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Junmo Kim
Konkuk University, Seoul, South Korea

Seung-Bum Yang
Konkuk University, Seoul, South Korea, sbyang@konkuk.ac.kr

Ador R. Torneo

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RESEARCH ARTICLE

A Comparative Examination of Disaster Organizations in the Philippines, South Korea, and the United States

Junmo Kim[1], Seung-Bum Yang[1]*, and Ador R. Torneo[2]
[1]Konkuk University, Seoul, South Korea
[2]De La Salle University, Manila, Philippines
*sbyang@konkuk.ac.kr

Abstract: The Philippines is highly vulnerable to weather-related and other natural disasters given its location in the Pacific Ring of Fire. Its disaster organization, the National Disaster Risk Reduction and Management Council or NDRRMC, however, has limited capacity, as demonstrated in its handling of natural disasters in the last 20 years. In this paper, we adopt a comparative approach and compare the NDRRMC with the U.S. Federal Emergency Management Agency (FEMA) and South Korea's Disaster and Safety Management (DSM) in terms of mandate, organizational structure, resources, and technical capacity to identify possible areas requiring reform. We observe that the NDRRMC's working group structure, policy making, coordination, integration, supervision, monitoring and evaluation mandate, lack of strong leadership structure, and limited resources and capacities hinder it from providing a swift and effective response. This warrants a revisiting of policies and benchmarking on other disaster organizations like the U.S. FEMA and South Korea's DSM. Our findings lead us to recommend that the Philippines consider establishing a separate Department of Disaster Resilience equipped with the mandate, authority, leadership structure, resources, and technical capability to effectively prepare and respond to disasters instead of simply expanding the authority of the NDRRMC.

Keywords: disaster management, resilience, climate change, comparative approach, disaster risk reduction and management, natural disasters

Introduction

Climate change and the associated related natural disasters have been drawing the attention of the general public, policy makers, and scientists since the 1990s. Globally, one can find increasing severity and damage from natural disasters such as typhoons, and experts predict these will worsen along with global warming. Although there is some common ground of understanding their impacts, preparing for and dealing with the actual disaster events and the accompanying damages is a challenge for the governments in many

countries. The challenge is especially difficult for developing countries like the Philippines in disaster-prone regions like the Pacific Ring of Fire.

Like other countries in the Pacific, the Philippines is frequently affected by natural disasters, including earthquakes, volcanic eruptions, and most especially weather-related calamities like typhoons and accompanying severe flooding and landslides. In the last two decades, its disaster management capacity has been tested by some of the most devastating typhoons on record, including the Category-4 Typhoon Haiyan in 2013, one of the most powerful and devastating in recorded history that killed at least 6,300 people and caused billions in damage. In only 11 years, the Philippines' National Capital Region (NCR) has been inundated twice, first by Typhoon Ketsana, which severely flooded and devastated more than 70% of the capital, and then again by Typhoon Vamco in 2020. In between, it has been battered by smaller but devastating typhoons, volcanic eruptions, and earthquakes. Government handling of these weather-related calamities demonstrates its limited capability and shows plenty of room for improvements.

A significant amount of responsibility for disaster response rests on the Philippines' National Disaster Risk Reduction and Management Council or NDRRMC and its corresponding councils. Its track record of inadequate response and the frequent repeat of similar scenarios such as the massive flooding of the capital, however, put a serious question on the Philippine government's disaster management capacity and its ability to prepare for, mitigate, and respond to natural calamities. We ask then, what is it that hinders the Philippines from having adequate preparation and mounting an adequate response to the many natural disasters it has faced in the last few decades? Is the problem a matter of policy, structure, capacity, or does it lie elsewhere?

In answering this question, we focus our attention on the Philippines' disaster organization, the NDRRMC. To better identify areas that need attention, we adopt a comparative approach and examine the Philippines' NDRRMC in contrast to the U.S. Federal Emergency Management Agency (FEMA), and South Korea's Disaster and Safety Management (DSM) under the Ministry of Interior and Safety (MOIS).

We note that there are already several existing studies of disaster management in the Philippines. For the most part, these consist primarily of case studies (e.g., Abaya et al., 2020 Burton & Venton, 2009; Dariagan et al., 2021; Luna, 2001) and general assessments of local and national practices utilizing a variety of lenses and frameworks (e.g., Asian Development Bank, 2013; Blanco, 2015; Brower et al., 2014; Jovita et al., 2018). The approach of the majority of these studies has been to examine the Philippine case or subcases using a general lens or framework.

We adopt the comparative approach to acquire a broader perspective and a better understanding of possible issues that affect the NDRRMC as a disaster organization *vis-à-vis* other similar organizations. Specifically, we adopted the method of comparative public administration, which "considers the workings of government in different socioeconomic and cultural settings" (Otenyo & Lind, 2006, p. 1). This approach expands, enriches, and deepens empirical analysis by adding more cases and data from a diverse range of settings. It helps avoid the pitfalls of a constrained view from a narrow frame of analysis. Thus far, we have only encountered one study that takes on a comparative approach (i.e., Howe & Bang, 2017), but its focus is on the politics of natural disaster management of the Philippines and Myanmar. The public policy and administrative aspects of this topic have not yet been explored using a comparative approach. This is regrettable as the latter comprise the more readily actionable aspects of the issue.

We chose the U.S. FEMA and South Korea's DSM as cases for four reasons. The first is because these countries are also located in the Pacific Ring of Fire region and face similar natural disasters as the Philippines. Second, the U.S. FEMA and South Korea's DSM have better track records of disaster response and can provide better benchmarks for the Philippines' NDRRMC. The third is the three countries' administrative and organizational similarities rooted in a shared American Public Administration that traces back to the 1950s (Torneo, 2020; Yang & Torneo, 2016). Fourth, we have done substantive work and have a deep familiarity with the three selected countries in this study and their policies and systems more than any other. We hope that the findings and insights that will be generated by this study will be useful to similarly situated natural disaster-prone developing countries evaluating their disaster organizations.

Typhoons in the Philippines and Its Economic Costs

The Philippines has experienced disasters and calamities in different forms, such as typhoons, earthquakes, and even volcanic eruptions. These disasters come at a cost, especially in terms of the economy. We briefly describe some of the most deadly and destructive typhoons that have passed through the Philippines from the 1990s to 2020 to illustrate the costs as well as the chronic and serious threat of weather-related disasters to the country.

The typhoons domestically named *Uring* (1991) and *Rosing* (1995) were considered as two of the 12 worst typhoons in the Philippines in the 1990s. *Uring* caused the deaths of 5,101 Filipinos, mostly from the area of Leyte and Negros Occidental, and inflicted damages worth 1.045 million pesos. *Rosing* devastated the country in 1995 with 10.829 billion pesos worth (USD 216.6 million at USD 1 = PHP 50) of damages and 935 deaths, which mostly came from Catanduanes, Camarines Norte, Quezon, and the Bicol Region (Typhoon2000, 2010).

In 2006, typhoon *Reming* arrived at a speed of 250 km/h as it landed in the Bicol Region. The typhoon caused 720 deaths and affected 649,829 families. It also inflicted approximately 1.2 billion pesos of damages. In 2009, Typhoon *Pepeng* affected the Cagayan Region and Catanduanes. According to NDRRMC (2012a), a total of 465 people died during the typhoon, with a total of 27.297 billion pesos (USD 24 million) in damages across Regions 1, 2, 3, and 4 and the Cordilleras. A total of 61,689 houses were destroyed, along with a loss of 1,052.993 metric tons of crops and 1,531 damaged schools, amounting to 767.45 million pesos (USD 15.35 million).

Typhoon *Ondoy* (2009) was one of the worst typhoons to hit the Philippines in the 2000s. It is known for its record-breaking flooding that submerged 70% of the capital, NCR (Metro Manila), and damaged the Central and Southern Luzon regions. It caused 921 deaths and around USD 1.15 billion in damages. Around 329.230 metric tons or 203,477 hectares of crops were lost, and 1,382 schools and 185,004 homes were damaged. Typhoon *Dante* (2009) caused the second least number of deaths (28), but it severely affected the agricultural economy of the Bicol Region as it destroyed 125 billion pesos (USD 2.5 billion) worth of rice, corn, high-value commercial crops, fisheries, and livestock. It also affected 73,642 families, and 2,387 houses were damaged, causing a total of 1.2 billion pesos (USD 24 million) worth of damage (National Disaster Coordinating Council [NDCC], 2009).

