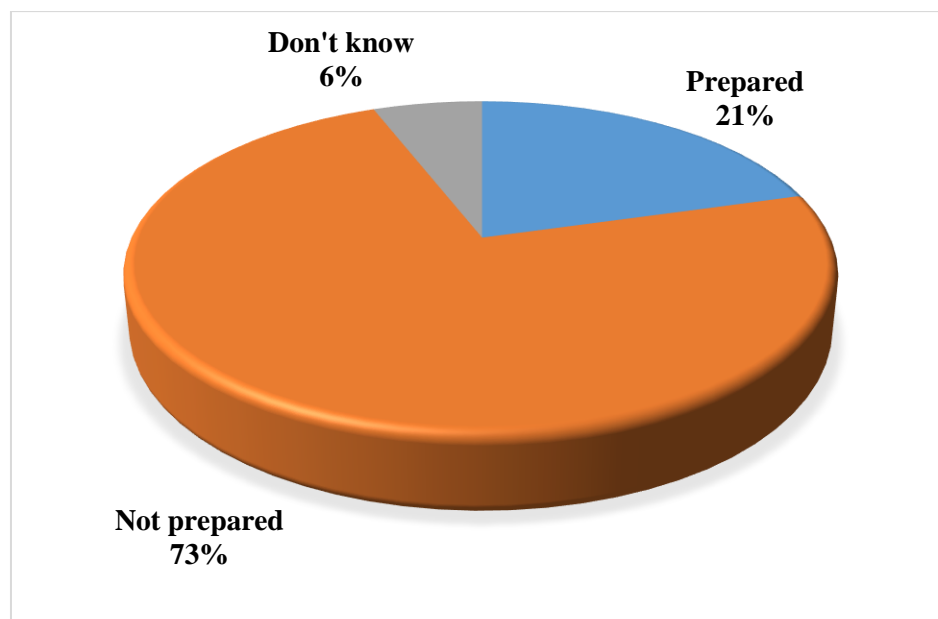
Disaster	Percentage
Cyclone	31%
Flood	20%
Pandemic	18%
Fire	13%
Tsunami	11%
Earthquake	6%
Others	1%

Source: Survey data, November 2020

According to Table (4.4), the most concerning disaster in Labutta Township is the cyclone. The second is the flood. The third is the current epidemic of the COVID-19 pandemic. There were also fires and tsunamis. According to these findings, Labutta Township and its villages were considered in the disaster-prone area. Although Labutta Township and towns have suffered many disasters and remain disaster prone areas, the community in the area has not functioned well in essential food and need, shelter and shelter materials, water and sanitation, occupation, market access, infrastructure, and natural resources. 92 percent of respondents said that venture capital and business

ventures were fundamentally inadequate. According to the survey, the basic needs of the region's livelihoods, markets, and resources are not suitable. The local community mainly engages in fishing, agriculture, salt production, and casual labor. In the years since the Cyclone Nargis period, irregularities in the weather and the influx of salt water have led to irregular production of agriculture and fisheries. In addition, the current labor and market conditions are deteriorating due to the COVID-19 effect and restrictions. Infrastructural services such as education, health, transportation, and cyclone shelters were insufficient.

Figure (4.3) Prepared Recovery Plan for Future Disaster

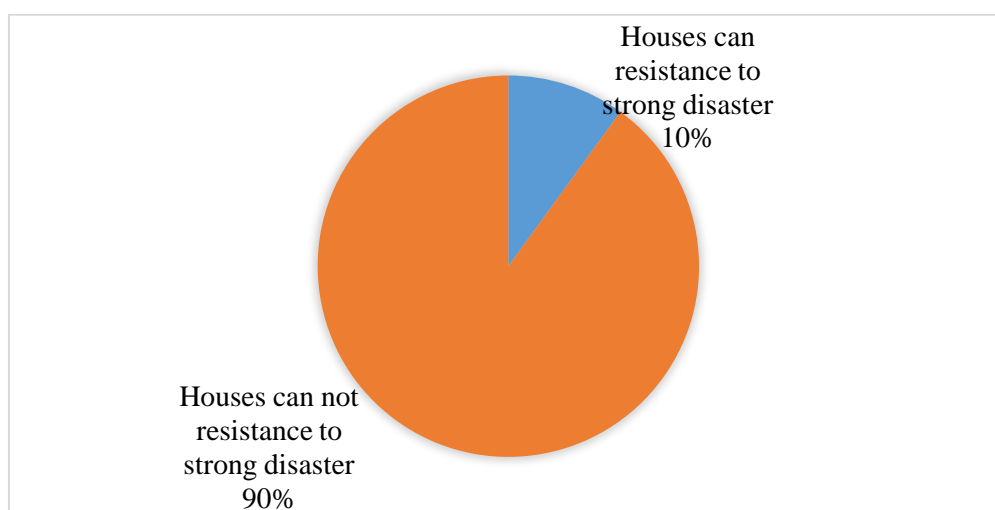


Source: Survey data, November 2020

As of figure (4.3), in the community, 73% of respondents said they were unprepared for weather forecasting and disaster recovery, and the village was largely unprepared. Only 20% of the respondents said that some leaders and the responsible person considered the amendments. More than 5 percent are unaware that disaster preparedness is weak. In addition, about half of the respondents did not even understand the nature of disaster preparedness, response, and recovery plan after affect disaster hit. It is clear that knowledge, awareness, and practice are still weak. About 70% of respondents said there was no rehabilitation record, such as response planning and essential seasonal business, social context response planning, and historical records of disasters in the community. Disaster warnings are most commonly getting on television,

and most are known through radio and village administration. A few people know about the use of mobile smartphones through social media and internet-networking sites, and sometimes from text messages. In addition, more than 70 percent understand that they will comply with disaster warnings, and only about 30 percent are unaware. About 70% of respondents are familiar with meteorological information, and only about 30% are unaware.

Figure (4.4) House Resistance to Strong Disasters



Source: Survey data, November 2020

In Figure 4.4, based on the community's experience and knowledge of disasters, 90 percent of respondents living that their current housing structure was not resistant to major disasters. And only about 10% could withstand it. As a result, it is essential that people in the area leave as soon as possible in the case of a major disaster. Only one of the villages that were looked at has a cyclone shelter that meets the standards.

