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# PARADIGM OF DISASTER RISK REDUCTION: A COMPARATIVE STUDY OF FIVE ASIAN COUNTRIES

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## Abstract

Disasters are a true litmus test of risk governance. Many attributes of governance interplay in disasters before, during and after a situation. Risk governance is the exercise of political, economic, and administrative authority in the management of a country's affairs at all levels. This study aims to analyze the national policy and mechanism of disaster risk reduction and risk governance in five Asian countries (i.e., Japan, India, China, Philippines, and Thailand) using the Hyogo Framework for Action 2005-2015 and documents for data collection. This study briefly analyzes the disaster risk reduction mechanism and governance of disaster risks that influence the way in which national and subnational actors (including governments, parliamentarians, public servants, the media, the private sector, and civil society organizations) are willing and able to coordinate their actions to manage and reduce disaster-related risk. This study also contextualizes the disaster risk reduction policies of these five countries in the light of the Hyogo Framework for Action 2005-2015 and also with the Sendai Framework for DRR 2015-2030.

*Keywords:* Disaster Management, Disaster Risk Reduction, Disaster Governance, Policy, Hyogo Framework for Action, Sendai Framework for DRR. General Information of Hazards in Asia

## 1. INTRODUCTION

Over the past two decades, many countries in the Asia-Pacific region have made significant progress in achieving sustainable development goals related to disaster risk reduction (Goal 1, Goal 9, Goal 11), and to promoting good health and well-being (Goal 3), but most are not ready for overlapping complex crises (ESCAP, 2021). Natural disasters pose a significant risk to the long-term viability of development initiatives and investments. Geophysical risks (e.g., earthquakes, tsunamis, and volcanic eruptions) and hydrometeorological

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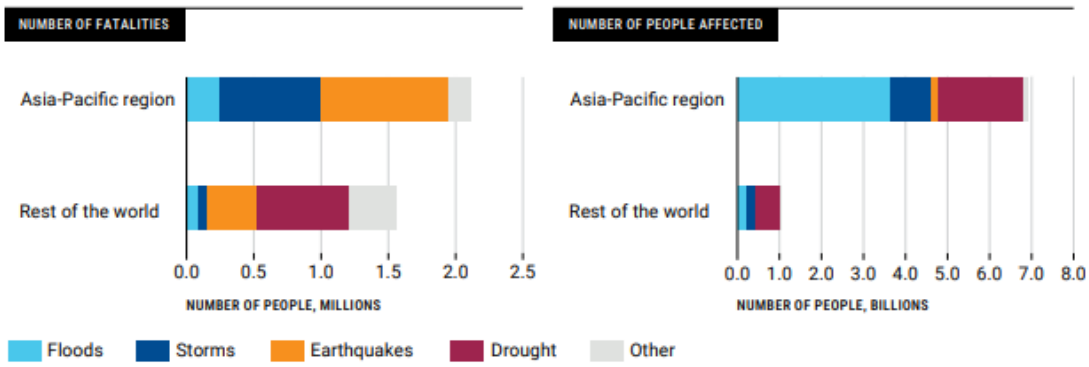
hazards (e.g., floods, droughts, and tropical cyclones) are classified into two groups that represent latent natural sources (ADB, 2017). Natural disasters of all sorts strike the Asia-Pacific area every year, killing thousands of people and severely affecting the economy. Natural disasters, notably storms and floods, have become more common throughout the world in recent decades. The prevalence of all-natural catastrophes has increased by 600 percent in the last 60 years (ESCAP, 2021).

Since 1970, the Asia-Pacific region has accounted for 57 percent of the world's disaster deaths and 87 percent of the world's population affected by natural disasters (Figure 1). Natural disasters in the Asia-Pacific region killed more than 2 million people between 1970 and 2020, affecting 6.9 billion people and killing 41,373 people each year, or one every 13 minutes. However, substantial progress has been made: between 2011 and 2020, the average annual loss of life dropped to 10,936; while between the 2019 and 2020, it reduced to around 6,200 (EM-DAT, 2021).

**Figure 1**: Number of fatalities and people affected in the Asia-Pacific area and the rest of the world, 1970-2020 (EM-DAT, 2021)




Faced with the rising frequency of natural disasters across the Asia-Pacific region, the response in different countries has varied widely. However, it is clear that all governments in the region need to do more to cope with these growing threats.

Disasters can seriously affect communities and households, and they can destroy (temporally or for many years) the livelihood and security of their members. A disaster results from a combination of hazard risk conditions, social vulnerability, and the limited capacities of households or communities to reduce the potential negative impact of the hazard. Disaster risk reduction (DRR) is a conceptual framework of elements to minimize vulnerabilities and disaster risks, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (ISDR, 2002). Overall, disaster risk management (DRM) includes but goes beyond DRR by adding a management perspective the combines prevention, mitigation, and preparedness with a response. Climate change is increasing the frequency and complexity of natural disasters, which results in greater loss of human life and livelihood, and decreases the resilience of vulnerable ecosystems and societies. Incorporating DRR into national development and climate change

adaptation (CCA) strategies strengthen established cross-sector collaboration and coordination, and provide financial support for implementation. To mitigate the effects of complex, interconnected risk, governments should collaborate to recognize, prevent, and mitigate the risks of concurrent and cascading events (UNDRR, 2021).

Both disaster management and development should be concerned with the overall aspects and improving the quality of life. The social development goals are a 15-year global agenda agreement that include 17 goals to fulfill the three pillars of economic, social, and environmental development. If the area wants to achieve the 2030 Agenda for Sustainable Development's goals, then the hazardous disaster risk management approach will no longer be viable for Target 1, Target 9, Target 11, and Target 13 (ESCAP, 2021).

The four primary processes that solve the hazard in the pre-disaster, during-disaster, and post-disaster phases of DRM are response, recovery, mitigation, and preparedness. Without uncertainty in DRM, sustainable development would be impossible to accomplish. Furthermore, the linkage of both will benefit countries through the three pillars, as shown in Figure 2.

**Figure 2**: The link between social development goals and DRM


During disasters, the primary priority is to protect the vulnerable and minimize the death rate. The government that should have full authority at all levels, particularly at the local level. Strong institutions and the rule of law, which are linked to "goal 13.1: strengthen resilience and adaptive capacity to climate-related hazard and natural disasters" and "goal 13. b: promote mechanisms for raising capacity for effective climate change-related planning and management, with either a focus on women, youth, and local and marginalized communities," are essential for this action, supported by "goal 16.1: significantly reduce all forms of violence and related death rates

everywhere", which required implemented processes in each stage of the disaster. Not only strong governments but also effective early warning will reduce the number of victims during risks, as stated in "objective 17: early warning systems are the method taken into account when assessing danger and risk management." Understanding catastrophe risk reduction is critical for response, recovery, and preparedness. Social culture will be created through increasing the awareness associated with each level of schooling to actualize the relationship between DRR and sustainable development in "objective 4.7: ensuring that all learners gain the information and skills needed to promote sustainable development, including, among other things, via education for sustainable development."

For city resilience, recovery and mitigation are required after a disaster. The relationship between "objective 9: Build robust infrastructure, promote inclusive and sustainable industrialisation, and stimulate innovation" and "goal 11: make cities and human settlements inclusive, safe, resilient, and sustainable" is infrastructure design. Furthermore, financial assistance is a critical component of mitigation. The most effective financial risk management transfer method is insurance, which ensures that funds are accessible in the event of a disaster.

Preparedness is the most important procedure to minimize losses and safeguard individuals. The establishment of environmental development planning as an integrated ecosystem in the national agenda is required for long-term policy formulation, not only for DRR but also for sustainable development. This is linked to "goal: 17.14 Improve policy coherence for sustainable development," "goal 15.9: integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts" and "goal 16. b: promote and enforce non-discriminatory laws and policies for sustainable development." Proceeding on to the policy implementation process, partnerships are absolutely essential. Vulnerability and stakeholders are linked in "16.7 Ensure responsive, inclusive, participatory, and representative decision-making at all levels" and "goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development in: goal 17.16: systemic issues-multi-stakeholder partnerships, enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology, and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries."

This study has not only researched the international frameworks as the paradigm for DRM but has also selected five national contexts. These contexts are examined in this study of DRM in Asia's rapidly changing and urbanizing societies, in terms of geography and especially in politics. This study will examine five case studies: Japan, India, China, Philippines, and Thailand. Through these case studies, the researcher highlights a set of national policies in DRM focusing on the progress of the "Hyogo Framework 2005-2015" to improve global collaboration.