Typhoon *Juaning* (2011) was third to *Ruby* (2014), with the least number of deaths (75). However, it displaced and affected 201,771 families in the area of Camarines Sur, Catanduanes, and Albay, raising the total economic cost of damages to 2.6 billion pesos (Salaverria, 2011). On the other hand, Typhoon *Sendong*, which arrived in December 2011, caused 1,257 deaths and 999,946,415 pesos worth of damage (Rappler, 2011). Furthermore, 946.95 million pesos worth of roads, bridges, and other infrastructure; 22.8 million pesos worth of health facilities; and 28.26 million pesos worth of schools were damaged, while 3,581 houses were destroyed and 8,550 were partially ruined (NDRRMC, 2012b). Typhoon *Pablo*, which arrived in December 2012, affected Mindanao the most, among other areas, inflicting 36.95 billion pesos (USD 739 million) worth of total damages. A total of 216,817 houses were reported as damaged by the NDRRMC (2012c).

Typhoon *Yolanda*, known internationally as Typhoon Haiyan, is one of the strongest typhoons ever recorded with maximum sustained winds of 235 kph, gusts of 275 kph, and a diameter of 600 km and resulted in 6,300 deaths, 1,062 missing residents, 28,688 injuries, 16,078,181 affected Filipinos, and 89.6 billion pesos (USD 1.8 billion) worth of damages (NDRRMC, 2014). Typhoon *Juaning* entered the Philippine Area of Responsibility in June 2013 and had its landfall in the Masbate and Samar provinces. The government spent 280.37 million pesos (USD 5.61 million) on standby funds, foods, and nonfood items (NFIs), and provided service through the Department of Social Welfare and Development (Rappler, 2013). In December 2014, typhoon *Ruby* entered the Philippine Area of Responsibility but caused the least number of deaths (18). It destroyed 42,466 houses and damaged 248,204 homes, resulting in 944,239 displaced families (NDRRMC, 2014).

According to the Emergency Event Database (EM-DAT) of the Center for Research on the Epidemiology of Disasters (CRED), at least 37,641 people died in the Philippines from natural disasters from 1990 to 2021. A total of 29,619 people in the Philippines died from typhoons alone. This is not counting those injured and the difficult-to-assess cost of damage in terms of lost

Table 1

Major Philippine Typhoons from the 1990s to 2020

Years	Typhoons (Philippine Names)
1990s	*Uring* (1991) *Rosing* (1995)
2000s	*Reming* (2006) *Pepeng* (2009), *Ondoy* (2009), *Dante* (2009)
2010s	*Juaning* (2011), *Sendong* (2011) *Pablo* (2012) *Yolanda* (2013) *Ruby* (2014), *Glenda* (2014) *Lando* (2015) *Ompong* (2018)
2020s	*Ulysses* (2020), *Rolly* (2020)

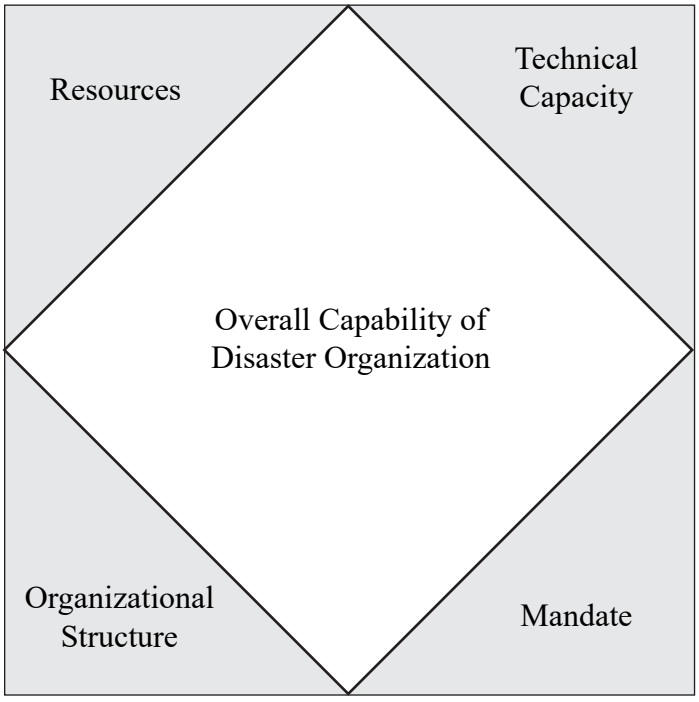

Figure 1. Analytical Framework for Comparing Disaster Organizations

homes, livelihood, infrastructure, and other losses. While natural disasters are hard to predict, effective disaster planning, management, and response can arguably mitigate these losses.

Comparison of Disaster Organizations in the U.S., South Korea, and the Philippines

Finding a framework of reference for a disaster organization in a country like the Philippines is not an

easy task. If finding a foreign best practice is a way to improve the current system in the Philippines, it would be reasonable to find a framework for comparison. Figure 1 is our attempt to come up with a framework for comparing the overall capability of disaster organizations across countries. It is based on the fundamental characteristics of all organizations whose significance has been identified in the Disaster Risk Reduction and Management (DRRM) literature (e.g., Baas et al., 2008; Fernandez et al., n.d.; United States Agency for International Development [USAID], 2011; and Organisation for Economic Co-operation and Development [OECD], 2012). In this framework, we examine the four basic features of disaster organizations in the Philippines, South Korea, and the U.S. Our examination includes mandate, structure, resources, and technical capacity.

Mandate

Mandate pertains to the authority granted to a disaster organization by an existing public policy. It defines the duties, scope of responsibility, and the powers granted or delegated to the organization to carry out its duties and responsibilities. Mandates may be granted through legislation or executive orders or by delegated authority.

Lead disaster organizations institutions are "the driving forces to plan, implement, monitor and evaluate disaster organizations processes and products within a country" (Baas et al., 2008, p. 23). These organizations are involved in developing policy frameworks, risk assessment schemes, and early warning systems, declaring levels of emergency during crises and communicating with the public and with other national and local agencies. It is imperative that their roles, scope of responsibilities, and powers are clearly defined in a formal legal framework, legislated or otherwise (Baas et al., 2008; Fernandez et al., n.d.).

It is vital to consider not only the mandate of the lead disaster organizations institution but also the mandates of sectoral agencies that have complementary responsibilities, given that these organizations are often the ones to implement the plans created by lead disaster organizations institutions. Further, institutionalized linkages between and among government agencies, research and knowledge institutions, Civil Society Organizations (CSOs), and lead disaster organizations bodies are also important elements of a holistic disaster organizations system (Baas et al., 2008; Fernandez et al., n.d.; USAID, 2011).

Organizational structure

Organizational structure pertains to the system that outlines how tasks, responsibilities, and authority are allocated and activities are directed within the disaster organization. It also defines the composition of the organization, the different positions and their corresponding responsibilities, and the chain of command or lines of authority. Organizational structures may be described and classified as flat, functional, divisional, matrix, or network, among others. In government agencies, they can also be classified as centralized or decentralized.

A strong organizational structure staffed by trained and knowledgeable personnel is integral to an efficient lead disaster organization (Fernandez et al., n.d.; USAID, 2011). An institutional architecture that ensures the coordination between national government agencies and subnational bodies facilitates the "development of an integrated view on the most significant risks facing the country and enhances the accountability of a whole disaster organizations system" (OECD, 2012, p. 20). Frameworks to regulate and guide the interactions of lead disaster organizations and sectoral agencies are crucial in maintaining consistency in policy implementation and communication. Institutional setups that allow for the participation of the private sector are sometimes necessary to provide much-needed inputs and resources.