The community and community-based organizations can connect with other outside organizations in the event of a disaster. 70% of the respondents replied that they could connect with the relevant departments, authorities, and social organizations. The community has the largest number of resources and resources to prepare for and respond to disasters. Some villages have Red Cross volunteer groups supporting the community. Poor facilities are infrastructure, natural resources, and forests. Financial and technical resources are scarce. Group discussions with village elders represent local traditions that can be used to anticipate natural disasters. A

tropical storm could be predicted if the sea urchins came ashore. They can predict thunderstorms and heavy winds if they hear screams from the valleys of the seashore.

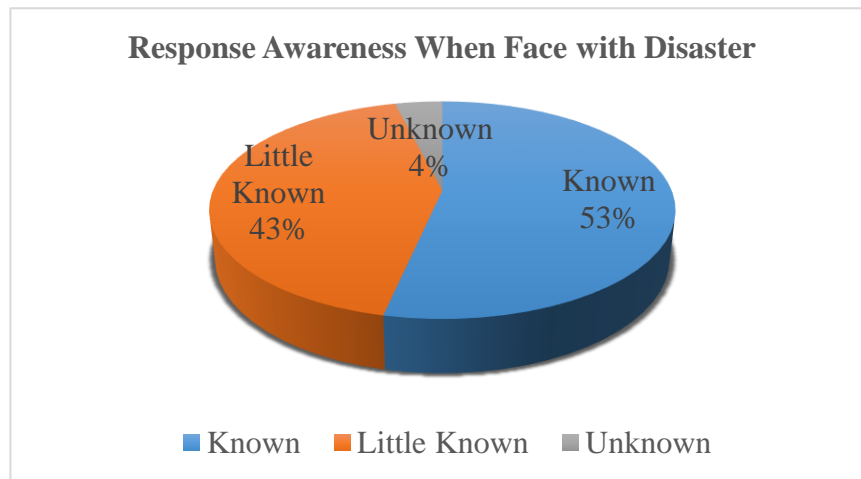
About 50 percent of the respondents know a little bit about the existence of government policies, regulations, and procedures regarding disaster management, so it can be considered that they do not know for sure. Furthermore, more than 30% are unfamiliar with disaster law, policy, and procedures. Therefore, the community's understanding of disaster law, policy, and procedures is weak. Communities play an important role in responding to the effects of a disaster. People at this stage are often at risk and suffer the greatest impact for a variety of reasons. Nevertheless, they are not victims of the disaster. The local community must be involved in disaster management programs, with responsive and professional knowledge from the outset based on local geology, disaster status, and disaster preparedness, together with resilience and livelihood skills. Relevant government departments, social organizations, and local administrators must plan and support the community.

The purpose of disaster preparedness is to minimize the impact of identifying vulnerable populations, locations, and access points, to create an organization for activity, and to develop a negotiation strategy that reduces the waste of resources, time, and effort. Local knowledge and practices can help to implement organizations to improve disaster preparedness activities. It is essential to learn how local people in a particular area view and interact with their environment. Local knowledge changes over time as people learn more about their environment and adapt to social and economic changes.

4.3.3 Local Knowledge on Response to Disasters

Understanding and adhering to community responses to disasters is an important part of disaster management.

Figure (4.5) Response Awareness When Face with Disaster



Source: Survey data, November 2020

According to Figure (4.5), according to the field study, more than half of all responders are prepared to respond to a disaster. The other half discovered little, and about 4% did not. Because of these respondents, only half of the community is aware of the disaster response process. Educating the other half on how to respond in the event of a disaster and conducting drill exercises and rehearsals still needs to be done. Another important step in disaster response is to identify vulnerable groups and systematic management of evacuation. 76 percent of respondents said that mapping was not conducted for vulnerable areas or groups. Furthermore, 9 percent of respondents said they had no idea. This is a concern for groups of people. Villages in the disaster-prone area should be provided with maps of the locations of vulnerable groups. It can be said that there are no maps showing the sensitive building sites according to the local situation. The elderly, pregnant women, the disabled, and women with children are the most vulnerable populations.

The community's response to a disaster can be assessed based on the resilience of the community. They are believed to be resilient because most of the surveyed villages were affected by Cyclone Nargis. Based on the experience of Cyclone Nargis in the past, it is believed to be resilient to future disasters. It is understood that utilizing resources for disaster resilience, systematic planning of vulnerable groups, evacuation, and good business practices are understood to be crucial. Local social organizations will prioritize these processes in disaster response. About 32% of respondents did not know about the government's disaster management procedures. More than 50 percent of respondents said they knew very little, and only about 10 percent said they did. It is also important for communities to be aware of the government's disaster management

practices. Accountability of government authorities in responding to disasters, rules, and regulations to be followed if you know the support.

According to Table (4.3), more than 45% of respondents said that there were no disaster relief or response teams in the villages. Disaster management must include relief and response teams from the national level to the ward/village level. Many villages, especially in Labutta Township, are in danger and need relief and response teams.

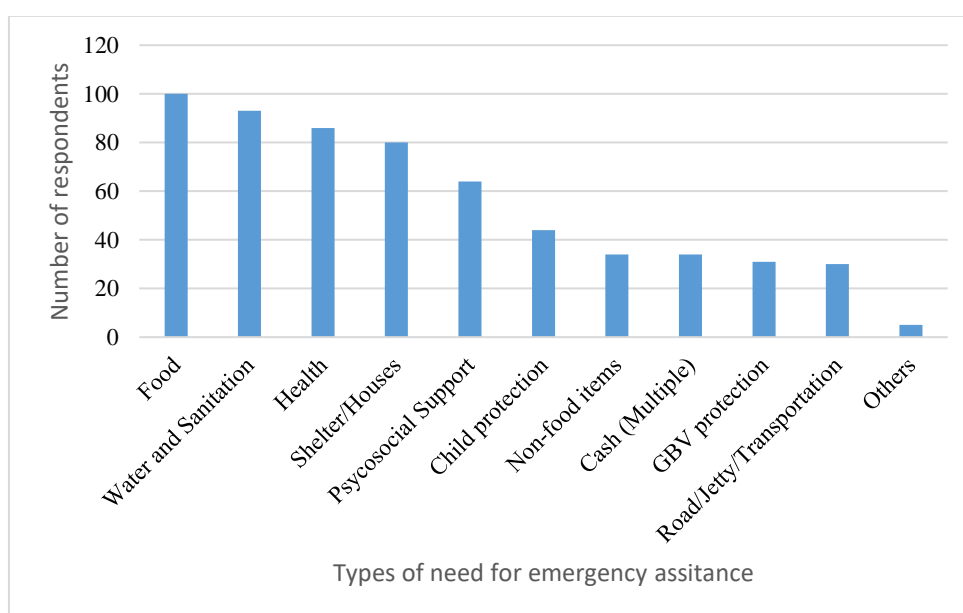
Table (4.5) Community Have a Group Specially Dedicated to Disaster Response

Have a Group	No. of Respondents	Percentage (%)
Yes, have a group	52	50
No, don't have a group	47	45.2
Unknown	5	4.8

Source: Survey data, November 2020.

