

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

**A STUDY ON COMMUNITY KNOWLEDGE AND
PREPAREDNESS OF NATURAL DISASTER IN MYANMAR
(Case Study on Three Townships in Yangon Region)**

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EMPA - 35 (18th BATCH)**

OCTOBER, 2022

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A thesis submitted as a partial fulfillment towards the requirement for the degree of
Master of Public Administration (MPA)

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This is to certify that this thesis entitled “**A STUDY ON COMMUNITY KNOWLEDGE AND PREPAREDNESS OF NATURAL DISASTER IN MYANMAR (Case Study on Three Townships in Yangon Region)**”, submitted as a partial fulfillment towards the requirements for the degree of Master of Public Administration has been accepted by the Board of Examiners.

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ABSTRACT

The study intends to examine to disasters preparedness and response planning of three townships household in Yangon Region. The study area is including Ahlone Township, Dagon Seikkan Township and Hlaing Tharyar Township. The objectives of the study are: (a) to analyze the disaster preparedness and management regarding fire, earthquake and cyclone disaster management of the community and (b) to evaluate the knowledge level regarding preparedness and management for the (fire, earthquake and cyclone) disasters in three townships. The survey data collection used simple random sampling method for this study was through a structure questionnaire and conducted on 150 households. The study finds the living areas included in the study have low concern of natural disasters. According to the majority of respondents, the risk of fire threatens the community. It is found that Dagon Seikkan Township usually exposes to floods every year during the rainy season. The study suggested that family-level preparedness, all households develop a family-level preparedness plan, discuss what to do in case of a disaster in advance, and designate places where family members can meet after disasters.

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LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
CSOs	Community Society Organizations
DDR	Disaster Risk Reduction
DDRWG	Disaster Risk Reduction Working Group
GAD	General Administration Department
MAPDRR	Myanmar Action Plan on Disaster Risk Reduction
MDPA	Myanmar Disaster Preparedness Agency
MIMU	Myanmar Information Management Unit
MSWRR	Ministry of Social Welfare, Relief and Resettlement
NDMC	National Disaster Management Committee
NDMWC	National Disaster Management Working Committee
NGOs	Non-governmental Organizations
RRD	Relief and Resettlement Department
UN	United Nation
UNDP	United Nation Development Program
TDMP	Township Disaster Management Committee

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

Myanmar is located in Southeast Asia, sharing borders with Bangladesh, India, China, Laos and Thailand, facing the Andaman Sea and Bay of Bengal in the South and Southwest. Total land area is about 676,590 square kilometers due to its topography of hills and mountains.

According to the 2008 constitution, Myanmar is divided into seven states, seven regions, one union territory, five self-administered zones and one self-administered division.. There are 67 districts and 325 townships are further divided. As of 2019, the Department of Population estimated the total population to have reached 54,457,024 people (Department of Population, 2019).

The effects of frequent and disruptive disasters. Long-term financial needs arising from reconstruction and rehabilitation can seriously affect economic development or their impact on livelihoods because it can seriously disrupt businesses after losing assets and infrastructure.

Cyclone Nargis in 2008 alone affected US\$ 4.02 billion, more than half of which was caused by heavy damages in the manufacturing sector, followed by the social sector with a continuous loss of US\$ 968 million (UNDRR & UNESCAP, 2012).

Due to the high dependence on crops, exports, exports, etc. are worried that the cyclone will affect rice production, especially the crops that have already been harvested. It can have a significant impact on income and domestic food security (FAO, 2008).

In 2015, similar impacts were witnessed following severe flooding and landslides which affected 2,952,753 hectares of rice cultivations (20.4% of the total

production area) (Government of Myanmar, 2015). In the case of cyclone Nargis, causing more than 140,000 fatalities, also resulted in significant trauma and reduced social capital among those affected due to deceased family members and friends, or lost livelihoods, homes and routines of life (ASEAN Secretariat, 2010).

Floods in 2015 temporarily displaced more than 1.6 million people (GFDRR, 2019), a significant concern at disaster levels, and displaced populations often face disruptions due to lack of access to sanitation and infrastructure. The disaster also increased inequality within regions by exacerbating local pockets of poverty and significantly reduced the spending of poor households.

Located in a seismic belt, Myanmar is indeed earthquake prone and is vulnerable to moderate and large earthquakes, including tsunami hazards along its long coastline. Most earthquakes in Myanmar originate along the Andaman Megathrust Zone in the west and the Sagaing Fault Zone in the middle of the country, according to seismometers in the region.

In addition, Yangon Region has experienced many earthquakes in the past because it is located along the Sagaing Fault, the most prominent and active fault in Myanmar. Because it is located on the Sagaing fault line, high-rise buildings are being built in Yangon to withstand earthquakes.

In Myanmar, 70 percent of disasters are fires and the annual loss is about 1 billion kyats. People often lose their lives and property due to fire. According to the Fire Services Department of Myanmar, the major causes of fire incidences are (a) kitchen fire, (b) negligence in using fire, (c) improper use of electricity, (d) arson, (e) forest fire and (f) others.

The study intends to examine to disasters preparedness and response planning of three townships household in Yangon Region. The survey area is Ahlone Township, Dagon Seikkan Township and Hlaing Tharyar Township.

1.2 Objectives of the Study

The objectives of the study are: (a) to analyze the disaster preparedness and management regarding fire, earthquake and cyclone disaster management of the community and (b) to evaluate the knowledge level regarding preparedness and management for the (fire, earthquake and cyclone) disasters in three townships.

1.3 Method of Study

The descriptive method is used with primary data and secondary data. Primary data is collected with a structured questionnaires and interviewed with various ten government officers and households in Yangon Region, Myanmar. Secondary data is collected relevant information from Myanmar Earthquake Committee, Myanmar Engineering Society, Fire Service Department, Department of Social Welfare, Department of General Administration, Department of Human Settlement and Housing Development, Yangon City Development Committee, research papers, libraries and internet website.

1.4 Scope and Limitation of the Study

The study is mainly focuses on 150 households living in Ahlone Township, Dagon Seikkan Township and Hlaing Tharyar of Yangon Region, Myanmar. The study is only on the community preparedness and management of disasters in three townships of Yangon Region regarding fire, earthquake, and cyclone.

1.5 Organization of the Study

The study is divided into five chapters. Chapter one is introduction with rationale of the study, objectives of the study, method of study, scope and limitation of the study and organization of the study. Chapter two is literature review on type of disaster, causes of disaster and most of disaster, impact of disaster. Chapter three presents the disaster management in Myanmar. Chapter four describes the survey analysis on the study. Chapter five mentions the conclusion which includes findings, suggestions and recommendation.

CHAPTER II

LITERATURE REVIEW

Disasters are people, material sudden, significant disruptions to community/society activities in terms of economic or environmental impairments and unexpected progressive events. These incidents require immediate action to stabilize the situation (Randolph, 2015).

Disaster results from a combination of situations of threat arising from exposure to hazards and situations of vulnerability that are insufficient to mitigate or deal with potential adverse effects (Bethel, Foreman and Burke 2011). Disaster effects include death, injuries infections and people's physical, other harmful effects on psychological and social well-being; damage to property; loss of services; These include social and economic disruption and environmental degradation (Blaikie, Cannon, Davis and Wisner, 2014).

2.1 Type of Natural Disasters

Disasters are divided into two basic groups: natural and man-made. Natural disasters include earthquakes, volcano, hurricane, floods and fires. Man-made natural disasters include war, air pollution nuclear explosion, fire, exposure to hazardous substances, explosions and transport accidents (Noji, 1997).

Disasters are inherently different from normal emergencies, so planning ahead is difficult. It's true that both can lead to large numbers of casualties and property damage, but the difference between a natural disaster and an ordinary emergency is more than just quantity (Basel, 1984).

The disaster challenge cannot be overcome by accumulating more personnel or materials. A community needs a disaster plan that accommodates multidisciplinary and jurisdictional circumstances in order to survive a disaster. Major disasters affect

communities from economy and social. The effects can range from physical to psychological (Chhibber & Laajaj, 2013).

2.1.1 Earthquakes

Earthquakes cause high death rates due to falling objects. The greatest risk of injury from an earthquake is indoors or in close proximity to buildings and other structures. In open areas such as fields or rural areas, the risk of injury is very low. Furthermore, injury severity is inversely related to distance from the epicenter (WHO, 1989). Earthquake intensity Injuries and fatalities generally increase with increased ground motion and structural damage.

If there is an earthquake at night, the pelvis, chest and spine injuries are more common. Because most people are lying in bed when disaster strikes. These injuries often cause severe damage to internal organs with severe internal bleeding. If there is an earthquake during the day, cuts and wounds of the joints, severe external bleeding, lesions including rhabdomyolysis and compartment syndrome are common.

In addition, most of the victims were standing and sitting. During daily earthquakes, most of the victims are injured as skulls and collarbones fall off, resulting in damage. People trapped in the collapsing debris for hours or days are at high risk of infected wounds and/or gangrene (WHO, 1989).