## 2. THE GLOBAL INSTITUTIONAL FRAMEWORKS

Governance is the exercise of political, economic, and administrative authority in the management of a country's affairs at all levels. Appropriate governance for DRM is a fundamental requirement if risk

considerations are to be factored into development planning and if existing risk are to be successfully mitigated (UNDP, 2004). The governance of disaster risks influences the way in which national and subnational actors (including governments, parliamentarians, public servants, the media, the private sector, and civil society organizations) are willing and able to coordinate their actions to manage and reduce disaster-related risk (UNDP, 2015). The concept of DRG has evolved over the last decade. Current thinking acknowledges that the governance of disaster risk cannot be separated from the governance of other types of risks, including those associated with climate change, environmental degradation, financial crises, and conflict (UNDP, 2015). The international conceptual framework is a crucial aspect of governance in an effort to recognize and deal with international disasters. It first emerged in 1989 in the International Decade for Natural Disaster Reduction (IDNDR; 1990–1999). This was the starting point to make progress through cooperation. During that time, the Yokohama Strategy and Plan for Action (1994) was analyzed to formulate the Strategy for 2000. In 2000, the International Strategy for Disaster Reduction (ISDR) was adopted by ECOSOC to establish continuity, and was followed by more commitment to Johannesburg Plan of Implementation: World Summit on Sustainable Development (WSSD; 2002). Ultimately, the Hyogo Framework for Action (HFA 2005–2015) was the first framework to provide a concrete action approach for effective monitoring of progress. The Sendai Framework (2015–2030) is currently the framework that the member states are heading towards. These frameworks are outlined in the following subsections.

**1) International Decade for Natural Disaster Reduction: IDNDR (1990–1999)**

On 22 December 1989, the 85th plenary meeting of the UN General Assembly considered that natural disasters have adversely affected lives, and caused damage to infrastructure and property worldwide. It also raised the importance of environmental protection for the prevention and mitigation of natural disasters. An appropriate framework for international cooperation was developed to address the objective "to reduce the loss of life, property damage and social and economic disruption caused by natural disasters" with the goals of the decade, including five specific aspects (United Nations, 1989): to improve the capacity of each country to mitigate the effects of natural disasters; to devise appropriate guidelines and strategies to apply existing scientific and technical knowledge; to foster scientific and engineering endeavors aimed at closing critical gaps; to disseminate existing and new technical information related to measures for the assessment, prediction, and mitigation of natural disasters; and, to develop measures for natural disasters and training to address specific disasters (IDNDR, 1999).

In relation to the inaugural international disaster management conference, there were six aspects of development and environmental concerns: disaster reduction within development; disaster reduction and recovery for sustainable human development; land use planning; capacitating developing countries; protection of natural resources, vulnerability of ecosystems and natural disasters; and CC and natural hazards.

Any meaningful examination of the disaster-development dilemma must utilize a temporal framework that ensures that the complete lifecycle of a disaster may be thoroughly evaluated

for development and environmental problems. More attention should be paid to the vast range of lower-level harmful occurrences that afflict diverse areas, towns, and communities across the world on a regular basis. However, the statistics on disaster impacts that have been obtained so far do not lend themselves to a thorough analysis of the disaster-development dilemma. The actual issue is the diminished size and/or degree of development of the impacted economies and societies, rather than sanitizing risks because of their social consequences. It would probably be more accurate to sanitize society for its hazards-related effects. More than mere economic rationality and efficiency, achieving better living circumstances for the poor and a significant reduction in their vulnerability is a matter of ethics, equality, and social justice.

Natural disaster avoidance requires a worldwide strategy that considers both physical and social problems to undertake adequate land management at the national level. Prevention must be incorporated into the land management of fragile lands or territories, such as major cities, mountain areas, coastal areas, flood plains, and degraded natural spaces. Hazard mapping, land-use planning, and management are essential instruments for prevention. However, there is no uniform model because preventive measures must be adapted to local conditions. Specific funding is required for prevention. A unique International Fund for Prevention has been suggested (*Ibid*.). Networks encouraging interactions, similar goals, and solidarity at the international and regional levels might constitute a new type of balanced and efficient collaboration.

To help developing nations, it is critical to consider the importance of collective capacity building and the mutual advantages that would result. Projects must be planned to benefit all countries equally, and sufficient resources must be found to accomplish this. The value of ensuring the long-term viability of developing nations' coping mechanisms by direct investment in facilities to assist in prevention and mitigation should be emphasized. In addition, the private sector should be mobilized to contribute in insurance operations. There is also a need to determine the best institutional disaster-reduction strategy that complements rather than duplicates existing systems.

Governments must approach disasters as regular phenomena in terms of protecting natural resources, which are varied elements in mainstream, long-term planning. Basic structural improvements must therefore be undertaken to raise the resilience of physical infrastructure, natural systems, and water management, as well as communities. Governments, business leaders, environmentalists, as a whole must collaborate to establish practical and workable solutions. Reforms and improvements are needed at the national and international levels to produce a stronger legislative, economic, and technological framework for managing catastrophic anthropogenic fires.

On ecosystem vulnerability and natural disasters, institutional structures, legislation / regulations, and finance mechanisms must be mutually reinforcing at the national level in order to deal with ecosystem management for natural disaster protection in vulnerable areas. A network of local practitioners is required on the ground to implement solutions and bridge the quality of communication between politicians, researchers / technicians, and the public in general. This can help to develop a culture of risk awareness, and then an understanding of how to respond.

**2) Yokohama Strategy and Plan for Action (1994)**

The Yokohama strategy expresses deep concern for the continuing human suffering and disruption of development caused by natural disasters. The following points are included in the strategy for the year 2000 and beyond as the "Yokohama Strategy and Plan of Action for a Safe World." The Yokohama strategy is divided into four groups: global culture, capacity building, networking, assessment, and monitoring (United Nations Development Programme, 1994).

Activities are designed in various dimensions for this plan, including at the international level, particularly through bilateral agreements and multilateral cooperation, regional and sub-regional level activities, and community and national level activities, all of which appear to be highly focused. Throughout the rest of the decade, all countries were encouraged to express their political commitment to eliminate their vulnerability through declaration, registration, policy decisions, and action at the highest level; encourage the continued mobilization of domestic resources for disaster reduction activities; and, develop a risk assessment program and emergency plans focusing on disaster preparedness. Furthermore, they should develop comprehensive national disaster management strategies that include disaster reduction as necessary, establish and/or strengthen National Committees for the decade, or establish clearly designated bodies tasked with disaster reduction promotion and coordination Furthermore, the role of local governments in implementing safety standards and rules should be investigated, and institutional capacities for natural disaster management should be strengthened at all levels. In addition, these countries should consider attracting the attention of non-governmental organizations (NGOs) to improve disaster reduction at the local level, and integrating disaster reduction prevention or mitigation into socio-economic development planning regarding risk assessments, as well as the possibility of undertaking environmental impact assessments in their development plans with a view to disaster reduction. These countries should also define exactly specialized disaster prevention requirements, as well as make a possible endeavor to report all disasters. Importantly, they should incorporate cost-effective technologies into disaster reduction programs, such as forecasting and warning systems, and they should develop appropriate educational and information programs aimed at raising general public awareness, with a special emphasis on policymakers and major groups, to guarantee disaster assistance and effectiveness.

**3) International Strategy for Disaster Reduction: ISDR (2000)**

The ISDR, which succeeded the IDNDR in 2000, was developed by stepping away from the prior emphasis on hazard protection to a strategy that included risk awareness, assessment, and the management of risk. This approach emphasizes the importance of incorporating DRR into a broader context of sustainable development and related environmental considerations. ISDR intends to strengthen multidisciplinary engagement for a stronger professional understanding of DRR approaches through its Global Review of Disaster Reduction Initiatives, which may have been accomplished by working through political, professional, institutional mechanisms, and public collaboration.

As a vision "to enable all communities to become resilient to the effects of natural, technological and

environmental hazards, reducing the compound risks they pose to social and economic vulnerabilities within modern societies and to proceed from protection against hazards to the management of risk through the integration of risk prevention into sustainable development" this strategy has four goals: 1) raise awareness about the risks that natural, technological, and environmental threats bring to contemporary civilizations; 2) obtain government agencies' targets for reducing hazards to the public, their livelihoods, social and economic infrastructure, and natural resources; 3) involve the public in the implementation process at all levels; and 4) reduce the measurable economic and social losses caused by disasters.

Although national and local governments retain primary responsibility for protecting communities, this strategy recommends that the private sector should play a key role in DRM and resilience strengthening. Both the consequences of these risks and the obligation to act to mitigate them fall to the private sector. In 2005, the United Nations brought this issue to the global forefront by initiating the ISDR and adopting the HFA (2005–2015): ' Building the resilience of nations and communities to disasters.' The UN acknowledges that disaster response and humanitarian assistance efforts alone will not be enough through any of these initiatives. The hazards will outstrip all humanitarian crisis and resources unless the underlying causes of disaster consequences are addressed appropriately, adaptation is enhanced, and public awareness is raised. Raising disaster risk awareness, encouraging a preventive culture, and mobilizing appropriate resources to build resilience are both a necessity and a long-term investment, which will pay off spectacularly for all. Emphasizing the significance of the foregoing, the "Call for Action: Five Essentials for Business in DRR" was launched. The agreement was established to serve the three aforementioned commitments, primarily focusing on the main five essentials: promote and expand public-private partnerships; consider taking utilization private sector experience and capabilities under certain sectors; promote data sharing and dissemination in a collaborative manner; strengthen risk assessments at the national and local levels; and, assist in establishing and enhance national and local laws, rules, policies, and initiatives.

