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Sectoral Integration in Disaster Risk Reduction (DRR) Investments: The Case of Myanmar and Philippines' Financial Disaster Risk Response

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Abstract

For decades, emergency plans of top-down, state-centered policies have been employed for disaster risk mitigation measures. These efforts undermine the importance of grassroots involvement in disaster governance, community-based initiatives, and resilience in terms of resource allocations and financial considerations. Hence, this paper tries to assess disaster risk reduction (DRR) investments in terms of structural and non-structural levels as mentioned in three dividends of DRR investment conceptualization. Further, it incorporates sectoral involvement in participatory budgeting, especially as framed by Integrated Community Based Risk Reduction (ICBRR), in building disaster resiliency at the substrate level. The study employed secondary data analysis, especially the latest inputs, through national and international sources, as a base year of calibration. By looking at the context of the Philippines and Myanmar–both being prone to extreme weather events and having climate-sensitive economic activities–the study rules out that while there are available DRR investments in both countries utilized for disaster mitigation, response, and rehabilitation, particularly in the frequent typhoon and flooding, it still has compelling gaps and consideration to augment response potentials. A bottom-up approach is necessary to empower local governments in both contexts and ensure the long-term impact of DRR financial considerations amidst unanticipated calamities.

Keywords

Disaster risk reduction, Investments, Bottom-up, Philippines, Myanmar

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Introduction

In February 2010, an 8.8 magnitude earthquake hit central Chile, and this was the month before a category seven earthquake claimed more than 160,000 lives in Haiti and caused the displacement of 1.5 million people (Laurent, 2015). Despite the catastrophic impact the natural disaster-induced on Chile, the country displayed outstanding resilience. Most storm-related fatalities recorded from 1995 to 2014 originated in lower-income countries, even though these countries experienced only 26 percent of global storms (World Bank, 2016). Chile's resiliency in earthquake disasters due to its rapidly expanding economy (Gitlin & Fuentes, 2012) corresponds to the assumption that the development level of a country correlates significantly with the resiliency of a community when coping with natural disasters, and poorly mishandled policy may exacerbate the catastrophic impact of these disasters (Howe & Bang, 2017).

Such connotation is relevant to Asian nations as the continent is notorious for being the most disaster-prone region. It remained the epicenter of the urbanization surge, which is approximated to be the center of mobility for 1.1 billion people for the next 20 years (UN-Habitat, 2007). The impact of urban expansion paired with regional vulnerability to climate-induced disasters is presumed catastrophic. There are varieties of studies like Chapagain et al. (2023) that analyze the trend of disaster impacts, and they purport that an increased density in population, especially in Asian cities, results in more loss of lives followed by economic discrepancy once a disaster event sweeps through the region (Shaw & IEDM Team, 2009). This ongoing predicament puts pressure on international initiatives like the Millennium Development Goals, as it demarks these efforts as futile if there is an omission of disaster risk reduction (DRR) in development planning or the general improvement agenda aimed at mending urbanization issues. However, it must be mentioned that the disaster risk response in the current milieu has also long been contested, as some would question the urgency surrounding disaster response when disasters have already been with us throughout history. People have withstood disasters, and life continues despite suffering the casualties and consequences of these unprecedented catastrophes (Carter, 2008). While these ideas hold some truths, modern challenges must consider various factors when facing disaster management, as situations now and then are complex and ever-changing. We must also uphold the fact that preparedness mitigates impact. Thus, strategies must be withheld by meticulously considering multiple facets and possibilities. By that, emerging DRR strategies must consider various factors and motivations in crafting disaster risk reduction policies.