Although most earthquake injuries are the direct result of falling debris or collapsing structures. Another concern is the first golden fire within 24 hours of the disaster (Noji, 1992). Burn injuries depending on the size and extent of the fire. Respiratory problems from smoke inhalation can quickly become a serious burden on the medical system after an earthquake.

2.1.2 Volcanoes

Volcanic eruptions can have life-threatening effects as they release tons of pollutants into the atmosphere (Noji, 1992). Like smoke from wildfires, air pollution can cause new respiratory illnesses or worsen existing conditions. With volcanoes, however, the magnitude of a large explosion can literally fill the air with ash and deadly gas.

Close exposure to volcanic eruptions can cause difficulty breathing, even for people without respiratory disease. carbon dioxide, Common effects of toxic volcanic gases such as carbon monoxide and sulfuric acid include acute respiratory distress syndrome, pneumonia itchy conjunctivitis; joint pain Includes muscle weakness and skin bullae. Burns from superheated steam or secondary fires started by volcanic eruptions are also common (Noji, 1992).

2.1.3 Hurricanes, Typhoons, and Cyclones

In recent years, sustained population growth in conjunction with aggressive development of vulnerable coastal areas has led to an increase in hurricane related deaths, injuries, and economic costs. In a hurricane (cyclones in the Indian Ocean and typhoons in the western Pacific Ocean), the greatest mortality originates from the secondary disasters that have been triggered such as small tornadoes, flash flooding, and storm surges (Kunkel, Pielke and Changnon, 1999).

For coastal areas (within 30 miles of the Salt Coast), the level of hurricane surge is one of the most lethal predictors. Historically, nine out of ten hurricane deaths can be directly attributed to the previous storm surge. People in the storm's path underestimated the hurricane's ability to cause coastal flooding, and many were unprepared for the aftermath.

This effect can be exacerbated by the possibility of hurricanes that can cause landslides during high tides and wind waves over the height of storm surges. Wind speed is the second deadliest aspect of hurricanes (Noji, 1992). Houses and other wooden structures are often destroyed by hurricanes. The breaking of a building's windows or doors by flying objects or wind pressure is a precursor to major damage to a building.

In a hurricane; further trauma is caused by large objects that can become airborne during strong winds (WHO, 1989). The most common injury in a hurricane is a blowout from glass and other debris. But in many instances, dealing with post-hurricane injuries includes drinking water, Compared to the pressing need to provide nutritious food and adequate shelter for all concerned residents, it is not considered a public health concern.

Due to the lack of tornado warnings because tornadoes give communities little time to prepare or take shelter, the morbidity and mortality rates are proportionally higher compared to other disasters.

2.1.4 Floods

It is estimated that the most likely cause of death from flooding is drowning. Most of the deaths and injuries occur when there is almost no warning of impending floods. flash floods; It can be caused by tidal waves caused by dam collapses or distant or sub-ocean earthquakes. In parallel, individuals underestimate the power of moving water, resulting in preventable death and injury (Greenough, 2001). At the best of times, It is difficult to estimate the average depth of black and fast-moving water. It's next to impossible in the early evening or in the middle of the night. It takes less than two feet of water to float a large vehicle like a school bus, and three to six inches of water to push an adult off their feet. Second to drowning, exposure to the element's accounts for a large percentage of the deaths and serious injuries that occur in floods. In many cases, the people caught in the flood are the trees, They wait for rescue in any shelter, including the tops of buildings and cars.

2.15 Fires

Ninety percent of the world's wildfires are caused by human activity, but natural wildfires are often caused by lightning strikes in dry and windy conditions. The biggest health impact of wildfires is the impact on ambient air quality. Due to suitable local conditions, many small fires can cause poor air quality in a particular area.

Burns may be associated with members of the forest firefighting team, who are usually called to be in the vicinity of large and unpredictable fires (Wijkman and Lloyd, 1984). Depending on prevailing wind conditions, wildfires can quickly spread and change direction, quickly trapping firefighters and private citizens.

Occasionally, Large wildfires also increase animal attacks and/or bites (Wijkman and Lloyd, 1984). Depending on population centers in the vicinity of wildfires, many wild animals are forced to fly and come into greater contact with humans.

Large fires across urban areas are less common in developed countries due to the rise of trained and equipped fire departments. However, large urban fires as well as other natural disasters such as earthquakes can still occur in developing countries.

Burn injuries and deaths are higher in large urban fires than in suffocation and related deaths (Basel, 1984). Common complications of burn injuries are hypovolemic shock and massive infection and sepsis.

2.2 Causes of Natural Disaster

There are different types of natural disasters and the causes vary depending on the types of disasters (Basel, 1984). For example, the cause of an earthquake cannot be the same as a forest fire. Natural disasters are caused due to different reasons like soil erosion, seismic activity, tectonic movements, air pressure, and ocean currents etc. It is caused by various factors such as ocean currents, and natural disasters are not a new phenomenon that has continued to cause serious damage since the beginning of the earth's formation. Loss of life all over the world after many years.

The root cause of most of the natural disasters occurring in the world can be attributed to the imbalance created in the environment. This imbalance is caused by air pollution, Be it in the form of noise pollution or water pollution, the collective effect of these inequalities is one of the few reasons for natural disasters (Fomby, Ikeda & Loayza, 2013). Because it's only one of a few reasons, no one can be blamed.

Natural disasters such as floods, earthquake etc., have also occurred in the distant past of human civilization. Therefore, it would not be fair to blame the same for modernity (Noji, 1997). Natural disasters are naturally occurring events that can seriously threaten human health and well-being and cause long-term adverse effects. Natural disasters have proven to have their origins in the normal workings of the earth.

Floods and cyclones occur widely, although they damage both infrastructure and agriculture, depending on the timing of the agricultural cycle. mining, Flooding and erosion can actually occur in areas where deforestation and manufacturing activities occur. The reason global warming may eventually affect ocean currents is the source of modern humans' overuse of fossil fuels. Earthquakes are the movement and excavation

of layers within the Earth's crust; bombing Earthquakes from mining and construction can occur.

2.3 Impact of Natural Disaster

The natural disasters directly impact economies, agriculture, food security, water, sanitation, the environment and health each year. Therefore, it is one of the single largest concerns for most of the developing nations. Different natural hazards cause varying levels of physical damage to infrastructure and agriculture with implications for their indirect and secondary impacts. While the earthquakes have little impact on standing crops excluding localized losses but can cause wide spread devastation of infrastructure and other productive capacity over relatively large areas.

In addition to the physical impacts, the economic impact and social impact of disasters are also often catastrophic. Natural disasters can fragment family structures and force new roles and responsibilities on remaining individuals. Perceived scarcity of usable land can create insecurity and conflict within and between communities. The impacts of natural disasters on affected communities depend in large part on prior development choices and the extent to which capacities to reduce and mitigate known risks have been created and sustained.

2.3.1 Physical Impact

The physical impacts of disasters include casualties' deaths and injuries and property damage, and both vary substantially across hazard agents. According to Noji 1997, hurricanes produced 16 of the 65 greatest disasters of the 20th Century in terms of deaths and the greatest number of deaths from 1947 to 1980 499,000.

Low-income countries suffer approximately 3,000 deaths per disaster whereas the corresponding figure for high-income countries is approximately 500 deaths per disaster. Moreover, these disparities appear to be increasing because the average annual death toll in developed countries declined by at least 75% between 1960 and 1990, but the same time period saw increases of over 400% in developing countries (Berke 1995).

2.3.2 Economic Impact

The empirical relationship between natural disasters and economic growth has largely remained inconclusive with existing studies reporting positive, negative and even no effects, both in the short and long term. Natural disasters are expected to disrupt economic activities in the short term due the direct and indirect damages cause (Hochrainer, 2009).

Direct damages occur in two forms: (a) loss of labour which includes human deaths, disabilities or injuries; and (b) loss of capital which includes loss of physical assets (damage to houses, factories and infrastructure). These direct losses may result in a further loss of potential labour hours (wages) and cause a decrease in the expected production output, say, agricultural or industrial output. The loss of potential wages and subsequent decrease in expected output may indirectly impact economic growth of the country, as the forgone wages would have been added to the country's GDP if the disaster had not happened (Noy & Nualsri, 2007).

The negative impacts of relatively severe natural disaster are observed to be even stronger since large-scale destruction and damage caused by such events are more likely to decelerate economic growth or even trap the economy at a lower-level equilibrium (Fomby, Ikeda & Loayza, 2013). Developing countries are found to be more sensitive to the economic shocks of natural disasters than developed ones largely due to their limited capacity to cope with the economic and financial consequences of such events (Fomby, Ikeda, & Loayza, 2013).