Resources

Effective DRRM organizations require requisite resources (Baas et al., 2008; Fernandez et al., n.d.; USAID, 2011). These include but are not limited to financial, human, technical, and material resources. It includes the money, materials, personnel, equipment, and other assets that are possessed by and can be directly mobilized by a disaster organization. In the context of this study, it does not include materials, personnel, equipment, and other assets borrowed from other agencies. Resources can be gauged based on the annual budget of the organization.

Technical Capacity

Technical capacity broadly defined encompass the technical knowledge and skills of personnel as well as scientific resources and technical capability available

to an organization. It also includes the organization's ability to effectively tap and mobilize these resources to prepare for, respond to, and perform postdisaster activities. In practical terms and the context of this study, these include seismic and weather monitoring equipment, weather satellites, mission aircraft, amphibious vehicles, protective gear, and other similar rescue equipment.

Related to the discussion on resources, scientific and technical capacities are also vital in building a culture of safety and resilience to disasters (Fernandez et al., n.d.). For instance, scientific knowledge is needed to inform any plan for disaster risk reduction. Furthermore, technological expertise is vital not only for risk identification, assessment, monitoring, and forecasting but also for facilitating adequate communication with the public and among government agencies.

Improving risk communication at different levels and raising awareness "impact the way people face an emergency, get prepared or take a proactive role towards risk reduction" (Fernandez et al., n.d., p. 9). The creation of information dissemination channels and information systems such as hazard databases will contribute to the adoption of a culture of resilience among the public.

Disaster Organizations in the Philippines, South Korea, and the United States: A Comparison of Context

FEMA: The U.S. Context

The FEMA, a federal-level disaster response organization in the U.S., was established in 1979 and became a component of the U.S. Department of Homeland Security (U.S. DHS) in 2003. In 1979, President Carter's Executive Order 12127 enabled FEMA to absorb the separate disaster-related programs into FEMA. The functions absorbed by FEMA include that of the Federal Insurance Administration, the National Weather Service Community Preparedness Program, and the Federal Preparedness Agency of the General Services Administration and the National Fire Prevention and Control Administration. From the Defense Civil Preparedness Agency, it absorbed the civil defense responsibilities. The Department of Housing and Urban Development absorbed the Federal Disaster Assistance Administration activities.

Its mission statement reads, "to support our citizens and first responders to ensure that as a nation we work together to build, sustain and improve our capability to prepare for, protect against, respond to, recover from and mitigate all hazards." As of 2020, FEMA has an annual budget of 28.7 billion dollars and more than 11,300 employees (U.S. DHS, 2019).

The federal government and FEMA can get involved in state- and local-level disasters in case of emergency or major disaster. From a comparative perspective, the FEMA model is the ultimate disaster organization model, which most countries will not be able to operate. Yet, this model offers a direction toward which other countries working to improve their disaster management capabilities should head up.

The Korea Meteorological Administration and the DSM: The Korean context

South Korea suffered chronic floods each year from the 1950s until the 1970s. With economic development, the government started investing in meteorological administration, which has grown as the backbone institution that protects society from natural disasters, including typhoons and earthquakes. It is still true that South Korea's preparedness in weather and climate change is much weaker than that of the U.S. in some areas. Several years ago, the Korea Meteorological Administration (KMA) even invited former high-level U.S. officials in the weather forecasting field for advice. This shows there is still room for improvement in several areas of disaster management.

In the research conducted by the KMA between 2002 and 2011, all industrial sectors, from textile and construction to core manufacturing industries, acknowledged that weather and climate information is very important to them. The problem was no sector was willing to invest in meteorology using its budget, knowing that the investment requirement is enormous. This is where government intervention can be justified for providing public goods-type services to protect and reduce damages to the economy and society.

South Korea invested heavily in its meteorological services, which included investments in infrastructure with modern technology; various fields of scientific expertise such as telecommunications, automated systems for data storage, processing, manipulation, and retrieval as well as for acquiring observations;

and automated numerical weather prediction (NWP) computing and engineering systems with sophisticated data visualization and integration systems. The KMA has devoted efforts toward data processing and forecasting systems (DPFS) for decades. Although it had a rough start, especially when appeasing the public when it purchased its first supercomputer and the accuracy and perceived value of its DPFS, it was able to show that the investment it made was returned severalfold (Lee, 2013).

The KMA focused on two areas: automation of its telecommunications systems and acquisition of a supercomputer. These are two new strategic breakthrough areas. The automated telecommunications system became the foundation of its data processing, and the supercomputer led to several developments that helped obtain additional funding to support software and application progress. The KMA also invested in young scientists who were attracted to the innovative environment and continued to adopt technological advancements, which allowed it to keep its DPFS assets. With this, they have been able to meet the continually growing needs for meteorological services. The socioeconomic environment of Korea made the investment in meteorological services very valuable as the country has been affected by numerous types of natural disasters that plague midlatitude nations.

Emergency management is considered a primary function of the government in South Korea. Before 2004, disasters were handled by enacting laws and regulations according to the type of disaster or emergency. Natural disasters fall under the Natural Disaster Counter-Measure Act of 1995, which was based on two previous laws: the Flood Disaster and Relief Act and Flood with Typhoon Counter-Measure Act (Park, 2015). Social disasters were handled separately from natural disasters.

In 2004, these policies were combined under the Emergency and Safety Management Basic Act. This combined the Civil Defense Basic Act, the Natural Disaster Counter-Measure Act, and the Emergency Management Act. Before the Emergency and Safety Management Basic Act, the responsibility to handle disasters was assigned to numerous organizations and government agencies. As a result, there was a lot of confusion on who should handle which disaster. Different policies were set to deal with varying types of disasters. South Korea established the National Emergency Management Agency (NEMA) in 2003. The NEMA's functions were absorbed by the Ministry of Public Safety and Security in 2014 and, in July 2017, by the Ministry of the Interior and Safety (MOIS). As a result, all disaster management institutions were integrated under the DSM (Song et al., 2020).

The Vice Minister of the Interior and Safety serves as the head of the DSM with authority to command all disaster responses and supervise the Disaster Safety Measure Headquarters down to the *Si* (cities), *Gun* (counties), and *Gu* (districts). The latter provides the first level of response to any disasters or emergencies, but a more systematic national level response is elevated to the national headquarters following the "National Crisis Management Guidelines." Natural and weather-related disasters were all integrated under one organization in this setup.

The Korean experience clearly shows an increased intervention in the weather and climate fields in the form of making specialized organizational bodies. Its experience is not yet at the extent and magnitude of experience of the FEMA in the U.S. But what one can glean from the South Korean case was that with increased government budget to undertake disaster management, the government has allocated more resources with an expectation that it would bring future societal benefits. As investment in disaster management, including weather forecasting, requires a long-term time horizon until the benefits can be materialized, investing like South Korea cannot be generalized to other developing countries. At the same time, it works as a middle-ground reference point, from a more conservative standpoint.

NDRRMC: The Philippine Context

The history of the government of the Philippines' disaster management system began in 1941 when the National Emergency Commission was created under Executive Order (EO) No. 335. The commission was established to oversee and implement measures for dealing with natural and human-induced disasters. Under this commission, Provincial Emergency Committees and Municipal and City Emergency Committees were also established. In 1954, the government created the National Civil Defense Administration (NCDA) under Republic Act (RA) 1190. The law established civil defense councils at the national and local levels. NCDA was tasked to coordinate, oversee, and implement the creation of disaster control units in all government offices and

political subdivisions, including government-owned and controlled corporations.

In 1972, the Office of Civil Defense (OCD) was created to coordinate the disaster response efforts of the national government, private institutions, and civic organizations. The NDCC was created in 1978 through Presidential Decree (PD) 1566. The NDCC became the Philippines' top policy-making body and focal agency for disaster management. Under the NDCC, local disaster coordinating councils were established at the regional, provincial, city, municipal, and barangay levels.

The Philippine Congress passed the Philippine Disaster Risk Reduction and Management (PDRRM) Act of 2010 and the Climate Change Act of 2009. These laws included in their aims 1) "increasing the resilience of vulnerable communities and the country against natural disasters" and 2) "reducing damage and loss of lives and properties due to disasters." The PDRRM Act provided "for the development of policies and plans and the implementation of actions and measures on all aspects of DRRM." These include "good governance, risk assessment and early warning, knowledge building and awareness-raising, reducing underlying risk factors, and preparedness for effective response and early recovery."