Drawing from this, the paper anchors the necessity to analyze the cases of the Philippines and Myanmar, both Asian countries being (1) from the Global South, (2) recipients of the greatest natural disasters in Asian history like the 2008 Cyclone Nargis in Myanmar and 2013 Typhoon Haiyan in the Philippines, and (3) inadequately managed by

their government despite frequent exposure to disaster-related calamities (Howe & Bang, 2017). These administrative and contextual similarities in mitigation efforts are only a prelude to many contrasting disaster risk resiliency coping mechanisms employed in these two contexts. One thing to look at is the understanding of the "multiple benefits" and the "co-benefits," as mainly implied by the Dynamic Model of Multi-hazard Mitigation CoBenefits (DYNAMMICs). Unlike the traditional view of DRR investment as the sole purpose of disaster response, DYNAMMICs highlight the need for greater attention to the potential spillover effects of DRR investments. It means looking at the increased likelihood of benefits from the initial disaster outside the primary purpose of DRR investments that influences economic growth and improves social welfare even without the occurrence of disaster for the broader goal of sustainability among investment allocations (Yokomatzu et al., 2022). Hence, looking at this angle allows exploring the DRR done by both countries in a narrowed purview as it significantly touches not just the direct use of investment but also the overarching macroeconomic effects.

Utilizing the DYNAMMICs model that considers "multiple benefits," the paper aims to (1) determine and analyze the structural and non-structural investments done by both countries, (2) analyze each country's administrative landscape on DRR, especially the financial schemes, and strategies, (3) draw out some similarities and differences from both contexts and (4) present some recommendatory measures that will augment the disaster risk response. Further, the study argues for a bottom-up policy approach, especially in financial considerations and state intervention in investment-related policies as implicated by integrated community-based risk reduction (ICBRR) (Kafle, 2010; Ubungen, 2020). The paper asserts that addressing vulnerability and community risks to reduce the disaster impacts needs to involve key stakeholders and incorporate all aspects of the disaster management cycle to ascertain the enforceability of DRR investment measures and realize the bold goal of sustainability.

Theoretical Framework

This chapter defines the fundamental concepts of this paper. It incorporates the notions of people-centric response understood in the purview of Integrated Community-Based Risk Reduction (ICBRR), the elucidation of the broader Disaster Risk Management Cycle, the economic manifestation of these measures as it corroborates with the Dynamic Model of Multi-hazard Mitigation CoBenefits (DYNAMMICs), the Multiple Benefits and Triple Dividends, and lastly the weaving of these theoretical underpinnings to the analysis of the Myanmar and Philippine disaster risk investment mechanisms.

The People-Centric Response: Integrated Community-Based Risk Reduction (ICBRR) and the Disaster Risk Management Cycle

The ICBRR integrates all known facets of the disaster management cycle (preparedness, response, recovery, and prevention) to multi-stakeholder participation in the DRR local-level planning. For the ICBRR to make sense, it must be under the provision of well-trained volunteers and abide by formulating rational and responsive DRR and contingency plans. Also, it must incorporate the needs and concerns of vulnerable sectors like children and geriatric people. While normatively, the risk reduction response would include the at-risk sectors in formulating risk reduction measures, most policies would only demand them to engage actively in immediate implementation. It then hinders the direct involvement of vulnerable sectors in the planning stage, resulting in the incapacity to include experiential narratives, which would have been valuable inputs in enhancing capacities. The ICBRR recognizes this lapse, so it considers the involvement of the most vulnerable social group as a paramount consideration for successfully implementing the DRR process. As the ICBRR approach aims to address vulnerability and community risks to reduce the disaster impacts, it must derive the procedure invoked in the disaster management cycle (Kafle, 2010).

The motivation to mitigate or avoid potential losses from hazards through proactive, immediate, and appropriate responses to the victims/ potential victims of disasters paddled the formulation of the Disaster Risk Management Cycle (Khan, 2008). The cycle explicitly illustrates how government, civil society, and entrepreneurship hubs will work together to reduce disaster impact, ensure active responses to calamities, and fulfill specific roles. Appropriate actions at all cycle points are assumed to lead to greater preparedness and minimized vulnerability during the cycle's next iteration. Its completion relies upon public policies and plans catering to the impacts on infrastructure, property, and people. The four disaster management phases are as follows.