Further, countries with higher levels of per capita income, better institutional frameworks, higher literacy rates, greater trade openness and more effective ex ante disaster risk financing mechanisms find it easier to absorb the economic shocks of natural disasters (Noy, 2009). Contrary to the findings that report adverse impacts from disasters, some studies find that natural disasters may also have a positive impact on economic growth in the short-to-medium term. Following a disastrous event, reinvestment in capital stocks and the upgraded technology may accelerate growth. A few older studies support this view (Okuyama, 2003) and some recent studies have found that the positive impacts of natural disasters were limited to specific economic sectors (e.g., the agricultural sector) and disaster types (e.g., floods) (Fomby, Ikeda, & Loayza, 2013).

Natural disasters may have negative, positive and even no impact on long-term economic growth and development. Like the short-term impact, natural disasters are expected to have a negative impact on long-term economic growth as well. The damage to human and physical capital may shift the growth paths of countries experiencing natural disasters to lower-level equilibriums, thereby causing a permanent negative impact in the long term (Berlemann & Wenzel, 2016).

More severe natural disasters often create high opportunity costs. The impact is more pronounced for developing countries as the funds mobilized for post-disaster response and recovery could have been used for other social welfare initiatives. Moreover, frequently recurring disasters can create an atmosphere of uncertainty and hamper long-term investment prospects in a country (Fiala, 2017).

The long-term positive impact of natural disasters can be explained by endogenous growth models based on the Schumpeterian creative destruction theory. Such models predict that growth in a disaster-affected location may accelerate following a negative shock due to reconstruction efforts which lead to higher investments and leave ‘productivity effects’ on the economy in the long term (Chhibber & Laajaj, 2013). Apart from the negative and positive impacts, a few studies have found that the growth effects of natural disasters fade away in the long term (Klomp, 2015).

2.3.3 Social Impact

Social impacts, which include psychosocial, sociodemographic, socioeconomic, and sociopolitical impacts, can develop over a long period of time and can be difficult to assess when they occur. Despite the difficulty in measuring these social impacts, it is nonetheless important to monitor them because they can cause significant problems for the long-term functioning of specific types of households and businesses in an affected community.

A better understanding of disasters’ social impacts can provide a basis for preimpact prediction and the development of contingency plans to prevent adverse consequences from occurring. For many years, research on the social impacts of disasters consisted of an accumulation of case studies, but two research teams conducted comprehensive statistical analyses of extensive databases to assess the long-

term effects of disasters on stricken communities (Friesma, Caporaso, Goldstein, Linberry, and McCleary 1979).

The authors concurred with earlier findings by Friesma, Caporaso, Goldstein, Linberry, and McCleary 1979, in concluding that no long-term social impact of disasters could be detected at the community level. In discussing their findings, often a tornado; the authors acknowledged that their results were influenced by the types of natural disasters that occur most frequently, floods and hurricanes.

In addition, most disasters have a small scale of impact, causing minimal disruption to their communities, even in the short term. Finally, their findings suggest that the ward, It noted that this did not preclude the possibility of significant long-term impacts on bottom-up levels such as the economy and households.

2.4 Knowledge and Preparedness on Natural Disasters

Kapucu (2008), investigate how local communities utilizes local knowledge and wisdoms in natural disaster management. Knowledge management will increase humanitarian operations' visibility by enabling data analysis and current situations to speed the response and support correct decision-making (Beamon and Balcik, 2008). Knowledge management will also boost coordination and networking among the humanitarian actors and stakeholders which will speed up the response (Tatham and Pettit, 2010).

Knowledge management supports the creation and transfer of tacit and tacit knowledge. This activity improves the capacity of humanitarian actors, despite the high turnover in this sector. It occurs between humanitarian actors through coaching and workshops.

Knowledge management will also support institutional learning in the humanitarian sector by enhancing the process by which tacit knowledge learned during one disaster is transformed into explicit knowledge that can be used to prepare for the next disaster (Moe, Gehbauer and Senitz, 2007).

In addition, knowledge management supports disaster risk information's availability and accessibility. It also enables humanitarian actors' capacity development, communities, and stakeholders through knowledge creation and sharing (Allen, 2006). The role of knowledge management in the preparedness phase is vital

(Moe, Gehbauer and Senitz, 2007). During this phase, knowledge management activities are mostly related to creating and transferring knowledge (Seneviratne, Baldry & Pathirage, 2010).

Knowledge is created during the preparedness phase by development of the Term of Reference (TOR) of disaster mitigation programs, historical disaster data, disaster mitigation books and government regulations (Allen, 2006). Knowledge creation during the preparedness phase also includes the transformation of tacit knowledge from previous disasters into explicit knowledge to prepare for the next disasters (Allen, 2006).

The knowledge transfer during the preparedness phase includes the same type of knowledge transfer by humanitarian stakeholders (e.g., knowledge transfers from one humanitarian organization to another humanitarian organization), or Transferable between different types of humanitarian stakeholders (eg, government or humanitarian organizations and societies) (Allen, 2006).

Disaster preparedness is a stage in the disaster management cycle where society implements response mechanisms to overcome non-mitigating factors. Disaster preparedness is necessary for disaster types with higher mortality that are difficult to predict (e.g., earthquakes), as the impact is higher when communities are ill-prepared (Sapir and Lechat, 1986).

Disaster preparedness activities include: educating residents about natural disaster risks in the area; educate residents about safety procedures in the event of a disaster; developing emergency plans; testing and enforcement; and installation of early warning systems (Sapir and Lechat, 1986).

From the perspective of humanitarian organizations, five disaster preparedness building blocks must be in place and interconnected before a disaster strikes: human resources; knowledge management; logistics, financial resources and community. Therefore, community-based disaster preparedness (CBDP) is an important part of disaster mitigation. humanitarian organizations; It can be developed if there is cooperation between the government and the communities (Doocy, Russell, Gorokhovich, & Kirsch, 2013).

To achieve beneficial effects, CBDP must involve community-driven participatory activities by obtaining information on disaster preparedness from different

communities, sharing knowledge about disaster preparedness (eg, socialization, education, workshops) and sharing information among themselves (Jamshidi, Majdzadeh, Saberi Namin, Ardalan, Majdzadeh, & Seydali, 2016).

2.5 Disaster Management

To avoid natural disasters in disaster management; before a disaster strikes, with the aim of reducing its impact or recovering from its losses. All actions that may be taken during and after; includes a summary of programs and measures.

Before a disaster: Disaster prevention measures to reduce loss of life and property caused by potential hazards. For example, conducting awareness activities; strengthening existing weak structures; preparation of disaster management plans at the household and community level. Risk reduction measures taken below this level are called mitigation and preparedness activities.

During a disaster: These include actions to ensure that refugees' needs and supports are met and that suffering is minimized. Activities performed below this level are called emergency response activities.

After a disaster: In the immediate aftermath of a disaster, there are initiatives to respond to natural disasters with the aim of recovery and rehabilitation. These are called response and recovery activities.

2.6 Review on Previous Studies

Ko Ko Aung (2011) found that the historical events of Myanmar and the characteristics of Myanmar's disaster. The study provides information on the types and causes of natural disasters, including rapid-onset and slow-onset disasters, and historical disaster events in Myanmar. It also contains comprehensive information on Cyclone Nargis recovery operations.

Aye Aye Khine (2011), found that the community knowledge about flooding, awareness and perception of natural disasters and attitudes towards disasters and risks in Ayeyarwaddy Region were also found. The study included community-based disaster preparedness activities; sixteen community-based prevention and mitigation activities and three main components, namely school-based disaster mitigation activities, were highlighted.

Theingi Soe Naing (2019) found that floods and storms are the main hazards for the township. This study indicates that the state has the primary responsibility to protect its people and their property from various disasters. However, people at the community level need to be aware of the dangers of disasters and be equipped with the skills to prepare for potential disasters.

Yin Mar Nay Win (2019), found that there is a need to improve the awareness of natural disasters in the entire community. In addition, community disaster preparedness planning and mitigation activities are needed to reduce the risk of these disasters. Early warning information of the community is regularly obtained through the village leader and is difficult to obtain through media channels and communication channels. In addition, the need for emergency fund distribution and relief materials is increased during emergencies. In conclusion, the township-level natural disaster mitigation and management system lacks a response system.

CHAPTER III

NATURAL DISASTERS MANAGEMENT IN MYANMAR

3.1 Disaster Risk Profile of Myanmar

Myanmar is located depending on the region's climate and geological conditions and topography, it is vulnerable to a wide range of natural and anthropogenic hazards. Approximately half of total number of disasters in the country are caused by flooding, followed by storms (23 percent), earthquakes (15 percent) and mass soil movement (12 percent) (JICA, 2015).

An increased risk of flash flooding must also be acknowledged. Events that occur as a consequence of the rapidity of rainfall and the low absorption capacity of impermeable surfaces and/or soils can quickly endanger large numbers of people and infrastructure. Other risks include drought, forest fires In addition to tsunami risks, large-scale infectious diseases and technological disasters originating from industrial or transportation accidents are also included.