The PDRRM Act also established the NDRRMC in the Philippines as a multisectoral disaster coordinating, planning, and policy-coordinating body. The NDRRMC is organized as a working group. It includes not only government organizations but also nongovernment, civil-sector, and private-sector organizations. The actual functions of disaster preparedness, response, prevention and mitigation, and rehabilitation and recovery, however, are primarily relegated to the appropriate national agencies for national disasters and emergencies and, for local ones, to the Local Disaster Risk Reduction and Management Offices (LDRRMOs), which exist at the regional, provincial, municipal, city, and barangay levels. This structure is very similar to the setup under the NDCC in 1978.

A Comparison of Mandates

Each organization has a different focus. FEMA begins its mitigation processes with information campaigns among the public. They make sure that everyone understands what might happen and what could happen in case of a disaster. FEMA also makes sure that this phase will include all activities for emergency prevention and reduction of the likelihood of emergencies, as well as reduce the damages that may arise from unavoidable hazards. They also set common examples in their campaign drives so that it would be easier for the citizens to understand.

In South Korea, mitigation of damages from natural disasters relies heavily on early warning systems. KMA's DPFS plays a vital role in this area. KMA's forecasts and warnings allow DSM to do mitigation activities before the onset of a disaster. As a country that regularly suffers from weather and climate-related disasters, investments in meteorological services have very high returns for South Korea (Dolcemascolo et al., 2011).

DSM is responsible for acting on the early warning from KMA and other related agencies. For mitigation, they inform the general public on how to deal with disasters through training and education, although there are only college-level lectures available currently. Lectures for lower education level students are also being considered (Park, 2015). DSM was formed to be a control center that would deal with all forms of natural and human-made hazards, but it has been mostly focused on fires and floods, which occur commonly in the country (Bae et al., 2016). Since the integration of DSM to the MOIS, all disaster management institutions were integrated under the wing of the DSM (Song et al., 2020).

In terms of the second thematic area, namely, preparedness, FEMA provides checklists and toolkits with the help of various agencies in the U.S. to help the citizens survive the impending disaster, for both individuals and private and government companies. In their checklist, they provide emergency response plans while various agencies provide preparedness planning for businesses, emergency preparedness, emergency management, and a business continuity self-assessment checklist and individual insurance forms.

In contrast, preparedness is not as emphasized as response and recovery in South Korea. DSM attempted to put a stronger emphasis on this thematic area by establishing the role of citizens and the local government to achieve participatory management. They mapped out clearer responsibilities for the local government and citizens. Consequently, the death toll from natural disasters has lowered by 60% and property damage has reduced by 40% since 2004. The death toll from traffic accidents has even overtaken that of natural disasters (Bae et al., 2016). DSM also

developed manuals for disaster management education. These were made to inform people how to act during different disasters, and these are disseminated through advertisements and the Internet (Park, 2015). Local governments are mandated to draft a standardized crisis response manual.

In the Philippines, the NDRRMC's mandate is primarily policy making, coordination, integration, supervision, monitoring, and evaluation. It leads in planning and oversees activities in various fields, including communication, emergency transportation, warning signals, rescue, evacuation, engineering, auxiliary services, public education, and health and rehabilitation. The actual functions of disaster preparedness, response, prevention and mitigation, and rehabilitation and recovery, however, are primarily relegated to LDRRMOs, which exist at the subnational levels under the provincial, municipal, city, and barangay governments, which have some degree of local autonomy but are under the general supervision of the President of the Philippines, through the Department of Interior and Local Government (DILG). During preparation, these LDRRMOs heighten community awareness of potential hazards, risks, and vulnerabilities. They also capacitate institutions and communities to cope with the adverse impacts of disasters.

The NDRRMC serves to coordinate the efforts of nongovernment organizations, national government agencies, civic, and private organizations. The NDRRMC leads the preparation of the comprehensive national plans and disaster preparedness plans, policies, and systems *vis-à-vis* strengthening partnerships with all stakeholders and key players. It also coordinates efforts in times of major disasters and emergencies and the responses of the appropriate agencies.

Postdisaster recovery and rehabilitation for major disasters are led by the National Economic and Development Authority (NEDA) of the Philippines. This includes restoring the people's livelihood, restoring shelter and other buildings or installations, rehabilitating infrastructure and other public utilities, facilitating continuity of business and economic activities, and assisting in the psychological and physical rehabilitation of affected persons. In 2013, the Office of the Presidential Assistant for Rehabilitation and Recovery (OPARR) was established as a dedicated office for coordinating recovery efforts after major disasters or calamities.

Local government units are the primary organizations responsible for dealing with disasters and emergencies. Their LDRRMOs handle the drafting of local disaster preparedness policies, plans, and systems vis-à-vis strengthening partnerships among all key players and stakeholders. During these times, the local DRRMs centers at all levels should not only have disaster plans and prevention in place but also be prepared to have an immediate response in case a disaster ravages their immediate communities. The local government units are answerable to DILG in their preparations at the local level. Come the time of disasters and emergencies, however, it is the local government units led by the local chief executives and through their LDRRMOs that serve at the frontlines of disaster response, mitigation, and postdisaster rehabilitation and recovery. When disasters meet a certain threshold, the local governments can declare a state of calamity to mobilize more funds and resources and exercise other emergency measures.

South Korea's DSM focuses more on response and recovery over preparedness and mitigation (Park et al., 2015). The goal is to immediately restore working order through relevant government organizations and volunteerism. Korea also supports businesses in making business continuity plans (BCP) through the Act of Supporting Business Continuity Planning for Corporate Autonomic Activity by reducing the financial burden through insurance premiums (Ha & Ahn, 2008). DSM also encourages volunteer organizations to participate in response and recovery by providing training to their leaders. However, it is the local government's role to provide training to the other members (Jang & Yun, 2017).

A Comparison of Organizational Structure

FEMA's structure is shown in Figure 2. The Office of the Administrator and program offices are in the agency's headquarters in Washington, DC. FEMA is decentralized and divides the entire country into ten regions so that there is a specific FEMA office that will focus solely on the assigned area. These regions have representatives from FEMA who are as capable as the ones in the main office. As a result, if a disaster happens in a certain region, the response and recovery, as well as mitigation and preparation, would be of the same quality as that from the central office, making FEMA's performance efficient overall. If there is a situation that needs more attention than the regional