Table (4.4) shows that villages have established relief and response teams that use village loudspeakers to warn and respond to disasters. Evacuation of vulnerable groups assists with flag-raising, warning flags, and the identification of safe places. Based on their experience, the community responds to the need for emergency assistance in the event of a disaster, as shown in Figure 4.6.

Figure (4.6) Need for Emergency Assistance



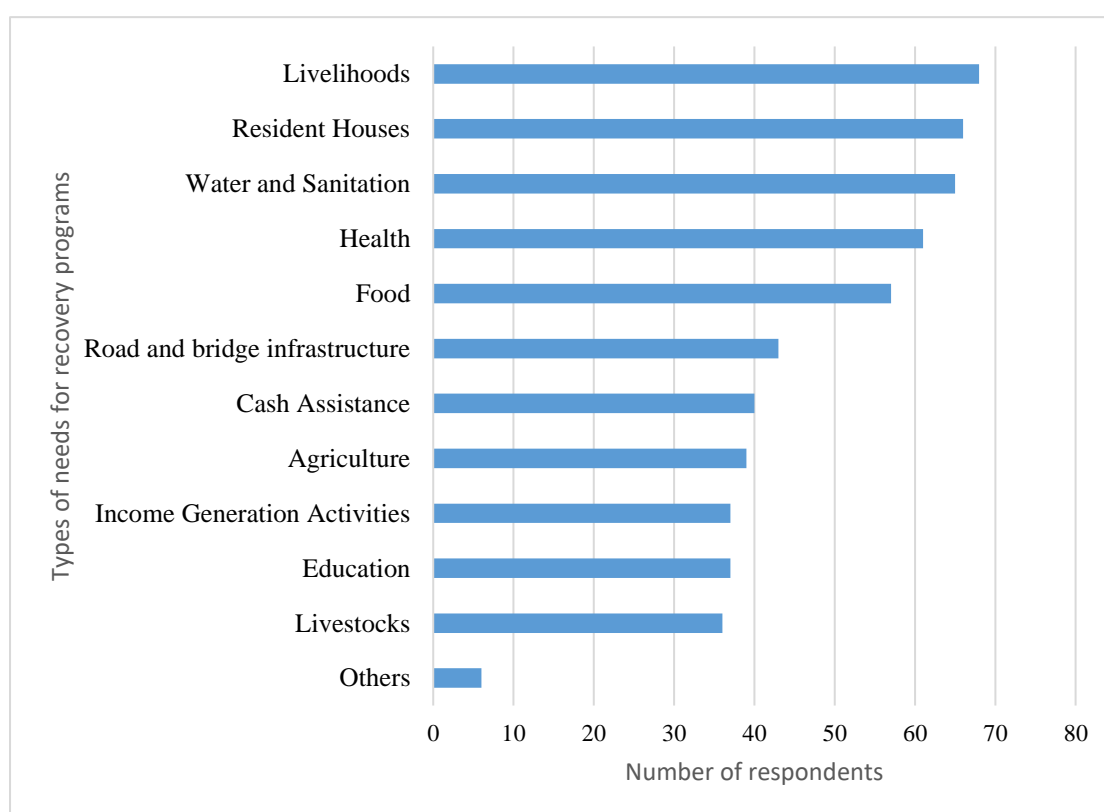
Source: Survey data, November 2020

According to Figure (4.6) of the respondents, the five priorities for an emergency response to disaster relief are food, water and sanitation, healthcare services, shelter and house materials, and psychological support.

4.3.4 Knowledge of Recovery and Rehabilitation

Recovery and Rehabilitation work is important to be able to resume agriculture, livestock, fishery, other occupations, and businesses in disaster-stricken areas. To carry out these activities, priority projects such as transportation, communication, health, education, and power must be reconstructed systematically.

Figure (4.7) Needs of Recovery Programs

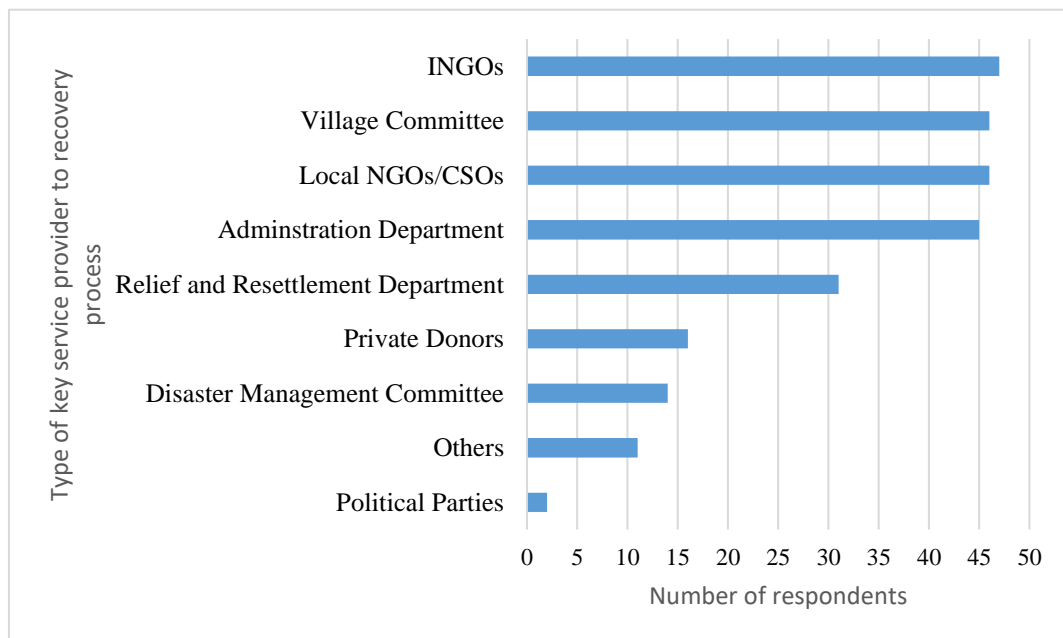


Source: Survey data, November 2020

According to Figure (4.7), respondents, the first five priority activities to be implemented are livelihoods, residential building, water and sanitation, health care services, and food access, based on their experience in the community. Other priorities include road and bridge infrastructure, providing financial capital, agriculture, education, livestock, and income generation activities. Based on past experience, they coordinate with township-level departments and NGOs for recovery and rehabilitation