Cyclones usually cross the Bay of Bengal from the west coast of Myanmar and usually affect Myanmar. The average lifespan of a cyclone is about four to five days, depending on the cyclone season. The pre-monsoon months from mid-April to mid-May. In the post-monsoon months from October to November, strong storms can occur (Department of Meteorology and Hydrology, 2019).

Such events can generate storm surges and cause flooding in coastal areas, increasing the risk of coastal flooding. According to the Saffir-Simpson storm severity scale, Rakhine State. The risk of tropical storms is highest in Ayeyarwady Region and other coastal areas (OCHA, 2011).

Water scarcity and drought are also common in Myanmar, exacerbated by the limited availability of domestic water in rural areas, which often rely on shallow wells

or rainwater harvesting tanks, making them vulnerable to drought (RIMES, Adaptation Fund & UNDP, 2017).

Due to dry conditions and low rainfall, forest fires occur frequently in Myanmar, mostly in the form of low-intensity surface fires (Department of Meteorology and Hydrology, 2009). However, they still threaten forested areas, watersheds and wildlife along with the economy and people. In addition, landslides, often caused by heavy rains or earthquakes, are a concern in a country characterized by hilly terrain.

The conditions are often worsened by unplanned expansion of cultivations and settlement, slope cutting, erosion and changes in the hydrological cycles. When it comes to earthquake risk, Myanmar is located on the southern side of the Himalayas and faces the Indian Ocean to the east, so it is prone to earthquakes caused by natural Himalayan earthquakes or by the thrusting of the Indian plate beneath the Burma Plate (Department of Meteorology and Hydrology, 2009).

Five seismic hazard zones have been identified from I to V, with the most dangerous in the northern and central parts of the country. Climate change is also a serious concern for the country, which frequently experiences weather-related disasters. flood Storms and associated storm surges exacerbate the effects of storm surges and lead to prolonged droughts.

In addition, loss of biodiversity and degraded ecosystems could seriously affect the livelihoods and well-being of millions of people due to high reliance on activities including fishing and subsistence agriculture, which depend on environmental stability.

Changes in regional climate patterns may endanger agricultural activities. For example, high temperature can cause rice, wheat corn It can significantly reduce the yield of soybeans and peanuts (World Bank, 2019). Coastal areas are not only affected by increased flooding and storm surges, but also by rising sea levels; Coastal erosion and salinization of otherwise fertile soils also affect productive and economically important delta and lowland croplands (World Bank, 2019).

These effects have affected coastal settlements. It will also affect their population and critical infrastructure. Increases in temperature and humidity will also affect the prevalence of diseases, and will lead to a number of health effects exacerbated by heat stress, especially in urban areas.

Increased mosquito-breeding conditions lead to an increase in the spread of viruses such as dengue and malaria, and an increase in non-potable sources of fresh water makes communities unable to access safe water, exacerbating diarrheal diseases and dehydration.

Myanmar is fire, forest fire Earthquake strong wind Cyclone storm surge Tsunami Landslides flood Includes drought and industrial hazards. In recent years, Myanmar has been experiencing localized natural disasters such as lightning strikes and river bank erosion. Between 2014 and 2017, lightning killed 175 people.

At the same time, 261 people and 782 people lost their lives in Myanmar due to river bank erosion and strong winds. The 2015 flood caused damage of US\$1.5 billion, and the 2008 Cyclone Nargis cost US\$4.1 billion. Comprehensive risk assessment for Myanmar needs to be done comprehensively at the national level. Table (3.1) presents basic information of major hazards in Myanmar.

Table (3.1) Major Hazards in Myanmar

Hazard	Particular
Earthquake and Tsunami	Two main sources: the Sagaing fault and the Sunda subduction mega thrust zone. The four areas designated as destruction zones are 1) Bago-Phyu; 2) Mandalay-Sagaing-Tagaong, 3) Putao-Tanai and Child-Humlin. The latter two are at risk of major earthquakes, but their risk levels are low due to sparse population. In Burma's coastal areas: a strong zone on the Rakhine coast; It falls in the middle zone in the Irrawaddy delta and the Taninthari coast.
Fire and Forest Fire	The most common hazards in Myanmar. In the past ten years (2007-2016), 12,000 cases were recorded in Yangon, Mandalay The Irrawaddy, Sagaing and Bago are the most affected provinces and regions.
Drought	Magway Region About 51 townships in Mandalay Region and Sagaing Region are affected by drought.

Hazard	Particular
Landslide	Landslides are common in mountainous areas, especially in the western and eastern highlands. In the western parts, landslides and other types of ground movements such as rock falls, Various landslides and mud flows were encountered.
Floods	Flooding is one of the most common hazards in Myanmar. The risk of flooding occurs three times a year, in June. July to late August. The biggest threat is in September and October, around which time the monsoon rains are the biggest threat in August. Most regions in Myanmar are prone to flooding, with the central Irrawaddy region being the most affected.
Cyclone/ Storm Surge	Myanmar is particularly susceptible to these risks during April and May and October to November. Although cyclones often occur in the middle of the monsoon season, they do not reach their aximum strength. However, in 2015, Cyclone Komen brought heavy rains; It caused landslides and floods. In coastal areas, the cyclone may produce strong winds. Climate change is likely to exacerbate the current cyclone/storm risk.

Source: Myanmar Action Plan for Disaster Risk Reduction, 2017

3.2 Legislative and Institutional Arrangements for Disaster Risk Management

Myanmar Disaster Management Law was enacted in July 2013, and the subsequence Disaster Management Law in 2015 issued by the Ministry of Social Welfare, Relief and Resettlement.

Thet law provides for the formation of disaster management bodies and their duties and responsibilities for all levels of disaster; This includes the establishment of a disaster management fund at national and regional/state levels. The law provides guidelines for implementing disaster mitigation measures along with development plans in the country.

The rules for implementation of Myanmar Disaster Management Law have been also drafted by the Ministry of Social Welfare, Relief and Resettlement in consultation with disaster risk reduction experts and Myanmar Disaster Risk Reduction Working Group with 56 international and national organizations led by UNDP.

The objectives of the Disaster Management Law are follows:

(1) In order to implement natural disaster management plans systematically and quickly.

(2) To form a national committee and regional organizations in order to implement natural disaster management in a systematic and speedy manner.

(3) In carrying out natural disaster management activities, national and international government departments and organizations; social organizations.

(4) To coordinate with other non-governmental organizations or international organizations and regional organizations.

(5) To preserve the natural environment.

(6) To provide a better life for refugees by providing social and vocational programs. In order to reduce the potential damages caused by natural disasters, the following functions have been reduced in the Natural Disaster Management Law.

(7) Preparedness and preventive measures for disaster risk reduction during the forecast period.

(7) Emergency responses including search and rescue during natural disasters.

(8) Rehabilitation and reconstruction activities to preserve the natural disaster-affected environment and improve the standard of living in times of natural disasters (Natural Disaster Management Law, 2013).

The aim of Myanmar's disaster risk management policy is to provide large-scale infrastructure for a comprehensive disaster risk reduction approach for Myanmar. preparation, Efforts are being made to achieve a fair balance of response and recovery and reconstruction. In 2008, Cyclone Nargis and its effects increased the government's awareness of the need to prepare for future disasters, leading to the development of a risk reduction strategy and the Myanmar National Disaster Reduction Action Plan (MAPDRR), which was approved in 2012.

3.3 Institutional Structure for Disaster Management

Myanmar has an evolving landscape of disaster management organizations following Cyclone Nargis. In 2011, the Myanmar Disaster Preparedness Agency (MDPA) was established as a central focal point for advocacy and disaster preparedness.

Two years later, the social worker The Ministry of Relief and Resettlement (MSOWRR) constituted the National Disaster Management Committee (NNDMC) under the Disaster Management Law. NNDMC funded by MSOWRR replaced MDPA. This committee is responsible for DRR planning, It is the lead government agency responsible for implementing and coordinating post-disaster management policies and activities. However, NNDMC has focused on post-disaster activities, reflecting the government's stance on disaster management and DRR.

The government is responsible for natural disaster prevention, Disaster management response activities were primarily conducted after events rather than proactively in preparation and mitigation. Non-governmental disaster management organizations in Myanmar include the Myanmar Information Management Unit (MIMU) and the Disaster Risk Reduction Working Group (DRRWG). DRRWG is the United Nations; It is a network of 53 agencies, including international and local NGOs and other stakeholders. The DRRWG aims to strengthen DRR policies and institutions and form partnerships with the private sector and academia.

3.3.1 National Disaster Management Committee

The National Disaster Management Committee (NDMC) was chaired by the Vice President and the Union Minister of the related department, and members of the disaster response support team in Myanmar attended. Disaster Management Committees of Regions, States, Self-administered zones and District, Township, Wards and Villages were also formed.