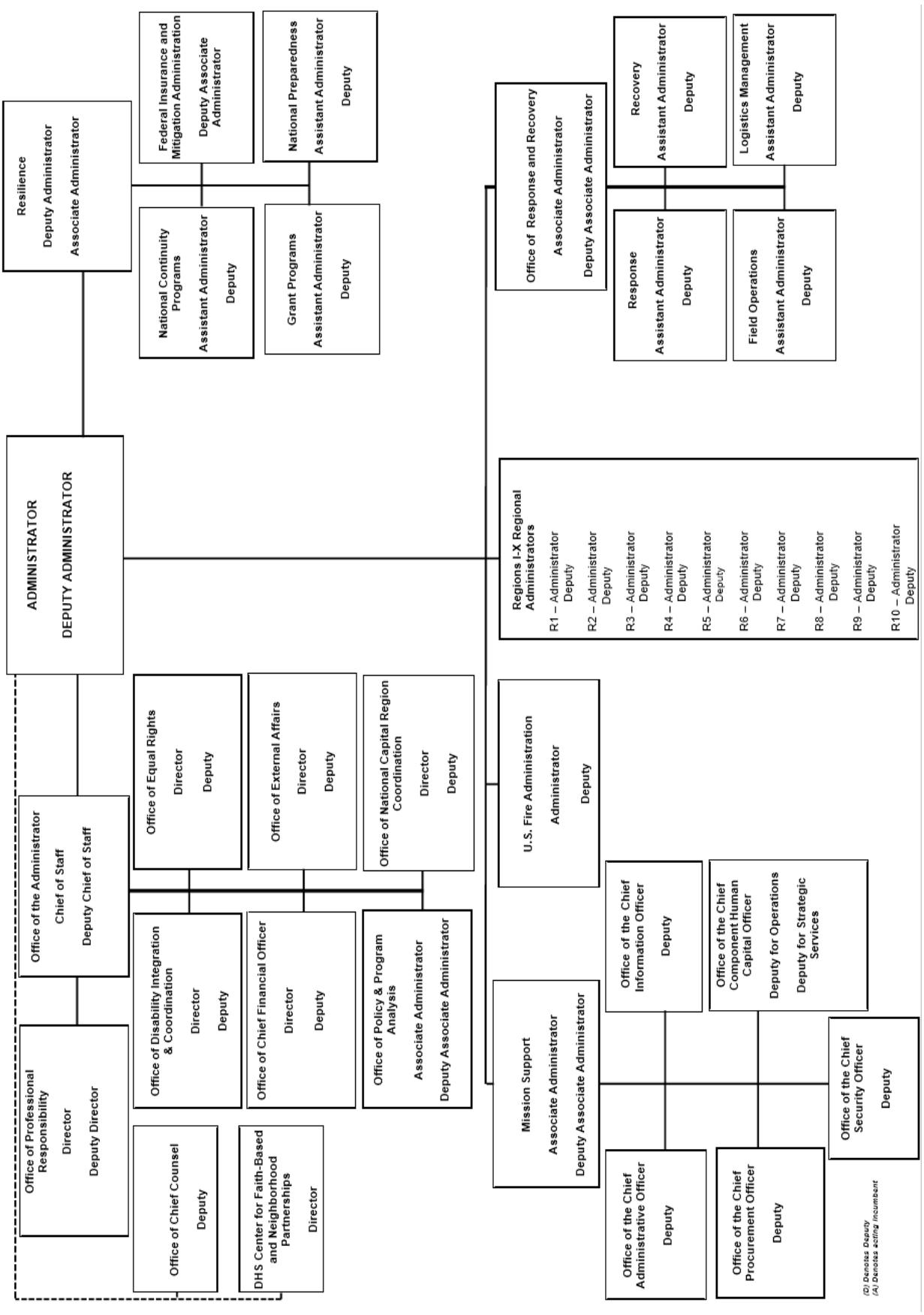

Figure 2. Organizational Structure of the U.S. FEMA

office can give, reinforcements from nearby regions can quickly reach the area; no water bodies separate them, and there is an emergency lane in the free road for emergency vehicles.

Unlike FEMA, South Korea's DSM is highly centralized (Jang & Yun, 2017; Park, 2015). DSM has established Disaster Management Divisions in all 250 local governments in South Korea. This gives them nationwide network coverage for disaster management. However, there are often communication problems among these Disaster Management Divisions, causing delays and even confusion about the extent of the situation (Park, 2015). The DSM's structure is in Figure 3.

Meanwhile, in the Philippines, the NDRRMC is organized as a working group or council comprised of the civil sector, private sector, government, and nongovernment organizations. The Administrator of the OCD, an office under the Department of National Defense (DND), serves as Executive Director. As a working group, the NDRRMC has only a very limited number of staff and resources of its own. Instead, it relies mainly on the personnel and resources of its member agencies, especially during periods of major disasters or emergencies. In many instances, it is the local government units through the LDRRMOs and local offices that are in the frontlines of dealing with disasters and emergencies.

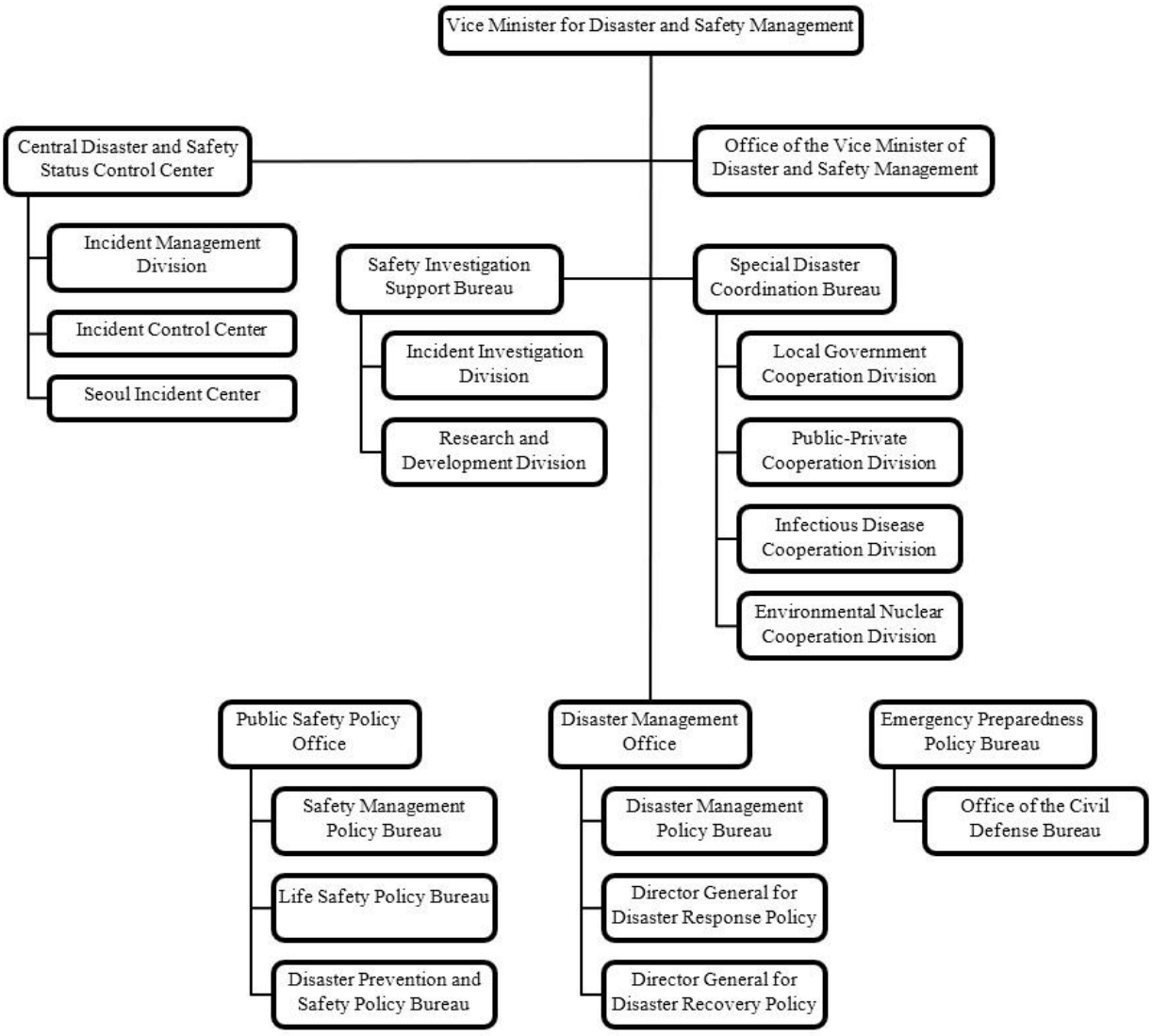

Figure 3. Organizational Structure of South Korea's Disaster and Safety Management (DSM) under the Ministry of the Interior and Safety (MOIS)

