Asian Disaster Reduction Center Visiting Researcher Program FY 2022

Study on Community Based Disaster Preparedness and Prevention Activities in Japan

Summited by;

Ms. Mi Mi Tun

Deputy Director

Department of Disaster Management

Ministry of Social Welfare, Relief and Resettlement, Myanmar

ADRC Visiting Researcher

Kobe, JAPAN

28 March 2022

Disclaimer

This report was compiled by an ADRC visiting researcher (VR) from ADRC member countries. The views expressed in the report do not necessarily reflect the views of the ADRC. The boundaries and names shown and the designations used on the maps in the report also do not imply official endorsement or acceptance by the ADRC.

ACKNOWLEDGEMENTS

First of all, I would like to express my sincere gratitude to the governments of Japan and Myanmar. I am sincerely grateful to the Asian Disaster Reduction Centre (ADRC), Ministry of Social Welfare, Relief and Resettlement and Department Disaster Management of Myanmar for their great support and guidance to participating this program as a visiting researcher, FY 2022. I would like to express my deepest gratitude to Mr. SASAHARA Akio (Executive Director), Ms. Miki Kodama, Mr. Makoto Ikeda who gave me the valuable lectures, kindness and guidance. I would like to express all Senior Researchers, Researchers and all admin staffs for valuable advice, guidance, and support in the accomplishment of this task. I am also to thank Ms. Fujimoto who gave me kindness and support. I am also deeply grateful the advice and suggestions provided by My mentor Ms. Chihori Tatebe, research department, Asian Disaster Reduction Centre. My special thanks go to all the lecturers who delivered a lecture to straightening my knowledge during this program. I possessed the sweet memories. Finally, I am fully thankful to my husband and family for helping and support me to complete this research study and the ones from my department who are being shared my responsibilities and duties.

Contents

LIST OF FIGURES

LIST OF Tables

List of Abbreviations

CBDRM	Community-Based Disaster Risk Management
CDMP	Community Disaster Management Plan
CSOs	Civil Society Organizations
DMH	Department of Meteorology and Hydrology
GAD	General Administration Department
DDM	Department of Disaster Management
DM	Disaster Management
DMTC	Disaster Management Training Center
DRR	Disaster Risk Reduction
EOC	Emergency Operation Center
FY	Fiscal Year
GEJE	The Great East Japanese Earthquake
HQ	Head Quarter
IDDR	International Day for Disaster Reduction
LDMO	Local Disaster Management Organizations
MAPDRR	Myanmar Action Plan on Disaster Risk Reduction
M&E	Monitoring and Evaluation
MSWRR	Ministry of Social Welfare, Relief and Resettlement
NDMC	National Disaster Management Committee
NDMO	National Disaster Management Organization
NGOs	None-Government Organizations
PDNA	Post Disaster Nargis Assessment
QGIS	Geographic Information System
TOT	Training of Trainers
UNDP	United Nations Development Program
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
SDC	Swiss Development Cooperation
UNDP	United Nations Development Program
IOM	International Organization for Migration
HCT	Humanitarian Country Team
CBO	Community-Based Organization

Chapter (1)
Introduction

There have been climate changes and natural disasters on the earth since the existence of the universe. However, both the living and non-living organisms have survived adaption to these changes and catastrophes. Due to changes in weather conditions, deteriorations of natural environment, global warming, developments in technology etc, disasters in various forms break out more today than in the past. Consequently, people have to find ways and means of adaptation to them or applying systematic, strategic management to lessen the damaging adverse effects.

1.1 Background and Significance of the study

Myanmar is prone to almost all types of hazards such as earthquake , tsunami , flood , landslide, cyclone, strong wind, lighting, soil erosion, fire, forest fire, drought, industrial and technological hazards. Myanmar faced many disasters in the recent past. The skewed development and climate change will further aggravate the existing disaster risk in Myanmar. In recent years, monsoon season is getting shorter to shorter and causing flooding and landslide in countrywide annually. 120000 people were displaced and 16 people were dead in 2018. On August 2019, Myanmar faced floods in several parts of the country due to the heavy rains. Mon State was the most seriously affected by this flood. As a consequence of heavy rain, landslide was claimed the 70 death in Paung Township (Mon State).

Myanmar regularly suffers significant loss of life, livelihoods, and property from large and small disaster events. Examples include major events such as Cyclone Nargis in 2008 or the widespread flooding in 2015, as well as more localized hazards like landslides and forest fires. These events are estimated to cost Myanmar up to 3% of GDP annually, killing thousands of people and displacing millions more. The death toll from Cyclone Nargis alone was estimated to be around 140,000 people and over 1.5 million people were displaced in the 2015 floods.

The ambitious development trajectory of Myanmar can be severely derailed in hours or days by a disaster, as the country is prone to hydrological, meteorological, geological, industrial and technological hazards. Key development sectors were severely affected by disasters and Figure 1.1 captures the impact (damage and losses) of two major disasters on key development sectors and the GDP of Myanmar.

Figure 1.1: Impact of Disaster on Key Development Sectors in Myanmar

(Figures are in million kyats)

Development Sectors	Cyclone Nargis 2008[6]	Floods and Landslide 2015[7]
Agriculture, Livestock and Fisheries	571,000 - 694,000	713,217
Industry and Commerce	2516,600	480,808
Housing	711,900	542,233
Education	116,300	50,772
Health	18,900	8,185
Total damage and loss as a percentage of the GDP of the previous fiscal year	21	3.1

Source; from MAPDRR 2017

Disasters not only cause immediate damage, but they also have far-reaching implications, particularly on poor rural households, small businesses, farmers and marginalized groups and can continue for several years afterwards. A study, five years after Cyclone Nargis to analyze its social impact, found that the disaster had a profound impact on the social and economic fabric of its affected communities. These effects evolved over time, based on the strength of the community to cope, the effectiveness of aid efforts, subsequent external events, and changes in the wider social and economic environment.

Despite institutional efforts, disaster risks remain high. Communities people are more vulnerable in Myanmar because of the lack of awareness in disaster and need for disaster preparedness and prevention. Community based disaster preparedness and prevention are important in reducing the risk of natural disaster. So, we need to improve the capacity of communities concerning with disaster. Communities are essential in all the stages of Disaster Risk Management activities because local communities are key responders to any disaster. Especially, Communities' participation and empowerment are central to good preparedness and prevention activities. we need to enhance and conduct capacity development and public awareness programs for disaster risk management especially related with four pillars of Myanmar Action Plan on Disaster Risk Reduction (MAPDRR-2017). These pillars are in line with four priority actions of the Sendai Framework for disaster risk reduction. By doing so, they will know the importance of prevention and preparedness measures for future DRR and will encourage them to participate in it. The more the communities participate in DRR, the less loss of lives and properties. They experience.

Our Economic Policy envision people-centers, inclusive and continuous growth; hence it is important to imbibe ‘resilience’ into our development interventions in letter and spirit. It is equally important to prepare for disaster response, rehabilitation and reconstruction. If we strengthen capacity

of communities for disaster preparedness and prevention activities, they can tackle the disaster risk. They will be able to consider all aspects of disaster prevention measures in local development interventions. In addition, they will be able to build a resilient community for the future disaster.

1.2 Objective of the Study

The objective of this study are;

(a) To explore the disaster events of Myanmar and their impact of affected areas

(b) To study the preparatory and preventive measures for Disaster Risk Reduction in Japan

(c) To enhance the capacity of community for DRM in Myanmar.

1.3 Method of the study

Secondary data are used in this paper and data sources are documents collected from Department of Disaster Management, Myanmar and through lectures by professionals on DRR and field visits in Japan. This paper focuses on descriptive method. Some data are gathered from internet websites.

1.4 Organization of the Study

This paper is composed of five chapters. Chapter (1) is the Introduction. Chapter(2) includes Hazard Profile of Myanmar. Chapter(3) mentions Disaster Management in Myanmar. Chapter(4) presents Hazard Profile and Disaster Management System of Japan. Chapter(5) includes Conclusion.

Chapter(2)

Hazard Profile of Myanmar

2.1 Location

Figure: 2.1 Map of Myanmar

Source; from Alam.com

The Republic of the Union of Myanmar is geographically situated in southeast Asia between latitudes 90° 32' N & 28° 31' N and longitudes 92° and 10' E& 101° 11'E. It is surrounded by China in north and north east, Loa PDR and Thailand in east and south east, India and Bangladesh in the west while the Bay of Bengal and the Andaman Sea are in the west and the south.

Myanmar is one of the largest countries in South East Asia covering 261,228 square miles. It stretches for 582 miles from east to west and 1,275 miles from north to south. The population of Myanmar (2019 estimate) is 54.05 million. Myanmar is ethnically diverse with more than 135 ethnic groups represented within the total population. The largest city in Myanmar is Yangon and the capital of Myanmar is Naypyitaw. The predominately spoken language in Myanmar is Burmese and 89 percent of the population is Buddhist. Myanmar is regarded as an agriculture-based country as it accounts for 40.2 percent of the GDP.

In terms of administration, Myanmar is divided into twenty-one sub-divisions, seven states (largely based on ethnicities), seven regions, one union territory, five self-administered zones and one self-administered division as per the constitution adopted in 2008. At the second level, district governments operate over the third, fourth and fifth levels, comprising townships, wards and villages, respectively. At the second level, there were 67 districts, further subdivided to 325 townships as of 2013 (The Asia Foundation, 2013). Legislative authority resides in a bicameral Assembly of the Union, represented by a 224-seat House of Nationalities and a 440-seat House of Representatives, three-fourths of which are directly elected to serve five-year terms (Aung-Thwin, et al., 2019).

2.2 Climate

Myanmar has a tropical with three seasons, namely the rainy season, winter and summer. The rainy season comes with the southwest monsoon, lasting from mid-May to mid-October, followed to

mid-May. The average annual rainfall in the coastal regions of Rakhine and Tanintharyi ranges from 4,000 to 5,600 mm, while in the Ayeyarwady Delta it is approximately 3,300 mm. The extreme north receives between 1800 mm and 2400 mm of rain while the hills of the east receive between 1200 mm and 1400 mm . The central dry zone has between 600 and 1400 mm of rain. The average temperature in the delta ranges from 22 C to 32 C, while in the central region it is between 20 C and 34 C . The temperature in the hilly regions is between 16 C and 29 C. Physical Features Myanmar can be divided into five major physiographic units namely:

The Indo-Myanmar Ranges

The Rakhine Coastal Lowlands

The Sino-Myanmar Basin

The Inner Burman (Myanmar) Basin

The Eastern Himalayas

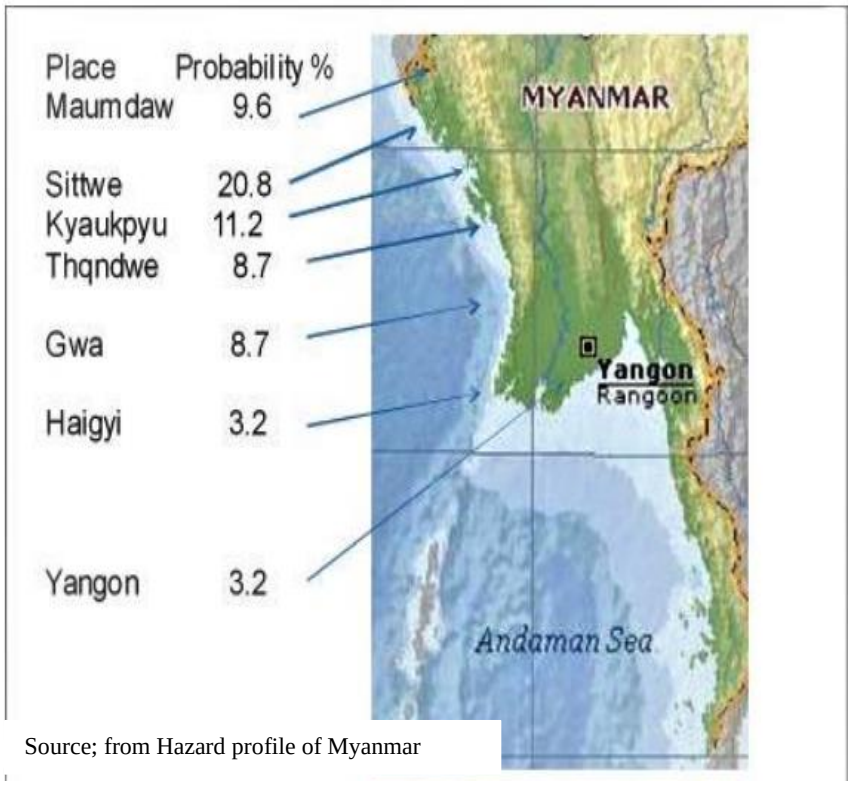
The first four units run more or less north to south while the fifth unit i.e., the Eastern Himalayas, runs west to east in the northern most part of the country. The Indo-Myanmar Ranges decreases in altitude and spreads out towards the south and extends up to the Andaman Sea. The narrow Rakhine Coastal Lowlands on the Bay of Bengal are geographically part of the Indo-Myanmar Ranges. The Sino-Myanmar Ranges are in the eastern part of Myanmar. The Inner Myanmar Basin lies between the Indo-Myanmar Ranges and Sino-Myanmar Ranges and it widens towards the south.

2.3 Hazard Profile of Myanmar

Myanmar is prone to almost all types of hazards, which include fire, forest fire, earthquake, strong wind/ cyclone, storm surge, tsunami, landslide, floods, drought and industrial/technological hazards. In recent years, the country is also witnessing a spate of localized disasters such as lightning and riverbank erosion. In 2014- 2017, lightning led to the loss of 175 lives. During the same period, Myanmar also experienced loss of 261 and 782 lives due to riverbank erosion and strong wind respectively. The 2015 floods caused damages and losses amounting to USD1.5 billion, while the 2008 Cyclone Nargis led to USD4.1 billion. Since comprehensive multi-hazard risk assessment of Myanmar needs to be done at the national level. Basic information pertaining to major hazards in Myanmar is as following.