The duties and functions of NDMC are as following: (a) to set up required organizations to implement the activities of the committee; to provide policies according to the priority of step-by-step activities; to review the progress of the work of the committee and give instructions as necessary. (b) provide guidance for the use of

domestic resources as necessary in the face of natural disasters; (c) To establish principles of coordination for activities requiring assistance from external sources. (d) To manage the national finances and resources and to distribute them where needed. (e) Issuing orders and instructions to carry out natural disaster management activities without hindrance if necessary;

3.3.2 Township Disaster Management Committee

Township Disaster Management Committee is formed with many members in order to execute disaster related activities before, during and after the disasters. The formed committee members will meet once a month for coordination and updating of implementation of planned activities related to Disaster Risk Reduction. The committee chairman will provide quarterly report to District/State Disaster Management Committee.

The existing duties and responsibilities of Township Disaster Management Committee in all phases of disaster management were reviewed and revised accordingly, including the tasks, preparedness and mitigation measures to be performed before disaster, tasks and responses to be performed during disaster and relief, reconstruction, rehabilitation, recovery activities, to be performed after disaster as follows;

Before Disaster

- Review and revise the TDMP annually;
- To convene regularly the meetings of Township Disaster Preparedness Committee and its sub-committees and undertake continuous watches on the disaster risk reduction and preparedness measures;
- Maintain the vertical relationship with the District and State Authorities;
- Ensure effective inter-departmental coordination among government departments at township;
- Oversee and supervise the before disaster activities of all sub-committees;

- Ensure the formulation of disaster preparedness plans in wards and villages, and inspection on their executions;
- Ensure mainstreaming of DRR into township level departmental development works;
- Initiate DRR capacity building programs in close collaboration with Relief and Resettle Department, Government and other stakeholders;
- Formulate activities to educate and mobilize people for their full participation in raising their awareness on natural disasters and Dos & Don'ts;
- Develop SOP for emergency management
- Organize mock drills in which Township Disaster Management Committee, its sub-committee and communities are involved in to check effectiveness and practicability of the plan;
- Provide instructions and guidelines to develop the Early Warning System, so that emergency warning news is quickly disseminated to the grassroots levels;
- Determine the activities to mitigate disaster risks such as raising the level of roads, renovate and reconstruct the buildings from low lying flood prone areas, and putting long leg to the houses/buildings;
- Identify safe places in advance for refuge in times of disaster and designated place suitable for opening of temporary Relief Center;
- Prepare and plan the necessary equipment and tools for emergency response prior to the flood season;
- Prepare plan for likely outbreak of epidemic diseases after flood;

During Disaster

- Disseminate the early warning information clearly and precisely to sub-committees and communities;
- Evacuate the communities at vulnerable places to safe shelter immediately after the emergency warning is received;
- Supervise and coordinate during disaster activities of all sub-committees;

- Ensure the effective implementations of activities by all sub-committees in close supervision at different levels (Township, Ward and Village);
- Establish Relief Fund (or) Disaster Emergency Fund;
- Keep the state government informed about disaster situation and progress;
- Coordinate the activities of the lateral agencies like military and other stakeholders (CSOs, NGOs);

After Disaster

- Collect and compile data on death toll, damage and loss, affected people and report to district/state disaster management committees;
- Report the disaster management activities to district disaster management committee and to make arrangement for implementation of directions from higher authorities;
- Provide supervision for prompt distribution of financial and basic needs (food, water, clothing and medicines) from the State and donors to the beneficiaries;
- Supervise and coordinate the after-disaster activities of sub-committees including psycho social supports, rehabilitation and reconstruction;
- Record the experiences, lessons mentioning pros and cons deriving from disaster management activities;
- Reviewing disaster related activity reports received from sub-committees and provide appropriate directions;
- Monitor and document the response and update Township Disaster Management Plans based on learning of the past disaster;

Some of Civil Society Organizations existing and operating in Township are also included as members of the Township Disaster Management Committee. The Institutional Arrangements for Disaster Management at Township is needed to disseminate widely to all the Township Disaster Management Committee members on composition of the committee, organogram and responsibilities.

The following Table (3.2) shows the role and department of township disaster risk management committee members.

Table (3.2) Township Disaster Management Committee Members

No.	Committee Member	Department	Role
1	Administrator	General Administration Department	Chairman
2	Commander	Police Force	Vice Chairman
3	Staff Officer	Fire Services Department	Member
4	Ward Administrator	General Administration Department	Member
5	Health Officer	Health Department	Member
6	Education Officer	Education Department	Member
7	Executive Officer	Development Affairs Department	Member
8	Engineer	Public Works	Member
9	Staff Officer	Immigration Department	Member
10	Staff Officer	Forest Department	Member
11	Manager	Agriculture Department	Member
12	Staff Officer	Information Department	Member
13	Engineer	Department of Electric Power	Member
14	Staff Officer	Department of Planning	Member
15	Representative	Myanmar Women's Affair Association	Member
16	Representative	Myanmar Red Cross Society	Member
17	Representative	Auxiliary Fire Brigade	Member
18	Deputy Administrator	General Administration Department	Secretary

Source: General Administration Department

Township Disaster Management Committee is the main body for disaster risk management and there are ten sub-committees constituted for effective execution of disaster risk management activities including disaster risk reduction and disaster management activities based on the needs according to the local context and situation in the Township.

The Township Administrator designated as the chairman of the Township Disaster Management Committee is the key responsible person in strengthening the Township Institutional Arrangement and empowers its sub-committees for Disaster Management activities. The commitment of the township administrator will determine the far-reaching impacts of this township disaster management plan, by maintaining the proper vertical relationship with higher authorities and ensuring the effective horizontal

communication among Township Disaster Management Committee and sub-committees. The role of chairperson also includes overseeing the coordination and operations of disaster management activities in partnership with both national and international agencies including Non-Government Organizations both during emergency and normal times. The ten sub-committees under which committees are listed below in Table (3.3).

Table (3.3) Township Disaster Preparedness Sub-Committees

No.	Name of the Sub-Committee
1	Information
2	International Relation
3	Search and Rescue
4	Collecting of Preliminary Damages News and Emergency Aids
5	Confirmation of Damage and Losses
6	Transport and Route Clearance
7	Disaster Risk Reduction and Building of Emergency Tents
8	Health Care
9	Rehabilitation and Reconstruction
10	Security Disaster Reduction and Emergency Tents

Source: General Administration Department

3.4 Action Plan on Disaster Risk Reduction

Resilience is key to sustainable development, as Cyclone Nargis in 2008 and the 2015 floods in Myanmar demonstrated that decades of development gains are being eroded by the hour. Myanmar is prone to almost all types of disasters, from earthquakes to floods and cyclones to fires. Climate change and misguided development may increase the current risks of floods if not addressed comprehensively and systematically. The Government of the Union of Myanmar has developed an inter-agency plan for disaster risk reduction 2017 (MAPDRR, 2017).

Task Force mechanism in a broader consultative mode than in 2016-2017. The process involves a series of thematic discussions at the national level, MAPDRR, to develop issues on the ground. 2017 is a comprehensive and integrated action plan for disaster reduction across Myanmar until 2020. By considering the entrenched forces of disaster risk with a long-term perspective. It sets an overall target for 2030. It primarily aims to provide a basis for mobilizing and deploying national and external resources, and will provide a basis for results.

Vision of MAPDRR 2017; "Protected lives and property, economy heritage and the environment; Through an inclusive approach towards sustainable development in Myanmar". The action plan identifies 32 priority actions under four pillars. Risk information and awareness. risk management; risk mitigation; reaction Preparation for recovery and reconstruction. Objectives in each priority action; activities; the results, Duration and lead ministry identified. Additionally, other departments and partners were identified to support the lead agency.

Priority actions to strengthen policy frameworks and systems for long-term risk reduction. Many development policies and interventions are in nascent stages, and this provides a window of opportunity for new disaster and climate risk-informed development. Preparedness for recovery and reconstruction is key to addressing the current threat. The plan is MAPDRR, Strong implementation to realize the vision of 2017; funding; A monitoring and evaluation mechanism is in place.

The ministries that will implement the priority according to the relevant sectors will take the lead. The high-level MAPDRR Steering Committee will be the main coordinating body and the NDMC will provide oversight and strategic guidance. Priority activities will be funded from internal and external sources.

A multi-layered monitoring and evaluation mechanism is planned at various stages of implementation. The natural disaster created over the years and decades, the government, development partners; the private sector; Coordination of all stakeholders, including civil organizations and the community. It is important to remember that systematic and long-term interventions are needed (Department of Disaster Management, 2020).

3.4.1 Disaster Risk Reduction Working Group Action Plan

The Disaster Risk Reduction Task Force was established in 2008 to support the government and communities to improve disaster resilience in Myanmar. Since then, the Working Group on Disaster Risk Reduction (DRR WG) has evolved into one of the most diverse and dynamic networks in Myanmar, and currently includes the United Nations, international non-governmental organizations; It is made up of 53 agencies, including local non-governmental organizations. Professional organizations work on natural disaster risk reduction (DRR).