work. For water and sanitation restoration, water is pumped from unclean ponds, replenished with water from drinking water sources, and drinking water is provided. The construction and operation of safe toilets were provided. As a disadvantage of the rehabilitation process, the forests and trees have been destroyed, and the property has been sold due to a lack of livelihood. The benefits include the construction of new roads, the construction of new bridges, and changing lifestyles. The community participation of the villagers has been strengthened during the recovery period.

Figure (4.8) Key Service Provider to Recovery Process



Source: Survey data, November 2020

As in Figure (4.8), as the respondents, international NGOs, village committees, local NGOs/CSOs, and the General Administration Department (GAD) provided to the community in the recovery process based on their experience. In addition, the Relief and Resettlement Department, private donors, the disaster management committee, and the Myanmar Red Cross Society also support recovery programming in their community.

4.3.5 Mitigation Plans for Future Disasters

While these disasters and hazards cannot be prevented, mitigation plans focus on minimizing the impact of such incidents when they occur. Mitigation plans include projects that reduce or get rid of losses caused by the same risk that keeps happening over and over.

Table (4.6) Prepared Mitigation Activities from Past Lesson Learnt

Prepared mitigation	No. of Respondents	Percentage (%)
Yes, prepared	65	62.5
No, don't prepared	36	34.6
Unknown	3	2.9

Source: Survey data, November 2020

In Table (4.5), over 62 percent of respondents said that the community had taken lessons from past disasters and made mitigation plans. In particular, the formation of committees, the sustainability of schools, rural health centers, and infrastructure. They also plant trees. In some villages, cyclone-resistant monasteries are being built and are not yet completed. However, over 30 percent of respondents said there was no plan based on the previous disaster experience, so disaster mitigation plans were weak in some villages. In addition, the community committees of some towns prepared emergency food, medicine, and drinking water when devastating disasters happened in their villages. However, some village committees do not have a plan for the mitigation arrangement.

Evacuation plans are an essential part of coping with disaster mitigation. Only then can the disaster be minimized. It is also crucial to have a relocation facility, including pre-rehearsal drills for evacuation. Sixty percent of respondents are familiar with the emergency evacuation site. Over a third have only heard from other communities. Only about 10% were unsure of where to flee. Just over 50 percent of respondents said the emergency evacuation facility was a standard cyclone shelter. More than 30% of the respondents said it was not a typical shelter, so it can be considered that it is not a designated safe shelter in some villages. More than 70 percent of respondents said they did not have a disaster risk assessment chart or maps showing the capacity of the community. Most villages do not have these capacity maps, as only 20% of respondents said that. The ability of the villagers is essential for the disaster mitigation process. In a disaster, the community should contact the relevant departments; about 50 percent of the respondents said that there are plans to connect organizations. Therefore, village elders and representatives can coordinate with disaster-related departments and agencies.

According to group discussions, village representatives have seen the current climate change situation. Significantly increasing temperatures, abnormal seasons,

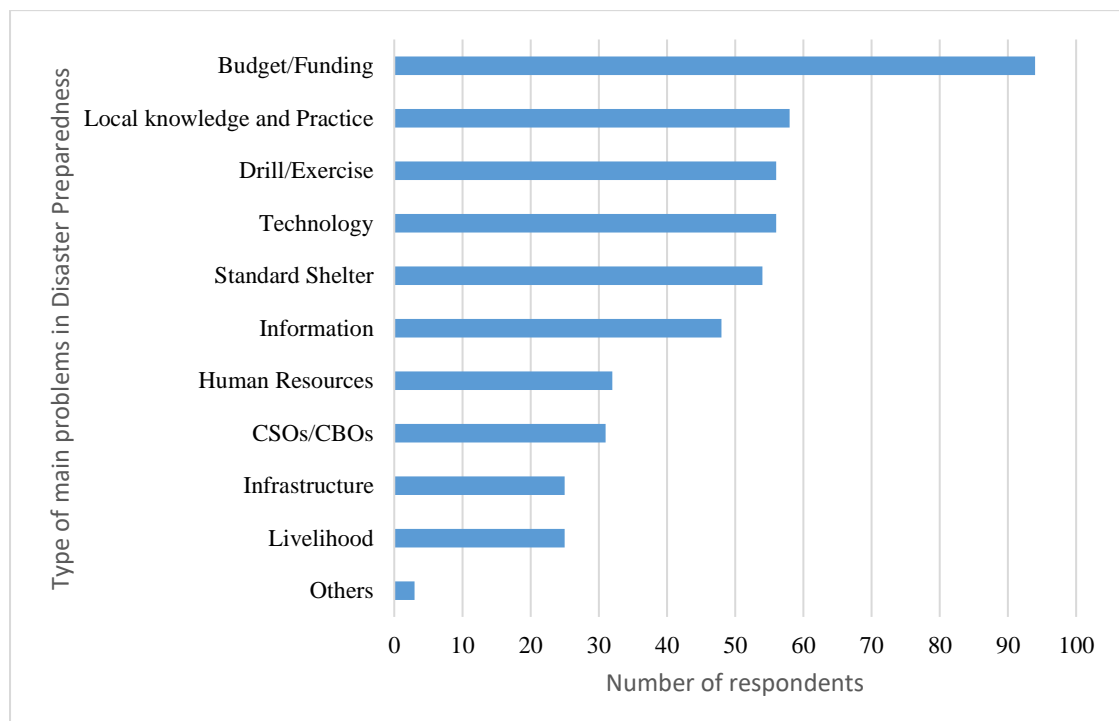
landslides beside rivers, rising sea waves, and deforestation occur in their villages. Village committees often have no plans to change land management patterns depending on the changing climate and population growth. There are more poor people in the villages and more unemployment. According to the discussion, the best ways to overcome the disaster are access to information, evacuation and cyclone shelter, networking with townships, and good transportation.