**4) Johannesburg Plan of Implementation: World Summit on Sustainable Development (WSSD; 2002)**

At the Sandton Convention Centre in Johannesburg, South Africa, 82 heads of state and government; 30 vice-presidents and deputy prime ministers; 74 ministers, royalty and other senior officials; and thousands more official representatives gathered with participants from civil society, academia, the scientific community, local communities, and the private sector for the World Summit on Sustainable Development that was held from August 26 to September 4, 2002 (WSSD). Thousands of people from all around the world attended parallel events in their own right, summits that were organized to coincide with the WSSD, in addition to the main summit, which drew over 20,000 people.

The official summit saw seven major accomplishments: a sanitation target; acceptance of the need to disassociate economic growth from environmental degradation; reaffirmation of the principle of access to information, participation, and justice; the launch of some key initiatives and partnerships on sustainable development; recognition

of community and indigenous people's rights; acknowledgment of the importance of ethics; and, promotion of greater corporate reintegration. Under Chapter IV (Protecting and managing the natural resource base of economic and social development), the WSSD includes commitments related to disaster and vulnerability reduction.

The disaster reduction aims of the WSSD certainly brought more commitment and approach to reduce multi-hazard risk and vulnerability, within the context of sustainable development. The three main outcomes were the political statement, the plan of implementation (PoI), and a set of initiatives and partnerships (United Nations, 2002), as follows:

i. The political statement that was adopted by the heads of state identifies natural disasters as one of the priority conditions that pose a severe threat to sustainable development and which need priority attention.
ii. The PoI relates to disaster, vulnerability reduction and improved early warning capacities under the chapters of poverty eradication, protecting and managing the natural resource base of economic and social development.
iii. A set of initiatives and partnerships was produced to support the implementation.

**5) Hyogo Framework for Action (HFA 2005–2015)**

The World Conference on Disaster Reduction took place in Kobe, Hyogo, Japan, from January 18 to 22, 2005, and approved the Framework for Action 2005-2015 (Building the Resilience of Nations and Communities to Disasters). This conference provided an opportunity to advocate a systematic and methodical approach to minimizing hazards and vulnerabilities. It emphasized the need of disaster resilience in nations and communities, along with methods for achieving it. The review of the 1994 Yokohama Strategy identifies major challenges for the coming years in ensuring systematic action to address disaster risks in the context of sustainable development, as well as in building resilience through enhanced national and local risk management and reduction capabilities. This report emphasizes the necessity for a more proactive approach to educating, inspiring, and integrating people in all areas of DRR in their own communities. It also emphasizes the scarcity of resources dedicated specifically from development budgets to achieve risk reduction goals, whether at the national or regional level, or through international cooperation and financial mechanisms, while noting the significant potential to better exploit existing resources and established practices for more effective DRR (International Strategy for Disaster Reduction, 2005).

In total, 168 countries signed the Hyogo Framework, a convention on reducing the risk of natural disasters. The Hyogo Framework for Action (HFA) develops a specific action plan for progress in DRR and it develops measurements to assess that progress (UNISDR, 2011). States, regional and international organizations, and other actors involved in DRR were called on to examine the main actions outlined under each of these five objectives and implement them as suitable to their respective circumstances and capacities (United Nations, 2007).

Priority for Action 1: Ensure that DRR is a national and a local priority with a strong institutional basis for implementation.

Countries that establish DRR policy, legislative, and institutional frameworks, as well as the capacity to

develop and monitor progress through specific and measurable indicators have a greater capacity to manage risks and achieve strong consensus, engagement, and compliance with DRR measures across all sectors of society.

Priority for Action 2: Identify, assess, and monitor disaster risks and enhance early warning

The knowledge of the hazards and physical, social, economic, and environmental vulnerabilities to disasters that most societies face, as well as the strategies in which hazards and vulnerabilities is changing in the short and long term is a basic foundation for reducing disaster risk and promoting a disaster resilience culture, followed by action based on certain knowledge.

Priority for Action 3: Use knowledge, innovation, and education to build a culture of safety and resilience at all levels

Communities can be properly informed and encouraged to adopt a disaster-prevention and resilience culture, which requires the gathering, compilation, and dissemination of essential knowledge and information on risks, vulnerabilities, and capabilities.

Priority for Action 4: Reduce the underlying risk factors

Disaster risks are associated with changing social, economic, environmental conditions, and land use. The impact of potential dangers with geological events, weather, water, climate variability and CC, are explained in the sector development planning and program, as well as in post-disaster situations.

Priority for Action 5**:** Strengthen disaster preparedness for effective response at all levels

If authorities, people, and communities in hazard-prone regions are adequately prepared and ready to respond, and are equipped with the knowledge and capacities for efficient disaster management, then the impacts and losses from disasters can be significantly minimized.

Following the completion of the HFA framework, the Sendai Framework for DRR (2015–2030) was adopted at the Third UN World Conference in Sendai, Japan, on March 18, 2015 (UNISDR, 2013) as the successor instrument to the HFA 2005–2015 (United Nations, 2015). Understanding disaster risk, strengthening disaster risk governance to manage disaster risk, investing in DRR for resilience, enhancing disaster preparedness for effective response, and "Building Back Better" in recovery, rehabilitation, and reconstruction are among the goals of the United Nations (United Nations, 2015). Figure 3 illustrates the DRR paradigm, from the first narrative to the current framework.

**Figure 3**: The Global Institutional Frameworks (authors)


The first international framework, the IDNDR (1990–1999), focused on the effect of disasters, and created technical and scientific systems for coping. However, in this first paradigm, although it realizes that disasters can be prevented, the scope is that disasters are natural events that destroy human lives and communities. The second framework, the Yokohama Strategy and Plan for Action (1994), considers that natural disasters can be managed with networks and global culture. The paradigm shift began in 2000 with the third framework, the ISDR (2000), which included the technological and environmental causes of disasters. This means that a disaster is not only a natural event but can also be a man-made event that interrupts human lives. This plan had been followed in UN's Sustainable Development Goals.

The politics and commitment were first contained in the fourth plan, the Johannesburg Plan of Implementation (2002) and continued in the fifth plan, the HFA (2005–2015), in which governance is the priority for action. The HFA also aims to reduce risk factors during development planning. Finally, the Sendai Framework for DRR (2015–2030) focuses on the understanding of DRR at all levels, and states that prevention and reduction are essential to enhance each sector.

## 3. BACKGROUND OF THE FIVE SELECTED COUNTRIES IN ASIA

International organizations and countries have made efforts to strengthen disaster management in the same direction through various frameworks, based on the number of people most impacted, the number of most frequent catastrophes, and the high losses. In particular, Asia is a highly interesting area to study. In this study, we will examine this issue with the intent of selecting a varied group of nations to represent countries with comparable characteristics to assess their approaches to disaster management, make policy recommendations, and provide some solutions for regional cooperation. Consequently, the ultimate

outcome of DRR and sustainable development will be to "leave no one behind", which is a goal of sustainable development. The five countries that have been chosen (i.e., Japan, India, China, the Philippines, and Thailand) will be described in the following subsections.

### 1) Japan

Japan is an island country in the western Pacific Ocean. Although Japan has approximately 378,000 square kilometers of land, mountainous terrain covers more than 70 percent of the land area. Japan has multiple volcanic regions and it is frequently affected by earthquakes and tsunamis due to its geographical location on the circum-Pacific volcanic belt. The distinct temperature fluctuations between the four seasons are a key aspect of Japan's climate. Despite its small volume, Japan's climate varies greatly across the regions, from subarctic to subtropical. For example, the country's side that faces the Sea of Japan has a climate that typically includes a lot of snow in the winter due to seasonal winds from Siberia. Most of Japan has a damp rainy season from May to July, which is caused by the seasonal winds from the Pacific Ocean. From July to September, Japan frequently suffers from typhoons.