2.3.1 Cyclone

Figure 2.2 Cyclone Prone Areas in Myanmar



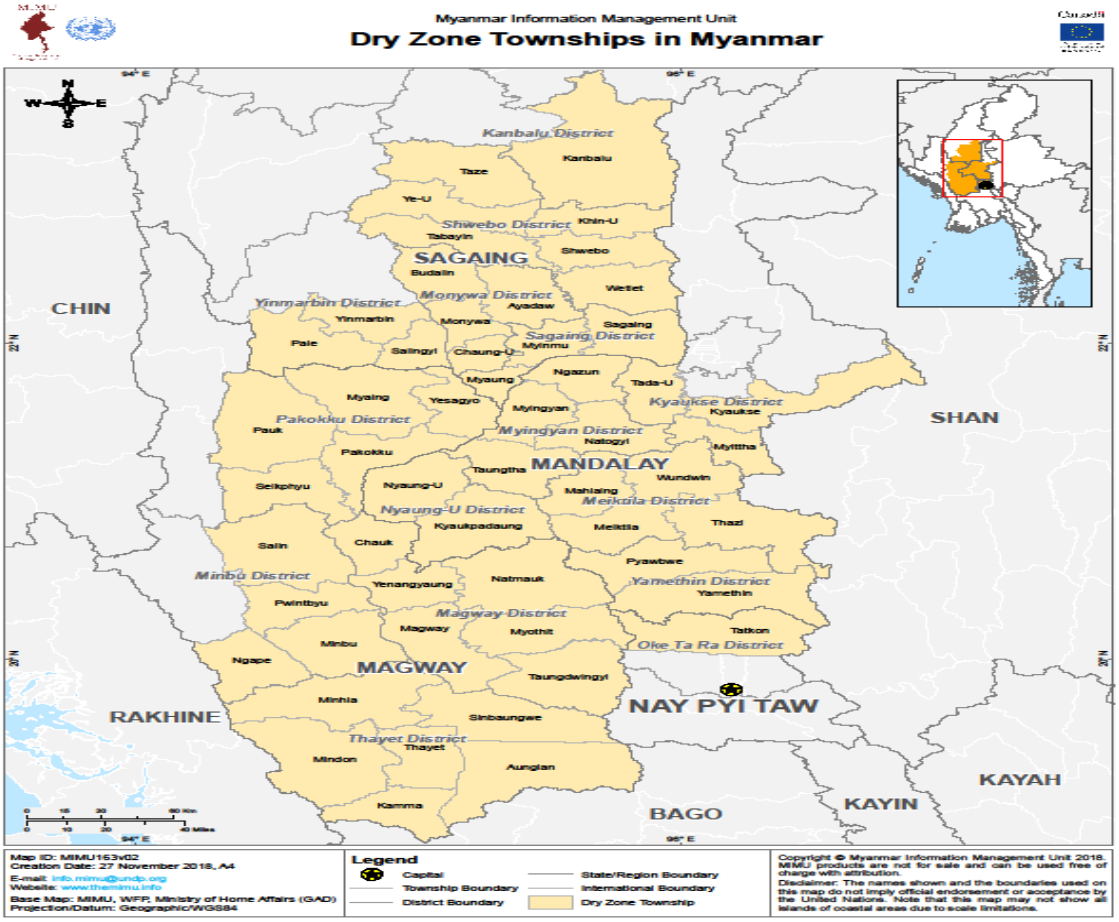
Source; from Hazard profile of Myanmar

Myanmar is prone to cyclones having a long coastline along the Bay of Bengal, which is considered to be highly vulnerable to cyclones. April, May and October are considered to be cyclone months as per the last 100-year record. In the last four decades, five major cyclones hit Myanmar: in 1968 (Sittwe cyclone), 1975 (Pathein cyclone), 1982 (Gwa cyclone), 1994 (Maundaw cyclone), 2006 (cyclone Mala) and 2008 (cyclone Nargis). The Sittwe cyclone led to the loss of 1037 lives, Pathein cylone claimed 304 lives and Nargis, the most devastating in the living memory of Myanmar, led to the loss of 138,373 lives, while affected 2.4 million population while the damage and destruction to properties to the tune of USD 4.1 billion7 were sustained.

2.3.2 Dry Zone/Drought

The Dry Zone of Myanmar is located in the central part of the country in Magway, Mandalay and Sagging (Lower) Divisions and covers approximately 10 percent of the total area of the country. It falls under arid to semi-arid zone as per different zonation and criteria. While it is located in rain fed area, the average annual precipitation is below 1000mm. Approximately 51 townships spread across 13 Districts in 3 Divisions fall under the Dry Zone as per the Dry Zone Greening Department. Some other reports identify 60 townships under the Dry Zone. The deterioration of natural resources such as soil erosion and deforestation has made the agricultural production base unstable. The main reasons include increased human as well as cattle population, demand of fuel wood for domestic as well as industrial use, etc.

Figure 2.3 Drought Prone Area in Myanmar



Source; from MIMU

2.3.3 Earthquake

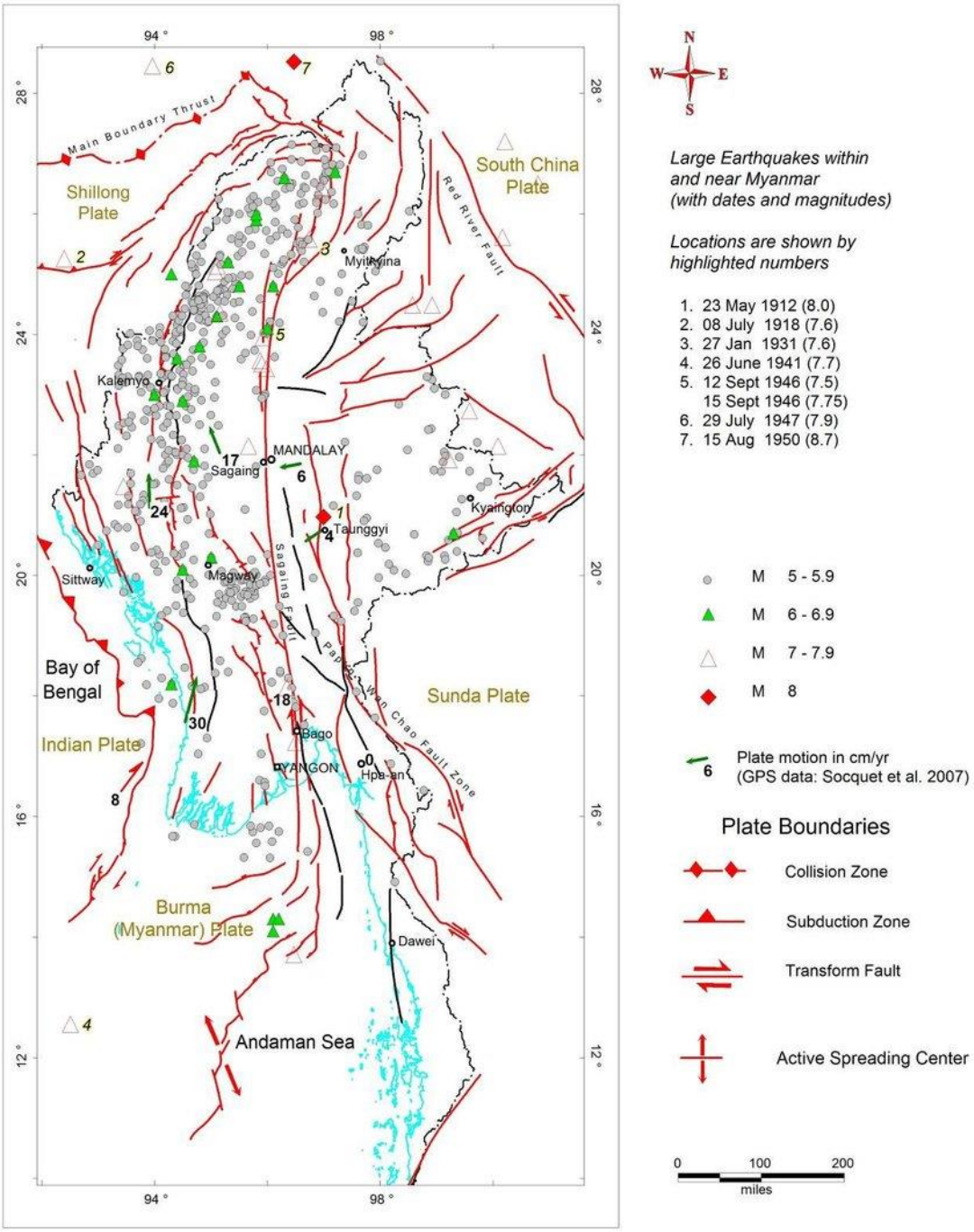
Earthquakes in Myanmar usually have two main causes:

- Result of collision between the northward moving Indian Plate underneath the Burma Plate
- The northward movement of the Burma Plate from a spreading center in the Andaman Sea.

Myanmar can be divided into three seismically active regions namely: the Northwestern Region, the Central Lowland, and the Shan PlateauYunnan Region. The subduction and collision caused many shallow and intermediate earthquakes with considerable magnitude. During the 20th Century, at least 18 large earthquakes happened in the Central Lowlands where the well-known Sagaing Fault passes through. Another large seismogenic fault called Kyaukkyan Fault is about 500 km long in the western part of the Shan Plateau. The largest recorded earthquake so far has the magnitude 8.0 in the Richter

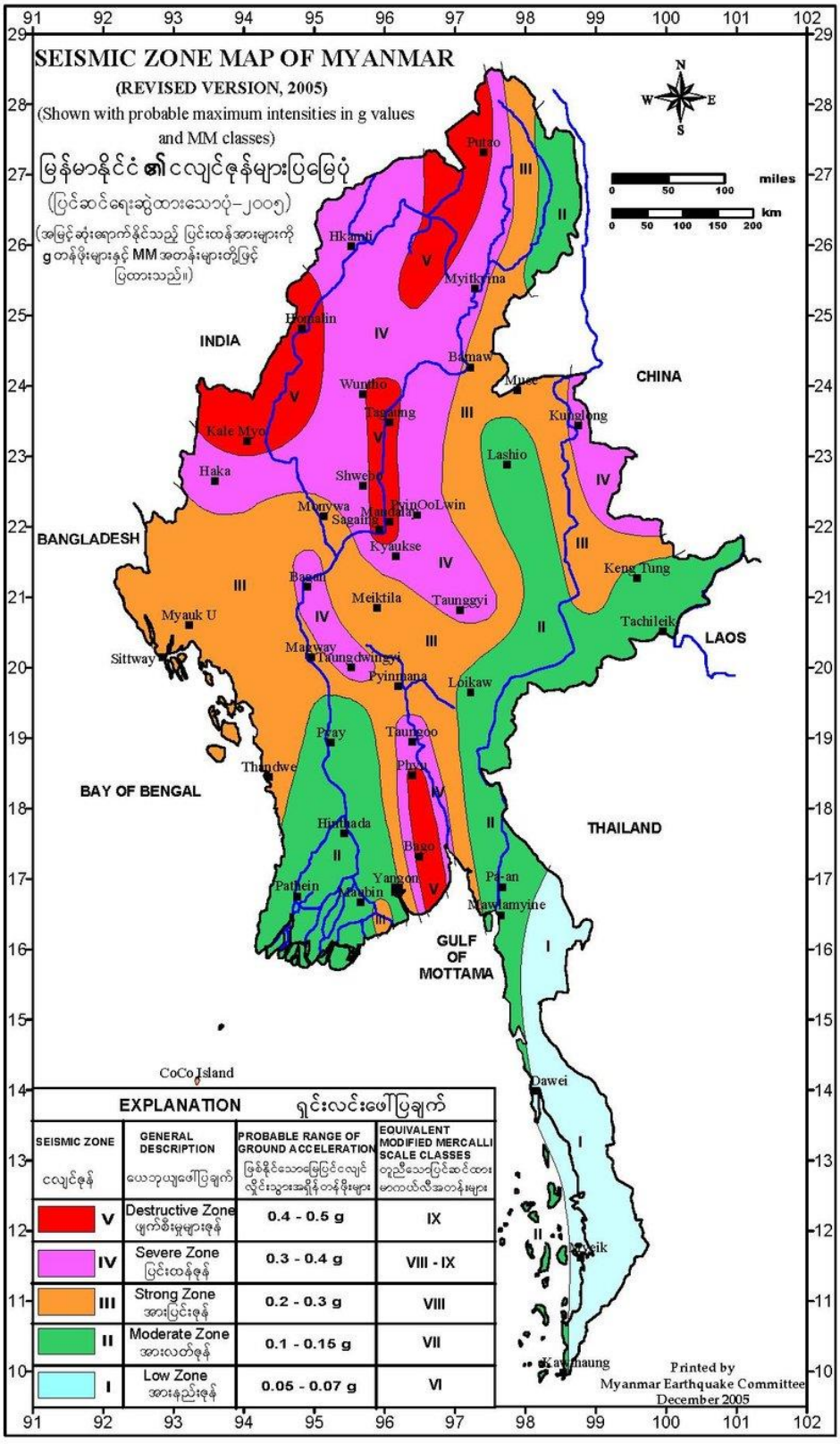
Scale and occurred on the northern segment of this fault on 23 May 1912. Shan Plateau-Yunan is also seismically active region.

Figure 2.4 Tectonic Map of Myanmar and Surrounding Regions



Source; from researchgate.net

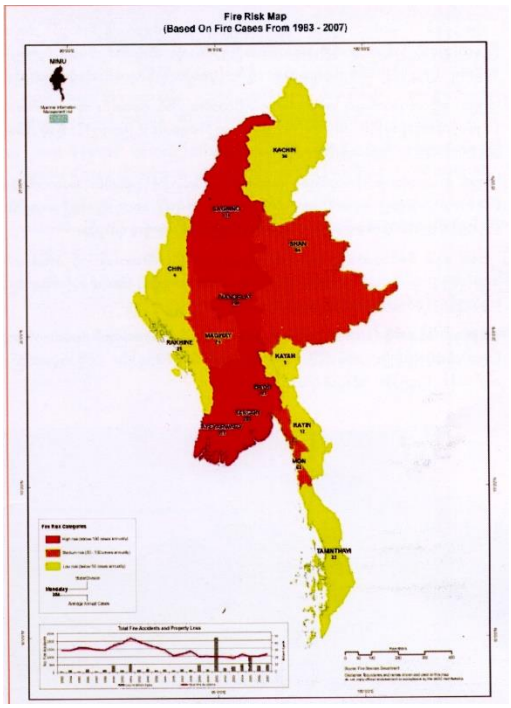
Figure 2.5 Seismic Zone Map of Myanmar



Source; from researchgate.net

2.3.4 Fire/ Forest Fire

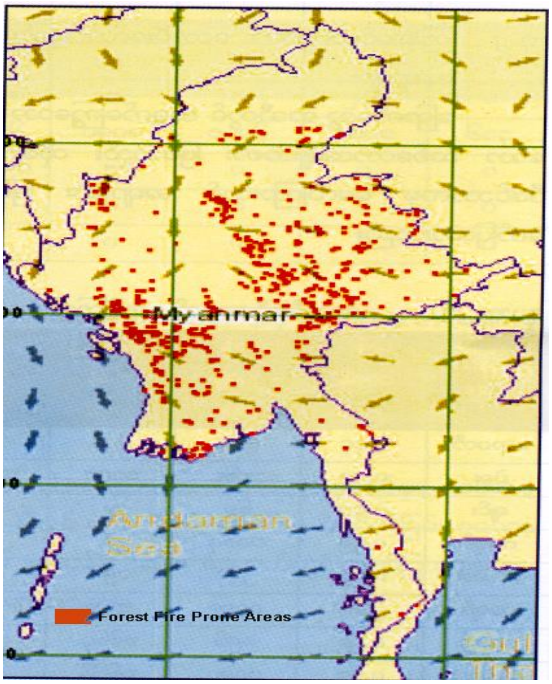
Figure 2.6 fire prone area in Myanmar



Source; from MIMU

The Fire hazard is the most frequent in terms of frequency, which accounts for approximately 70 percent of the disasters. The number of fire cases is decreasing while the losses due to fire have an increasing trend. The high incidences of fire cases are concentrated mainly in Yangon, Mandalay, Ayeyarwady, Sagaing and Bago. These Divisions account for 63 percent of the total fire cases of the country, while the financial loss is approximately 38 percent. The main causes of fire are kitchen related fires and negligence which together account for 83 percent of the cases. The period from January to May is the high season for fires. The average annual fire cases run to 900, and the loss of properties is to the tune of 1 billion kyats or 0.91 million USD9.