4.3.6 Problems and Challenges of Community Disaster Resilience

Community resilience depends on disaster preparedness, response, recovery, and mitigation being essential to be involved in respective programming. There are several significant challenges involved in disaster preparedness.

According to figure (4.9), the five main challenges and issues for disaster preparedness are budget/funding, local knowledge and practice, drill and exercise, technology, and standard cyclone shelter.

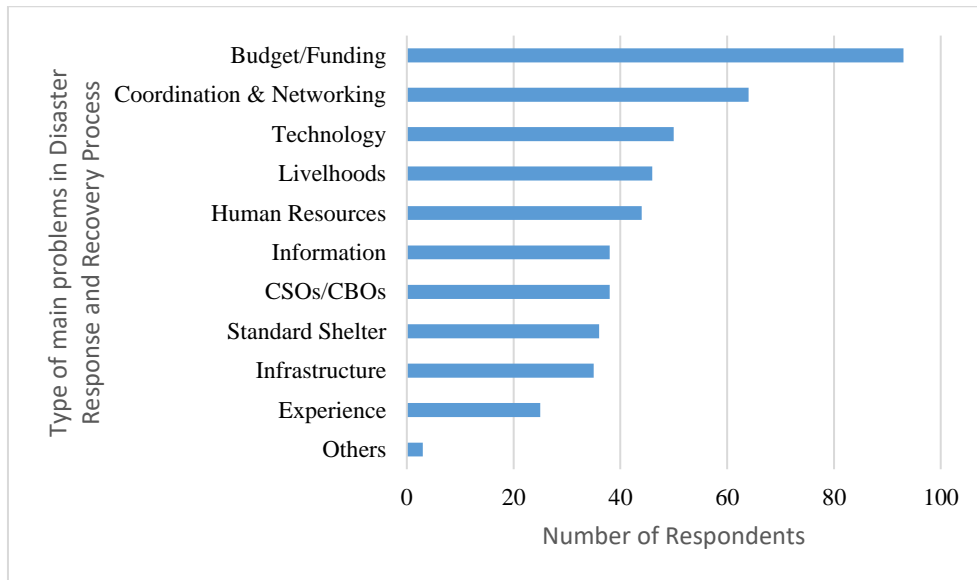
Figure (4.9) Main Problems in Disaster Preparedness



Source: Survey data, November 2020

According to the respondents of figure (4.9), the five main challenges and issues for disaster preparedness are Budget / Funding, Local knowledge and practice, Drill & exercise, Technology and Standard cyclone shelter.

Figure (4.10) Main Problems in Disaster Response and Recovery Process



Source: Survey data, November 2020

According to the figure (4.11), the five main problems and challenges to disaster response and recovery are budget and funding; coordination and networking; technology; livelihood; and human resources. Moreover, the challenges and needs of community disaster resilience include shelter, emergency food, drinking water, information, and health care services. Health risks are encountered in disaster preparedness, and the response has water and sanitation problems, including diarrhea and infectious diseases like dengue fever. These problems may be due to the difficulty of accessing clean drinking water and inadequate latrines. The main requirements for disaster management committees and organizations are funding, cooperation with organizations outside the community, preparedness, and community participation. Difficulties in accessing expertise and experience in disaster resilience include a lack of regular educational sessions and drill exercises, a funding gap, and technical weaknesses. In addition, the villagers are poor and have socio-economic difficulties in their context. Most coastal villages are more vulnerable to natural disasters. Because preventive measures are not carried out properly, there is insufficient income, poor knowledge and education in the community. The villages in Labutta Township are vulnerable as the government does not implement preventive measures. Many difficulties communicating with government departments and a few community-based disaster preparedness and response groups. Community disaster resilience is still challenging due to socio-economic and livelihood challenges in disaster-prone areas.

CHAPTER V

CONCLUSION

5.1 Findings

Natural disasters can have a severe effect on Myanmar, making it one of the most vulnerable countries in the world. Many of the country's 51.4 million people and productive assets (land, ecosystems, and infrastructure) are concentrated in the Ayeyawady Delta and the Dry Zone Area, which are also the two physio-geographic regions most vulnerable to cyclones and tropical storms, storm surges, and floods, and droughts and heat waves, respectively. As a result, people and assets are particularly vulnerable to catastrophes, and people's ability to withstand and recover from disasters is hampered by low socio-economic outcomes due to a significant reliance on climate-sensitive industries like agriculture and limited access to infrastructure.

Labutta Township's community disaster resilience poses a significant threat to the livelihoods and well-being of thousands of residents. In Labutta Township, Cyclone Nargis' devastation in 2008 has left a near-dangerous legacy of natural disasters. The findings suggest, however, that climate change's effects on ecological and infrastructure systems and social and productivity in Labutta Township could substantially impact capacity and resilience in the future. Furthermore, the likelihood of future natural disasters is projected to rise. Therefore, it likes to inform the humanitarian & development partner organizations and government responsible people to take attention to this problem.

Almost every community in Labutta has been impacted by the disaster. The current COVID-19 pandemic is also affecting them. As a result of these findings, the disaster-prone area was identified as Labutta Township and its villages. The community does not have appropriate access to basic needs, socio-economic conditions, or catastrophe readiness for the planning process. International organizations and governments rarely meet their disaster preparedness obligations. In villages, community-based local groups are also underutilized. Traditional experience and local knowledge are more valuable in disaster preparedness and response processes.

Technology and creativity are still lacking, as are local institutions and structured educational activities.

The community does not engage in regular disaster response exercises, drills, and awareness-raising activities because these response capacities are less effective. As a result, the community's ability to respond to disasters is limited. Planning and organization, including responsibilities for pre-determined vulnerable groups and locations in the community, are lacking. In evacuation zones, emergency food and shelter must be available. There was no emergency drinking water, food, or equipment arrangements at the evacuation site.