**Figure 4**: Map of Japan


*Source*: http://www.worldatlas.com/webimage/countrys/asia/jp.htm, 2017

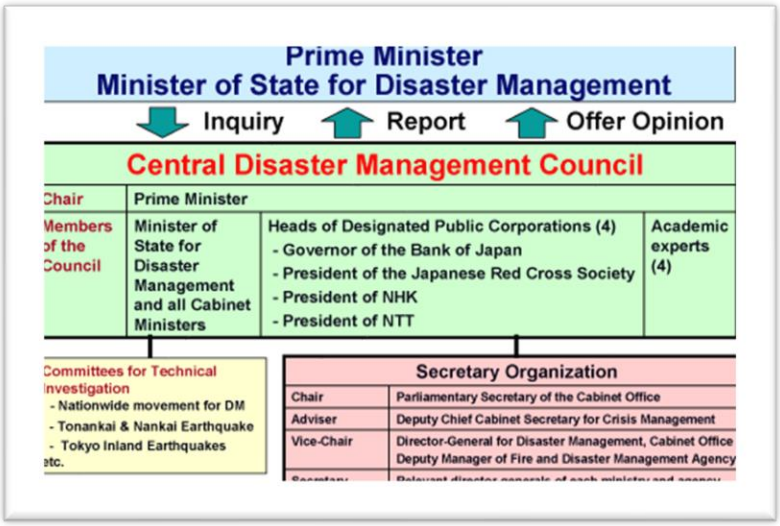
The capital of Japan is Tokyo. The total population of Japan is about 127.77 million. Japan is affected by typhoons most years, by volcanic disasters that are triggered by an eruption, and by volcanic earthquakes. Japan is an earthquake-prone area due to the geological formation of the plate boundaries of the Pacific plate, the Philippine Sea plate, the Eurasian plate, and the North American plate (Asian Disaster Reduction Center, N.D.a).

Basic Disaster Management is Japan's highest-level plan and it constitutes the basis for disaster management activities prepared by the Central Disaster Management Council based on the Disaster Countermeasures Basic Act (National Land Agency, 1997). This plan was revised entirely in 1995 based on the experiences of the Great Hanshin-Awaji Earthquake. The plan defines the responsibilities of each entity, such as the national and local governments, public corporations, and other entities. It consists of various plans for each type of disaster, where specific countermeasures to be taken by each entity are described according to the disaster management phases of prevention and preparedness, emergency response, as well as recovery and reconstruction. The plan includes 10 chapters, as follows: Chapter I. General Rule, Chapter II. Organizations Relating to Disaster Prevention, Chapter III. Disaster Prevention Plans, Chapter IV. Prevention of Disasters, Chapter V. Disaster Emergency Measures, Chapter VI. Rehabilitation, Chapter VII. Financial Measures, Chapter VIII. State of Emergency, Chapter IX. Miscellaneous Rules, and Chapter X. Penal Provisions (Yokkaichi, 2012).

The Central Disaster Management Council was formed under the Disaster Countermeasures Basic Act. The council consists of the prime minister (who is the chairperson), the minister of state for disaster management, all ministers, heads of major public institutions, and experts. Within the cabinet office, the minister of state for disaster management has been assigned as the minister state for special missions. This minister is assisted by the Department of the Cabinet Office Director-general for Disaster Management, whose mandate is to handle planning and central coordination concerning matters relating to basic policy on DRR, and matters concerning disaster countermeasures in the event of a large-scale disaster.

In Japan's prefectures and local municipalities, the prefectural and municipal disaster management councils are established with the members of representatives of local government organizations, including police and fire management departments and designated local public corporations. The implementation of the DRM measures is based on the local disaster management plans that are drafted by the councils.

**Figure 5**: The disaster governance of Japan

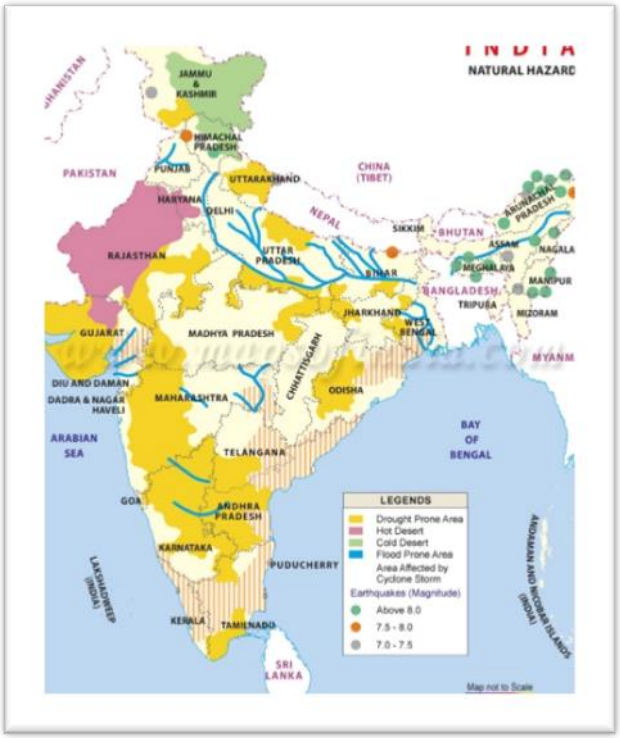



*Source*: Asian Disaster Reduction Center, N.D.a

**2) India**

India has a land mass of 3, 287, 263 sq. km (including a disputed region with China) and it occupies most of the Indian subcontinent. It borders Pakistan, China, Nepal, Bhutan, Bangladesh, and Myanmar on land, and Sri Lanka, Maldives, Indonesia at sea. There is an upland plain (Deccan Plateau) in the south, a flat to rolling plain along the Ganges, deserts in the west, the Himalayas in the north. The capital of India is Delhi. India has a population of 1.4 billion, which consists of a variety of religious, linguistic, and ethnic groups. India is a disaster-prone country with frequent earthquakes, floods, cyclones, drought, tsunami, landslides, and avalanches (Asian Disaster Reduction Center, 2017).

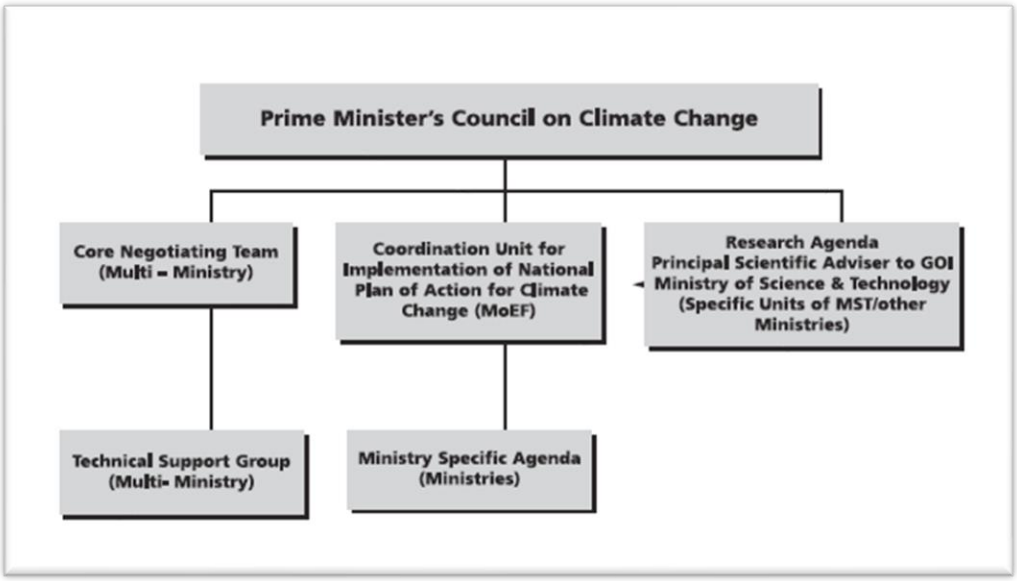
**Figure 6**: Map of India




*Source*: http://www.mapsofindia.com/maps/india/natural-hazard.htm, 2017

India's National Disaster Management Plan (NDMP) provides a framework and direction to the government agencies for all phases of the disaster management cycle. The NDMP is in accordance with the provisions of the Disaster Management Act (2005). Guidance given in the National Policy on Disaster Management (NPDM) for 2009 and by the established national practices.