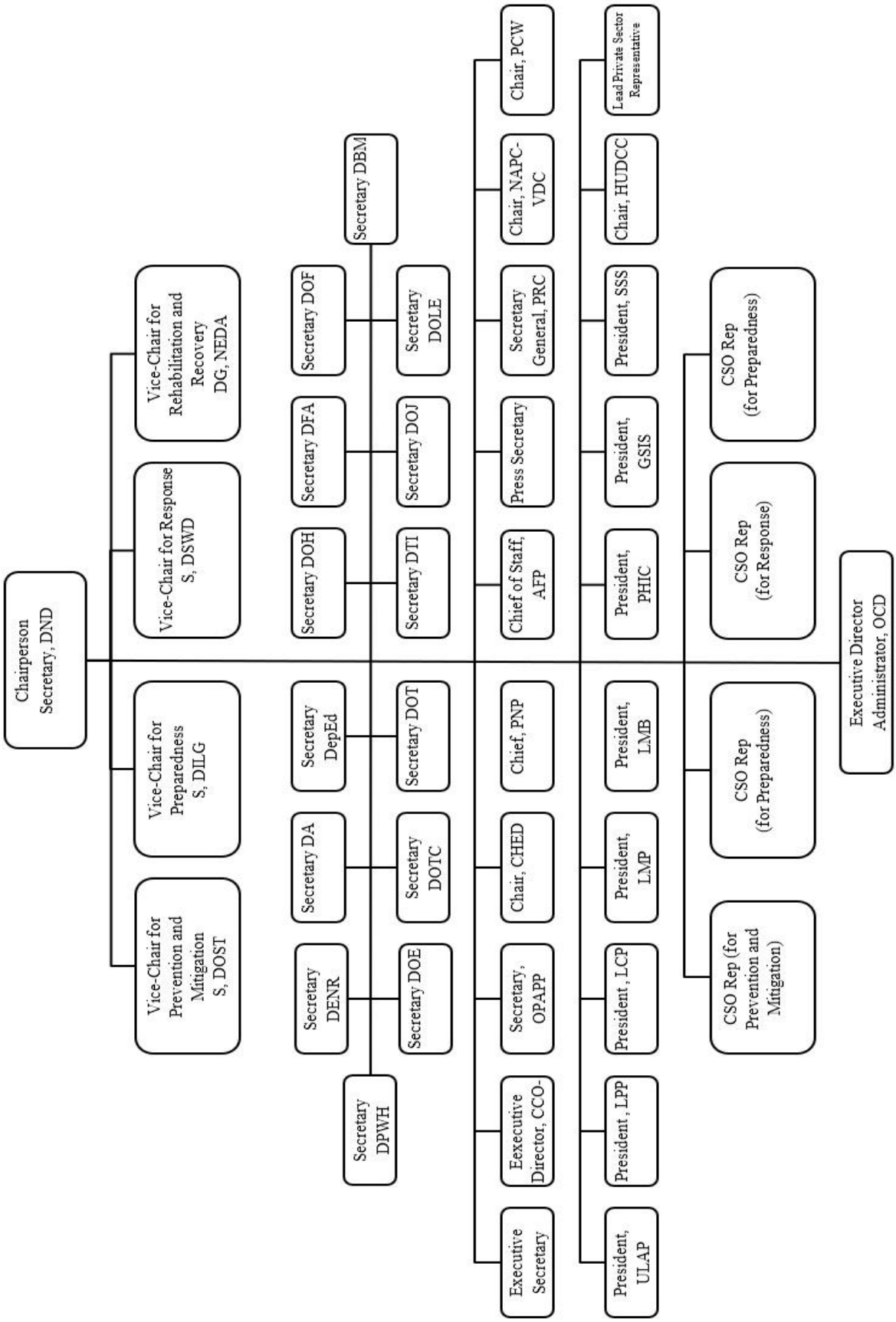

Figure 3. Organizational Structure of the Philippines NDRRMC

The NDRRMC itself consists of senior government officials, cabinet members, and heads of agencies and member organizations, as well as heads of nongovernment private and civic organizations, as seen in Figure 4. The expectation is that these organizations will mobilize and coordinate their units, resources, and efforts following the framework and guidance of the council.

Among these organizations, the Philippines NDRRMC is unique in that it is a working group or council that primarily coordinates the response of other agencies. While it is chaired by the Secretary of Defense, most of the other members of the council are also coequal ranking cabinet members (secretary or minister level) and are technically not under the supervision nor direction of the chair. The NDRRMC primarily exists and has offices and staff at the national and only down to the regional level. As a coordinating body, it has only a very limited budget and resources, has a skeletal staff, and is highly reliant on the personnel and resources of other agencies.

In contrast, both the U.S. FEMA and South Korea's DSM are distinct organizations under one agency. While they are both led by a subcabinet-level official, they have clearly defined hierarchies and command structures, significant resources, and offices and staff from the federal/ national down to the state level, which they can mobilize along with the resources of other agencies and organizations during periods of disasters and calamities.

A Comparison of Resources

Table 2 shows the annual allocation given to the OCD, an agency under the Department of National Defense, which serves as the administrative and logistics arm of the NDRRMC. Also shown is the annual allocation of the National DRRM Fund. Both the budgets of the OCD and the National DRRM Fund are based on the General Appropriations Act (GAA) being legislated by the Philippine Congress every year.

The OCD's budget is mainly composed of three items: personnel services, maintenance and other operating expenses (MOOE), and capital outlays. Personnel services include the basic salary given to the permanent employees of the agency, employer contributions to government-mandated benefits such as PAG-IBIG and PhilHealth, and allowances and bonuses given to employees. MOOE includes expenditures related to the regular operations of the agency, such as travel, training, supplies and utility, and printing. Lastly, the capital outlay refers to expenditures related to the maintenance of fixed assets such as machinery and equipment.

While there is a specific allocation for the National DRRM Fund that the NDRRMC can use for disaster relief and response, they are also mandated to utilize

Table 2

Annual budget of the Office of the Civil Defense with the National DRRM Fund, FY 2017 to FY 2021

Item (in thousand USD)**	2017	2018	2019	2020	2021
Personnel Services	5,813	3,516	4,597	5,183	5,813
Basic Salary	1,646	2,597	3,417	3,892	4,399
Other Compensation Common to All	550	843	1,049	1,175	1,277
Other Benefits	173	76	105	116	137
Maintenance and Other Operating Expenses	7,198	12,457	12,835	15,514	15,814
Capital Outlays	56	5,372	10,104	4,030	3,276
Total Annual Budget	9,623	21,344	27,536	24,727	24,903
National DRRM Fund	315,100	392,000	400,000	320,000	400,000

*All figures are based on the General Appropriations Act enacted by the Philippine Congress from 2017 to 2021.

** Exchange rate is at USD 1 = PHP 50.

resources from other allocations, such as the specific DRRM fund given to member agencies and local DRRM funds of local government units (NDRRMC, 2011).

Table 3 shows the annual budget of the U.S. FEMA in the last five years. In comparison with the NDRRMC, the U.S. Congress directly allocates the Disaster Relief Fund to FEMA for its use in disaster relief and response. The item on operations and support item mainly funds the logistics and operations of the agency as well as programs to "…mitigate long-term risks, ensure the continuity and restoration of essential services and functions and provide leadership to build, sustain, and improve the coordination and delivery of support to citizens and SLTT [State, local, tribal, and territorial] governments" (U.S. DHS, 2021, p. 47).

The procurement, construction, and improvements fund the technology and infrastructure needed by the agency for its continual operations. Federal assistance includes grants and funds financing the training and education of FEMA's stakeholders related to disaster and safety. Their flood insurance policy rests under the National Flood Insurance Policy Program. And lastly, they provide SLTTs support "…in the development of off-site radiological emergency preparedness plans within the emergency planning zones of Nuclear Regulatory Commission (NRC) licensed commercial nuclear power facilities" (U.S. DHS, 2021, p. 434).

Table 4 shows the annual budget given to the DSM, an agency under the MOIS in South Korea. The budget

Table 3

Annual budget of the U.S. FEMA from FY 2017 to 2021

Organization (in thousand USD)	**2017*** **	**2018****	**2019***	**2020***	**2021***
	Enacted	**Enacted**	**Enacted**	**Enacted**	**President's Budget**
Operations and Support	1,048,551	1,030,135	1,066,258	1,102,199	1,134,195
Procurement, Construction, and Improvements	35,273	85,276	133,830	133,363	86,503
Federal Assistance	3,024,458	3,334,932	3,135,210	3,229,467	2,482,552
Disaster Relief Fund	7,328,515	7,900,720	12,258,000	17,863,259	5,653,366
National Flood Insurance Program	4,795,353	4,982,536	5,050,836	4,983,460	5,176,462
Radiological Emergency Preparedness Program	1,048,551	1,030,135	1,066,258	1,102,199	1,134,195
Total	16,231,885	17,332,575	21,643,469	27,310,748	14,533,078

*U.S. DHS FY 2021 Congressional Submission, p. 17.