Housing, health centers and clinics, schools, roads, bridges, cyclone shelters, and transportation are all vulnerable to the growing effects of climate change during the recovery process. The community's health facilities and schools are not resistant to severe calamities. Housing and infrastructure services are made of non-sustainable local materials, with over 90% of local items used in some places. Only roughly 10% of the township's population is protected by resilient structures such as cyclone shelters. There is no plan for farming, fishing, making salt, or raising cattle to get back on their feet after a disaster.

The study concludes that it is critical to mitigating natural disasters caused by amplified severe weather events. Rising coastal floods, greater temperatures, and more frequent hot days necessitate emergency plans. In addition, during the brief monsoon, be prepared for variations in rainfall and unpredictable rainfall patterns in other seasons. The threat posed by these climates is posed by severe and diverse vulnerabilities that are deeply intertwined within them. It is vital to maintain the ecosystem services on which communities rely, but there is a risk of loss in the years ahead if there is no means to avoid it.

Local economic and production models have insufficient technical abilities to adjust to various vocations, relying mainly on climate-sensitive agriculture and fisheries, which are crucial for the current problems and challenges. Agriculture has been harmed by saltwater intrusion, high average temperatures, heat waves, floods, and heavy rains, yet most local communities lack possibilities for social, technical, and vocational skills selection. Young individuals are more likely to have it, and men migrate twice as much as women. These consequences are expected to worsen in the coming years. This condition suggests that incomes will likely fall, and migration will undoubtedly grow.

The entire system must be addressed to bring about the advantages and adaptability of vulnerabilities. Effective planning, resource mobilization, coordination, and timing, on the other hand, require a strategic approach. The exposure and action plan are a step toward long-term development and resilience. Local governments and government levels, in particular, must be involved in the implementation process for it to continue. Lifestyles and livelihoods would be especially difficult for individuals who live near the coast if no action is taken now.

5.2 Suggestions

For communities, natural disasters are unavoidable. However, it is not an option to build catastrophe resilience. Disasters have demonstrated the far-reaching, negative impact of disasters on hard-won development gains in the past.

In disaster planning, a community must be able to manage the threats that surround it while also reducing its exposure to these hazards. Therefore, it is vital to develop a village management organization comprised of young and old individuals. The Committee for Disaster Management Members, staff, and social organizations all have a responsibility to fulfill their obligations on time. In their respective villages, they communicate with local representatives and youth committees. The government and relevant stakeholders should hold more public awareness seminars and train at the village, village tract, and ward levels. This is the most effective strategy to improve community understanding and resilience. Disaster awareness IEC materials, including posters and booklets, must be distributed to all families and those in crowded places. Arrangements for rescue boats and vehicles should be made. Buildings for cyclone shelters should be built and supported in each village according to their demands. Early warning systems should seek to increase coverage and make it available to everyone in the event of a natural disaster. The township disaster management committee should better integrate these early warning systems into its plans. Adaptive action plans should be devised at the grassroots level. Intercommunication between villages, townships, districts, and regions is crucial in implementing action plans.

Village-level response implementation should be based on capacity and capital in disaster response. Understanding and relating to the effects of climate change is strategic and essential. Local government entities and communities are responsible for developing their own policies, plans, and activities related to disaster management and education. The Township Disaster Management Committee should organize a funding

mobilization and budgeting system for the line department for emergency response in place. The regional government should encourage the decentralization of budget management for township-level disaster management systems in line with disaster management plans and procedures. The disaster management committee should consider the needs of the response process which the five priorities for an emergency response to disaster relief are food, water and sanitation, healthcare services, shelter and house materials, and psychological support.

The recommendation is to support recovery and rehabilitation efforts based on the needs of local communities. Based on their experience in the community, the top five priority activities are livelihoods; residential building; water and sanitation; health care services; and food access. In addition, all infrastructure must be protected from cyclones, floods, earthquakes, and tsunamis. It is essential to be resilient to natural disasters such as floods, inundation, and water scarcity. Roads, bridges, and houses can be built by planning according to the weather-resistant landscape. So these bridges, roads, and residential locations can be protected from disasters. School buildings, housing, and basic infrastructure, including health clinics, should be constantly upgraded based on needs and periods. New buildings must also be built with disaster-resistant techniques and a strong structure.

As a mitigation recommendation, it is also essential to work to improve Labutta's ecosystems. These ecosystems provide a variety of services to local people. Without these services, household vulnerabilities will increase dramatically due to climate change, sooner or later. The government and concerned stakeholders need to rehabilitate and improve mangroves for environmental protection. Biodiversity habitats, especially fish breeding grounds, need to be protected and enhanced. The cultivation of salt-tolerant and heat-resistant varieties should be innovated. Switching to solar panels and energy-efficient stoves can reduce the over-exploitation of natural resources. Training should be provided on water resources management and capacity building.

According to the problem and challenges analysis, job scarcity would encourage migration, and men and women, particularly young people, should be assisted in improving their skills and employment possibilities. Because technical proficiency is currently poor, it is critical to encourage vocational training. Farmers' and fishers' ability to recover from natural disasters should be improved through cooperative actions. As a result, socio-economic production systems will be strengthened, new

industries and businesses will be created, and loans and other incentive programs will be established. It's also critical to tap into the potential for women to contribute to the social lives of their families. Women play a crucial role in local climate resilience by adopting innovative, adaptable lifestyles. Therefore, it's essential to consider how gender roles affect long-term productivity.

The emphasis on local knowledge and practices (especially adaptation measures) serves as a springboard for disaster preparedness, response, recovery, and mitigation. It allows internal and external organizations to investigate people's talents and what they genuinely know to strengthen community resilience. Complex adaptive responses to internal and external change characterize local knowledge and practices. They have a potentially significant role in catastrophe risk reduction and community disaster resilience when combined with traditional knowledge and understood in the context of sustainable development. In the future, it is recommended that proactive disaster preparedness, which is based on local knowledge of community resilience, be used. The vulnerability and adaptability action plan is a step toward resilience and long-term growth.

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- <https://www.myanmarwaterportal.com/repository/941-myanmar-sustainable-development-plan-2018-%E2%80%93-2030.html>
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- <https://www.rcrc-resilience-southeastasia.org/document/ifrc-framework-for-community-resilience/>
- <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

APPENDIXES

Appendix (A)

Household Questionnaire Survey (Community)

INTRODUCTION AND CONSENT

Hello, my name is “_____”for the Executive Master degree on Development Studies Programme of Yangon University of Economics.