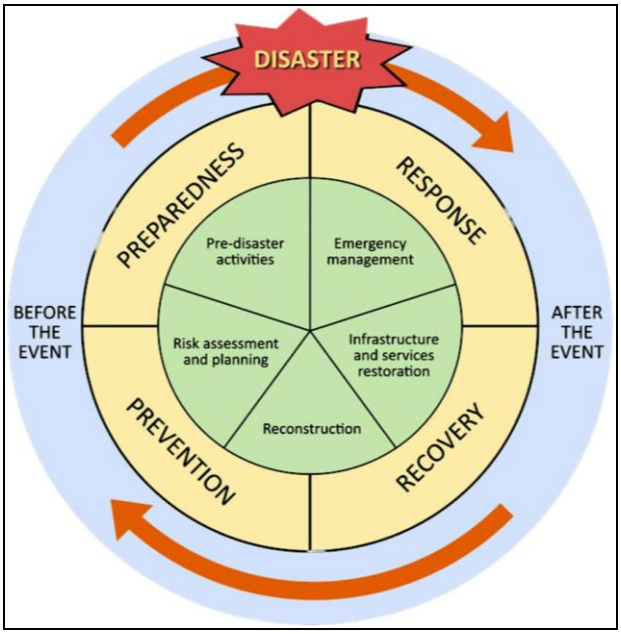


Figure 1 The Disaster Management Cycle

Source: Erdelj, et al., 2017

The four phases are not isolated from each other or are in a specific order. These phases overlap depending on the government's proactiveness or the disaster's severity. Similarly, DRR investments are formulated or conducted in any cycle phase.

1. *Mitigation Phase*. It refers to minimizing disaster impact through zoning and building codes, vulnerability analysis, and public education. It highly depends on the availability of information hazards as it corresponds to national and regional development planning.
2. *Preparation Phase.* It pertains to the plans to respond to emergencies for adequate preparedness. It includes logistical readiness and procedural response mechanisms rehearsed, constructed, procured, and developed for long-term and short-term DRR. It could also refer to strategic food and medicinal reserves.
3. *Response Phase.* This phase pertains to response and approach to hazards created by disasters to minimize the impact as much as possible. It refers to search and rescue operations, providing emergency reliefs, transport to shelters, and establishing semi-permanent settlements. The response phase focuses on meeting the people's immediate needs in the aftermath of calamity while developing a more sustainable and permanent solution. In this phase, the humanitarian organizations would play a critical role in providing victims sustenance and supplies.
4. *Recovery Phase*. This phase presupposes that the emergency has already subsided and that the affected population is prepared to undertake large-scale

activities that would presumably cater to the resumption of their lives before the disaster. Hence, this period caters to constructing infrastructural support and focusing on long-term sustainable development. Vital life support returns to minimal operational standards, and there are counseling and economic programs, health and safety education, public information, housing system establishment, and impact studies and documentation to acquire essential learnings from experience (Chadha, 2020).

It is necessary to acknowledge that these phases operate through two central notions, which are also essential for understanding DRR investments: (1) the utmost consideration of sustainable developments and (2) the significant involvement of humanitarian actions. Sustainable development encompasses the mitigation and response phase, as developmental considerations are critical in these periods. Among the main goals of DRR is to provide sustainable livelihoods to inoculate individuals in disasters and emergencies and catalyze their recovery mechanisms. Including a paradigm for sustainability offers a robust capacity to deal with calamities and decreases the number of vulnerable sectors in emergencies. Meanwhile, humanitarian action is a significant supplement aside from the administrative focus, as these organizations play a crucial role in the response and recovery phase. The answer must also coincide with the optimal leadership of these agencies and personnel trained to handle transport, communication, and logistics support. If not for humanitarian agencies, meeting the immediate demands of people would not have been easier for the administrative bodies. As these cycles manifest themselves through investments, infrastructures, and other programs, it is crucial to know what measures we use in looking at DRR investments in contexts of, for instance, Myanmar and the Philippines. In this case, we see it comprehensively through the DYNAMMICs model.