Figure 2.7 Forest Fire Prone areas in Myanmar

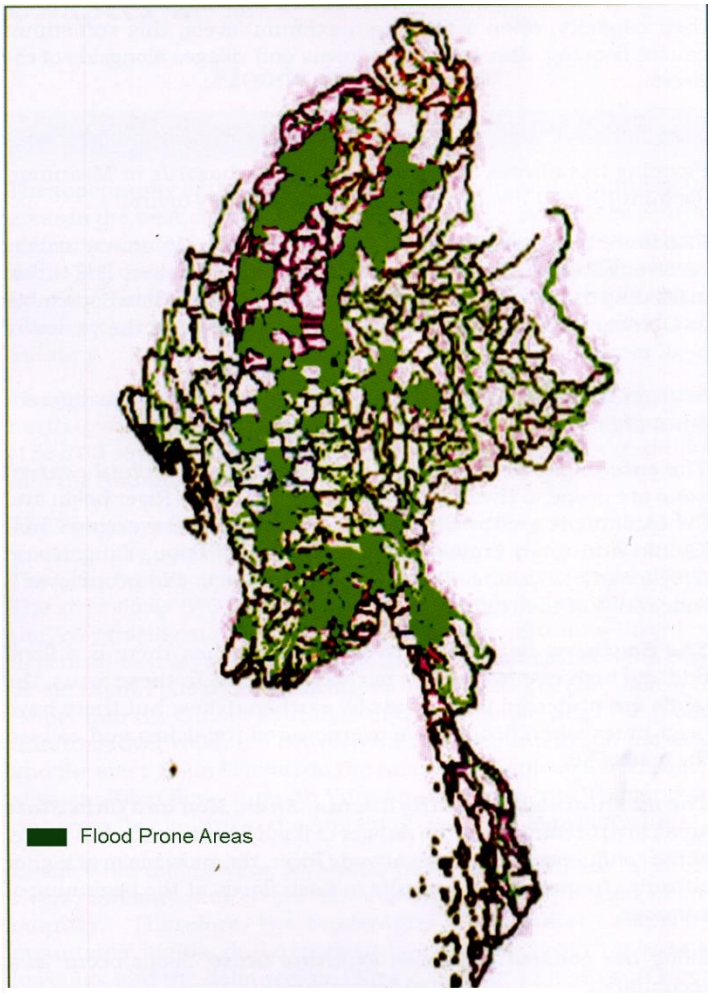


Source; from Hazard Profile of Myanmar

The forest fires in Myanmar are normally surface fires, most frequent during the dry season, starting around December until May. They occur in almost all States and Divisions sporadically, but are more common in upland regions, namely, Bago, Chin, Kayah, Kachin, Mandalay, Rakhine and Shan. They cause haze problems and have negative impact on the community.

2.3.5 Floods

Figure 2.8 Flood Prone Areas in Myanmar



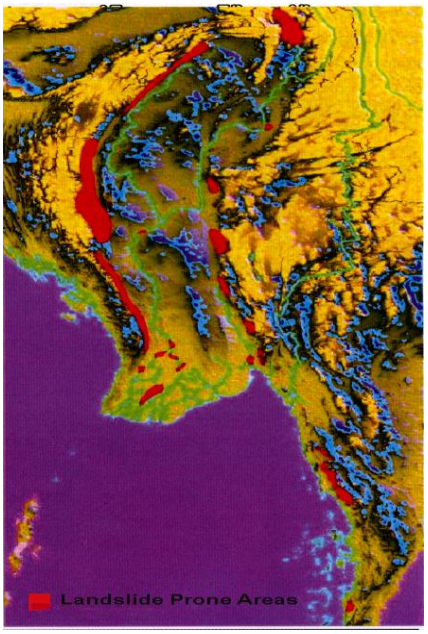
Source; from Hazard Profile of Myanmar

Flooding has always been one of the major hazards in Myanmar, accounting for 11percent of all disasters, second only to fire. Between 1910 and 2000, there were 12 major floods. Flooding leads to loss of lives and property, damage to critical infrastructure, economic loss and health-related problems such as outbreak of water-borne diseases when the lakes, ponds and reservoirs become contaminated. The country receives practically all its rainfall between mid-May and October, the rainy season, during which flooding and landslides are common. In Myanmar, the threat of flooding usually occurs in three waves each year: June, August and late September to October with biggest danger arriving in August as peak monsoon rains occur around that time. Throughout the rainy season, riverine floods are common in the river deltas while flash floods and landslides frequent in the upper reaches of the river systems, which are normally the mountainous areas, whereas the coastal areas experience intermittent flooding from cyclones10. Tropical storms from the Bay of Bengal trigger storm surges and cause floods along the Rakhine coastline in the pre and post monsoon months. In cities and towns, localized floods occur from time to time due to a combination of cloudburst, saturated soil, poor infiltration rates and inadequate or poorly built infrastructure (such as blocked drains). In the rural areas, breakage of water-resistant structures as dams, dykes and levees

destroys valuable farmlands. Flash floods are frequent in the large and medium rivers, caused by the heavy rainfall striking at head water regions for a considerable period of 1-3 days. In the central part and the delta region in the south of the country, accidents caused by river bank erosions are frequent occurrences.

2.3.6 Landslide

Figure 2.9 Landslide Prone Areas in Myanmar

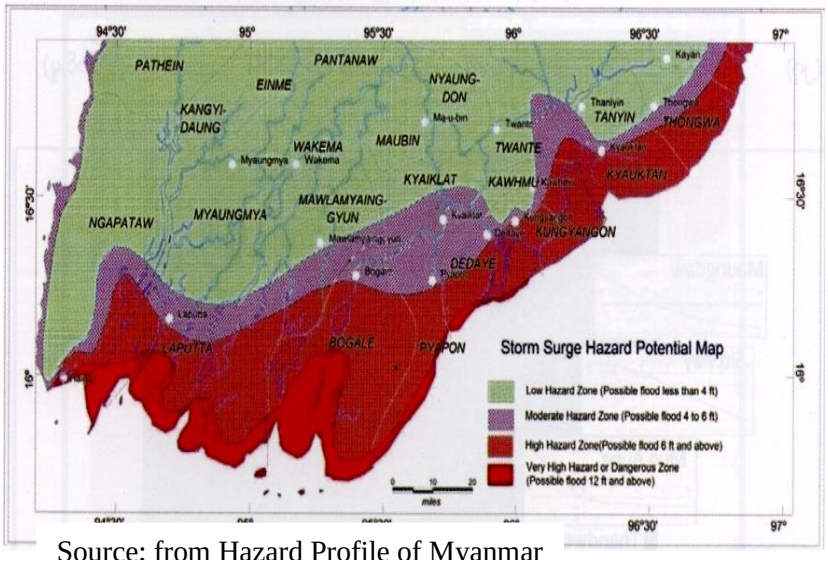


The landslides of various scales occur in mountainous regions especially in the Western Ranges and some localities in the Eastern Highland of Myanmar. The Western ranges experience all types of landslides and earth movements such as rock falls, rock slides, soil avalanches and mud flows. Due to the sparsity of population, landslides in this region damage infrastructure rather than human settlements.

Source; from Hazard Profile of Myanmar

2.3.7 Storm surge

Figure 2.10 Storm Surge Prone Areas in Ayeyarwady Delta



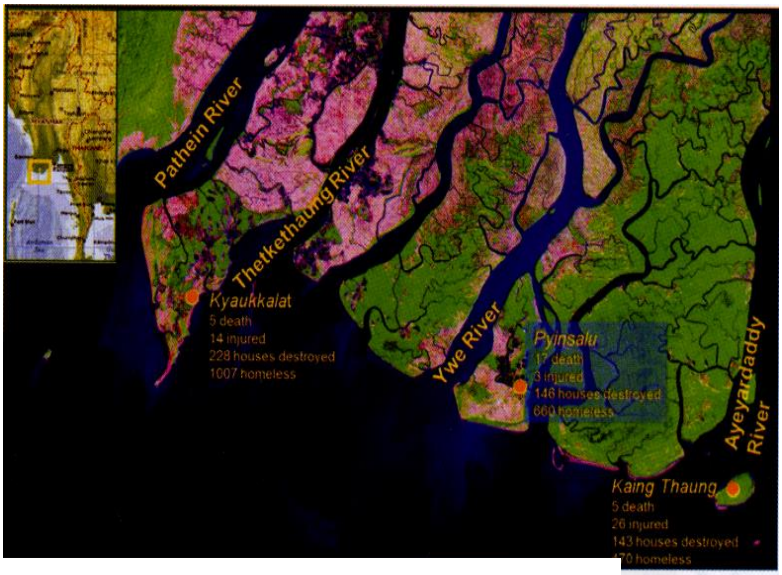
Source: from Hazard Profile of Myanmar

Myanmar has a very long coastline and the densely settled low-lying lands are particularly vulnerable to rising sea levels. Even diminutive rises in sea level vertically can lead to enormous erosion horizontally. As per the IPCC report, a rise in sea level of one centimeter can result in beach erosion of one meter horizontally. The low-lying areas of Myanmar's Ayeyarwady Delta, interspersed with many tidal waterways, are

naturally exposed to storms and monsoon winds blowing from the southwest. Rising sea levels, stronger cyclones and ecosystem degradation mutually reinforce each other, exacerbating the fallout from seaward disasters. During Cyclone Nargis, according to Alan Sharp of the Australian Government Bureau of Meteorology, 90 percent of deaths were caused as a direct consequence of the storm surge.

2.3.8 Tsunami

Figure 2.11 Tsunami Damage and Losses in Ayeyarwady Delta (2004)



Source; from Hazard Profile of Myanmar

Myanmar coastline is about 1,900 kilometers long, which can be divided into three parts, namely the Rakine coastal area in the west, the Ayeyarwady Delta in the middle, and the Taninthayi coastal area in the south. The intensity of the Indian Ocean Tsunami (2004) in terms of round-up and the extent of the inundation was comparatively lower than those in other countries around the Indian Ocean and the casualty and damage was also lesser. This is because the tsunami amplitudes are relatively smaller along the Myanmar coast. The amplitudes are slightly large off the Ayeyarwady delta, because the shallow delta extends offshore to cause concentration of tsunami energy. Another reason for the smaller tsunami is due to the fact that the coast of Taninthayi Division is protected by the offshore islands of the Myeik Archipelago trending in the north-south direction.

2.4 Climate Change and Variability

Studies at the global level have found that climate change is reconfiguring hazards and increasing the risks of disasters. The rise in sea levels, changes in the intensity of the strongest storms and the frequency with which they occur. This in turn increases extreme temperatures, and alters precipitation patterns. Although, it is difficult to link an individual extreme event to climate change, Myanmar has witnessed some extreme events in recent years. For example, in the Chin State, during the last seven days of July 2015, the recorded rainfall was 30 percent higher than in any other month over the past 25 years. The monthly rainfall of July measured at the weather station in Hakha was equal to a 1-in-1000-year rainfall.16 In July 2009, 434 mm of rainfall fell in a single day in Launglon,

which was the highest rainfall recorded in the country during a 24 hours period. In August 2009, the Bago Region experienced its highest 24 hours rainfall in 45 years. On 21st July 2011, 739 mm of rainfall within a 24 hours period in Taungoke, Rakhine, was recorded as the highest rainfall in the country. On 14th May 2010, the highest temperature, reaching 47.2°C, was recorded in Myanmar. Climate change projections: A recent study17 on climate risk in Myanmar, found that the climate is projected to shift dramatically in the coming decades. The study highlighted the following:

- In every region in Myanmar, temperatures are expected to soar by the middle of the 21st century by 1.3°C–2.7°C.
- The eastern and northern hilly regions are projected to see the most dramatic warming, with temperatures rising as much as 3°C during the hot season.
- In the future, the country can experience anywhere between four to 17 days of extreme heat every month, in contrast to one day a month during the period between 1981–2010. Changes in rainfall patterns are projected to vary by region and season. While increases are projected during the monsoon season, both a rise and fall in the temperature is likely during the rest of the year.
- Projections on rising sea levels for the coastline, range from 20 cm to 41 cm by mid-century.

The implication of climate change on six development sectors: agriculture, fisheries and livestock; environment and natural resources; energy, transport and industry; cities, towns and human settlements; climate hazards and health; and education, science and technology has been analyzed in the Myanmar Climate Change Strategy and Action Plan.

2.5 Vulnerability, Exposure and Trends

There has been a rise in disaster losses over the past decades primarily due to increased exposure of the population and assets in hazardous zones. It is important to profile current vulnerability, exposure and future trends for better understanding of these underlying factors i.e. drivers of disaster risk. At the global level, the United Nations has identified key drivers of disaster risk;

- poverty and inequality
- climate change and variability
- unplanned and rapid urbanization and the lack of disaster risk considerations in land management

- environmental and natural resource management
- demographic change
- non-disaster risk-informed policies
- lack of regulations and incentives for private disaster risk reduction investment
- complex supply chains
- limited availability of technology
- unsustainable uses of natural resources
- declining ecosystems - pandemics and epidemics

There is a need to develop a comprehensive profile of vulnerability and exposure of Myanmar. However, the following trends have been identified:

- Poverty and inequality: An estimated percent of Myanmar's population lives in poverty. In certain pockets of the country, the prevalence is higher than in others. For example, in the Chin State 73 percent of its population lives in poverty. Chin is also highly prone to floods and landslides.
- Rapid urbanization and migration: The rate of urbanization in Myanmar has increased over the past decades from 24.8 percent of the total population classified as urban in 1983 to 29.6 percent in 2014. Some of these urban centers are exposed to multiple hazard. Yangon, with an urban population of 5.2 million, is the most urbanized region and accounts for about 35 percent of the total urban population. It is projected that by 2040, Yangon will become a megacity with a population of 10 million. Approximately four percent of the population, or 2.02 million persons were reported to be living abroad, of which 1.7 million (83 percent) are between the ages of 15 and 39 years. Migration benefits migrants and host communities. There are however, problems associated with migration, such as social conflict, environmental degradation and difficulties associated with the separation of migrants from their family and community members.
- Vulnerable population: The overall number of women is 26,661,667 and it accounts for 51.8% of the total population. The number of children below the age of 15 and the elderly above the age of 65 years are 14,399,569 and 28,97,563 respectively. Together, both these demographics constitute 33.6 percent of the population. The percentage of people with disabilities stands at 4.6 percent and its prevalence starts to increase at the age of 40, with a sharp rise after the age of 65.

- Deforestation: Myanmar lost over three percent of its forest ecosystem over the past two decades. It has been estimated that 83 percent of mangroves in the Ayeyarwady Delta have been destroyed between 1924 and 1999. Decreased productivity and limited vegetation cover has destabilized soils and caused erosion. The compound effects of land degradation, overutilization and unfavorable agricultural practices are diminishing water supplies for domestic, agricultural and industrial use.
- Housing condition: Apartments and single storey buildings account for 12% of the housing in the country.24 A large proportion of houses are constructed with materials that are, highly vulnerable to cyclones and strong winds.
- Limited access to communication: Almost half of the population or 49.5 percent of households have access to television, 35.5 percent have access to a radio, 32.9 percent use a mobile phone, while landline and internet access at home accounts for less than 10 percent.

2.6 The Disasters that Struck Myanmar

Myanmar faced many disasters in the recent past. The skewed development and climate change will further aggravate the existing disaster risk in Myanmar. In recent years, monsoon season is getting shorter to shorter and causing flooding and landslide in countrywide annually. According to annual record from DDM FY 2010-2011 to 2021-2022 Oct- March, Myanmar experienced many natural Disasters and Man-made disasters.

The table below presents the record of storms and cyclones during fiscal year from 2010-2011 to 2021-2022 Oct- March. It shows that Storms and Cyclones was the most frequent disaster in Myanmar. There are strong winds in middle and northern regions of Myanmar between March and June annually. The cyclones usually break out in the coastal regions (Ayawaddy, Rakhine and Tanintharyi) during the pre-monsoon period and post monsoon periods. Areas in Chin State, Sagaing, Bago and Magway region are also likely to experience some impacts from the high winds of these storms as they move further inland before losing power, with the risk decreasing the farther one is from the coast.

According to records, between from FY 2010-2011 to 2021-2022 Oct- March, though less frequent than storm and cyclones, fire in Myanmar tend to be significantly more dangerous as individual events. The number fire cases as table below. The high incidences of fire cases are concentrated mainly in Yangon, Mandalay, Ayeyarwady, Sagging and Bago. The reason of the

number of fire cases being the greatest in 2018-2019and 2019-2020 is that weather condition was extremely hot favoring the fire to break out easily.