I would like to ask you some questions regarding disasters in your township. We are asking many people these questions in order to learn people’s knowledge and experience. Your answers will be counted along with all the others. The questions will take 10 minutes.

This interview is confidential. Your name will not be appeared on this paper and your answers will be totally private. You don’t have to answer if you don’t want to. You may decline to answer any questions or stop the interview at any time.

Are you comfortable to answer these questions? YES () NO ()

Survey questionnaires for “A Study on Local Knowledge of Community Resilience in Disaster Prone Area: Case Study in Labutta Township”

Township..... Village/Village Tract/Ward.....

No.	Gender	Age	Education	Type of Occupation/ Business

Section: 2 Preparation

1. Have you experienced disaster in Labutta Township/District?
Yes No Unknown

2. What are the hazards of most concern to the community?
Cyclone Flood Fire Earthquake
Tsunami Epidemic Others.....

3. Is there adequate food, water, livelihoods, access to markets, infrastructure in the community (E.g. Assets/Resources)
Yes No Unknown

4. Is prepared the community to anticipate and recover from the climate extremes and disasters (rapid and slow onset) that occur, and may occur in future?
 Yes, prepared No, not prepared Unknown
5. Do you know there is a preparedness plan for disasters?
 Yes, well know No, little know Unknown
6. Is there a history of disasters in the community?
 Yes No Unknown
7. Is there a social, economic, health and seasonal chart in the community?
 Yes No Unknown
8. What sources of information has received the community for early warnings?
 Radio forecasts Television Government Phone
 Internet Facebook/Social Others.....
9. Are they understand to prepare for a disaster event if they got the warning based on different households, community groups and individuals in the community?
 Yes No Unknown
10. Is your current building resilient to major disasters?
 Yes No Unknown
11. Is the community getting meteorological information early and on time?
 Yes No Unknown
12. Can organizations within and outside the community work together to prepare for and prepare for disasters?
 Yes No Unknown
13. Does the community have the following resources for disaster preparedness and response?
 Social Organizations Natural Resources Technologies Forestry
 Financial/Budget Infrastructure Human Resources
 Others.....
14. Did you know that there are departments, laws and regulations regarding disaster prevention and response procedures?
 Well known Little known Unknown

Section: 3 Response

1. Do you know how a community responds to a disaster?

Well known	Little known	Unknown
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2. Is there a map for vulnerable groups, locations in the community?

Yes	No	Unknown
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3. Do you understand define as “disaster resilience for community” for a disaster response?

Yes, understand	No, don’t understand	Unknown
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4. Do you know the disaster management program of the Government departments?

Well known	Little known	Unknown
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5. Does the community have a group specially dedicated to disaster response?

Yes	No	Unknown
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6. In the event of a disaster, the following activities are urgently needed:

Food	Water and Sanitation	Shelter	Health care
Non-food items	Cash assistance	Road/Jetty	
Psychosocial support	Gender based violence	Child protection	
Others.....			

Section: 4 Recovery

1. The following areas need to be rehabilitated to recover from disasters:

Food	Water and Sanitation	Shelter	Health care
Non-food items	Livelihood	Agriculture	Livestock
Income generation	Cash assistance	Road/Jetty	Education
Others.....			

2. Do you think the villagers will be involved in the rehabilitation work?

Yes	No	Unknown
-----	----	---------

3. Do the following departments/agencies/organizations assist in post-disaster recovery / resettlement?

GAD	Relief and Resettlement Department
Disaster Management Committee	Village Committee
Social Organizations	Private Donors/Companies

INGOs
 Others.....

Political Parties

Section: 5 Mitigation

1. Are there lessons and improvements to be learned from past disasters events as organization/department? (E.g., what went well and what did not go well?)
 Yes No Unknown
2. Do village committees / community organizations have any plans for disaster risk reduction and mitigation in the future?
 Yes No Unknown
3. Are the evacuation routes visible and well-marked in the community?
 Yes No Unknown
4. Do the shelters comply with the following standard shelter requirements?
 Yes No Unknown
5. Is there a community risk mapping?
 Yes No Unknown
6. Is there a capacity and resources map in the community?
 Yes No Unknown
7. In the event of a disaster in the community, is there a plan to network/coordinate departments, related organizations for recovery activities?
 Yes No Unknown

Section: 6 Problems and Challenges

1. What are the main problems in disaster preparedness?

Finance/Budget	Technologies	Human Resources
Shelters	Infrastructure	Community based Organizations
Livelihoods	Information access	Drill/Exercises
Knowledge and experiences		Others.....
2. What are the common problems in disaster response and recovery?

Finance/Budget	Technologies	Human Resources
Shelters	Infrastructure	Community based Organizations
Livelihoods	Information access	Knowledge and experiences
Coordination/Networking		Others.....

3. What suggests would you give to be resilient in the event of a disaster?

.....

Appendix (B)

Focus Group Discussion Questionnaire with Village community

INTRODUCTION AND CONSENT

Hello, my name is “_____”for the Executive Master degree on Development Studies Programme of Yangan University of Economics.

I would like to ask you some questions regarding disasters in your township. We are asking many people these questions in order to learn people’s knowledge and experience. Your answers will be counted along with all the others. The questions will take 45 - 60 minutes.

This interview is confidential. Your name will not be appeared on this paper and your answers will be totally private. You don’t have to answer if you don’t want to. You may decline to answer any questions or stop the interview at any time.

Are you comfortable to answer these questions? YES() NO()

Survey questionnaires for “A Study on Local Knowledge of Community Resilience in Disaster Prone Area: Case Study in Labutta Township”

Township..... Village/Village Tract/Ward.....

Section: 1 Socio Demographic					
No.	Gender	Age	Education	Occupation/ Organization/ Department	Position and Role for Disaster

Section: 2 Preparation

1. What are the experience of disaster in Labutta Township/District?
2. What are the hazards of most concern to the community?