**U.S. DHS FY 2020 Congressional Justification, p. 16.

***U.S. DHS FY 2019 Congressional Justification, p. 15.

Table 4

Annual budget of South Korea's DSM from Fiscal Year [FY] 2017–2021

Organization *(in thousand USD)***	**2017**	**2018**	**2019**	**2020**	**2021**
Safety Management	86,522	52,609	642,609	467,391	547,043
Disaster Management	633,217	639,739	62,348	61,652	766,957
Disaster Safety Technology Development	26,261	38,000	51,217	58,174	78,696
Disaster Safety Informatization	20,435	124,696	152,522	153,304	109,217
Total	766,435	855,044	908,696	740,521	1,501,913

*All figures are based on the Revenue and Expenditure Budget Overview 2017–2021, Ministry of the Interior and Safety.

**Exchange rate is at USD 1 = KRW 1150.

of the MOIS is legislated by the South Korean National Assembly every year.

DSM's budget is mainly composed of four items: Safety Management, Disaster Management, Disaster Safety Technology Development, and Disaster Safety Informatization. The budget increased from 766,435 thousand USD in 2017 to 1,501,913 thousand USD in 2021.

A Comparison of Technical Capacity in the DRRM context

Guided by previous international commitments on DRRM, the Sendai Framework for Disaster Risk Reduction 2015–2030 emphasizes the urgent need to address the challenges and minimize the impacts brought about by disasters through developing capacities of countries and communities (United Nations, 2015). According to the United Nations (2009), capacity is the "combination of all strengths, attributes, and resources available within a community, society, or organization that can be used to achieve agreed goals." People, organizations, and systems should be equipped with technical capacities that focus on specific areas of need related to the priorities for action of a given problem or issue (Capacity for Disaster Reduction Initiative, 2011).

Within the DRRM context, technical capacity refers to the ability to effectively respond to and manage the adverse effects of disasters. At the organizational level, it corresponds to the capability to utilize available skills, knowledge, and resources for improved disaster prevention, mitigation, response, recovery, and reconstruction. Technical capacities associated with DRRM can include expertise in understanding and monitoring disaster risk and vulnerabilities; integrating disaster risk in governance; implementing strategies, plans, and policies on DRRM; and utilizing mechanisms and tools on disaster preparedness. To complement the existing capacities on DRRM, tools, and assets such as hazard-monitoring telecommunications systems, geospatial information technologies, management information systems, satellites, drones, and other resources can also contribute to the reduction of risk and vulnerability to disasters and hazards.

Technical Capacity of the U.S. FEMA

The National Preparedness Goal of the Federal Emergency Management System of the U.S.A. is anchored on five mission areas and 32 core capabilities necessary to prevent, respond to, and recover from threats and hazards such as disasters. Each of the capabilities has specific targets that can be assessed by communities based on their needs and its relevance and appropriateness based on their exposure to risks. Some of the capabilities aligned with disaster response are risk and disaster resilience assessment, long-term vulnerability reduction, and natural and cultural resources (FEMA, 2020b).

In the event of disasters, FEMA has an information management system that contains disaster information, responses, and channels for assistance. To ensure resilience in managing risks and hazards, FEMA uses different tools for each disaster. For instance, the National Hurricane Program (NHP) consists of planning and response mechanisms that aim to provide information and assistance at the state and local levels. Its components include the Hurricane Evacuation Studies and Planning, HURREVAC Decision Support Tool, Hurricane Liaison Team Operational Decision Support, Intergovernmental Hurricane Preparedness, and Post-Storm Assessment. These tools are in the process of integrating new technologies to be more accessible and functional to the people (FEMA, 2020a).

Apart from harnessing tools and resources to help identify and assess risks, a new online mapping application has also been developed by FEMA. The National Risk Index gathers data and visualizes risks caused by natural hazards and disasters. It is designed to assist in risk assessment, emergency operation and hazard mitigation plans, and information dissemination. The maps can be viewed at the country and census tract level, which makes understanding and managing risks easier and faster. The index can also be used to formulate more programs and strategies to reduce potential disaster risks (FEMA, 2021).

Technical Capacity of South Korea's DSM

One of the national priorities of South Korea is to protect the lives of its people through the establishment of integrated and effective disaster and safety management. The MOIS takes the lead role in overseeing the implementation of the country's disaster and safety plans. Their programs and protocols are guided by their key commitments to (1) develop a field-oriented disaster response mechanism, (2) establish a victim-oriented relief system, and (3) reinforce governmental protection of people's lives (MOIS, 2021b).

At the core of the disaster management system in South Korea is its DSM. Its existing capacities focus on disaster management technology through the creation of integrated disaster management information systems and communications networks. The information system includes three portals and a mobile application that consolidates information that the citizens can use for disaster preparedness, response, and recovery. The MOIS also works in collaboration with the National Disaster Management Research Institute to develop a Public Safety Map Service that will provide real-time information on the possible risks and safety facilities for the people. As of 2017, a total of 50,000 people downloaded the app on their mobile phones. Lastly, the MOIS launched Korea Safe-Net, which is a disaster and safety communication network system for improved response to disasters and other hazards. Through the network, the response team can easily be mobilized during emergencies (MOIS, 2021). The innovative approaches and measures in the disaster response of South Korea demonstrate its technological skills and resources.

Technical Capacity of the Philippines' NDRRMC

Institutionalizing the country's response to disasters and hazards, the NDRRMC is tasked to monitor the implementation of the National DRRM Framework at the national and local levels. Throughout the years, there has been considerable improvement in the development of DRRM capacities and structures in the country. In 2020, the Philippines ranked medium in terms of its lack of coping capacities in the World Risk Index of the most affected country from extreme weather events. However, the country's exposure to natural hazards is very high, indicating that more Filipinos are prone to be exposed to and experience the devastating effects of natural disasters (Congressional Policy and Budget Research Department, 2021).

Based on the National DRRM Plan 2011–2028, NDRRMC pursues a comprehensive approach towards achieving its goal to foster "safer, adaptive, and disaster-resilient Filipino communities towards sustainable development." Its response mechanisms include strengthening of its capacities on disaster prevention, preparedness, response, rehabilitation, and recovery. Among the existing tools and instruments that NDRRMC has developed is its online Geographic Information System-Based Monitoring Dashboard, which provides the latest updates on the weather situation, flood advisories, dam situations, earthquakes, and tsunamis, volcanic eruptions, and other incidents all over the country. This dashboard, which is accessible through their website (https://monitoring-dashboard.ndrrmc.gov.ph/) and is updated in real-time, serves as a guide in community response on disasters. In addition, to improve its emergency alert systems, the Emergency Telecommunications Cluster of the NDRRMC works closely with the Department of Information and Communications Technology (DICT) in improving information and communications technology capacities down to the local level. As a result, timely emergency and coordination telecommunications are cascaded through different clusters. Early warning and emergency alerts are also announced to the people through mobile disaster alerts. Promoting effective information dissemination played a significant role in disaster prevention and mitigation response in the country.

Summary Comparison of U.S., South Korea, and Philippine Disaster Organizations

Table 5 shows a three-country comparison of the U.S., South Korea, and the Philippines. The U.S. has a high-end model, which also represents the model of nations that are similar or equal in terms of meteorological service and disaster management capability. In comparison, the South Korean model is a middle-ground model, which can be the next step for many developing countries that are trying to upgrade disaster management capabilities.

Challenges for the Philippines in Creating a Disaster Risk Reduction Body

The Philippines is confronted with many natural disasters from typhoons, to earthquakes, volcanic eruptions, to severe flooding and needs a capable disaster organization with similar capacities to U.S. FEMA or South Korea's DSM. The country, however, faces impediments and challenges that hinder effective DRRM as well as impede the establishment of a separate disaster body that will solely focus on risk reduction, emergency management, and relief administration. Researchers have spelled out various impediments the country faces.