In the past two decades, the duration of Monsoon was found to be getting shorter but rainfall become much more intense and heavier. The annual rainfall surpassed normal amount significantly in Kachin, upper Sagging, Mon, Yangon, Ayeyarwady, Kayah, Kayin, Tanintharyi, Bago and Rakhine. Floods occurred along all major rivers during peak monsoon year by year. The number of flooding between FY 2010-2011 to 2021-2022 Oct- March is shown in Table (2.1).

According to the records of DDM, there were three severe earthquakes hit Myanmar during least decade and total losses by the earthquakes are Taung Dwin Gyi (Richter Scale 6.8, No. of death 7, No. of affected building (108 pagodas, 153 houses, 9 schools, 3 bridges),Tarlay (Richter Scale 7.0, No. of death 75, No. of affected building 305 houses, Hospital 1, Religious sector 15, government building 19. Estimated loses (kyats, million) 3031.30), and Tha Beik Kyin (Richter scale 6.8, No. of death 18, No. of affected building (2478 houses, 396 pagodas and religious building 1273). The earthquake cannot be predicted beforehand that people should know the do's and don't about earthquake disaster. They should have the knowledge about their habitat whether or not being in seismic zones, and the previous earthquake that hit their regions. It is also necessary that the infrastructure including the buildings, roads, and bridge be built after consulting with experts, to get proper construction ideas and technologies.

Other disasters refer to drought, landslide, pest attack, thunder storms, lighting, wrecks of water-craft such as ships and boats due to bad weather, and social conflicts and riots, etc. These Tables convey the record of other disasters occurred during Fiscal year 2010-2011 and 2021-2022.

Table (2.1) Disaster in Regions and states from fiscal year 2010-2011 to 2021-2022

No.	Fiscal Year	No. of total cases				total	No. of affected houses	No. of household	No. of Victim	No. of deaths	Provided by Government Kyats (Million)
		Fire	Flood	Strom and Cyclones	Others						
1	2010-2011	135	24	34	22	215	6956	14513	52004	-	133.88
2	2011-2012	181	79	35	107	402	26915	46457	219854	-	312.21
3	2012-2013	157	45	97	89	388	29733	38853	237190	106	1594.57
4	2013-2014	146	45	48	69	308	9996	34947	150968	68	622.32
5	2014-2015	194	33	95	94	416	9953	19111	74546	279	440.1
6	2015-2016	220	126	208	154	708	71636	78231	494402	346	1433.35
7	2016-2017	455	240	496	447	1638	158696	273298	905002	518	3351.07
8	2017-2018	548	223	752	988	2511	114971	119352	515153	554	5585.82
9	2018-2019 April-sep	206	267	1310	720	2503	60997	110993	579679	347	4452.79
10	2018-2019	747	254	1676	1479	4156	95018	147604	633715	555	7002.81
11	2019-2020	837	331	1187	1302	3657	59176	315353	1352137	657	11722.11
12	2020-2021	495	152	898	804	2349	19560	264791	1096660	310	9563.28
13	2021-2022 Oct-March	304	13	131	333	781	3740	127192	546921	300	5091.26
	Total	**4625**	**1832**	**6967**	**6608**	**20032**	**667347**	**1590695**	**6858231**	**4040**	**51305.57**

Source: Annual Record from Department Of Disaster Management

Chapter(3)

Disaster Management System in Myanmar

Natural disasters have immediate impacts including loss of life or injuries, and loss of property, crops, means of livelihood, or animals such as cattle, in addition to longer term impacts including disruption or damage to livelihood infrastructure, services such as health and education, roads, bridges and communication infrastructure, damage to the soil and sources of drinking water and the spread of infectious diseases. An analysis of the impact of disasters reveals that the extent of damage and losses mainly depends on the following three factors;

(a) **Vulnerability of the disaster-affected area and population density.**
Exposed geographical location and environment (e.g. location of villages on the banks of rivers and streams and in lower ground, in open fields without wind breakers, in earthquake zones with building construction that fails to take the risks of earthquakes into consideration, etc.); population density.

(b) **Preparedness.** Management processes for protection against natural disasters and people's awareness of their role; their level of alertness regarding protection against natural disasters; the level of preparedness or drills for anticipated natural disasters.

(c) **Type of natural disasters and their severity.** The extent of loss and damage also depends on the type of natural disasters and their severity. Of the above-mentioned 3 factors, the third is beyond our control. Consideration will mainly be given to the first and second factors as appropriate measures can be taken in those areas. In carrying out those preparedness activities, best practices during natural disasters in our country and in the world as well as natural disaster management in various countries should be studied and the experience and lessons that are appropriate to our country and to our local contexts should be incorporated systematically.

Disaster management in Myanmar is based on the following principle aims-

(a) To prevent or mitigate losses in human life

(b) To prevent or mitigate losses in settlement and properties of the people

(c) To prevent or mitigate losses in state properties.

3.1 Legislative and Institutional Arrangements for Disaster Risk Management

Legislative and institutional arrangements for Disaster Risk Management is evolving in Myanmar. The country enacted the Disaster Management Law in 2013 and the Disaster Management Rules was prescribed in 2015. The Law was developed to be in line with Hyogo Framework for Action (2005-2015) and to comply with the AADMER. The Law does not include the concept of climate change adaption (CCA), and focuses on risk information, preparedness, awareness and early warning, and data management for early warning systems, together with the following objectives:

- to implement natural disaster management programmes systematically and expeditiously in order to reduce disaster risks;
- to form the National Committee and Local Bodies in order to implement natural disaster management programmes systematically and expeditiously;
- to coordinate with national and international government departments and organizations, social organizations, other non-government organizations or international organizations and regional organizations in carrying out natural disaster management activities;
- to conserve and restore the environment affected by natural disasters;
- to provide health, education, social and livelihood programmes in order to bring about better living conditions for victims.

The Law enables the formation of the National Disaster Management Committee (NDMC) with its duties and powers.

The Disaster Management Law (2013) provides for the establishment of the National Disaster Management Committee (NDMC). National Disaster Management Committee is the supreme agency on Disaster Risk Management (DRM) (policy level, decision making, formulating strategies, and overall supervision). 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) To provide guidance to use domestic resources as necessary in the face of natural disasters.

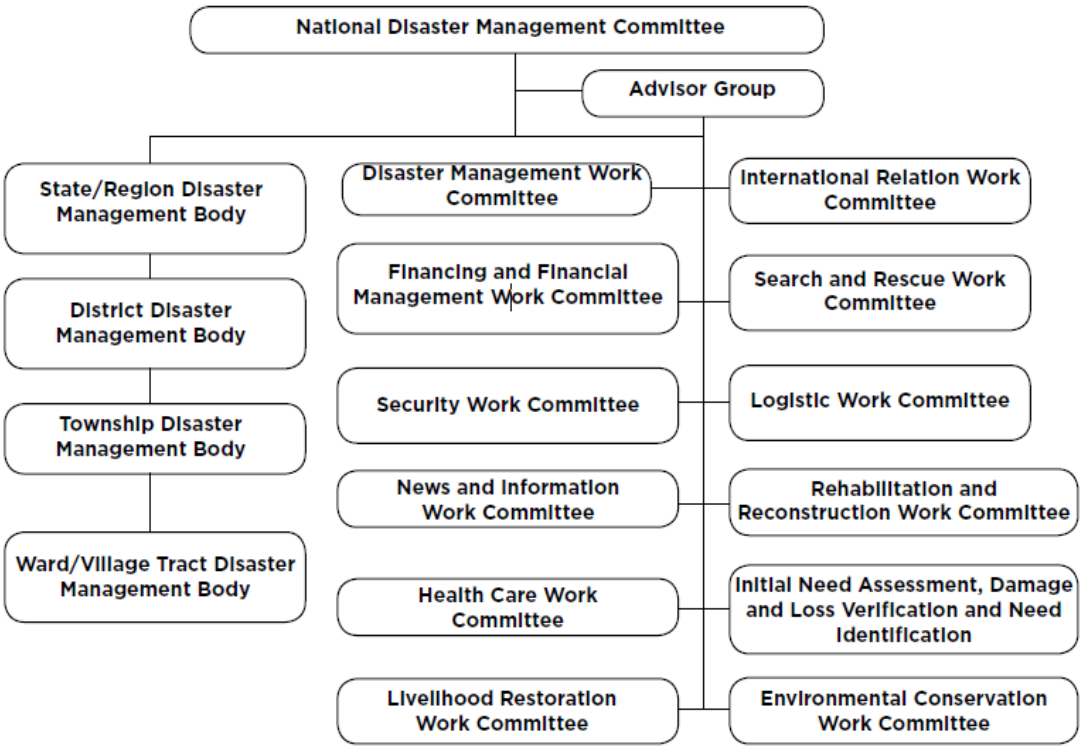
(c) To adopt basic principles on coordination for activities which are necessary to receive assistance external sources.

(d) To manage national finance and resources, and then to distribute them to required places.

(e) If necessary, to issue orders and instructions to carry out natural disaster management functions without hindrances, avoiding the misuse of rescue materials and prevail law and order in the community during and after the natural disasters;

The National Disaster Management Work Committee (NDMWC) chaired by the Union Minister for Ministry of Social Welfare, Relief and Resettlement was formed to supervise the implementation of the Disaster Risk Reduction (DRR) activities. Department of Disaster Management under Ministry of Social Welfare, Relief and Resettlement is the National Disaster Management Office for DRR and Line Ministries with related mandates on DRR.

Figure 3.1 Organogram of Disaster Management Bodies in Myanmar



The twelve work committees related to the specific areas of disaster risk management and an advisory committee have been set-up under NDMC. State/Region-, District-, Township- and Village Tract-level Disaster Management Bodies had also been formed respectively. The organogram is reflected in the following figure:

Figure 3.2 Sample of Disaster Management Bodies in Village Tract level

DM Bodies in Ward/ Village Tract Level (Sample)		
1	Leader elected by community	Chairman
2	Clerk from Department of Survey	Member
3	Representative from Myanmar Red Cross Society	Member
4	Fire Brigade (Volunteer)	Member
5	Police from Village Tract level	Member
6	Retired person from Military	Member
7	Myanmar maternal and child welfare association	Member
8	Myanmar Women's Affairs Federation	Member
9	Teachers from primary schools	Member
10	Respectable person in these areas	Member
11	Staff from General Administration Department	Secretariat

Source;from DDM Power Point

3.1.1 Standing Order

The standing order 2009 was issued for natural disaster management based on experiences in the 2008 Nargis cyclonic storm. The "Standing Order for Natural Disaster Management in Myanmar" is issued with the aim of ensuring that once disaster strikes, emergency relief and rehabilitation work is carried out according to the prepared plan and that the people are mobilized at the national level for participation in such efforts.

Now, the order was revised in line with the management system and technological development. The standing order on natural disaster management for 2022 was drafted with remarks from relevant committees and the ministry. Work committees and management committees are to scrutinize natural disaster prevention plans in line with the 2022 standing order.

3.2 Disaster Risk Reduction Networks of Myanmar

Disaster Risk Reduction Working Group (DRR Working Group) was established in 2008 to support recovery and reconstruction efforts of Cyclone Nargis. It serves as a platform for information sharing and strengthened coordination among development partners working on disaster risk

reduction issues. Working groups have been also set-up at the sub-national level in selected regions and states, including in Mon State, Kayin State and Rakhine State. The groups also coordinate sub-national risk reduction activities. UNDP is the chair of the DRR Working Group at the national level, while the Swiss Development Cooperation (SDC), the Community Development Association and the International Organization for Migration (IOM) head the DRR Working Groups of Chin State, Kayin State and Rakhine State respectively. Myanmar Humanitarian Country Team (HCT) is a strategic humanitarian coordination and decision-making body that seeks to optimize the collective efforts of the UN, other international and national organizations, non-governmental organizations and the Red Cross Movement. It is convened under the leadership of the Humanitarian Coordinator (RC/HC). The UN Office for the Coordination of Humanitarian Affairs (OCHA) serves as its Secretariat. It oversees the development of sector/cluster response plans and provides oversight and advice to the cluster/sector leads and humanitarian-focused geographic and subsidiary groups. It also leads decision making on inter-agency coordination in regards to assessments, joint monitoring and evaluation missions. Several international and local non-government organizations, community based organizations, professional societies such as Myanmar Engineering Society, Myanmar Geosciences Society and Red Cross system are working on disaster risk management, including community level disaster preparedness.

3.3 Responsibility of Department of Disaster Management on Disaster Risk Reduction

In Myanmar, Ministry of Social Welfare, Relief and Resettlement is the focal Ministry for disaster management. It also serves as the secretariat of NDMC. Under the Ministry, there are three Departments: Department of Social welfare, Department of Disaster Management and Rehabilitation Department. Each department has specific disaster related duties. The Department of Disaster Management (DDM) was established with the objectives to provide emergency assistance for the victims of natural disasters for ensuring immediate relief and to conduct preventive measures to reduce the loss of lives and properties due to disasters. DDM is responsible for conducting disaster management activities in accordance with the international norms and standards. Under the Department, there are Emergency Operation Center, Disaster Management Training Center (DMTC), Region/ State offices, District offices and Township offices. DDM is a focal point of the ASEAN Committee on Disaster Management (ACDM).

DDM's functions in four DM circle are as following;

- Preparedness

  - Stock piling relief materials
  - Developing Disaster Preparedness Plans
  - Awareness raising
  - Capacity developing
  - Drills and Exercise
  - Disaster Monitoring (EOC)
- Response
  - Early warning dissemination (DMH)
  - Provision of relief aids (GAD)
  - Coordination with UN Country Team (UNOCHA)
  - Reporting to NNDMC and AHA Centre
- Recovery
  - Serve as secretariat of NNDMC (via Ministry)
  - Coordination with line ministries, State/Region Government, Sub-committees under NNDMWC (via Ministry)
- Mitigation & Prevention
  - Drafting necessary laws and regulation
  - Policy advocating
  - Risk Assessment (in collaboration with UN Agencies that signed MOU)

Figure 3.3 four phases of emergency management

Source; from DDM Power Point

3.3.1 Emergency Operation Center (EOC)

Myanmar is vulnerable to natural disasters which have potential to impact large number of people and developmental gain in the country. Therefore, the government of Myanmar has prioritized preparedness and mitigation plans. In 2012, the country finalized the Myanmar Action Plan On Disaster Risk Reduction (MAPDRR) which identified the 65 priority projects. Emergency Operation Center (EOC) is one of the Prioritized projects in MAPDRR to manage emergency operations within the geological boundaries.