The Dynamic Model of Multi-hazard Mitigation CoBenefits (DYNAMMICs), Multiple Benefits, and the Triple Dividends

The DYNAMMICs model compares and analyzes various potential programs regarding their economic impact to comprehend the ex-post and ex-ante consequences of DRR investments. In the comparative assessment of Tanzania and Zambia, the model was significant in determining the importance of risk transfer instruments and physical infrastructures in generating various benefits even without emergencies. This model is critical to capture the notions of “co-benefits” or “multiple benefits,” which gained academic attention in analyzing DRR as it emphasizes the potential positive spillover impact of DRR investments. It contrasts with the traditional view that solely looks at DRR investments in protecting assets, lives, and livelihoods. These spill-over effects are influenced by the goal of acquiring advantages that improve social welfare, regardless of whether a disaster is to occur, providing the broader connotation of the sustainability goal in DRR. Tragedies are

prone to lead to long-term consequences (Takasaki, 2017; Wang et al., 2017; Cadag et al., 2017; Mochizukiet et al., 2014; Watson et al., 2007; Noji, 2005) and often result in inequity, poverty, and macroeconomic instability (Cavallo et al., 2013; Noy, 2009; Raddatz, 2007). Hence, DRR must be able to integrate the spill-over effect into the impact of future shocks to ascertain sustainability.

Despite efforts to mainstream this idea, significant gaps still need to be addressed regarding fostering resilient DRR investments. Among the reasons for underinvestment is the limited visibility to possible areas of improvement, as opposed to immediate and easy priorities like the humanitarian response (Kelman, 2014). This myopic view of investment is embodied in the statement of the United Nations Office for Disaster Risk Reduction (UNDRR, 2011), "If DRR measures work well, they represent an invisible success; if there has been no disaster, then nobody is conscious of this success, so there is no political reward" (p.62). Hence, a growing body of scholarly curiosity has tried to conceptualize the quantification of multiple benefits of DRR investments.

Among the most critical works envisioned is the technical report, *The triple dividend of resilience: Realising development goals through the multiple benefits of disaster risk management* (Tanner, et al., 2018). The report's authors introduced the widely adopted triple dividends associated with DRR investments and hypothesized that they could bring three types of benefits presented below.

1. *The 1st Dividend.* It pertains to the DRR investments to avoid the direct impact of a disaster. It may come in structural (building of gray and green infrastructures like dikes, dams, and retention areas) or non-structural forms (including building codes, land use planning, and early warning systems). It is the most perceived benefit by laypeople and experts as it reduces the immediate impact on crop production, fatality, or infrastructure. Moreover, these investments can typically be quantified, allowing easy calculations of expected damage, pre- and post-calamity.
2. *The 2nd Dividend.* This aspect refers to the DRR investment for enhanced economic potential. Disaster risk also harms the financial lives of firms and individuals, influencing their behavior, such as savings and investments (Chantarat et al., 2015; Stephane, 2016). So, this DRR investment ensures that regions and countries retain confidence to invest and must still have minimal impact on economic activities.
3. *The 3rd Dividend.* This investment tackles the principles for sustainable development co-benefits with various utilizations. For instance, dams may provide flood mitigation or cyclone shelter for schools and community buildings but are still functional for power generation or water sources. So, this DRR investment is anchored to nature-based solutions for risk reduction, but communities may also profit from it in the long run.