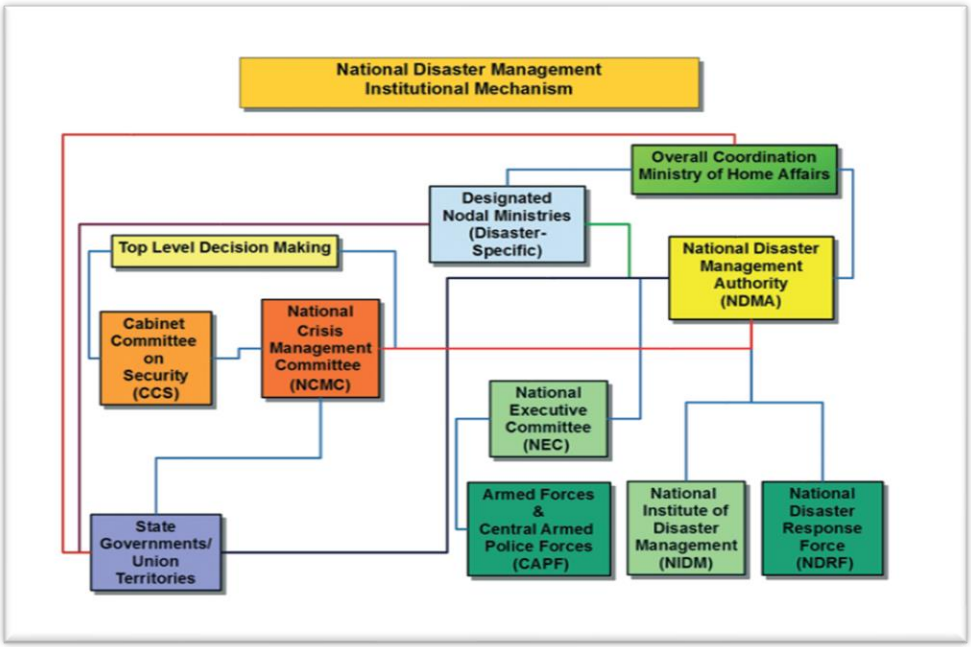
**Figure 7**: The disaster governance of India




*Source*: NDMP (2016)

The NDMP is envisaged as ready for activation at all times in response to an emergency in any part of the country. It is designed in such a way that it can be implemented as needed in a flexible and scalable manner in all phases of disaster management, as follows: a) mitigation (prevention and risk reduction), b) preparedness, c) response, and d) recovery. Moreover, it is consistent with the approaches promoted globally by the United Nations, in particular the Sendai Framework for Disaster Risk Reduction (2015–2030). It attempts to comply voluntarily and it aims to contribute to the realization of the global targets by improving the entire disaster management and adopting globally accepted best practices (NDMP, 2016). The National Disaster Management Authority (NDMA), which is headed by the Prime Minister of India, is in charge of creating and implementing disaster management policies, DM plans, and guidelines. The state-level DM bodies are the State Disaster Management Authorities (SDMAs). Under the umbrella of the NDMA, the National Institute of Disaster Management (NIDM) has been established to promote capacity building for disaster mitigation and emergency response, which is called the National Disaster Response Force (NDRF).

**Figure 8**: The disaster governance of India




*Source*: NDMP, 2016

### 3) China

The People's Republic of China is located in eastern Eurasia. Having an area of approximately 9.6 million square kilometers, China enjoys the third largest land area in the world after Russia and Canada. China shares land borders with the Democratic People's Republic of Korea (east); Mongolia (north); Russia (northeast); Kazakhstan, Kyrgyzstan, and Tajikistan (northwest); Afghanistan, Pakistan, India, Nepal, Sikkim, and Bhutan (west and southwest); and Myanmar, Laos, Vietnam (south). Meanwhile, China borders Korea, Japan, the Philippines, Brunei, and Malaysia at sea. China has a diverse climate, reflecting the vast extent of its land area - from tropical in south to subarctic in north. Fertile hills and plains spread in the east. China has four river systems: the Yangtze River, Yellow River, Heilongjiang, and the Pearl River. The capital of China is Beijing. China has a population of about 1.4 billion. Meanwhile, 92 percent of the total population is Han Chinese (ADRC, 2017).

**Figure 9**: Map of China

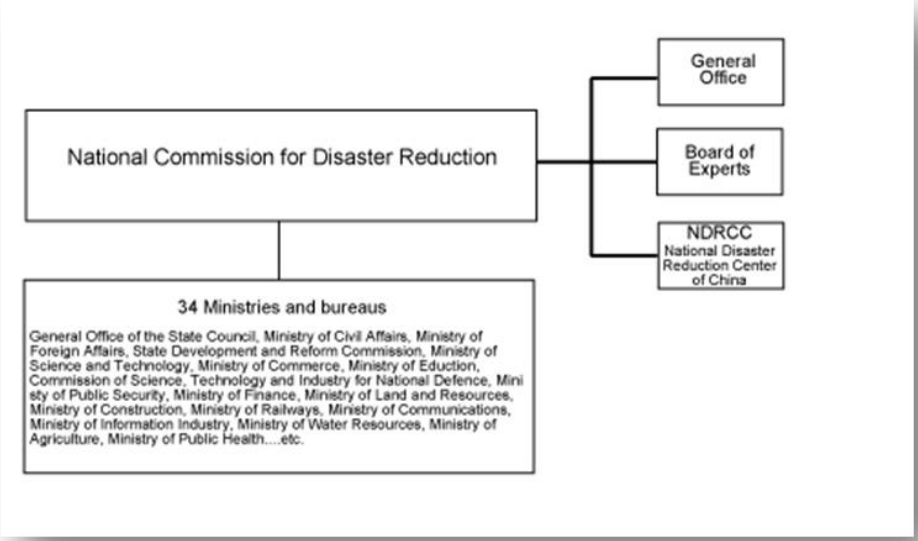

*Source*: http://www.worldatlas.com/webimage/countrys/asia/cn.htm, 2017

On January 8, 2006, the State Council of China issued the National Master Plan for Responding to Public Emergencies, which is an overall framework to be used at all levels of government, including all disaster response activities.

The National Master Plan identifies four kinds of public emergencies: natural disasters, accidents, public health events, and social security events. It emphasizes the importance of: (a) cooperation and coordination among different levels of government and central government departments; and (b) the general mobilization of social resources, involving both civilian and armed forces. It also sets out six principles for dealing with public emergencies.

China has established comprehensive coordination mechanisms for disaster prevention, mitigation, and relief for all levels of government, from central to local. During severe disasters, at the central government level, the National Committee for Disaster Reduction, the Office of State Flood Control and Drought Relief headquarters, the State Council Headquarters for Earthquake Mitigation and Relief, and the State Headquarters for Forest Fire Control are coordinated by the National Coordination Office for Disaster Mitigation and Relief. Provincial and municipal governments have established comprehensive coordination mechanisms to cope with major public emergency events, and all local governments have established specific offices at the county level to deal with disaster emergencies.

**Figure 10**: The disaster governance of China




*Source*: http://www.adrc.asia, 2017

**4) The Philippines**

The Republic of the Philippines (RP) is located in Southeast Asia. It is bordered by the Pacific Ocean to the east, the West Philippine Sea to the west, and the Celebes Sea to the south. The Philippines constitutes an archipelago of 7,109 islands, with a total land area of approximately 299,764 square kilometers. The Philippines has a tropical and maritime climate. It has two major seasons: a rainy season that lasts from June to November; and a dry season that lasts from December to May. The capital of the Philippines is Manila. The population of the Philippines was 88.57 million as of August 2007. Most Filipinos are ethnically Malay but the country also includes people of Chinese, American, Spanish, and Arab extraction, and other ethnic minorities (Asian Disaster Reduction Center, N.D.b).

The Philippines' National Disaster Risk Reduction and Management Plan (NDRRMP) provides the legal basis for policies, plans, and programs to deal with disasters. The NDRRMP covers four thematic areas: disaster prevention and mitigation, disaster preparedness, disaster response, and disaster rehabilitation and recovery. This corresponds to the structure of the National Disaster Risk Reduction and Management Council (NDRRMC).

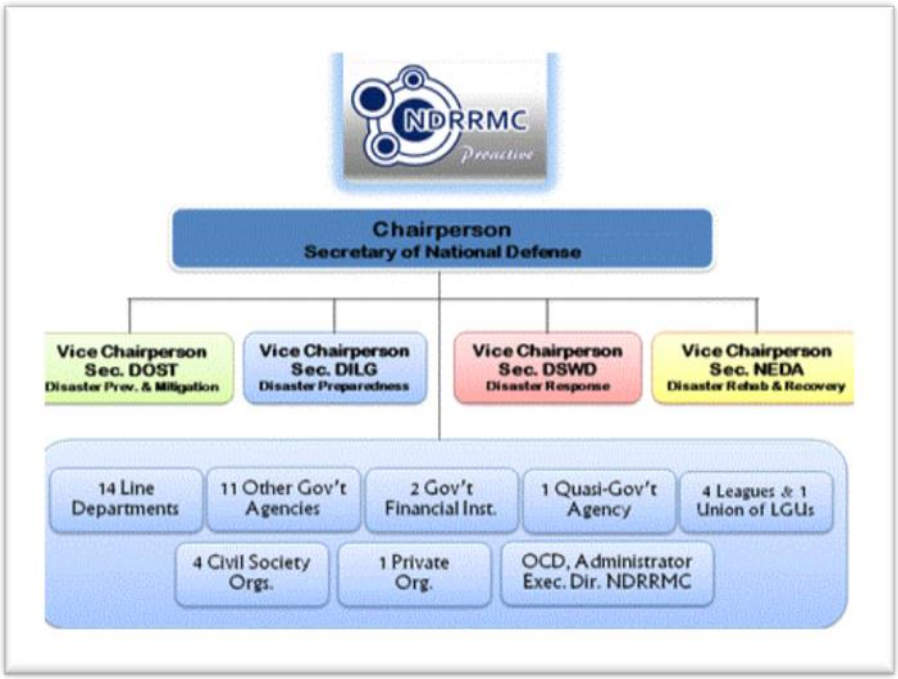
The implementation of the NDRRMP at the national level is taking place through the integration of DRRM into relevant national plans, such as the Philippine Development Plan (PDP), as well through the development and implementation of the action plans of government agencies, as indicated in the NDRRMP (2011–2028).