The Working Group on Disaster Risk Reduction (DRR WG) consists of three UN agencies; Three international non-governmental organizations; three local non-governmental organizations; It is led by 11 members in the steering committee, which includes the Myanmar Red Cross Society and an academic organization.

Director General of Relief and Resettlement Department (DRR) is also the Secretary of the Center for Disaster Management and the National Disaster Management Working Committee (NDMWC) and the Honorary Chairman of the DRR Working Group. A member of an international organization, the DRR Sub-Sectoral Working Group (DRR SSWG), co-chaired by DRR and UNDP; local NGO An expert organization and DRR members include the Myanmar Red Cross Society. WG

CHAPTER IV

SURVEY ANALYSIS

4.1 Survey Area Profile

The survey area is conducted on three townships such as Ahlone Township, Dagon Seikkan Township and Hlaing Tharyar Township.

(1) Ahlone Township

Ahlone Township is located in the western portion of West District, Yangon Region. It lies between the north latitudes $16^{\circ} 46'$ and $16^{\circ} 47' 54''$ and between east longitudes $96^{\circ} 17' 8''$ and $96^{\circ} 18' 12''$. It is bounded by Dagon Township on the east and Yangon River on the west, and on the north by Lanmadaw and Seikkan Townships and Kyeemyindine Township on the north.

Data from General Administration Department Ahlone Township (2021) has a width of about (1.15) miles from east to west and (1.81) miles from north to south. The total land area of Ahlone Township is estimated to be about 1.04 square miles. This township's general elevation is about (8) feet above sea level. In Ahlone Township, the land is smooth and mostly the land is low and flat from east to west. There are few rivers and creeks in this township flowing from north to south. The distinct river is Yangon River which is flowing from north to south and the length of this river is 2.1 miles. Total population is 46787 numbers, 11 wards with 2522 houses and 10260 households.

(2) Dagon Seikkan Township

Dagon Seikkan Township is located in the eastern part of Yangon City, immediately to the west of Bago River. This township lies between the north latitudes $16^{\circ} 46'$ and $16^{\circ} 49'$ and between east longitudes $96^{\circ} 11'$ and $96^{\circ} 13'$. It is bounded on the

west by the Bago Rivers on the south Southeast by Thanlyin Township, on the West by Dagon (South), on the North by Hlegu Township and Dagon (South). It has an extreme width of about 4 miles from east to west and extreme length of approximately 13.25 miles from North and South. The total area of Dagon Seikkan Township is estimated to be about 32.97 square miles. Regarding from General Administration Department of Dagon Seikkan Township (2021), the township includes 35 wards, 4 village tracts, 5 villages, 4647 houses and 74762 households. Total population is 28722 numbers with 251958 people are living in urban area and the rest 35764 people are living the rural area.

(3) Hlaing Tharyar Township

Hlaing Tharyar Township established on July 13, 1989 and formed into 20 wards and 9 village tracts to accommodate the squatter and fire victims caused by Yangon's growing population. Slums and squatters have been on the rise in Yangon as migrant people especially those from the rural areas are moving in with the hope of getting a better job and a better life in the city.

Hlaing Tharyar Township is situated at the bank of Hlaing River and in the north western part of Yangon City. It is bounded by Hlaing River in the east and Pan Hlaing River in the south. This township is laying between North latitudes 16° 47' and 20° 12' and East Longitude 96° 12' and 100° 13'. Total area is 26.01 square miles or 16647.29 acres. The length is 5.3 miles from East to West and extends 7.6 miles from North to South. The urban area of Hlaing Tharyar Township is 10.88 square miles or 6643.51 acres.

Hlaing Tharyar Township is bordered with Htantabin Township in the north and west, with Twante Township in the south, with Insein, Mayangone, Hlaing and Kamayut Townships in the east and in the north is Shwepyithar. According to the Hlaing Tharyar Township General Administration Department report (2021), total population is 440949 with 340536 (77.2%) people are living in urban area and the rest 100413 (22.8%) people are living the rural area. This township is comprised (20) Wards, (9) Village Tracts and (18) villages.

4.2 Survey Design

The survey data collection used simple random sampling method for this study was through a structure questionnaire. The survey was conducted on 150 samples include 50 samples of Ahlone Township, 50 samples from Dagon Seikkan Township and 50 sample from Hlaing Tharyar Township. The survey was based on the voluntary cooperation and interviewed within September, 2022 for this study. The questionnaire was divided into three sections: (a) characteristics of the respondents, (b) housing condition, and (3) knowledge and preparedness actions on natural disaster.

The questionnaire is provided multiple choice of answers and dichotomous questions that had only two response alternatives, Yes or No. Collected data were tabulated, analyzed and interpreted in the light of objective of the study by applying descriptive statistics. The survey questionnaire is attached in Appendix.

Table (4.1) Sample of Study

Township Name	Ward	No. of Households
Ahlone	Galone	10
	Htanay	10
	Thithtaw	10
	Sinmin	10
	Sawyanpaing	10
Dagon Seikkan	68	10
	75	10
	89	10
	93	10
	94	10
Hlaing Tharyar	2	10
	5	10
	7	10
	11	10
	18	10

Source: Survey data, 2022

4.3 Survey Finding

The survey findings present the analysis and interpretation of the results of statistical techniques carried out to answer the basic questions raised in the study.

4.3.1 Characteristics of Respondents

The following Table (4.2) shows the characteristic of respondents include gender, completed age, marital status, educational qualification, occupation and number of family members.

Table (4.2) Characteristics of Respondents

Description	No. of Respondents	Percentage
Gender		
Male	87	58.0
Female	63	42.0
Total	150	100
Completed Age (Year)		
Between 21 Years to 30 Years	32	21.3
Between 31 Years to 40 Years	36	24.0
Between 41 Years to 50 Years	43	28.6
51 Years and over	39	26.1
Total	150	100
Marital Status		
Single	24	16.0
Married	126	84.0
Total	150	100
Educational Qualification		
High School	25	16.7
University/College	34	22.7
Graduated	65	43.3
Master	26	17.3
Total	150	100

Description	No. of Respondents	Percentage
Occupation Status		
Government Employee	38	25.3
Company Employee	59	39.3
Business Owner	10	6.7
Others	43	28.7
Total	150	100
Number of Family Members		
Less than 5 members	122	81.3
More than 5 members	28	18.7
Total	150	100

Source: Survey data, 2022

Regarding from 150 respondents (Table 4.2), the majority of respondents are male and age between 41 years to 50 years. Mostly respondents are married and graduated level. The occupation status of 150 respondents, 38 respondents (25.3%) are government employee, 59 respondents (39.3%) are private employee, 10 respondents (6.7%) are business owner and 43 respondents (28.7%) are various working activities in the survey area. The most of respondents are under five family members.

4.3.2 Housing Conditions

The housing conditions in the survey area are listed by factors such as house ownership, house type, house width, house wall and roof, total number of room and house constructed year. Table (4.3) shows the house ownership of 150 respondents.

Table (4.3) House Ownership

Description	No. of Respondents	Percentage
Own	92	61.3
Rent	35	23.3
Inherited	23	15.4
Total	150	100

Source: Survey data, 2022

From Table (4.3), 92 respondents (61.3%) have owned their house, 35 respondents (23.3%) are rent the house and 23 respondents (15.4%) are inherited from their parents respectively.

The following Table (4.4) shows the house type of 150 respondents in the survey area.

Table (4.4) House Type

Description	No. of Respondents	Percentage
One Story Building	13	8.7
Two Story Building	36	24.0
Apartment	80	53.3
Brick Nogging	15	10.0
Wooden House	6	4.0
Total	150	100

Source: Survey data, 2022

Regarding housing condition of 150 respondents, 13 respondents (8.7%) are living in one story building house type, 36 respondents (24%) are two story building, 80 respondents (53.3%) are living in the apartment, 15 respondents (10%) are brick nogging and 6 respondents (4.0%) are wooden house respectively.

The most of respondents said that their house width is between 601 square feet to 800 square feet as shown in Table (4.5).

Table (4.5) House Width (Square Feet)

Description	No. of Respondents	Percentage
Less than 400	25	16.7
401 to 600	38	25.3
601 to 800	52	34.7
More than 800	35	23.3
Total	150	100

Source: Survey data, 2022

Table (4.6) House Wall and House Roof

Description	No. of Respondents	Percentage
House Wall		
Concrete	132	88.0
Wood	18	12.0
Total	150	100
House Roof		
Brick Tile	23	15.3
Tin Roof	127	84.7
Total	150	100

Source: Survey data, 2022

According to result of 150 respondents, the majority of respondents said that their house built concrete wall and tin roof. The following Table (4.7) shows total number of rooms in the house.