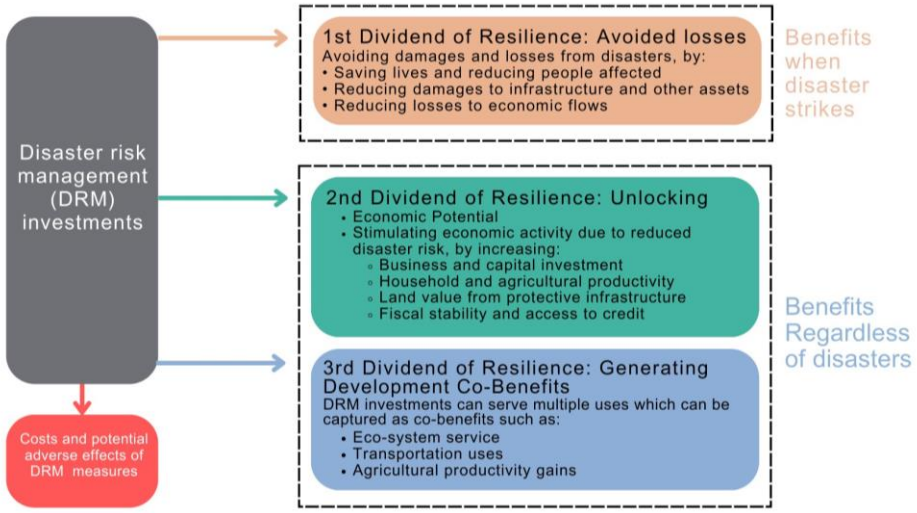


Figure 2 The Three Dividends of Multiple Benefits

Source: Yokomatsu et al., 2022

In a nutshell, the ICBRR approach provides a comprehensive theorization of the possibilities of multi-stakeholder coordination in DRR. Meanwhile, the Disaster Management Cycle discussion supplements the pragmatic implication of the ICBRR in correspondence to the intricacy of the disaster planning phases. The tendencies of cooperation have been present in the Philippines, for instance, in the "Ready to Rebuild: Disaster Rehabilitation and Recovery Program," highlighting the necessity of communications strategy in the planning process. In Myanmar, the ideational push to focus on community-based response in "Myanmar's Action Plan for Disaster Risk Reduction" indicates the possibility of ICBRR incorporation. The paper provides the initial analysis of the options of ICBRR by shedding light on the respective country's administrative and financial allocation approach to DRR. Thus, it explores the possibilities of long-term resilience and sustenance (with the possibilities of socio-civic participation), which was devolved in the DYNAMMICs model of DRR investments. It then purports the necessity for multiple benefits, ex-post and ex-ante, a disaster's occurrence. Overall, these are the broader theoretical foundations implored in the methods of the study. The narrower implications are discussed in the subsequent discussions.

Synthesis: Pragmatic Implication to Myanmar and the Philippine Case

The above notions are the study's theoretical underpinnings that contextualize how we see the DRR strategies to mitigate the impact of disaster risks and enable community development through spill-over effects. These are necessary lenses for understanding the context of the Philippines and Myanmar, both disaster-prone countries with different geographical landscapes and approaches regarding DRR investments and preparation. The

Philippine's natural and physical conditions make the country vulnerable to typhoons, droughts, and seismic activities resulting in volcanic eruptions, earthquakes, and tsunamis (Luna, 2001). The archipelago comprises 7,107 islands amidst the Pacific Ocean and the South China Sea. As the country is on the path of the average typhoon created in the northeastern Pacific, even the common monsoon rain can cause severe flooding in both urban and rural areas. Monsoons have caused devastating impacts on local communities, like the 1991 Ormoc flash flood, which killed 8,000 people (Citizen Disaster Response Center, 1992: 48–55). Meanwhile, Myanmar remains the third most affected nation among the 184 countries impacted by climate change in the last 20 years, according to the 2019 Global Climate Risk Index. Additionally, the country is one of the five Asian nations most vulnerable to major natural disasters. These circumstances are precursors to why focusing on the DRR response of Myanmar and the Philippines is integral. The theoretical notions aforementioned will ensure a parallel understanding of both countries regarding the administrative response. Thus, the prior ideas facilitate investments in the DYNAMMICs modeling, covering structural and nonstructural DRR investment options. Yokomatsu et al. (2022) utilized the DYNAMMICs modeling as it integrated the triple dividends through the following accounts:

- *Structural DRR investments*: encompassing construction of reservoir as an energy source being the primary objective and secondary purposes of flood regulation and water supply.
- *Nonstructural DRR investment*. (1) the presence of drought-resistant crops for the main objective of countering drought risks, (2) exposure management (like planned relocation and land use restrictions) with flood risk reduction as the main objective, (3) insurance with the primary focus of food and drought economic risk reduction.

This study utilizes these lenses to assess each country and determine which investment area can be harnessed, especially by incorporating ICBRR or a people-centric response. However, the study will not delve into the deeper connotations of economic impact brought by the DYNAMMICs model. Due to the current data discrepancy on Myanmar's account, with ongoing political turmoil, it is extremely challenging to gather substantial data to conduct a full-blown macroeconomic comparative analysis. However, pinpointing specificities of progress on DYNAMMICS investments would allow surface-level comparison of the Philippines and Myanmar cases regarding initiatives taken by both administrative landscapes. Thus, this reverts to the fore and primordial concept of the DYNAMMICs model, which is more qualitative, contextual, and descriptive (Yokomatsu et.al., 2022). Hereon, the study's academic merit lies in preliminarily stirring contentions and discourse on these issues by facilitating the initial exploration of this subject focus. In doing so, deeper, rigorous, and meticulous analysis can be conducted for future reference.

Methodology

Through qualitative research design, the study wishes to address the raised inquiries on similarities and differences of situations and DRR investments as evinced by structural and non-structural manifestations in the case of Myanmar and the Philippines. As it is significant to describe previous studies' themes corresponding to the specificities of circumstances, this can be addressed with qualitative inputs, which the study delimited from the early 2000s to 2020. The qualitative research method provides the subjective perception of actions and policy processes as ideated by past scholars (Fossey et al., 2002). Moreover, the study employs comparative cross-national research to provide comparisons and differences and to draw descriptions and logic to accentuate the prominent discourses and themes of different national contexts (Alasuutari et al., 2008; Given, 2008; Outhwaite & Turner, 2007). The research locale is the southeast Asian countries, Philippines and Myanmar. While there are striking resemblances between both countries on political issues like poverty, control over local natural resources and indigenous struggles, ethnic and racial issues, and public-sector corruption (Pacturan, 2015), the core ground of the locale selection is rooted in the proneness of the country to natural hazards. The inadequacy of disaster management in these countries has resulted in tremendous macroeconomic casualties and loss of lives (Howe & Bang, 2017).