**Figure 11**: Map of the Philippines


*Source*: http://www.worldatlas.com/webimage/countrys/asia/ph.htm, 2017

As explicitly stated under Republic Act 10121, the NDRRMC has the overall responsibility of approving the NDRRMP and ensuring that it is consistent with the NDRRMF. It also has the main responsibility for coordination, integration, supervision, and monitoring the development and enforcement by agencies and organizations of the various laws, plans, programs, guidelines, codes, or technical standards, managing, and mobilizing resources for DRRM, including the National DRRM Fund; monitoring and providing the necessary guidelines and procedures on the Local DRRM Fund (LDRRMF) releases, as well as the utilization, accounting, and auditing thereof. Within the NDRRMC, four committees will be established to deal with the four thematic areas outlined in the NDRRMP and the NDRRMF. Following RA 10121, the overall lead or focal agency for each of the four priority areas are the vice-chairpersons of the NDRRMC

**Figure 12**: The disaster governance of the Philippines




*Source*: http://www.adrc.asia, 2017

### 5) Thailand

Thailand is located in the center of Indochina and the northern part of the Malay Peninsula. It is bordered by Cambodia to the east, Laos to the north, Myanmar and the Andaman Sea to the west, and the Gulf of Thailand and Malaysia to the south, covering an area of 514,000 square kilometers. The north of Thailand is mountainous, while the Menem Chao Phraya delta in the central part is one of the greatest rice-growing areas in the world. The climate is tropical, and there is a rainy season from May to October. The northern and central regions have high precipitation from August to October, which causes frequent floods. The capital of Thailand is Bangkok. Thailand's population is around 63.04 million (ADRC, 2017).

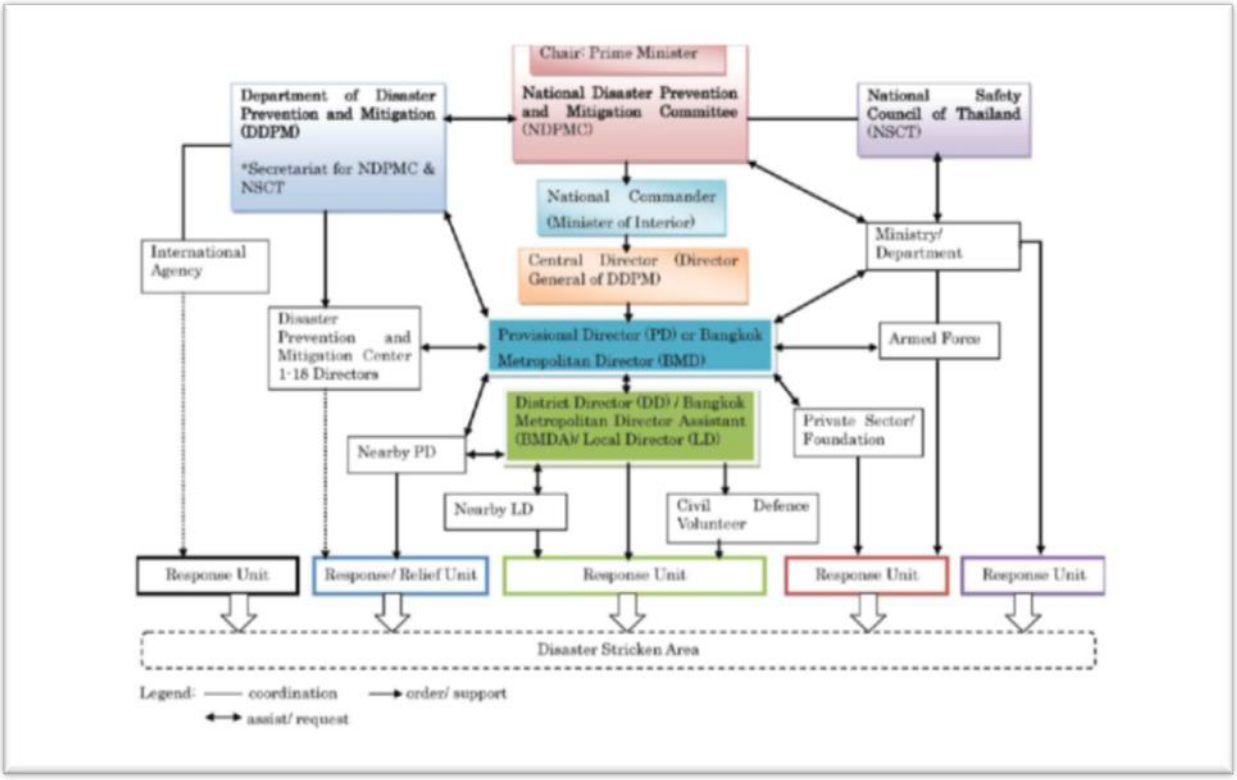
The National Disaster Prevention and Mitigation Committee (NDPMC) has formulated the National Disaster Prevention and Mitigation Plan (NDPMP) B.E. 2553-2557 (2010-2014) that provides frameworks and guidelines to facilitate concerned agencies of all sectors and levels in handling disaster, which contributes to the AMER. This covers all aspects of disaster management and outlines a detailed roadmap for four strategic components, as follows: first, risk assessment, early warning, and monitoring; second, prevention and mitigation; third, preparedness and response; and finally, recovery. The building blocks include the institutionalization of AADMER, a partnership strategy, resource mobilization, outreach and mainstreaming, training and knowledge management system, information management and communication technology, and monitoring and evaluation.

**Figure 13**: Map of Thailand


*Source*: http://www.worldatlas.com/webimage/countrys/asia/th.htm, 2017

The disaster management system in Thailand has four levels. At the top or *policy level*, the NDPMC is a national multi-sectoral body responsible for policy formulation and planning for disaster preparedness, mitigation, and response, which chaired by the prime minister (PM) or deputy prime minister (who is appointed by the PM). The NDPMC has 22 members, who are drawn from relevant ministries and government agencies (Kabir, 2011).

**Figure 14**: Disaster Management System




*Source: AHA Centre, 2015*

## 4. COMPARATIVE STUDY OF DISASTER RISK MANAGEMENT IN ASIA

Following the establishment of the DRR system, the HFA (2005–2015) substantially followed all systems, particularly risk management, prevention, mitigation, and readiness, as shown in Table 1. Meanwhile, several frameworks explore the effect of indicators and dimensions on the assessment. The HFA contains five goals. China received a score of 4, whereas India had a score of 3.8, the Philippines received a score of 2.8, and Thailand received a score of 4.

**Priority for Action 1**: National policy and legal framework for DRR exists with decentralized responsibilities and capacities at all levels.

**Table 1**: National policy and legal framework for DRR in Japan, India, China, the Philippines, and Thailand

| | Japan | India | China | Philippines | Thailand |
|---|---|---|---|---|---|
| **National development plan** | YES | YES | YES | YES | YES |
| **Sector strategies and plans** | YES | YES | YES | YES | YES |
| **Climate change policy and strategy** | YES | YES | YES | YES | YES |
| ***Poverty reduction strategy papers*** | *NO* | *YES* | *NO* | *NO* | *YES* |
| **CCA, UNDAF, UN Development Assistance Framework** | NO | YES | NO | YES | YES |
| **Civil defense policy, strategy, and contingency planning** | NO | YES | YES | YES | YES |
| **Legislation (Is there specific legislation for local governments with a mandate for DRR?)** | YES | YES | YES | YES | YES |
| ***Regular budget allocations for DRR to local government*** | *YES* | *NO* | *YES* | *YES* | *YES* |
| **National finance and planning institutions (specify the absolute number)** | 36 | - | 2 | 39 | 1 |
| **Civil society members (specify the absolute number)** | 1 | - | 2 | 4 | 0 |
| **Sectoral organizations (specify the absolute number)** | 2 | - | 34 | 6 | 7 |
| **Private sector (specify the absolute number)** | 1 | - | 0 | 1 | 0 |
| **Science and academic institutions (specify the absolute number)** | 2 | - | 2 | 1 | 5 |
| **Women's organizations participating in a national platform (specify the absolute number)** | 0 | - | 0 | 5 | 0 |
| **Other** | 1 | 1 | - | - | 1 |

In the each case study, the focus was on establishing DRR as part of the level plan, as shown in Table 1 (national policy and legal framework for disaster risk reduction exists with decentralized responsibilities and capacities at all levels). However, few nations have designated poverty reduction strategy documents as part of the plan. Women's groups engaging in a national platform (specify absolute number) in virtually all countries is also an important aspect and in the case studies was at an unacceptable level.