Table (4.7) Total Number of Room

Description	No. of Respondents	Percentage
None	57	38.0
One Room	45	30.0
Two Rooms	28	18.7
More than Two Rooms	20	13.3
Total	150	100

Source: Survey data, 2022

According result of 150 respondents (Table 4.7), 57 respondents (38%) are no room in their house, 45 respondents (30%) have formed one room, 28 respondents (18.7%) have two rooms and 20 respondents (13.3%) have more than two rooms in their house. Mostly respondents said that their house constructed year is between 10 years to 20 years as shown in Table (4.8).

Table (4.8) House Constructed Year

Description	No. of Respondents	Percentage
Within 10 Years	10	6.5
Between 10 Years to 20 Years	92	61.5
More than 20 Years	48	32.0
Total	150	100

Source: Survey data, 2022

4.3.3 Knowledge and Preparedness Actions on Natural Disasters

The people are often face various natural disasters. Along with natural disaster situations, the community people must participate in disaster management programs and be supported to develop skills.

Table (4.9) Concerns of Natural Disasters

Description	No. of Respondents	Percentage
High Concern	8	5.3
Low Concern	105	70.0
No Concern	37	24.7
Total	150	100

Source: Survey data, 2022

Regarding from 150 respondents (Table 4.9), mostly respondents said that their living area is low concerns of natural disasters.

Table (4.10) Types of Natural Disasters

Description	No. of Respondents	Percentage
Fire	135	90.0
Earthquake	5	3.3
Cyclone	0	0.0
Floods	10	6.7
Total	150	100

From Table (4.10), the majority of respondents answered that fire is threatened in the community. The following Table (4.11) shows the community has been affected by a natural disaster in the past five years?

Table (4.11) Affected by Natural Disaster in Past Five Years

Description	No. of Respondents	Percentage
Fire	10	6.7
Floods	25	16.7
None	115	76.6
Total	150	100

Source: Survey data, 2022

According to result of 150 respondents (Table 4.11), 10 respondents (6.7%) answered to fire is affected in the past five years and 25 respondents (16.7%) said to floods. Respondents from Dagon Seikkian Township said that they have faces floods every year from July to November. Schools are temporarily closed and the elderly and children face difficulties in living. Most of respondents said that they have not been affected by a natural disaster in the past five year.

The following Table (4.12) shows the households are preparing to handle a nature disaster.

Table (4.12) Households Prepare Status for Natural Disaster

Description	No. of Respondents	Percentage
Very Prepare	45	30.0
Somewhat Prepare	82	54.7
No Prepare	23	15.3
Total	150	100

Source: Survey data, 2022

From Table (4.12), 45 respondents (30%) have very prepared a medicine, packaged food, important documents and flashlight. And also, 82 respondents (54.7%) somewhat prepared a packaged food, important documents and cash. But, 23 respondents (15.3%) have not prepared for natural disasters.

Table (4.13) Family Planning for Natural Disaster

Description	No. of Respondents	Percentage
List of important phone numbers or contacts	72	48.0
Planned list of items to take in case the family leaves home	50	33.3
Nothing	28	18.7
Total	150	100

Source: Survey data, 2022

Regarding from 150 respondents, 72 respondents (48%) are planned list of important phone numbers or contact and 50 respondents (33.3%) are planned list of items to take in case the family leaves home.

The following Table (4.14) shows the preparedness for natural disasters in the community management.

Table (4.14) Preparedness for Natural Disasters

Description	No. of Respondents	Percentage
Early Warning System		
Yes	30	20.0
No	120	80.0
Total	150	100
Natural Disaster Plan		
Yes	113	75.3
No	37	24.7
Total	150	100
Organized Group		
Yes	150	100
No	0	0
Total	150	100
Trained to Assist		
Yes	26	17.3
No	124	82.7
Total	150	100

Regarding from 150 respondents (Table 4.14), 120 respondents (80%) said that the community have not early warning system for natural disasters, 113 respondents (75.3%) said the community is doing a natural disaster response or emergency plan. All of respondents are agreed to community have a committee or organized group that decides what to do in natural disasters. Although, the community members have not been trained to assist others in the event of a natural disaster

Table (4.15) Family Members Activities for Natural Disaster

Description	No. of Respondents	Percentage
Attended to Better Prepared for Disaster		
Yes	12	8.0
No	138	92.0
Total		
Attended First Aid Training		
Yes	45	30.0
No	105	70.0
Total		
Participated in Natural Disaster		
Yes	86	57.3
No	64	42.7
Total	150	100.0
Participated in Volunteer Activity Related to Disaster Preparedness		
Yes	82	54.7
No	68	45.3
Total	150	100

Source: Survey data, 2022

According to result of 150 respondents (Table 4.15), mostly respondents are not attended to be better prepared for a disaster and not attended first aid training. Although, mostly respondents are not participated in a disaster or evacuation drill and participated in a community or volunteer activity related to disaster preparedness or prevention.

CHAPTER V

CONCLUSION

5.1 Findings

Myanmar is prone to almost all types of hazards include fire, forest fire, earthquake, strong wind, cyclone, storm surge, tsunami, landslide, floods, drought and industrial hazards. Understanding current and future disasters and climate change associated risks are important for sustainable development. The current portal includes risk information riverine floods, coastal floods and cyclone winds. Several types of exposure data are included such as population density, buildings, agriculture and critical infrastructure.

The study intends to examine to disasters preparedness and response planning of three townships household in Yangon Region. The survey area is Ahlone Township, Dagon Seikkan Township and Hlaing Tharyar Township. The survey was conducted on 150 samples include 50 samples of Ahlone Township, 50 samples from Dagon Seikkan Township and 50 sample from Hlaing Tharyar Township.

The majority of respondents are male and age between 41 years to 50 years. Mostly respondents are married and graduated level. The most of respondents are private employee in the survey area. The most of respondents have owned their house and apartment. The majority of respondents said that their house built concrete wall and tin roof. Mostly respondents said that their living area is low concerns of natural disasters. The majority of respondents answered that fire is threatened in the community.

Respondents from Dagon Seikkian Township said that they have faces floods every year from July to November. Schools are temporarily closed and the elderly and children face difficulties in living. Most of respondents said that they have not been affected by a natural disaster in the past five year.

Within 150 respondents, 45 respondents (30%) have very prepared a medicine, packaged food, important documents and flashlight. And also, 82 respondents (54.7%) somewhat prepared a packaged food, important documents and cash. All of respondents are agreed to community have a committee or organized group that decides what to do in natural disasters. Although, the community members have not been trained to assist others in the event of a natural disaster.

5.2 Suggestions

The study suggested that family-level preparedness, all households develop a family-level preparedness plan, discuss what to do in case of a disaster in advance, and designate places where family members can meet after disasters. It is also better to hold awareness events in all schools and encourage children to share the knowledge with the adults at home which is a channel of dissemination of knowledge. Disaster awareness lessons should be taught more actively in the school curriculum and should be part of examinations.

The government's awareness of natural disasters to develop a public awareness strategy that considers comprehensive methods and approaches to achieve broad participation of the community in awareness-raising dialogues and to promote discussion and decision-making.

The government should strengthen the law, policies, rules and regulations and businesses should be allowed to operate ethically without harming the environment and contributing to the consequences of natural disasters and disasters.

It is also essential to establish early warning systems, important to budget for weather satellites and send disaster messages via mobiles in disaster-prone areas. In disaster management is including the relevant department of the government, development committees, Fire Brigade, Police forces, Red Cross, community organization, non-governmental organizations and international non-governmental organizations.

REFERENCES

- Allen, K.M., (2006), Community-based disaster preparedness and climate adaptation: local capacity-building in the Philippines, *Disasters* 30(1)
- Aye Aye Khine (2011). *A Study on Community Based Disaster Risk Reduction in Ayeyarwaddy Region*, Unpublished MPA Thesis, Yangon University of Economics.
- Basel, S. J., (1984), *Epidemiology of Natural Disasters*; Karger, New York.
- Beamon, B.M., and Balcik, B., (2008) Performance measurement in humanitarian relief chains, *Int. J. Public Sect. Manag.* 21(1)
- Berke, P. R. (1995), Natural-hazard reduction and sustainable development: A global assessment.' *J. Plan. Lit.*, 9, 3
- Berlemann, M., & Wenzel, D. (2016). Long-term growth effects of natural disasters—Empirical evidence for droughts. *Economics Bulletin*, 36(1), 464–476.
- Bethel JW, Foreman AN and Burke SC. (2011), Disaster preparedness among medically vulnerable populations. *American Journal of Preventive Medicine*. Feb 28;40(2):
- Blaikie P, Cannon T, Davis I, Wisner B. (2014), At risk: natural hazards, people's vulnerability, and disasters. *Routledge*; Jan 21
- Chhibber, A., & Laajaj, R. (2013). The interlinkages between natural disasters and economic development. In D. Guha-Sapir & I. Santos (Eds), *The economic impacts of natural disasters*. New York, NY: Oxford University Press
- Doocy, S., Russell, E., Gorokhovich, Y., & Kirsch, T., (2013), Disaster preparedness and humanitarian response in flood and landslide-affected communities in Eastern Uganda, *Disaster Prev. Manag.: Int. J.* 22(4)
- Fiala, O. (2017). *Natural disasters and individual behaviour in developing countries*. Springer.
- Friesma, H. P., Caporaso, J., Goldstein, G., Linberry, R., and McCleary, R. (1979), *Aftermath: Communities after natural disasters*, Sage, Beverly Hills, Calif.