With the aim to provide the supports for emergency management, response and logistic through information sharing on network and quick decision making, the Ministry of Social Welfare, Relief and Resettlement plans to set up Emergency Operation Centre (EOC). The functions of EOC will include;

- Monitoring/ Watching weather related information and early warnings were received
- Developing research on disasters occurred in Myanmar
- Developing the response plans for each type of disaster
- Exchanging weather information with local/ international organizations
- Documentation of disaster information, Distribution and Coordination
- Reporting the news acquired from affected area to the higher levels in emergency situation continuously and timely

3.3.2 Disaster Management Training Center (DMTC)

The government approved establishment of the Disaster Management Training Centre (DMTC) in order to build up the capacity of people implementing disaster management activities. The DMTC will build upon the existing pool of experts within the Relief and Resettlement Department and the existing Disaster Management Course, which has supported capacity development of officials from Government Departments and Social Organizations, since 1977. DMTC will be located in Hinthada Township in Ayeyarwaddy Region. The Ministry of Social Welfare, Relief and Resettlement is now undertaking the three-year plan (2013-2015) for establishment of DMTC. Under Phase 1 (2013-2014), construction of the three main buildings is now underway. The Ministry is collaborating with international and local partners to mobilize the technical and financial resources for:

- Human resource and institutional capacity development

- Infrastructure development
- Development of Curriculum and procurement of Teaching Aids
- Networking and partnership with International and Regional Training Institutes and Centers

3.4 Myanmar Action Plan on Disaster Risk Reduction (MAPDRR 2017)

The Myanmar Action Plan on Disaster Risk Reduction (MAPDRR), 2017 is a comprehensive and unified action plan for disaster risk reduction with prioritized interventions across Myanmar till 2020. The vision of MAPDRR is to protect lives, economy, heritage and environment through an inclusive approach towards sustainable development in Myanmar. With a long term vision and considering deep-rooted underlying drivers of disaster risk, it has set an overall target for 2030. It aims to provide a base for mobilizing and leveraging, primarily, national and external resources and will provide a basis for result printed outcomes. The MAPDRR 2017 covers not only natural hazards but also man-made accidents focusing on managing risks rather than managing disaster.

The action plan identifies 32 priority actions under four pillars: risk information and awareness; risk governance; risk mitigation; and preparedness and response, rehabilitation and reconstruction. For each priority action, objectives, activities, outputs, duration, lead agencies, and supporting partners have been identified. The priority actions aim to strengthen the policy frameworks and systems for long-term risk reduction. Robust implementation, funding as well as monitoring and evaluation mechanisms have been identified for the MAPDRR 2017.

3.5 Community Based Disaster Risk Management in Myanmar

The Natural Disaster Management Law, 2013 (Law No. 21/2013) recognizes disaster risk reduction as an underlying requirement for achieving sustainable development; calls for integrating disaster risk considerations in development processes; establishes the government-led institutional setup at all levels of administration; and requires close coordination between government, civil society groups, other non-government organizations (NGOs), and international and regional organizations in carrying out DRM activities. Specifically, with respect to community-level actions to reduce disaster risk, the Myanmar Action Plan on Disaster Risk Reduction, a road map for the implementation of disaster risk reduction priorities, has attached high priority to community-based disaster preparedness and risk reduction. Among others, the action plan identifies the need for strengthening the policy environment, scaling up implementation through local development, promoting volunteerism, and establishing financing mechanisms for community-level disaster risk reduction measures.

The Myanmar National Framework for Community Disaster Resilience has been developed to guide stakeholders in building resilience of Myanmar communities. The framework has been developed under the leadership of the Ministry of Social Welfare, Relief and Resettlement that is the secretariat of the National Disaster Management Committee (NDMC), and through extensive consultation with different ministries, development partners, and civil society organizations. The framework identifies actions to strengthen resilience so that communities are better prepared, can withstand the impacts of disasters, and are able to recover quickly. These actions are community-based and span across key sectors such as rural and urban development, agriculture, environmental conservation and forestry, financial inclusion, social protection, and disaster preparedness. The implementation requires an inclusive approach, and leveraging partnerships and resource mobilization through the cooperation of government organizations, civil society organizations, the private sector, and development partners. Implementation of this framework is critical for building a resilient society, and for realizing our regional and global commitments and priorities related to the 2030 Sustainable Development Goals, the Paris Agreement on Climate Change, and the Sendai Framework for Disaster Risk Reduction (2015-2030).

Community-based disaster risk management (CBDRM) interventions in Myanmar are typically implemented as “stand-alone” activities, lack in scale, and fail to tackle the underlying causes of disaster risk. These project-based interventions target the most vulnerable and are designed in close consultation with community representatives, village tract, and township authorities. In most cases, they are implemented as stand-alone activities disjointed from regular development processes at the village level.

The DRM policy landscape in Myanmar provides the building blocks for strengthening community disaster resilience. DRM in Myanmar has evolved over the last few years supported by legislation, implementing rules, action planning, funding mechanisms, institutional setup, capacity building, and volunteer networks.

Actions for government at the township, state or region, and union level are as follows:

- Strengthen linkages between development planning and budgeting and DRM planning at the township, state or region, and union level (e.g., development of guidelines and capacity for integrating disaster risk considerations in the village development planning process).
- Support technical agencies in generating and disseminating disaster risk information.
- Strengthen the capacity of the members of various township authorities and union line ministries present at the township to undertake risk-informed decision making.

- Ensure sector investments targeted at the community level factor disaster risk considerations (e.g., community forestry, social protection programs, etc.).

Actions for village tract or ward administration are as follows:

- Ensure the village DRM planning process (as required by the Natural Disaster Management Law, 2013) adopts participatory techniques to identify the disaster risk-related needs of various interest groups (e.g., poorer households, vulnerable population, marginalized groups, local private sector).
- Strengthen the linkages between village development planning and village DRM planning processes.
- Ensure that the disaster resilience needs are captured in the village development plan and funded through local development funds, sector programs, or projects of civil society organizations and address the underlying risk factors.
- Advocate for village resilience-building measures at the township level.

Actions for civil society organizations are as follows:

- Support communities through participatory processes in identifying disaster risk.
- Ensure disaster risk information is factored in the design and implementation of projects.
- Provide capacity building for communities in implementing resilient building measures (e.g., safer housing, resilient livelihoods, ecosystem management, disaster preparedness).
- Encourage communities to identify, prioritize, and invest in resilient building measures at the household and community level through the village development planning process, government programs in different sectors, local development funds, microfinance, etc.
- Ensure the needs of the poorer households, most vulnerable, and marginalized population are captured in resilience-building measures supported by the government and development partners.
- Document the outcomes of community-led initiatives and share them with all stakeholders in order to develop stronger evidence on the benefits derived by investing in community disaster resilience.

Actions for communities are as follows:

- Identify the natural hazards prevalent in the area; the households, assets, and livelihoods that are exposed to the hazards, and the physical and socioeconomic vulnerability in the society.

- Factor hazard and forecast information in decision-making processes to ensure personal and community assets and livelihoods are designed to higher standards of resilience.
- Identify household- and community-level investments to reduce disaster risk.
- Strengthen disaster preparedness measures at the household and village level.
- Strengthen disaster youth volunteer capacity on DRM, including dissemination of early warning, search, and rescue.
- Engage with village tract or ward administration, local civil society organization, and microfinance organizations to access resources (financial and human) for investing in resilience.

Actions for development partners are as follows:

- Support the development of disaster risk information.
- Support long-term capacity building and peer-to-peer learning among communities, local authorities, and community-based organizations.
- Provide technical assistance in identifying legal and regulatory gaps preventing the uptake of disaster-resilient measures (such as regulatory gaps in microfinance).
- Ensure projects (e.g., loans, grants, technical assistance) targeted at the community level factor in disaster risk considerations.
- Support piloting of innovative products and approaches for strengthening disaster resilience at the community level.

3.5.1 Community Based Early Warning system

Department of Meteorology and Hydrology DMH is the noble agency responsible to issue timely warning to public on Cyclone, Flood, Tsunami. Department of Disaster Management, Department of Meteorology and Hydrology and General Administration Department are main organizations in charge of Early Warning on DRM in Myanmar. The organizations in each level (State/Region, District, and Township) to be received/disseminated the Early Warning information by DMH are shown as follows;

- DMH State/Region receives the Early Warning information from DMH National.
- DMH State/Region disseminates/informs the Early Warning information to Chief Minister Regional Government, Army Commander, South West Army Command H/Q, Air force Commander Air Force Command, Navy Commander Navy Command, DMH District, DDM State/Region, DDM District, GAD District, GAD Township,

DMH National, Regional Fire Station, and Department of Information & Communication.

- DMH District receives the Early Warning information from DMH National and DMH State/Region. DMH District disseminates/informs the Early Warning information to DDM District, GAD District, and GAD Township.

Table 3.1 Organizations to be received or disseminated/informed the EW information by DMH

[DMH]	Received	Disseminated/ Informed
DMH Region	• DMH National	• Chief Minister Regional Government • Army Commander, South West Army Command H/Q • Air force Commander Air Force Command • Navy Commander Navy Command • DMH District • DDM Region, District, • GAD District, Township • DMH National, • DMH District • DMH District • DMH NMHs • DMH NMHs • Head Officer (Fire Station Region) • Public Information and Related(Region)
DMH District	• DMH National • DMH Region	• DDM District • GAD District, Township

The organizations in each level (Region, District, and Township) to be received/disseminated the Early Warning information by DDM are shown as follows;

- DDM Region receives the Early Warning information from DDM National and DMH Region.
- DDM Region disseminates/informs the Early Warning information to Chief Minister of State/ Region and DDM District.
- DDM District receives the Early Warning information from DDM Region.

- DDM District disseminates/informs the Early Warning information to GAD District, GAD Township, Chairman of disaster management committee, and Department of Information & Communication.

Table 3.2 Organizations to be received or disseminated/informed the EW information by DDM

[DDM]	Received	Disseminated/ Informed
DDM Region	• DDM National • DMH Region	• Chief Minister of State/Region • DDM District
DDM District	• DDM township	• GAD District • GAD Township • chairman of disaster management committee • Information & Communication

The organizations in each level (Region, District, and Township) to be received/disseminated the Early Warning information by GAD are shown as follows;

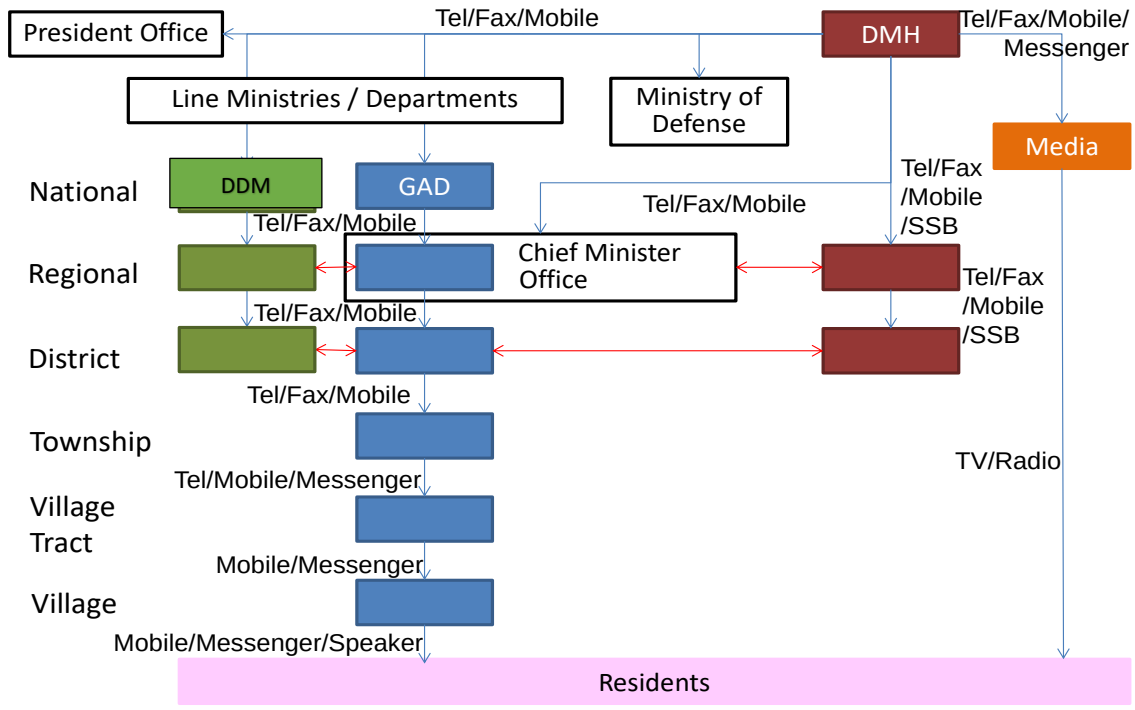
- GAD Region receives the Early Warning information from DMH National, Ministry of Home Affairs, and GAD National.
- GAD Region disseminates/informs the Early Warning information to GAD District and GAD Township.
- GAD District receives the Early Warning information from GAD Region, DMH National and GAD National.
- GAD District disseminates/informs the Early Warning information to GAD Township, Sub-township, Villages tracts and Wards.
- GAD Township receives the Early Warning information from DMH National, GAD Region, and GAD District.
- GAD Township disseminates/informs the Early Warning information to Sub-townships, Village tracts, Wards, NGOs & Social organizations, and Township Departments.

Table 3.3 Organizations to be received or disseminated/informed the EW information by GAD

[GAD]	Received	Disseminated/ Informed
GAD Region	• Head Quarter of DMH • Ministry of Home Affairs • Head Office of GAD	• District GAD/District Administrator • Township GAD / Township Administrator
GAD District	• GAD Region/Region Administrator • DMH HQ • Head office of GAD	• Township GAD / Township Administrator • Sub-township and Villages tracts
GAD Township	• DMH HQ • District GAD/District Administrator • Region GAD/Region Administrator	• Sub-townships & Village tracts and Wards • NGOs & social organizations • Township Department

The basic transmission route for Early Warning information among the above three organizations is shown in the following figure.

Figure 3.4 Information transmission route



Source; from Early warning Manual

3.5.2 Build on Public Awareness programs to strengthen networks and capacity for DRM

In order to integrate community based public awareness programs and also to become a community resistance to Disaster, Department of Disaster Management have been implementing Disaster Risk Reduction Programs including Public Awareness in collaboration with other related Ministries, UN, NGO and INGOs:

- Training of Trainers on Disaster Management Course-TOT
- Disaster Management Course – DMC (State and Regional level)
- Distribution of posters and pamphlets
- Educative Talks on Disaster Risk Reduction (DRR)
- Workshops and seminars (Both local and abroad)
- CBDRR and CBDRM trainings
- Disaster Reduction Youth Volunteers TOT Trainings
- Awareness Trainings on Disaster Risk Reduction
- Replicating Courses
- Workshops
- EOC(Emergency Operation Centre)
- Pamphlets and Posters of disasters
- Disaster Management and Disaster Reduction Guidelines

The Myanmar Action Plan on Disaster Risk Reduction promotes the involvement of youth volunteers in DRM. In 2014, the Department of Disaster Management launched the Disaster Risk Youth Volunteer Programme. Volunteers are expected to raise disaster awareness at the community level, improve community knowledge and the early warning system, act as first responders as well as act as the operational arm of township disaster management committees to connect the community with external agencies and partners, and contribute to response and recovery activities. To date, the Department of Disaster Management has trained a network of approximately 10,000 youth volunteers from over 800 villages in disaster preparedness and response (out of an estimated need of up to 230,000 volunteers for all village tracts and wards). Through training-of-trainers courses, the intent is to provide multiplier courses in the state or region with assistance from respective department officials. By integrating youth volunteers in village tract or ward (and, where possible, township) disaster management committees, the Department of Disaster Management seeks to strengthen the uptake of local disaster management plans at higher levels of government administration. This

requires undertaking training for youth volunteers on how they can support existing community structures for preparedness and response, and to ensure that community-level preparedness and response are inclusive and address the needs of the most vulnerable (including women, children, people with disabilities, the elderly, and others) and utilize their capacities.