**Priority for Action 2**: National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors.

**Table 2**: National and local risk assessments based on hazard data and vulnerability information in Japan, India, China, the Philippines, and Thailand

| | Japan | India | China | Philippines | Thailand |
|---|---|---|---|---|---|
| **Multi-hazard risk assessment** | YES | YES | YES | NO | NO |
| **Percent of schools and hospitals assessed** | 98.8 | N/A | 100 | N/A | N/A |
| **Schools not safe from disasters (specify The absolute number)** | 18.5 | N/A | 400M.M | N/A | N/A |
| ***Gender-disaggregated vulnerability and capacity assessments*** | *NO* | *NO* | *NO* | *NO* | *NO* |
| ***Agreed national standards for multi-hazard risk assessments*** | *YES* | *NO* | *YES* | *NO* | *NO* |
| **Risk assessment held by a central repository (lead institution)** | NO | YES | YES | NO | NO |
| ***Common format for risk assessment*** | *YES* | *NO* | *NO* | *NO* | *NO* |
| ***Risk assessment format customized by user*** | *NO* | *NO* | *NO* | *YES* | *NO* |
| ***Is future/probable risk assessed?*** | *NO* | *YES* | *YES* | *NO* | *NO* |
| **Disaster loss databases exist and are regularly updated** | YES | YES | YES | YES | NO |
| **Reports generated and used in planning by finance, planning and sectoral line ministries (from the databases or information systems)** | YES | YES | YES | YES | YES |
| **Hazards are consistently monitored across localities and territorial boundaries** | YES | YES | YES | YES | YES |
| **Early warnings acted on effectively** | YES | YES | YES | YES | YES |
| **Local level preparedness** | YES | YES | YES | YES | YES |
| **Communication systems and protocols used and applied** | YES | YES | YES | YES | YES |
| **Active involvement of media in early warning dissemination** | YES | YES | YES | YES | YES |
| **Establishing and maintaining regional hazard monitoring** | YES | NO | YES | YES | YES |
| **Regional or sub-regional risk assessment** | YES | NO | YES | YES | YES |
| | Japan | India | China | Philippines | Thailand |
| **Regional or sub-regional early warning** | YES | YES | YES | YES | YES |
| **Establishing and implementing protocols for transboundary information sharing** | YES | YES | NO | YES | YES |
| ***Establishing and resourcing regional and sub-regional strategies and frameworks*** | *YES* | *NO* | *NO* | *YES* | *YES* |

Table 2 shows that national and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors. The case study focuses on secondary concerns, while the most important, risk assessments, are failing in many nations and localities, including gender-disaggregated vulnerability and capacity assessments, agreed national standards for multi-hazard risk assessments, common format for risk assessment, risk assessment format customized by user, and future or probable risk assessment.

**Priority for Action 3:** Use knowledge, innovation, and education to build a culture of safety and resilience at all levels**.**

**Table 3**: Knowledge, innovation, and education to build a culture of safety and resilience in Japan, India, China, the Philippines, and Thailand

| | Japan | India | China | Philippines | Thailand |
|---|---|---|---|---|---|
| **Information is proactively disseminated** | YES | YES | YES | YES | NO |
| **Established mechanisms for access or dissemination (e.g., Internet, public information broadcasts on radio or TV)** | YES | YES | YES | YES | YES |
| **Information is provided with proactive guidance to manage disaster risk** | YES | YES | YES | YES | YES |
| **Primary school curriculum** | YES | NO | YES | YES | YES |
| **Secondary school curriculum** | YES | YES | YES | YES | YES |
| **University curriculum** | NO | YES | YES | NO | YES |
| **Professional DRR education programs** | NO | YES | YES | NO | YES |
| **Research programs and projects** | YES | YES | YES | YES | YES |
| **Research outputs, products or studies are applied** | YES | YES | YES | YES | NO |
| ***Studies on the economic costs and benefits of DRR*** | *YES* | *NO* | *NO* | *YES* | *NO* |
| **Public education campaigns for enhanced awareness of risk** | YES | YES | YES | YES | YES |
| **Training of local government** | YES | YES | YES | YES | YES |
| **Disaster management (preparedness and emergency response)** | YES | YES | YES | YES | YES |
| **Preventive risk management (risk and vulnerability)** | YES | NO | YES | YES | YES |
| | Japan | India | China | Philippines | Thailand |
| **Guidance for risk reduction** | YES | YES | YES | YES | YES |
| **Availability of information on DRR practices at the community level** | YES | YES | YES | YES | YES |

The case study made the most progress on this issue out of five priorities, as shown in Table 3, the priority was to use knowledge, innovation, and education to build a culture of safety and resilience at all levels. Only one sub-point has been overlooked by many case studies, which research the economic costs and advantages of DRR.

**Priority for Action 4**: Reduce the underlying risk factors

**Table 4**: Measures to the underlying risk factors in Japan, India, China, the Philippines, and Thailand

| | Japan | India | China | Philippines | Thailand |
|---|---|---|---|---|---|
| **Protected areas legislation** | YES | YES | NO | YES | YES |
| ***Payment for ecosystem services (PES)*** | *YES* | *YES* | *NO* | *NO* | *NO* |
| ***Integrated planning (for example coastal zone management)*** | *YES* | *NO* | *NO* | *YES* | *YES* |
| **Environmental impacts assessments (EIAs)** | YES | YES | YES | YES | YES |
| **Climate change adaptation projects and programs** | YES | YES | YES | YES | YES |
| **Crop and property insurance** | YES | YES | YES | YES | YES |
| ***Temporary employment guarantee schemes*** | *YES* | *YES* | *NO* | *YES* | *NO* |
| **Conditional and unconditional cash transfers** | YES | YES | YES | YES | YES |
| ***Micro-finance (savings, loans, etc.)*** | *NO* | *YES* | *YES* | *NO* | *YES* |
| ***Micro-insurance*** | *NO* | *YES* | *YES* | *NO* | *YES* |
| ***National and sectoral public investment systems incorporating DRR*** | *YES* | *NO* | *YES* | *YES* | *NO* |
| **Investments in retrofitting infrastructures including schools and hospitals** | YES | YES | YES | YES | YES |
| **Investment in drainage infrastructure in flood prone areas** | YES | YES | YES | YES | YES |
| **Slope stabilization in landslide prone areas** | YES | YES | YES | YES | YES |
| **Training of masons on safe construction technology** | YES | YES | YES | NO | YES |
| **Provision of safe land and housing for low-income households and communities** | YES | YES | YES | YES | YES |
| **Risk sensitive regulation in land zoning and private real estate development** | YES | YES | NO | YES | YES |
| **Regulated provision of land titling** | YES | YES | YES | YES | YES |
| **DRR capacities of local authorities for response and recovery strengthened** | NO | YES | YES | YES | YES |
| | Japan | India | China | Philippines | Thailand |
| | | | | | |
| ***Risk assessment undertaken in pre- and post-disaster recovery and reconstruction planning*** | *NO* | *YES* | *YES* | *NO* | *NO* |
| ***Measures taken to address gender-based issues in recovery*** | *NO* | *YES* | *YES* | *NO* | *NO* |

According to Table 4, the measures to address the underlying risk factors in Japan, India, China, the Philippines, and Thailand appear to be more complicated and difficult than the other priorities. Consequently, most of the case studies are unable to address this issue. Payment for ecosystem services (PES), integrated planning (e.g., coastal zone management), temporary employment guarantee schemes, micro-finance (e.g., savings, loans, etc.), micro-insurance, national and sectoral public investment systems incorporating DRR, risk assessment undertaken in pre- and post-disaster recovery and reconstruction planning, and measures taken to address gender-based issues in recovery are all issues that many countries are still grappling with.