- Fomby, T., Ikeda, Y., & Loayza, N. V. (2013). The growth aftermath of natural disasters. *Journal of Applied Econometrics*, 28(3),
- General Administration Department (2021), Township Report, General Administration Department, Ministry of Home Affairs, Ahlone Township, Yangon Region, Myanmar.
- General Administration Department (2021), Township Report, General Administration Department, Ministry of Home Affairs, Dagon Seikkan Township, Yangon Region, Myanmar.
- General Administration Department (2021), Township Report, General Administration Department, Ministry of Home Affairs, Hlaing Tharyar Township, Yangon Region, Myanmar
- Greenough, G (2001) The Potential Impacts of Climate Variability and Change on Health Impacts on Extreme Weather Events in the United States, *Environmental Health Perspectives*, Vol 109, Supp 2,
- Jamshidi, E., Majdzadeh, R., Saberi Namin, M., Ardalan, A., Majdzadeh, B., & Seydali, E., (2016), Effectiveness of community participation in earthquake preparedness: a community-based participatory intervention study of Tehran, *Disaster Med. Public Health Prep.* 10(2)
- Kapucu, N., (2008), Collaborative Emergency Management: Better Community Organizing, Better Public Preparedness and Response, *Disasters* 32(2)
- Ko Ko Aung (2011), *A Study on Natural Disasters Risk Reduction Measures in Myanmar*, Unpublished EMPA Thesis, Yangon University of Economics,
- Kunkel, K.E., Pielke Jr., R.A., Changnon, S.A. (1999), Temporal Fluctuations In Weather And Climate Extremes That Cause Economic And Human Health Impacts: *Bulletin of the American Meteorological Society*; Vol. 80, no. 6,
- López, R. E., Thomas, V., & Troncoso, P. A. (2016). Economic growth, natural disasters and climate change: New empirical estimates. Retrieved from
- Moe, T.L. F., Gehbauer, S. and Senitz, M., (2007), Balanced scorecard for natural disaster management projects, *Disaster Prev. Manag.: Int. J.* 16(5)

- National Disaster Management Committee, (2017), Myanmar Action Plan on Disaster Risk Reduction 2017. Government of Myanmar.
- Noji, E. K. (1992), Medical and Public Health Consequences of Natural and Biological Disasters, *Natural Hazards Review*, Volume 2, Issue 3.
- Noji, E. K. (1997), The nature of disaster: General characteristics and public health effects.' *The public health consequences of disasters*, Oxford University Press, New York
- Noy, I. (2009). The macroeconomic consequences of disasters. *Journal of Development Economics*, 88(2),
- Noy, I., & Nualsri, A. (2007). What do exogenous shocks tell us about growth theories? *Santa Cruz Center for International Economics Working Papers*, Vol. 7–16
- Okuyama, Y. (2003). Economics of natural disasters: A critical review. *Research Paper*
- Sapir, D.G., and Lechat, M.F., (1986), Reducing the impact of natural disasters: why aren't we better prepared? *Journal of Health Policy and Systems Research*, 1
- Seneviratne, K., Baldry, D., & Pathirage, C., (2010), Disaster knowledge factors in managing disasters successfully, *Int. J. Strat. Property Manag.* 14(4)
- Tatham, P., and Pettit, S.J. (2010), Transforming humanitarian logistics: the journey to supply network management, *Int. J. Phys. Distrib. Logist. Manag.* 40(8)
- Theingin Soe Naing, *A Study on Knowledge, Attitude, Preparedness and Protection of Disasters in Ayeyarwady Region (Case Study: Hinthada Township)*, Unpublished EMPA Thesis, Yangon University of Economics.
- Wijkman, A., Lloyd, T., (1984), *Natural Disasters: Acts of God or Acts of Man*, International Institute for Environment and Development, Washington, DC:
- World Health Organization, (1989), *Coping with Natural Disasters: The Role of Local Health Personnel and The Community*. World Health Organization, Geneva.
- Yin Mar Nay Win, *A Study on Disaster Risk Reduction and Management in Community (Case Study: Bilin Township, Thaton District, Mon State)*, Unpublished EMPA Thesis, Yangon University of Economics.
- World Bank, (2019), *Myanmar Country Environmental Analysis*, World Bank.

Websites

<https://reliefweb.int/sites/reliefweb.int/files/resources/MyanmarNatural0Disaster>

<http://www.wcpt.org/disaster-management/what-is-disaster-management>

<http://www.unisdr.org/we/inform/terminology>

SURVEY QUESTIONNAIRE

I am studying Master of Public Administration at Yangon University of Economics. I have designed the following questionnaire for “**A Study on Community Knowledge and Preparedness of Natural Disaster in Myanmar (Case Study on Three Townships in Yangon Region)**” which requires for my thesis work as an integral part of the study to complete the Master.

All information will be treated as confidential and the researcher undertakes not to reveal any individual information that appears in this questionnaire. You will require approximately 20 minutes completing these questionnaires. Read the questions and mark your response off with a tick in the box provided. Thank you for your participation.

Section (A) Characteristics of Respondent

1. Gender

(a) Male (b) Female

2. Age (Years)

(a) Between 21 Years to 30 Years (b) Between 31 Years to 40 Years

(c) Between 41 Years to 50 Years (d) 51 Years and over

3. Marital Status

(a) Single (b) Married

4. Educational Qualification

(a) Undergraduate (b) Graduate

5. Occupation

(a) Government Employee (b) Private Employee (c) Business Owner

(d) Others

6. Number of Family Members

(a) Less than 5 Members (b) More than 5 Members

Section (B) Housing Condition

1. House Ownership

(a) Own (b) Rent (c) Inherited

2. House Type

(a) One Story Building (b) Two Story Building (c) Apartment

(d) Brick Nogging (5) Wooden House (6) Hurt

3. House Width (Square Feet)

(a) Less than 400 (b) 401 to 600 (c) 601 to 800 (d) More than 800

4. House Wall

(a) Concrete (b) Iron Sheet (c) Wood (d) Bamboo (e) Nipa Palm

5. House Roof

(a) Brick Tile (b) Tin Roof (c) Wood (d) Bamboo (e) Nipa Palm

6. Total Number of Room

(a) None (b) One Room (c) Two Rooms (d) More than Two Rooms

7. House Constructed Year

(a) Within 10 Years (b) Between 10 Years to 20 Years (c) More than 20 Years

Section (C) Knowledge and Preparedness Actions on Natural Disaster

1. How many concerns of natural disasters to you?

(a) High Concern (b) Low Concern (c) No Concern

2. What types of natural disasters threaten your community?

(a) Fire (b) Earthquake (c) Cyclone (d) Floods (e) Others

3. Has your community been affected by a natural disaster in the past five years?

(a) Yes (b) No

4. What kinds of natural disasters have occurred in the past five years?

(a) Fire (b) Earthquake (c) Cyclone (d) Floods (e) Others

5. Has your family been affected by a natural disaster in the past five years?

(a) Yes (b) No

If yes, how is your family affected?

(a) Evacuation (b) Property Damage (c) Disruption or Loss of Income

(d) Serious Injury (e) Minor Injury (f) Death

6. How to prepare your family to handle a natural disaster?

(a) Very Prepare (b) Somewhat Prepare (c) No Prepare

7. Do you have materials or other items in your home that can be used for natural disaster relief?

(a) Yes (b) No

8. Have you and your family members planned what you would do if a natural disaster?

(a) Planned meeting place for family members

(b) List of important phone numbers or contacts

(c) Activities to strengthen your home or reduce risk or damage to your property

(d) Planned list of items to take in case the family leaves home

(e) Evacuation plan

(f) Nothing

9. Does your community have an early warning system?

(a) Yes (b) No

10. Does your community have a natural disaster response or emergency plan?

(a) Yes (b) No

11. Does your community have a committee or organized group that decides what to do in natural disasters?

(a) Yes (b) No

12. Have community members been trained to assist others in the event of a natural disaster?

(a) Yes (b) No

13. Does your community have evacuation routes?

(a) Yes (b) No

14. Previous year, have you or your family members done any of the following?	Yes	No
(a) Attended a meeting on how to be better prepared for a disaster?		
(b) Attended a First Aid training?		
(c) Participated in a disaster or evacuation drill?		
(d) Participated in a community or volunteer activity related to disaster preparedness or prevention?		

Thanks for your participation.