3. What assets / resources are different households or groups in the community reliant on for food, water, livelihoods, access to markets, infrastructure (and is it in good condition?)
4. Who are the different people in the community? Consider ethnicity, age, education level, health status, gender, degrees of poverty, disability or otherwise marginalized households or groups.
5. Which livelihood resources are the most sensitive to the climate extremes and disasters (rapid and slow onset) that occur in the community? e.g. paddy that relies of rain, infrastructure on the coast,
6. How well is the community prepared to anticipate and recover from the climate extremes and disasters (rapid and slow onset) that occur, and may occur in future?
 - a. Knowledge: what do different groups in the community know about coping, planning and preparing for the climate extremes and disasters (rapid and slow onset) that occur in the community?
 - a. What local / traditional knowledge they have that helps? Do they have local weather forecasting?
 - b. What understanding do they have about climate / climate change and future scenarios?
 - c. What do they understand about adaptation options and are they motivated to engage in the program?
7. Skills and experience: what do different households, community groups and individuals in the community do to prepare for an extreme event?
E.g. Do they store or preserve food? Do they secure household infrastructure?
8. Information –
 - a. What information can the community have? E.g. radio forecasts, agricultural extension. Do they receive early warnings? Are they on time?
 - b. What sources of information has the community got?
9. Networks and community groups –within and outside the community that can assist it to prepare and recover?
10. Resources – what resources does the community have? E.g. financial, natural, social

11. Institutions – What actors, organisations and institutions can support or hinder resilience building?
- a. What activities are they doing?
 - b. How well are organisations and institutions prepared or able to respond to events or engage in resilience building activities?
 - c. Do they have staff allocation, resources, strategic / policy commitment? Are they well-coordinated?

Section: 3 Response

12. How to response when face with disaster? What are the response efforts of your organization?
13. How does your organization/department define “disaster resilience for community” for a disaster response? What are the indicators/? How did you (or the organization) in your response work? Any documents/law/policy?
14. Explain about the disaster management program of the Government departments?
15. Does the community have a group specially dedicated to disaster response?
Yes/No
- a. If yes: please describe:
 - b. How is the response team alerted? (E.g. Radio, Telephone, megaphone, etc.)

Section: 4 Recovery

16. How do these different people in the community typically recover from the climate extremes and disasters (rapid and slow onset) that occur in the community?
17. How to do recover for health care services/water and sanitation programming in there?
18. Are there negative consequences from their actions to recover?

19. What if these actions to recover were used more often or for longer? Would there be negative consequences then? (E.g. cutting wood to rebuild, selling assets etc.)
20. After the disasters, do you know who help for rehabilitation/resettlement?

Section: 5 Mitigation

21. As organization/department, what went well and what did not go well? Any lessons-learned from past disaster events?
22. What climate extremes and disasters (rapid and slow onset) occur in the community and what locations are affected? How often?
23. As of past, current and any observed change in location, frequency, and severity, do they have thoughts on why? (E.g. Temperature, Rainfall, Variability, climate extremes etc.). For future – how will future climate likely exacerbate hazards?
24. What are other conditions to be considered how are land use patterns changing? Is there unplanned development or population changes, is this changing where impacts are felt and by whom?
25. What improvements did your organization do or planning to do, based on experience from past disaster events?
26. Does the committee have a plan for undertaking small mitigation projects that will reduce the risk of future disasters?
Yes/No
If yes, what disaster risk reduction mitigation projects are currently planned, ongoing or that have been completed over the last year:
27. Do you know at least three ways you can become better prepared to handle a disaster?
28. Are the evacuation routes visible and well-marked in the community?
29. Do the shelters comply with the following requirements?

Section: 6 Problems and Challenges

30. What are the main problems in disaster preparedness?
31. What are the common problems in disaster response and recovery?

32. Do you know at least three challenges for disaster resilience to community?
Please describe?
33. What are health risks, water and sanitation problems encountered in disaster preparedness / response?
34. What are the challenges for a budget of the Disaster Management Committee budget?
35. What are the key barriers for the access of knowledge and experience on disaster resilience to community?
36. What are the key challenges about the coordination, networking and collaboration with other relevant organizations?
37. What suggest would you give to be resilient for community in the event of a disaster?
38. Do you agree or disagree with the following statement for Disaster Preparedness, Response, Recovery and Mitigation process based on your knowledge and experience?

No.	Area/Description	Strongly disagree	disagree	agree	Strongly agree	Don't know
1.	Timeliness					
2.	Efficiency					
3.	Effectiveness					
4.	Sustainability					
5.	Technical standards					
6.	Community satisfaction					
7.	Coordination and Collaboration					
8.	Organizational commitment to accountability and community resilience					
9.	Capacity of resource persons					
10.	Infrastructure					
11.	Health Services					
12.	Information sharing to stakeholders					
13.	Community participation					

14.	Awareness raising on Early Warnings & Actions					
15.	Community's practice on DRR awareness					
16.	Learning to continuous improvement					

Appendix (C)

Key Informal Interview Questionnaire with Community Leader

Hello, my name is “_____”for the Executive Master degree on Development Studies Programme of Yangon University of Economics.

I would like to ask you some questions regarding disasters in your township. We are asking many people these questions in order to learn people’s knowledge and experience. Your answers will be counted along with all the others. The questions will take 15 minutes.

This interview is confidential. Your name will not be appeared on this paper and your answers will be totally private. You don’t have to answer if you don’t want to. You may decline to answer any questions or stop the interview at any time.

Are you comfortable to answer these questions? YES () NO ()

Survey questionnaires for “A Study on Local Knowledge of Community Resilience in Disaster Prone Area: Case Study in Labutta Township”

Name
 Position/Role
 Department/Organization
 Gender
 Age

1. What are the common hazards/disasters in the township?
2. Is there a committee on planning and preparation, response to climate change and disasters?
3. Who are involved the main members of this committee?

4. Which type of businesses and occupations in the township are most at risk from disasters?
5. Where locations and who is at risk of the disasters within township?
6. What are the indicators of climate change in the township?
7. What is the government's responsibility for disaster management?
8. How do you educate the community in the township about disaster risk reduction and preparedness?
9. Are there community-based drills and exercises for disaster preparedness in the township?
10. What activities should be prioritized and supported in the event of a disaster (short/long term)?
11. What are the problems and challenges of disaster management and community resilience?
12. If you have any suggestions, please describe.

Appendix (D)

Map of Cyclone Hazard Raking for Labutta Township



Appendix (E)

Composite Map for all Hazard Raking of Labutta Township