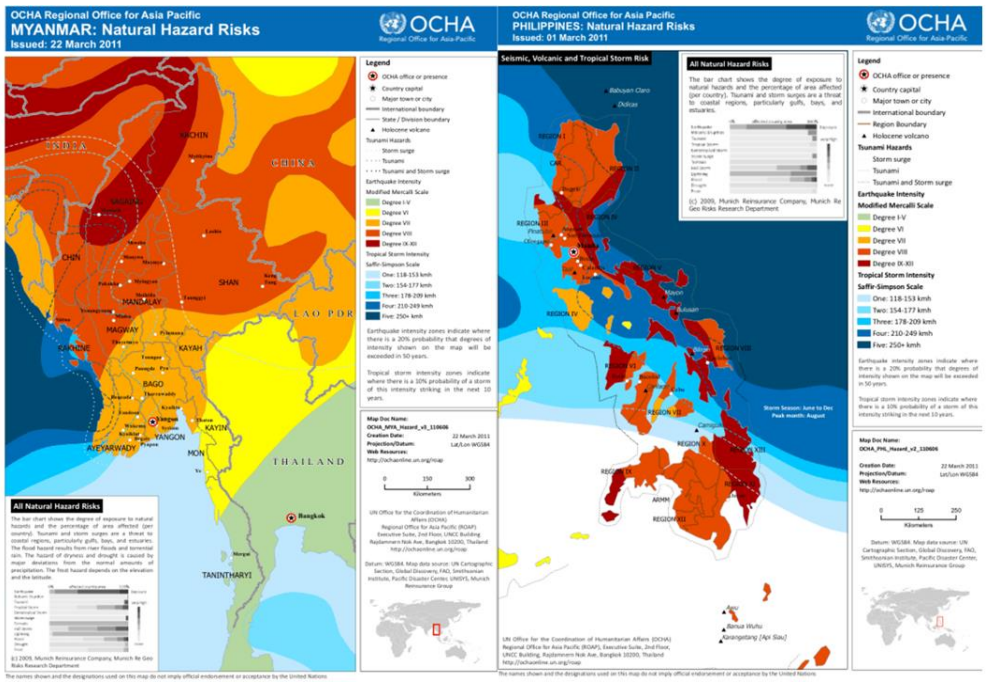


Figure 3 Map of Myanmar [left] and the Philippines [right] Showing Natural Hazard Risks

Source: UN OCHA, 2011

The study also employs secondary data analysis, a widely used data collection technique in social science research. It refers to the reanalysis and retreatment of previously gathered data to explore a dimension of a multifaceted issue (Punch, 2005, cited in Phellas, 2005). Such an analysis frame is necessary as there are various sources for secondary data analysis in response to the particularity of the research focus (Dixon-Wooods, et al., 2004). This study's domain of inquiry utilizes national documents of Myanmar and the Philippines, particularly but not limited to DRR resource allocation and investment, DRR mitigation plan, budget and disbursement frameworks and portfolios, and international support on DRR-related initiatives. Furthermore, it explores existing assumptions from previous studies that elucidate sectoral integration in DRR investment plans.

In analyzing the data, the study was treated with careful consideration of prevailing themes and discussions advanced by thematic analysis. It helps unravel the schema of DRR investment strategies of both countries as it offers a comprehensive and structured theoretical flow of data interpretation. The thematic analysis underlines six phases of analysis to uncover predominant narratives, namely, (1) familiarization which pertains to the process of systematical engagement and familiarization of the researcher with the acquired data through a methodological basis of reviewing these resources, like repeatedly listening to records, rereading transcripts or notes, and other means of reintegrating into initial findings or observations; (2) coding, where the analysis proceeds with identifying and labeling data following the research objectives; (3) theme searching, which refers to a more elaborate pattern-seeking that is aimed at finding clusters and pinpointing the critical themes in the entire data set; (4) reviewing themes where a thorough review is done to know if themes would suffice in covering the full description of the data sets; (5) defining and naming themes where upon finalization, the themes are defined and elaborated by providing clear and concise explanations; (5) and lastly, writing the report where finally, the researcher has to articulate the themes by relating them to the research objective through a vivid and compelling narrative. This last step aims to realize that each theme is a distinct and single facet of analysis, and there is a generalized conclusion derived from understanding each section (Braun & Clarke, 2012).

The processes of thematic analysis in this study were conducted by utilizing the MAXQDA software—a digital application specially made for qualitative and mixed-method research that aims to explore patterns out of noticeable narratives. It can process qualitative data and findings like photos, audio, transcribed texts, and other relevant inputs that can be treated as codes for more in-depth thematizing. For the research rigor, foremost, the researchers declare that there are no conflicts of interest in the conduct of the study. Moreover, it delimits itself to solely utilizing the DYNAMMICs modeling (and the Triple Dividends of Multiple Benefits) in understanding structural and non-structural DRR

investment. As this model proceeds with a much more comprehensive analysis of macroeconomic implications, the study delimits itself solely in determining these investments. It provides a cross-national comparative analysis of DRR strategies in Myanmar's and Philippine's social contexts. At its simplest, cross-national comparative research is a study in which nations are compared on some dimension (Przeworskiand & Teune, 1966). The purpose of cross-national comparisons is to describe national differences or to draw on the logic of comparisons to explain cross-national similarities and differences. Lastly, the study delimits itself from exploring the changes and timeline in the administrational, political, and sociological landscape and regimes affecting DRR investments. It also delimits the ecological transformation and changes not covered in mainstream literature and studies employed in the references cited.