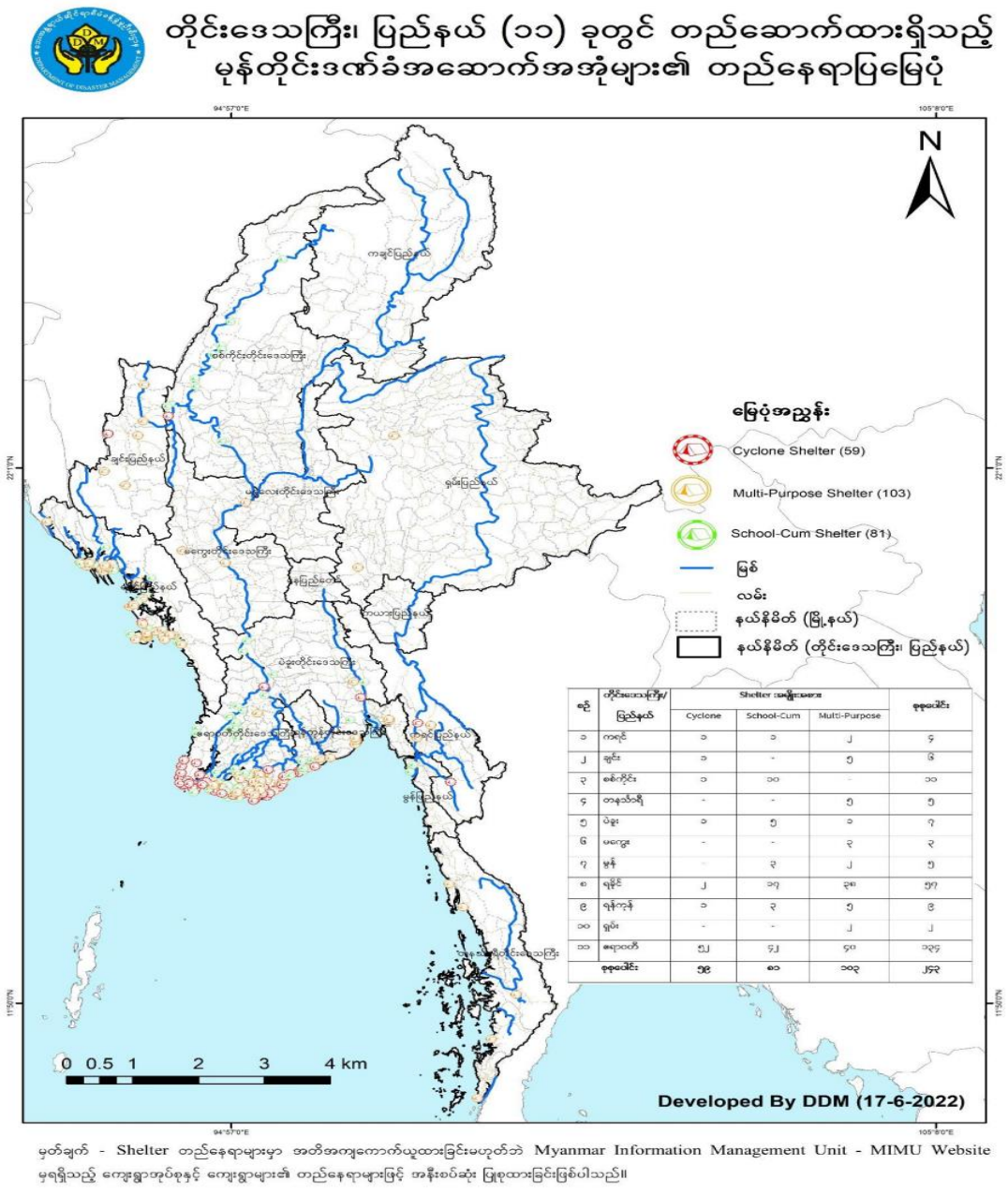
3.5.3 Cyclone shelter in Myanmar

Most Myanmar people have accumulated knowledge about cyclonic storm Nargis, which severely hit Yangon and Ayeyarwady regions and parts of Mon State in 2008. It gave physical and mental suffering to millions of people, leaving hundreds of thousands of people dead and injured. Hence, the word of Nargis always shakes the heart of the people in taking preventive measures against natural disasters. But such an unforgettable record left invaluable lessons to the people.

The dreadful Nargis stipulated the people to observe the weather forecasts whenever any kinds of disasters are slated to fall in parts of the nation. Most of the people in both Yangon and Ayeyarwady regions participate in the rehearsal to take preventive measures against natural disasters even in the condition of fine weather. It is because no one people wish to give casualties anymore in the disasters. Primarily, depressions and storms may fall one after another in the country in the rainy season. Hence, eleven regions and states have built cyclone shelters in order to give shelter to the people when any disasters fall. The national natural disaster management fund has been spent on the construction of 243 cyclone shelters to give shelters to local people in 11 regions and states after cyclonic storm Nargis had hit. In so doing, the Ministry of Social Welfare, Relief and Resettlement took responsibility for the construction of cyclone shelters.

These cyclone shelters are scattered in disaster-prone areas such as Ayeyarwady, Yangon, Bago, Magway, Tanintharyi and Sagging regions and Rakhine, Kayin, Chin, Mon and Shan states. The shelters can be used as accommodation for victims whenever they face natural disasters such as flooding, storms and others. During the normal time, the shelters can be used for community welfare tasks.

Figure 3.5 Cyclone Shelter in Myanmar



မှတ်ချက် - Shelter တည်နေရာများမှာ အတိအကျကောက်ယူထားခြင်းမဟုတ်ဘဲ Myanmar Information Management Unit - MIMU Website မှရရှိသည့် ကျေးရွာအုပ်စုနှင့် ကျေးရွာများ၏ တည်နေရာများဖြင့် အနီးစပ်ဆုံး ပြန်စုထားခြင်းဖြစ်ပါသည်။

Source ;from DDM(EOC)

Chapter (4)

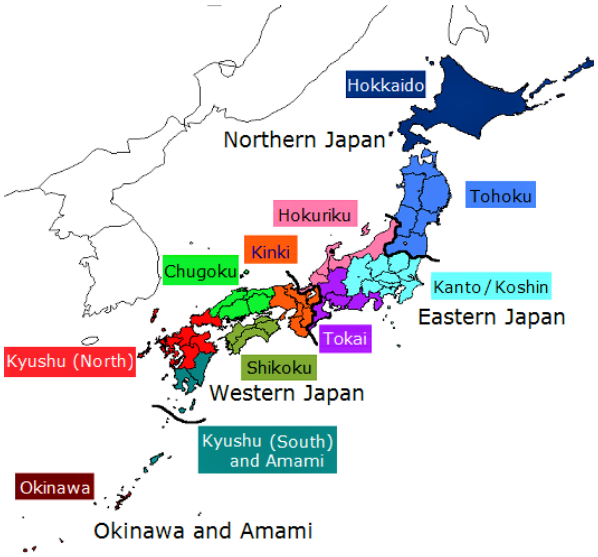
Hazard Profile and Disaster Management System of Japan

4.1 Location

Japan is an island country located in the western Pacific Ocean. It is bordered on the west by the Sea of Japan, extending from the Sea of Okhotsk in the north toward the East China Sea, Philippine Sea, and Taiwan in the south. Total land area is about 378,000 square kilometers. More than 70 percent of land surface is mountainous. As it is situated along the circum-Pacific volcanic belt, Japan has several volcanic regions and frequently affected by earthquakes and Tsunami. A major feature of Japan's climate is the clear-cut temperature changes between the four seasons. In spite of its rather small area, the climate differs in regions from a subarctic climate to a subtropical climate. The side of the country which faces the Sea of Japan has a climate with much snow in winter by seasonal winds from the Siberia. Most of the areas have damp rainy season from May to July by the seasonal winds from the Pacific Ocean. From July to September, Japan frequently suffers from Typhoon. The capital is Tokyo. Total population is about 127.77 million. Japan is divided into 47 administrative prefectures and eight traditional regions.

4.2 Climate

Figure 4.1 Map of Japan



Source ;from JMA

Japan has four distinct seasons with a climate ranging from subarctic in the north to subtropical in the south. Conditions are different between the Pacific side and the Sea of Japan side. Northern Japan has warm summers and very cold winters with heavy snow on the Sea of Japan side and in mountainous areas.Eastern Japan has hot and humid summers and cold winters with very heavy snow on the Sea of Japan side and in mountainous areas. Western Japan has very hot and humid summers (with temperatures sometimes reaching 35 ^{o}C or above) and moderate cold winters. Okinawa and Amami have asubtropical oceanic climate. These areas have hot and humid summers (with temperatures rarely reaching 35 ^{o}C or above) and mild winters.

4.2.1 Winter (December- January- February)

In winter (December-January-February), the Siberian High develops over the Eurasian Continent and the Aleutian Low develops over the northern North Pacific. Prevailing northwesterly winds cause the advection of cold air from Siberia to Japan and bring heavy snowfall to Japan's Sea of Japan side (upstream of mountainous land) and sunny weather to its Pacific side (downstream of mountainous land). Temperatures as low as -20°C are frequently observed in inland areas of Hokkaido, while Okinawa and Amami have mild winters due to their subtropical location.

4.2.2 Spring (March-April-May)

In spring (March-April-May), migratory cyclones and anticyclones that alternately move eastward prevail across Japan. Temperature increases (decreases) in front (back) of cyclonic systems due to warm southerly (cold northerly) flow. Temperature rises gradually with large short-term variations. Sunshine duration is long in the second half of spring due to the predominance of anticyclonic systems. The rainy season (known as the Baiu) begins in early May in Okinawa and in mid-May in Amami.

4.2.3 Summer (June-July-August)

Early summer is the rainy season, known as the Baiu, in Japan. Its precipitation is caused by a stationary front, called the Baiu front, which forms where a warm maritime tropical air mass meets a cool polar maritime air mass. In the second half of summer, the North Pacific High extends northwestward around Japan, bringing hot and sunny conditions to the country. Western Japan sometimes experiences temperatures of 35°C or above. On the other hand, the Okhotsk High sometimes appears over the Sea of Okhotsk and causes cool and moist easterly winds (known as Yamase), which bring cloudy and rainy conditions to the Pacific side of northern and eastern Japan. The number of tropical cyclones approaching Okinawa/Amami peaks in August.

4.2.4 Autumn (September-October-November)

In autumn (September-October-November), temperatures fall gradually. Monthly precipitation amounts are large in September due to the active autumnal rain front and tropical cyclones. In October, the frequent passage of anticyclonic systems brings sunny conditions and refreshing air to Japan. The frequency of cold northwesterly flows across Japan and precipitation (rainfall or snowfall) on the Sea of Japan side of the country show an increasing tendency in November.

4.3 Recent Major Disasters in Japan

Japan is located in the Circum-Pacific Volcanic Belt or “Ring of Fire” where seismic and

volcanic activities occur constantly. Japan and its surrounding areas experience roughly a tenth of all earthquakes that occur in the world. Of the world's active volcanoes, 7% exist in Japan. In addition, because of geographical, topographical and meteorological conditions, the country is subject to frequent natural disasters such as typhoons, torrential rains and heavy snowfalls, as well as earthquakes and tsunami. In addition, as society and industry become more sophisticated, complex and diversified, there is a need to further improve and strengthen disaster prevention measures for damage caused by large-scale accidents (accident disasters), such as maritime disasters, air disasters, railway disasters, road disasters, nuclear disasters, hazardous material disasters, large-scale fire disasters and forest fires.

Every year there is a great loss of people's lives and properties in Japan due to natural disasters. Until the 1960s, largescale typhoons with earthquakes caused extensive damage and thousands of casualties. Thereafter, with the progress of society's capabilities to respond to disasters and mitigate vulnerabilities to disasters by developing disaster management systems, promoting national land conservation, improving weather forecasting technologies, and upgrading disaster information communications systems, disaster damage has shown a declining tendency. In spite of such efforts, in 1995, more than 6,400 people died of the Great Hanshin-Awaji Earthquake. Also, in 2011, more than 22,000 people died or went missing due to the Great East Japan Earthquake. There is also a high probability of the occurrence of large-scale earthquakes in the near future including impending possibilities of Nankai Trough Earthquake and Tokyo Inland Earthquake. As such, natural disasters remain a menacing threat to the safety and security of the country. Major disasters occurred in Japan as following.

4.3.1 Great Hanshin –Swaji Earthquake1995

On 17 January 1995, an earthquake with a 7.3 on the Richter scale occurred at Awaji island of Hyogo Prefecture in Western Japan. It killed 6,434 people, injured 43,792 people, destroyed 104,906 houses, half destroyed 144,274 houses, and partially destroyed 390,506 houses. By the fires broke out along with the earthquake, the area of 835,858 square meters was burnt down.

4.3.2 Mid Niigata prefecture Earthquake 2004

On 23 October 2004, the Mid Niigata Prefecture was affected by an earthquake with a 6.8 on the Richter scale. Landslides and destruction of buildings and houses caused 68 dead, and 4,805 injured. 3,175 houses were totally destroyed, 13,810 houses were half destroyed, and 105,573 houses were partially destroyed.

4.3.3 The Great East Japan Earthquake

A magnitude 9.0 earthquake hit the northeastern Japan on 11 March 2011, recording the largest earthquake hit in Japan. Its epicenter was located in the coast of Sanriku and its epicentral area stretched from the coasts of Iwate Prefecture to Ibaraki Prefecture. Massive shakes were observed particularly in eastern Japan including Japanese intensity scale of 7 registered in the north of Miyagi Prefecture. Furthermore, this earthquake, a trench-type earthquake occurred near the boundary of the Pacific Plate and the plate beneath Tohoku area, triggered seafloor movements and generated massive tsunami. According to the National Police Agency, this earthquake and tsunami have left unprecedented human suffering: 15,870 people death, 2,814 people missing, and 6,114 people injured, as well as property damage: 129,472 totally collapsed buildings, 255,977 half collapsed buildings and 702,928 partially collapsed buildings. Furthermore, the value of the destruction of the social infrastructure, housing, and corporate facilities was estimated at 16.9 trillion yen and it had a great impact on Japanese economy.

4.3.4 Northern Kyushu Torrential Rain (July 2017)

During July 5-6, 2017, a linear precipitation system was formed and stayed due to the effect of warm and very humid winds flowing into a stationary seasonal rain front in the vicinity of the Tsushima Straits. This brought continued torrential rain to the same areas, resulting in record heavy rain in northern Kyushu. Due to the torrential rain, water supplies and electricity, as well as roads, railways, agriculture and forestry; all of which are key industries in this region were seriously damaged. More than 2000 people were forced to live in evacuation centers after the disaster. There were 44 people fatalities/ missing and 34 people were injured and 326 houses were completely destroyed, 1110 houses were half-destroyed and the number of houses which were above floor flooding were 222.

4.3.5 Typhoon 21 (October 2017)

Typhoon 21 moved northward from the southern part of Japan during 21-22 October and made landfall near Omaezaki in Shizuoka Prefecture while retaining its supersized and powerful momentum. This brought heavy rain over much of western and Eastern Japan and Tohoku Region; due to well-developed rain clouds surrounding the typhoon and the rain front near Honshu. In this event, there were 8 people died/missing, 244 were injured, the number of completely destroyed houses are 7, half – destroyed houses were 434 and 2776 houses were above floor flooding.

4.3.6 West Japan Torrential Rain (July 2018)

In July 2018, catastrophic floods occurred in western Japan. These catastrophic floods caused great economic losses and casualties, resulting in 212 deaths. damage to more than 2000 houses and 619 geological disasters in 31 prefectures. The flood resulted in the most significant impacts on western Japan since 1982; furthermore, the number of rainfall observation stations receiving the highest amount of rainfall within 48 h compared to historical recordings was the highest since 1982.