According to the Asian Development Bank (2013), poor conceptual understanding of DRRM and resilience in the Philippines remains relatively weak, manifesting in an approach borne out of a tunnel vision to the

issue. The NDRRMC's staff who lead the strategy implementation have limited knowledge. Its leadership has weak budgetary and political standing and thus remains in the periphery during preparation and budget processing, leading to missed opportunities. The weak voice of resilience proponents is also a challenge due to their relatively weak political standing. Despite some exemplary cases, capacity among local governments and their leadership is highly uneven (Brower et al., 2014). Many local government units that are in the frontlines have limited DRRM capacity and expertise in this matter. This considerably reduces the local governments' capacity to plan. These challenges are further exacerbated by short-sighted political focus, extreme budget constraints, and mostly inadequate assessment of the risk of disasters in the communities they serve. Poor vertical and horizontal integration is another impediment on the subnational level because the DRRM Councils are usually disconnected among the national and local governments. This may partially account for observed coordination problems (Howe & Bang, 2017).

Disaster management agencies experience insufficient funding, particularly in countries that have low-income local governments that are largely responsible for implementation. As a result, policymakers favor investments that create immediate and tangible results rather than investments against potential hazards in the future. Reliance on the international community is often misplaced since the local government units think that external support can only give much, but it still entails some support that the local government can use during rehabilitation (United Nations Office for the Coordination of Humanitarian Affairs, 2012). The agency's expenditure-tracking systems have also been a challenge, as there are budgets that come across different sectors and require a different budget proposal leading to loss of monitoring of the transactions made by the agency (Benson et al., 2009). Lastly, maintenance budgets for equipment and small-scale hazard maintenance are often ignored, leaving the infrastructure vulnerable to future hazardous events.

Another impediment concerns the existing political economy, as disasters are linked to poverty and socioeconomic inequality. In the Philippines, as well as in other countries, disaster management is characterized by unequal access (Brower et al., 2014). Disaster risk is focused more on poorer households, which constitute a part of the society with a limited political voice. Various misaligned incentives overemphasize highly visible disaster relief, early recovery, and reconstruction and encourage an insufficient public focus on disaster risk reduction combined with weak systems of accountability. Poor knowledge of the actions of disaster risk reduction results in favored constituencies being prioritized (Asian Development Bank, 2013).

Brower et al. (2014) point out that the Philippines is characterized by a focus on disaster response and recovery with the military and national police as central actors. The problem is that organizations like the military rank response four out of its six mission priorities (Howe & Bang, 2017). In terms of investment identification, design, and implementation, mandated consideration of disaster risk is very low. There is also a perceived low net return to investments in resilience. These influence the design of both public and private investments. There is also a lack of availability of high-resolution risk and hazard information to support investment in developing individual resilience. Inadequate risk information is a major challenge. There are considerable gaps in risk information gathered by local government units, which are essential for guiding a community plan as most of the risk-reduction measures are acted upon and conceived upon these units. Low participation in disaster drills is also a challenge (Asian Development Bank, 2013).

From a policy standpoint, the existing risk-reduction legislation in the Philippines is fragmented because various laws address different aspects of risk reduction such as emergency preparedness and response, building codes, water resource management, climate change, financial regulation, land use planning, and environmental protection. The weak enforcement of crucial DRRM regulation is another impediment, as enforcement has lagged in the Philippines because of various combinations of institutional, financial, human resource, and technical limitations; weak political support; insecure land tenure; and corruption (Asian Development Bank, 2013).

To be fair, the Philippines DRRM Act of 2010 has seen improvements in the country's capabilities, particularly in the infusion of additional resources to deal with disasters. The full potential, however, is not yet fully realized due to what Domingo (2017) notes as issues in institutional leadership at the national and local levels and "inefficient fund utilization, unequal resource distribution, inept directional funding, and

accounting and auditing issues" among others (p. 17). The deeper issue in the weaknesses in leadership and implementation, however, may be rooted in institutional barriers that he notes require legislative action. In particular, there is consensus that ad hoc arrangements under the current policy are major weaknesses that hinder the effective implementation and realization of the law.

Before the Covid-19 pandemic, the discourse and debates around DRRM in the Philippines were divided among those who are proposing an expanded DRRM policy and putting more "teeth" (i.e., authority) and resources to the NDRRMC, and the other is the creation of a new and dedicated agency tentatively named the Department of Disaster Resilience (DDR). The measure has gained support in the Philippine House of Representatives, but the measure is still stalled, and debates are still ongoing in the Senate, and possible hurdles may still be encountered at the executive even if the measure passes the two houses of Congress.

Concluding Notes

This study ambitiously attempted to compare disaster management functions and organizations in the U.S., the Philippines, and South Korea. The contexts from which these disaster organizations were born and managed differ so greatly that it would not be an easy task to benchmark one from another. What we attempted, therefore, is a general comparison.

We note that in terms of overall capability, the Philippines' NDRRMC is very limited and significantly lags behind the U.S. FEMA and South Korea's DSM. We trace the differences not only from the more limited resources of the Philippines as a developing country but also due to the differences in mandate, structure, resources, and technical capacity by their respective disaster management agencies.

We noted in the discussion that while they have many similarities in terms of their mandate to respond to man-made and natural disasters, including those that are weather-related, the structure and capabilities of the Philippines NDRRMC differ significantly from the U.S. FEMA and the South Korean DSM. Among the three bodies, the NDRRMC is the only one that is structured as a multisectoral council whose role is primarily limited to policy making, coordination, integration, supervision, monitoring, and evaluation functions. It has limited resources for response. In contrast, the U.S. and South Korean organizations are distinct government agencies with substantial resources, authority, personnel, and capabilities to respond to disasters on their own. The NDRRMC's multisectoral working-group organization and lack of a strong leadership structure can hinder effective leadership and coordination. The U.S. FEMA and South Korea's DSM, in contrast, are headed by a single official with a clear chain of command. The adoption of a similar leadership and organizational structure for the Philippines should be strongly considered.

While the U.S. FEMA is decentralized and the Korean disaster units are also cascaded down to local governments like the Philippines NDRRMC, the latter is not the agency that directly responds but is dependent on other agencies and local governments. In itself, the NDRRMC has limited resources, authority, technical capacity, and personnel. This poses challenges in coordination and implementation. Taken together, the annual budget for disasters in the Philippines of USD 324.7 to 427.5 million is considerable, even if it is less than that of South Korea and far behind that of the U.S. The challenge, however, is that most of this is in the National DRRM Fund, a budget shared by many agencies that comprise the NDRRMC. The actual budget of the NDRRMC only ranges from USD 9.62 to 24.90 million per year for the last five years, a paltry amount compared to the USD 740 million to 1.5 billion per year of South Korea's DSM and the U.S. FEMA's USD 14.5 to 27.3 billion per year. This has significant implications on the NDRRMC's technical capacity and ability to respond. More resources are necessary for it to develop its overall capacity.

While some advocates and legislators prefer expanding the Philippines' current DRRM law, we argue based on the U.S. and South Korean case that the Philippines' capability to deal with natural disasters, especially frequent weather-related disasters, can best be served if it pursues the establishment of a separate disaster agency such as the Department of Disaster Resilience being proposed by some advocates and legislators. This new organization will need the appropriate mandate, corresponding authority, enough resources, capable personnel, and strong leadership to overcome the various problems that hinder the NDRRMC in the past and at present. However, supporters of this new department will also have to overcome significant political, not to

mention budgetary hurdles for the new department to be established. To overcome this, they will need to secure as much public support as possible and navigate budgetary and political hurdles effectively. The capability of the Philippines in dealing with future disasters depends on this agency's success.

This study largely looked at macro-level organizational aspects of disaster organizations, so it is limited in terms of examining in-depth specific dimensions of DRRM and resilience capability. Many studies of DRRM in the Philippines are similar in the sense that they try to provide a general assessment or present specific case studies. We recommend that future studies be designed focusing on more specific aspects or dimensions of DRRM and resilience. Studies geared towards an in-depth examination of one of the dimensions we covered here (e.g., technical capacity, budget, organizational structure, or mandate) may find more specific findings and insights. These can contribute to both scholarship and the development of appropriate policies for the Philippines and similarly situated countries that are highly vulnerable to and regularly face natural disasters.

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Declaration of Ownership

This report is our original work.

Conflict of Interest

None.

Ethical Clearance

This study was approved by our institution.

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