**Priority for Action 5**: Strong policy, technical and institutional capacities, and mechanisms.

**Table 5**: Measures to address the underlying risk factors in Japan, India, China, the Philippines, and Thailand

| | Japan | India | China | Philippines | Thailand |
|---|---|---|---|---|---|
| **DRR incorporated in these programs and policies** | YES | YES | YES | YES | YES |
| **Institutional mechanisms exist for the rapid mobilization of resources in a disaster, utilizing civil society and the private sector, in addition to public sector support** | NO | YES | YES | YES | YES |
| **Policies and programs for school and hospital safety** | YES | YES | YES | YES | YES |
| **Training and mock drills in schools and hospitals for emergency preparedness** | YES | YES | YES | YES | YES |
| **Potential risk scenarios are developed taking into account climate change projections** | YES | NO | YES | YES | YES |
| **Preparedness plans are regularly updated based on future risk scenarios** | YES | YES | YES | YES | NO |
| ***Plans and programs are developed with gender sensitivities*** | *YES* | *NO* | *YES* | *YES* | *NO* |
| **Risk management or contingency plans for continued basic service delivery** | YES | YES | YES | YES | YES |
| **Operations and communications center** | YES | YES | YES | YES | YES |
| **Search and rescue teams** | YES | YES | YES | YES | YES |
| **Stockpiles of relief supplies** | YES | YES | YES | YES | YES |
| **Shelters** | YES | YES | YES | YES | YES |
| **Secure medical facilities** | YES | YES | YES | YES | YES |
| | Japan | India | China | Philippines | Thailand |
| | | | | | |
| **Dedicated provision for disabled and elderly in relief, shelter, and emergency medical facilities** | YES | YES | YES | YES | YES |
| **Businesses are proactive partners in planning and delivery of response** | YES | YES | YES | YES | YES |
| **National contingency and calamity funds** | YES | YES | YES | YES | YES |
| **The reduction of future risk is considered in the use of calamity funds** | YES | YES | YES | YES | NO |
| **Insurance and reinsurance facilities** | NO | YES | YES | YES | YES |
| ***Catastrophe bonds and other capital market*** | *YES* | *YES* | *NO* | *NO* | *NO* |
| **Damage and loss assessment methodologies and capacities available** | YES | YES | YES | YES | NO |
| ***Post-disaster needs assessment methodologies*** | *NO* | *NO* | *YES* | *YES* | *NO* |
| **Identified and trained human resources** | YES | NO | YES | YES | YES |

Table 5 shows that this aspect in the case studies is quite good. The issues to be addressed include plans and programs developed with gender sensitivities, catastrophe bonds and other capital market, and post-disaster needs assessment methodologies.

## 5. DISCUSSION

The critical role of policy and governance at the national level has been demonstrated through referring to the Hyogo Framework, which calls for governance, including organizational, legal, and policy frameworks; risk identification, assessment, monitoring, and early warning; knowledge management and education; reducing underlying risk factors; and, preparedness for effective response and recovery. This section will analyse the progress of the countries in the case studies.

This study has revealed that these five countries' highest priority was Priority for Action 1 (a national DRR policy and legal framework exist, with decentralized responsibilities and capacities at all levels). All of the case study countries have adopted a national plan and related strategies (e.g., the national development plan, sector strategies and plans, and CC policy and strategy) in line with HFA's guidance, as can be seen in the comparison table. However, some of these nations, Japan, China, and the Philippines, have yet to implement poverty reduction strategy documents and regular budget allocations for DRR have yet to be made. The adoption and implementation of HFA, according to the UNISDR study, was a watershed moment in accelerating national and local DRR activities, and enhanced international collaboration through the establishment of regional strategies, plans, and policies. The HFA was essential in the development of DRR organizations, policies, and laws. In particular, stakeholders at all levels improved their risk assessment and detection, disaster preparedness, response, and early-warning capabilities. However, progress in addressing underlying disaster risk factors has been slow in most of these countries. Institutional, legislative, and policy frameworks in general did not quite do enough (UNISDR, 2013).

Priority for Action 3 (use knowledge, innovation, and education to develop a culture of safety and resilience at all levels) is an area where case study overviews flourish. Studies on the economic costs and advantages of DRR, which has yet to be implemented in three countries, India, China, and Thailand, are among the areas that are in need of improvement. This is in the line with the report of ISDR. The results showed that despite its achievements thus far, the region still faces several obstacles. One of the major gaps noted in this study is how to guarantee that information and research results on disaster management, risk reduction, and early warnings reach local authorities and people. Much more must be done to encourage community members to participate, particularly women and children, the poor and disadvantaged, and those with impairments. More focus should be placed on non-formal education techniques and activities (ISDR, 2009). It is worth mentioning here that the case studies of these five countries differ from those of Zhou, Perera, Jayawickrama, and Adeniyi, who claimed that only a few effective initiatives have been implemented by stakeholders, particularly in higher education (where future policymakers and practitioners are educated and trained). However, this research is limited to higher education courses (Zhou et al., 2014). Similarly, although climate-smart DRR education is ongoing and some early attempts have been made in school disaster preparedness, The Government of Vanuatu has claimed that it is in a very embryonic stage of 'mentoring of champions' within the education sector. Consequently, the Ministry of Education and schools will have more ability to assist the replication of the strategy in other

regions. By providing a framework for school disaster management at the national, subnational, and local levels, this action in Vanuata contributes to the worldwide movement for safe schools (The Government of Vanuatu, 2021).

Priority for Action 4 (reduce the underlying risk factors, which identified seven areas that many nations have failed to fulfill) is a main priority for urgent multilateral cooperation, including PES, integrated planning (e.g., coastal zone management), temporary employment guarantee schemes, micro-finance (savings, loans, etc.), micro-insurance, national and sectoral public investment systems incorporating DRR, risk assessment undertaken in pre- and post-disaster recovery and reconstruction planning, and measures taken to address gender-based issues in recovery. For example, in Jamaica, of the five key categories, Priority 4 reported the lowest average score for progress. Governments have indicated that unsuitable development methods, high levels of poverty, and other factors that enhance vulnerability were obstacles to growth. The problem of regularly and successfully incorporating catastrophe risk reduction into development planning has been acknowledged. This integration is particularly difficult for Small Island Developing States (SIDS), who are exposed to a wide range of hazards, have vulnerable populations, and typically have little human and financial resources (Carby, 2018). In this context, Carby's research has explicitly highlighted viewpoints that may have an impact on the Priority 4. According to this study, a critique of present practice and knowledge of disaster risk leads to an attempt to identify major future requirements and adjustments that must be made in order for DRM to become more mainstream and successful. Among the most pressing problems, disasters are still frequently viewed as exogenous events rather than social constructs and the result of unbalanced development policies. This is apparent in many of the faulty governance practices and behaviors. The challenge is to transition from a reactive and corrective DRM strategy to a more proactive, risk-avoidance approach (Lavell & Maskrey, 2014).

As a result of the findings of this study, the authors are able to make the following policy recommendations:

1) Comprehensive assessment processes

This study's findings have revealed that disaster risk assessment is still inadequate. The five case studies appear to have similar vulnerabilities in this area, which might contribute to regional collaboration and progress tracking. The issues that need to be addressed include gender-disaggregated vulnerability and capacity assessments, agreed national standards for multi-hazard risk assessments, common risk assessment format, risk assessment format customized by user, future/ probable risk assessment, and establishing and resourcing regional and sub-regional strategies and frameworks.

2) Economic costs and benefits of DRR

Traditionally, typical cost-benefit assessments concentrate purely on reduced replacement costs. This analysis should be enlarged to include the subsequent benefits and anticipated costs in combination with low poverty and inequality, environmental sustainability, economic growth, and social advancement, as well as the trade-offs embedded in each decision. Countries may influence this through reviewing and analyzing risk assessments performed by financial institutions and research institutions.

3) Building bilateral, tripartite, or multilateral cooperation between regions

From the results of the study, it can be seen that in each priority there are several sub-points in which the countries of the case studies have similar strengths and weaknesses, and that there are countries that are geographically and geographically similar in context and culture. Consequently, mutual cooperation can occur in either countries with the same needs or in countries with similar characteristics. In addition to good cooperation between the countries, the country itself may also form a matrix cooperation. This will be the key to ensuring progress in each country.

## 6. CONCLUSION

Good governance creates a conducive environment for effective DRR through activating political will, and facilitating broad participation and partnerships. Consequently, several attempts have been undertaken to establish a framework, beginning at the international level. The IDNDR (1990–1999) was the first collaboration that focused on raising the awareness of the importance of collaboration, with a focus on strengthening individual countries, using technology and science in disaster management, and taking into account the ecosystem. NGOs began to be included in the Yokohama Strategy and Plan for Action (1994), which included the use of technology in forecasting and warning systems, as well as the problem of boosting general public awareness. The ISDR (2000) highlighted the need for integrating DRR into a broader context of sustainable development and related environmental concerns. The private sector members commited to this strategy following the "Call for Action: Five Essentials for Business in Disaster Risk Reduction." The WSSD (Johannesburg, 2002) approved the Johannesburg PoI, which focused on disaster and vulnerability reduction and concluded that early warning capacities should be strengthened. The HFA (2005–2015) was the final result. Several concerns have been addressed, such as the effort to document all disasters, data analysis and technology for disaster management, and network partnerships, particularly in the five case study nations. The national DRR strategy and legislative framework have succeeded in fostering a culture of safety and resilience through knowledge, innovation, and education. However, reducing the underlying risk factors, which include gender, societal, and poverty issues, is the most pressing task that must be addressed. These countries also need to enhance topics such as comprehensive assessment processes, and the study of economic costs and benefits of DRR. These concerns and issues may be addressed by fostering bilateral, tripartite, or multilateral collaboration across regions, which will encourage all nations to engage under the same flag of "No One Left Behind."

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