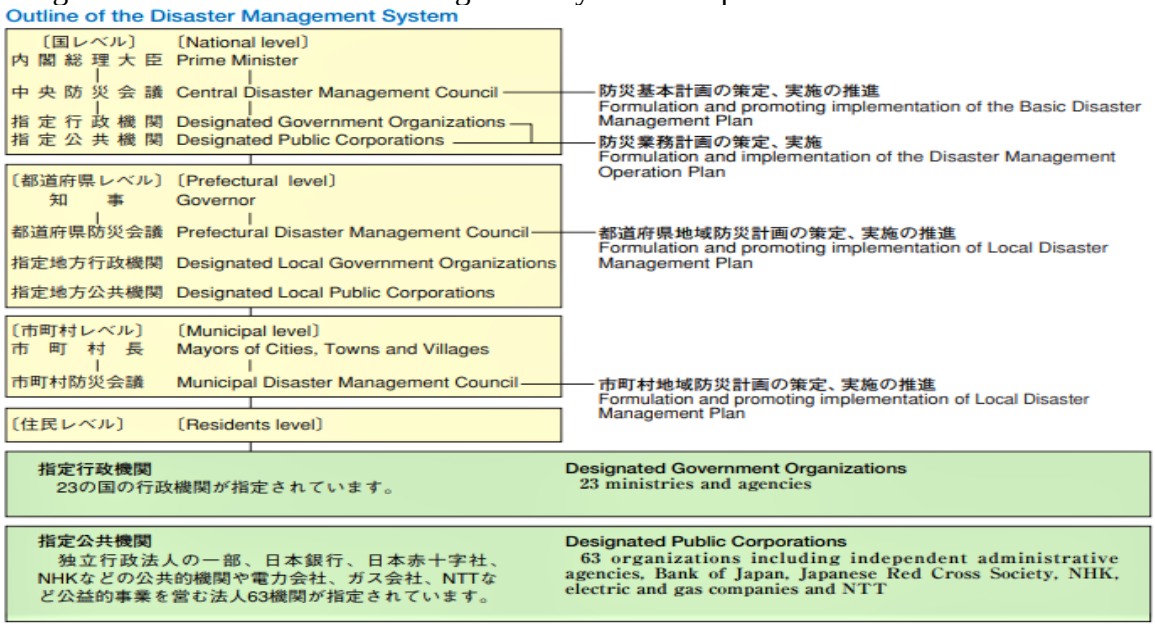
4.3.7 Typhoon Hagibis 2019

Between October 6 until 13, 2019, an extremely strong and large tropical cyclone, Typhoon Hagibis, caused widespread destruction across its path. It was the strongest typhoon to strike mainland Japan in decades, and one of the largest typhoons ever recorded in terms of its diameter. It was also the costliest Pacific typhoon recorded in history, causing a total of 15 billion US dollars in financial damage.

4.4 Disaster Management System in Japan

Japan has 3 layers of government which are National government, Prefectures government, and Municipalities government (National government, 47 prefecture government, 2350 cities, towns, villages Municipal).To protect national land as well as citizens' lives, livelihoods, and property from natural disasters is a national priority. The fundamental framework of the current disaster management system has been created after large-scale disasters .The turning point for strengthening the disaster management system came after the immense damage caused by the Ise-wan Typhoon in 1959, and led to the enactment of the Disaster Countermeasures Basic Act in 1961, which formulates a comprehensive and strategic disaster management system. The disaster management system has been further strengthened following the lessons learned from large-scale disasters such as the Great Hanshin-Awaji Earthquake. Japan's disaster management system addresses all of the disaster phases of prevention, mitigation and preparedness, emergency response as well as recovery and rehabilitation. With clear roles and responsibilities of the national and local governments, the relevant stakeholders of the public and private sectors cooperate in implementing various disaster countermeasures. Response oriented approach was changed to a preventive approach, and the individual approach was changed into a comprehensive multi-sectoral approach in the disaster management system. Also, the government has been trying to invest for disaster reduction in order to seek sustainable development.

Figure 4.2 Outline Disaster Management System of Japan



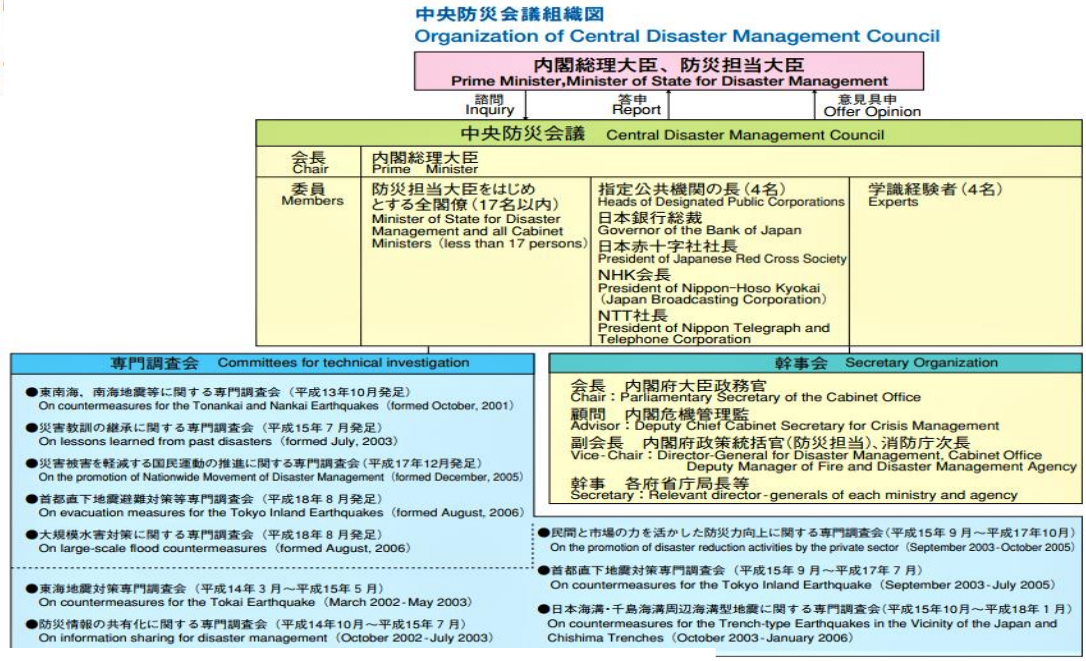
Source ;from Disaster Management System in Japan

4.4.1 Central Disaster Management Council

Basic Act on Disaster Countermeasures provides for the establishment of the Central Disaster Management Council (CDMC). The Central Disaster Management Council is one of the councils that deal with crucial policies of the Cabinet, and is established in the Cabinet Office based on the Disaster Countermeasures Basic Act. The council consists of the Prime Minister, who is the chairperson, Minister of State for Disaster Management, all ministers, heads of major public institutions and experts. The council promotes comprehensive disaster countermeasures including deliberating important issues on disaster reduction according to requests from the Prime Minister or Minister of State for Disaster Management.The duties and functions of CDMC are as follows:

- Formulate and promote implementation of the Basic Disaster Management Plan and Earthquake Countermeasures Plans.
- Formulate and promote implementation of the urgent measures plan for major disasters.
- Deliberate important issues on disaster reduction according to requests from the Prime Minister or Minister of State for Disaster Management (basic disaster management policies, overall coordination of disaster countermeasures and declaration of state of disaster emergency)
- Offer opinions regarding important issues on disaster reduction to the Prime Minister and Minister of State for Disaster Management.

Figure 4.3 organizarion of Central Disaster Management Council of Japan



Source ; from Disaster Management System in Japan

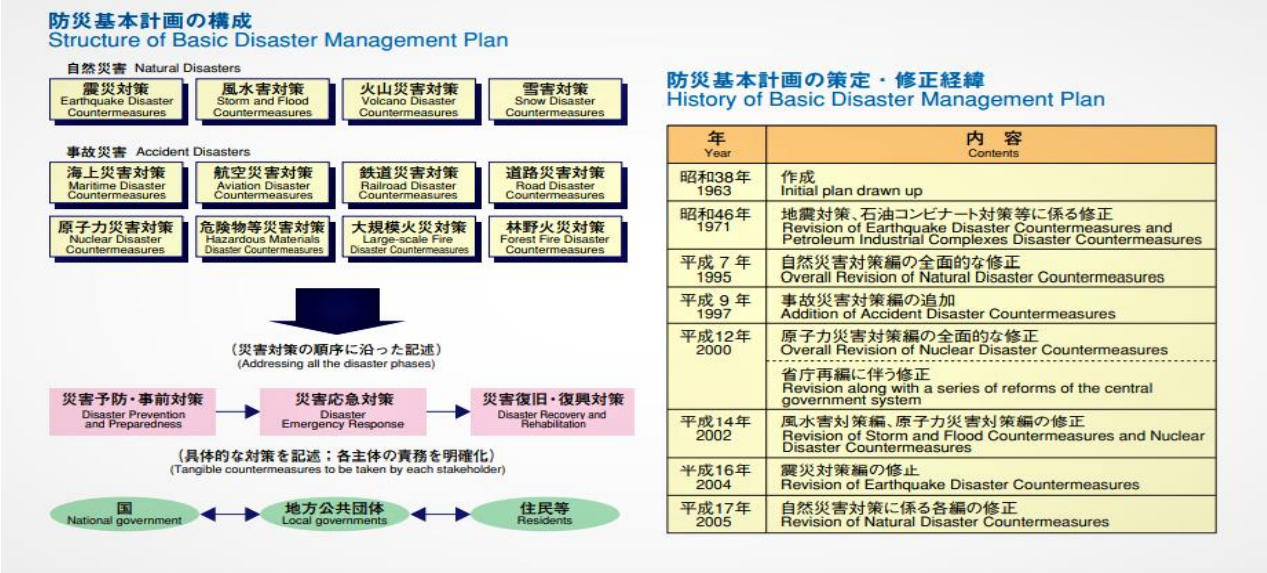
4.4.2 Disaster Management Planning System

The Basic Disaster Management Plan states comprehensive and long-term disaster reduction issues such as disaster management related systems, disaster reduction projects, early and appropriate disaster recovery and rehabilitation, as well as scientific and technical research. The plan was revised entirely in 1995 based on the experiences of the Great Hanshin-Awaji Earthquake. It now consists of various plans for each type of disaster, where tangible countermeasures to be taken by each stakeholder such as the national and local governments, public corporations and other entities are described for easy reference according to the disaster phases of prevention and preparedness, emergency response, as well as recovery and rehabilitation.

The Basic Disaster Management Plan is a basic plan for disaster reduction in Japan prepared by the National Disaster Management Council in accordance with Article 34, Paragraph 1 of the Basic Act on Disaster Management, and is subject to consideration "every year the results of scientific research on disasters and disaster prevention, the situation of disasters that have occurred, and the effects of emergency disaster response measures taken in response to such disasters, and it is revised if necessary." Based on the Basic Disaster Management Plan, local governments must prepare local disaster management plans, and designated administrative organizations and designated public corporations need to prepare and revise disaster reduction operation plans. Regarding FY 2020, the Basic Disaster Management Plan was revised in May 2020. Main revisions to the plan include the

addition of descriptions of responses to issues that became apparent after the disasters that occurred in FY 2019.

Figure 4.4 Structure of Basic Disaster Management plan



Source; from Disaster Management System in Japan

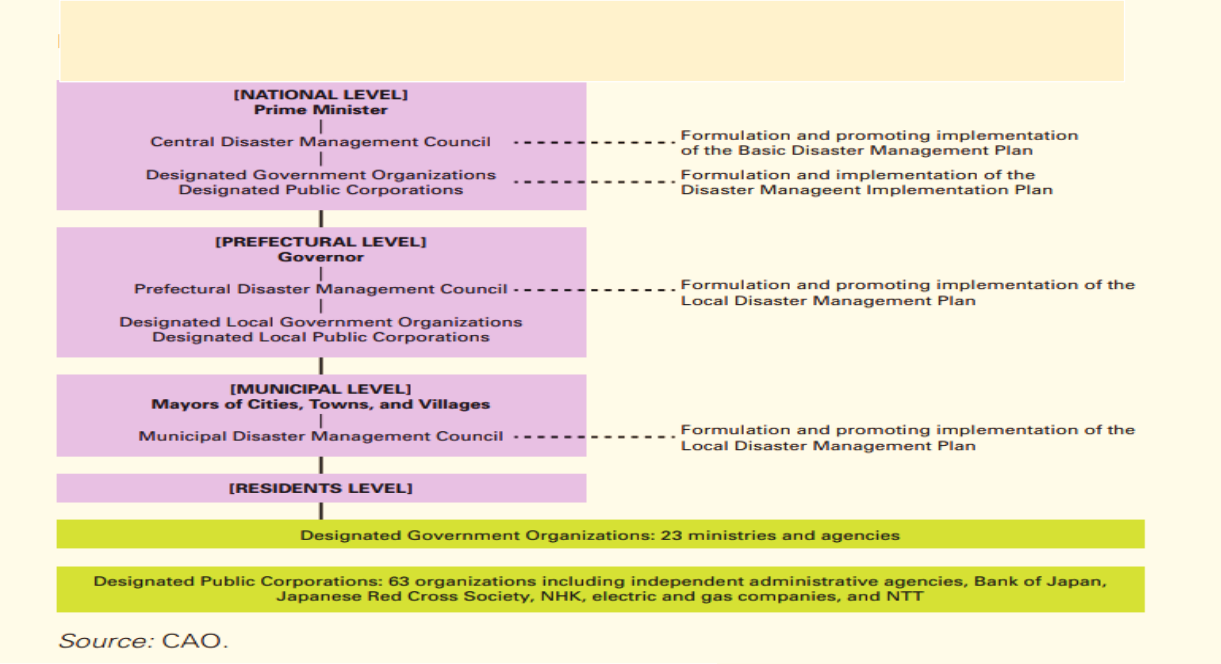
4.4.3 Community Based Disaster Risk Management in Japan

The municipal government plays a fundamental role in disaster management: according to the Disaster Countermeasure Basic Act, it is responsible for establishing a local disaster management plan, emergency operations such as warning systems, issuing evacuation recommendations and orders, and flood fighting and relief activities. In cases where a municipality is so widely and heavily devastated that it cannot carry out many of its primary roles, the prefectural government shall issue evacuation recommendations and orders instead of the municipality. A local disaster management plan shall provide for the following:

- Specification of the roles of government organizations, designated public corporations (such as public utilities and the Red Cross), and other relevant public organizations.
- Plans by category of activity, including: development or improvement of DRM facilities, investigation and research, education, drills and other preventive measures, collection and dissemination of information, issuing and disseminating of forecasts and warnings, evacuation, fire fighting, flood fighting, rescue, hygiene, and other emergency measures and rehabilitation efforts.
- Plans for coordination, stockpiling of food and supplies, procurement, distribution, shipping, communication, facilities, equipment, materials, funding, and so on.

When a prefectural disaster management council wishes to formulate or revise a local disaster management plan for the prefecture, the council is required to consult the prime minister in advance, who in turn shall consult the Central Disaster Management Council. When the prefectural disaster management council has formulated or revised its local prefectural disaster management plan, the council is required to release and disseminate a summary of the plan or revision.

Figure 4.5 Outline of Japan's Disaster Management System



Source ;from Disaster Management System in Japan

In the aftermath of the Great East Japan Earthquake, the limitations of the government's activities, and the importance of "mutual-help" in collaboration with local municipalities became apparent. Consequently, the Cabinet Office amended the Disaster Countermeasures Basic Law in June 2013, and created the "Community Disaster Management Plan" (CDMP), a plan for disaster management activities by businesses and residents of local communities. From the perspective of social capital, disaster management activities based on the CDMP will lead to local community participation in town planning, even during the preliminary reconstruction phase. In order to encourage and promote proactive disaster management activities among residents (including both individual and corporate residents) in a given area based on the spirit of self-help and mutual help, and to enhance the disaster management capabilities of the area in a bottoms-up manner, it is stipulated that a community disaster management plan, featuring the community level disaster management activities, may be prescribed in the municipal disaster management plan. In developing a community disaster management plan, more active and proactive participation of the area residents is necessary at an early stage of such development. As such, it is stipulated that the area residents may

jointly make a proposal (proposed plan) to the municipal disaster management council that a community disaster management plan be stipulated in the municipal disaster management plan. Thus far, the plans reflected in the community disaster management plans are that of 30 prefectures, 73 municipalities and 901 communities.

4.5 Study on community-based disaster preparedness and prevention activities in Japan

ADRC VRS visited to study about Torrential Rain Disaster in Tamba City on 3 March,2023. We met Mr. Yohei SHIBAHARA ,Life Safety Section, Living Environment Division, Tamba City and discussed about geography and disaster profile of Tamba city and how to response to and recovery efforts from 2014 Torrential Rain Disaster in Tamba City by local government and community.

The city is located at the eastern end of the Chugoku Mountain, the Geographically belongs to the hilly and mountainous area formed by mountains with steep slopes. The city has the lowest central watershed in Japan, located at 95m above sea level. Therefore, when torrential rain occurred in this area, which caused of landslide and flood. In Tamba City, Typhoon No. 23 in October 2004 caused large-scale flood damage that killed three people. However, in August 2014, the Tamba City heavy rain disaster centered on large-scale landslides caused by the heavy rain front occurred. Furthermore, when the West Japan torrential rain disaster occurred in July 2018, the first “heavy rain emergency warning” was announced, and flood damage occurred throughout the city area.

We also went the site visits to the Sakiyama area which was occurred by the flood and landslide disaster, and met with Ms. Akemi Yoden who was involved in the creation of the village development plan and made effort to face the mountains. She talked about how to do Community Development and Recovery/DRR Efforts by Local People after 2014 Tamba Torrential Rain. We observed how to recovery along mountain area and build Sabo dam by local people.

Figure 4.7 Study tour to Tamba city

Flood and landslide disasters caused by torrential rains in Tamba city. Damage and loss data are as follows table.

Table 4.1 Damage and loss data of disaster-Stricken in Tamba city

Items	Tamba city
Date of Disaster occurrence	August 16 to 17,2014
Human suffering (death toll)	1
Damage of residential houses	18 totally destroyed,51 half destroyed, 954 partially-damaged (including inundation below floor level) Total 1023 houses
Amount of drained soil	Approx. 500 thousand m^3
Precipitation	Approx. 100 mm per hour Approx. 300 mm per hours
Forest land collapse	256 sites
Number if volunteer	Approx. 18000 persons
Donation	Approx. 0.22 billion yen

Source: Lecture by Mr. Yohei SHIBAHARA, Life Safety Section, Living Environment Division, Tamba City

Regional concentrated torrential rain occurred in a short time. So, Sediment disaster brought by Torrential rains they had never experienced before. A large amount of sediment and driftwood flowed out because of more than 250 forest land collapse sites. Houses at the foot of a mountain were heavily damaged. Overflowed water mixed with sediment, and inundated the community and farmland.

In during disaster, implementation of disaster emergency response are:

- Public facilities of the city , regional hub facilities, and other (11 places)
  (Setting up consultation service, distribution of lime and antiseptic solution, offering bathing facilities, and others)
- Securing of emergency transportation roads, community roads, and river courses, removal of sediment around houses, secondary disaster risk reduction, and others
- Water supply to areas affected by a water cut-off (water-supply truck, water-supply bag, support from municipalities in Hyogo)

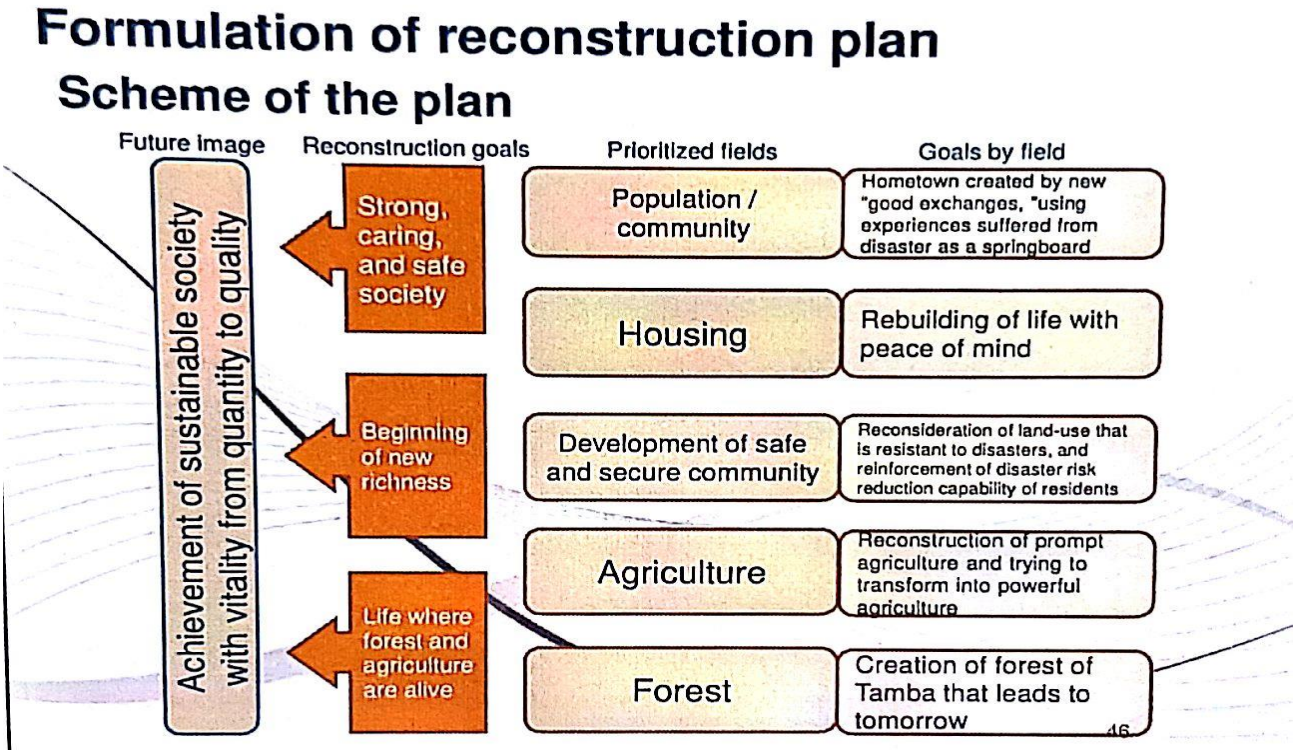
- Setting up a temporary storage site and implementation of special collection (support from municipalities in Hyogo)
- Acceptance and distribution of relief supplies (Accepting relief supplies such as housewares from all over the country)
- Setting up the volunteer centre, and others(Approximately, over 18 thousand volunteers were involved)

The local Government and community are lessons learnt from the past disaster and then preparedness for future disasters is as follow;

1. The local government has provided the Radio to each household (about 25 thousand household) free of charge for issuance of information on evacuation and evacuation actions. Local government issue evacuation advisory through disaster management radio system. Points of evacuation actions are evacuation actions at night, flooded roads ,risk of flood damage and sediment disaster and risk of secondary disaster due to evacuation actions by moving out.
2. Each local residents' association prepared self-made hazard map.
    - Areas where flooding is prone to occur, the sites where landslides are prone to occur.
    - Hazardous areas during evacuation, those who need helping hand(individual evacuation support).
    - Route to primary evacuation center, which is supposed to be safe
    - Direction of water flowing in , past examples of flood damage that occurred previously in the region.
    - What we want to tell local people to hand it over.
3. Frequently mixing well with the neighbors (mutual-help System)
    - Building a good relationship with your neighbors where you can always tell them

Situation three years after disaster, about 98% of restoration and reconstruction works was completed. Restoration and reconstruction works are such as forest conservation, erosion control, revitalization of hometown, promotion of house building, utilization of vacant house, setting up buffer zones and prevention of disasters, agricultural promotion.

Figure 4.8 Formulation of reconstruction plan



Source; from Lecture by Mr. Yohei SHIBAHARA ,Life Safety Section, Living Environment Division, Tamba City

Five years after the heavy rain disaster in Tamba City in 2014, citizens, private organizations, the city, etc. have worked together to create a creative reconstruction with the slogan of "connecting hearts" as a slogan for reconstruction, while receiving support from various fields. In the event of a disaster, the mutual help of local residents, known as "mutual aid," is essential. The city is also promoting the establishment of a "voluntary disaster prevention organization" as an arbitrary group that local residents can voluntarily cooperate with and carry out disaster prevention activities, with the residents' association as the parent body. A voluntary disaster prevention organization is a voluntary disaster prevention organization by local residents (with residents' associations as the parent body) as stipulated in the Disaster Countermeasures Basic Law. Based on the provisions of Article 42 of the Disaster Countermeasures Basic Law, they have established a regional disaster prevention plan. The Tamba City Regional Disaster Prevention Plan consists of "general rules", "disaster prevention plan", "disaster emergency measures, restoration/reconstruction plan", "nuclear disaster countermeasures plan", and "materials".

In order to ensure that the experience and lessons learned from the Tamba City heavy rain disaster do not fade away and are passed on to future generations, August 16 was designated as Tamba City's Heart-to-heart Disaster Prevention Day, and various initiatives are being promoted. The Tamba City Disaster Prevention Association was awarded the Hyogo Prefecture Kusunoki Award for its outstanding achievements in the realization of a beautiful and heart-rich Hyogo area through community development activities through participation and collaboration in the Tamba area. All members have qualifications such as disaster prevention specialists, and with their specialized knowledge, they have been receiving requests from elementary and junior high schools, welfare facilities, residents' associations, etc. In Tamba City for many years to conduct disaster prevention training workshops, and contributed to the creation of a strong local community. In line with these efforts by the national government and Hyogo Prefecture, they will comprehensively and systematically promote measures related to national resilience, and promote the development of strong, safe, and secure communities together with citizens, the national government, prefectures, businesses, and others. In order to move forward, they have formulated the “Tamba City Regional Plan for National Resilience”.

Chapter (5)

Conclusion

This paper presents community-based Disaster Risk Management in Myanmar and Japan. Especially , this paper focuses on community based Disaster preparedness and prevention .Nowadays, every country including Myanmar in the world is facing the effects of climate change and also the gap of unequal development. As a result, most of countries have been experiencing the attack of unexpected natural disasters. A disaster can put development gains at risk because it is directly linked with the development. Therefore, all countries in the world need to consider having the best plan on DRR and DRM. Myanmar has Disaster Management Plans at all levels which need to update/ develop the old ones according to the time and circumstances of the country's situations. To be the effective and efficient plan, we have to use a people-centered and inclusive approach since the backbone of the country is our citizens who are the key responders to any disasters. Moreover, DRR is Everyone's business. Especially, communities' participation and empowerment are central to good preparedness and prevention activities. If we strengthen the capacity of communities for disaster preparedness and prevention activities, they can tackle the disaster risk. They will be able to consider all aspects of disaster prevention measures in local development interventions. In addition, they will be able to build a resilient community for the future disaster. Myanmar as a Developing country needs to empower community members, raise awareness of community-based disaster risk management (DRM), and support community organizations through formal recognition and support of local and national authorities. Therefore, CBDRM needs to be implemented across the country. Myanmar National Farmwork for Community Disaster Resilience aimed at “Promoting People-centered, Inclusive, and Sustainable Development”**.** Strengthening community disaster resilience also requires a coherent approach that includes Community Engagement Disaster Risk Information, Disaster Risk Governance.

Japan, one of the most disaster-prone countries in the world, has developed a sophisticated and comprehensive disaster management system. Based on the three-layered national system of government and the country's administrative boundaries, the formation and evolution of the disaster management system in Japan has been strongly influenced by unfavorable geographical location, as well as by climate and topographic disasters and various Large-scale disasters have been the driving force for more change and improvement. Local communities play a key role in preparing for disastrous events, such as the Great East Japan Earthquake (GEJE), as the first responders to take

action. On March 11, 2011, the disaster response of community-based organizations saved countless human lives. Recognizing the role of communities and providing them with central and local government support remains critical to maintaining and strengthening important community-based functions. The GEJE experience yielded several important lessons about the need to empower communities to understand and reduce the risks they face, prepare for natural disasters, and act as first responders to hazard events. It also pointed to important ways to strengthen their roles.The community leaders knew well to prepare community-based disaster management plan by themselves and municipal government supported the leaders to make that plan. After preparing the plan, the members of CBOs distributed them all houses in those respective areas. The local government and community are understood to promote self-help initiatives to protect one's own life, mutual assistance initiatives to help and support each other in the community, and efforts to build a safe and secure society. They recognized that efforts for public assistance, and efforts that coordinated these self-help, mutual assistance, and public assistance are important.

Japan has the Museums in which the person who are interested on DRR can touch the image of past disasters and can suffer the messages they want to hand over to their generations. The maintenance of the records (photos, documentation, and some samples of broken physical features) about the past disasters is very systematic. In the earthquake museums, Commentaries clearly describe and inform visitors about the fault set out to preserve the memory of the earthquake but also to make us think of large earthquakes that might occur in future. We could study that valuable lessons and information need to be communicated to all people, young and old. We observed and got the experience the tremors of an earthquake with the seismic motion simulator and MX4D, what the earthquake disaster was like and the history of how the region’s recovery. In the Great East Japan Memorial Sendai Arahama elementary school and residential foundation museum displays photos and videos that were showing the real threat of a Tsunami. These museums remind all visitors of the importance of disasters preparedness and prevention.

Reference

- Myanmar Action Plan on disaster Risk Reduction 2017
- Hazard Profile of Myanmar 2009
- Myanmar Community Resilience Framework
- Disaster risk Reduction in Myanmar ,Status report 2020
- https://www.humanitarianlibrary.org/resource/standing-order-disaster-management-0
- March 2006 Early Warning Sub-Committee of the Inter-Ministerial Committee on International
- White paper of Japan 2022
- Cooperation for Disaster Reduction Government of Japan
- Assessment Report on Climate Change Impacts in Japan
- December 2020 Ministry of the Environment, Japan
- Basic Disaster Management Plan of Japan
- Climate, Environmental Degradation and Disaster Risk in Myanmar, a MIMU Analytical Brief ,May 2022
- https://www.gnlm.com.mm/cyclone-shelters-ready-to-give-shelter-to-disaster-victims/ https://www.city.tamba.lg.jp/soshiki/shimin/jinnkoutoukei.html
- https://www.city.tamba.lg.jp/soshiki/bousai/bousaimapzentai.html
- https://www.city.tamba.lg.jp/life/1/7/
- https://www.city.tamba.lg.jp/soshiki/bousai/jisyubousaisoshikibousaikeikaku.html
- Lectures of ADRC Visiting Researcher program
- Early Warning Manual (DDM,DMH,JICA)
- Data from Department of Disaster Management
- https://elibrary.worldbank.org/doi/10.1596/978-1-4648-0153-2_ch6
- https://www.adrc.asia/nationinformation.php?NationCode=392&Lang=en&NationNum=23
- https://www.adrrn.net/news/lessons-from-hagibis-learning-to-cope-with-intensifying-disasters-in-the-age-of-new-normal/
- https://www.mdpi.com/2073-4441/12/9/2489
- https://books.google.co.jp/books?id=9UinBgAAQBAJ&pg=PA136&lpg=PA136&dq
- https://books.google.co.jp/books?id=vQM7EAAAQBAJ&pg=PA36&lpg=PA36&dq
- https://en.wikipedia.org/wiki/Japan
- https://www.data.jma.go.jp/gmd/cpd/longfcst/en/tourist_japan.html
- https://news.un.org/en/story/2020/01/1055681