Results and Discussion

At this juncture, the paper proceeds with the analysis of the contexts of Myanmar and the Philippines, primarily anchoring to (1) the administrative landscape of both countries regarding DRR and the broader understanding of existing laws and provisions to mitigate environmental hazards, (2) the DRR investment scheme with utmost consideration to the DYNAMMICs' non-structural and structural aspects, and lastly (3) the considerations to move forward and the connotation of the socio-civic underpinnings of ICBRR in the policy formulation processes.

The Administrative Landscape

Governments are the primary duty-bearers for good governance and natural DRR management, as well as the examination of institutions, budgetary allocations, and even education and pedagogical interventions (Howe & Bang, 2017). This governmental scheme applies to Myanmar and the Philippines, where the administrative landscape is vital in making disaster resilience robust in unprecedented events (UNDRR, 2020). In the case of the Philippines, its government manages and copes with disasters and calamities by spearheading the operationalizations of the National Disaster Risk Reduction and Management Council (NDRRMC). The agency is responsible for preparing, planning, and responding to natural calamities. They follow three stages: (1) pre-disaster risk assessment plans, actions, and protocol, (2) involvement of Response Clusters and Incident Management Teams Response Cluster, and IMT demobilization and deactivation (Climate Adaptation Forum, 2019). They also deploy Project NOAH (Nationwide Operational Assessment of Hazards), which operates under the University of the Philippines and aims to implement and foresee disaster risk programs. Overall, the administrative structure of the country is as follows:

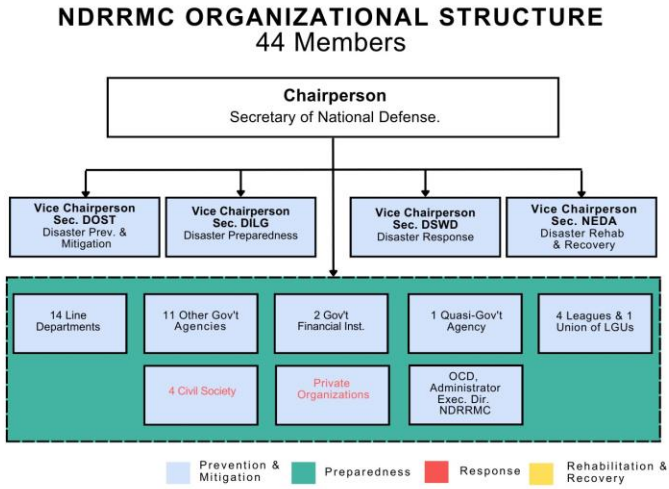


Figure 4 The Administrative Landscape of DRR in the Philippines

Source: Lhuiller, 2016

Myanmar's central government's attempt to establish a robust system for disaster management only began when it adopted the Hyogo Framework for Action 2005–2015 (HFA) and signed the ASEAN Agreement on Disaster Management and Emergency Response (AADMER). All DRR responses are managed by the National Natural Disaster Management Committee (NNDMC). However, in 2008, the ruling government was unprepared and non-responsive to cater to the cataclysmic impact of Cyclone Nargis. It was a crucial turning point as it devastated 130,000 lives when it landed in the Ayeyarwady Delta on May 2-3, 2008. With these events, disaster risk response would need cooperation between different ministries from the central government and cooperation between sub-national governments or state/regional governments. Myanmar also formalized its national disaster management plan in 2009 with the Myanmar Action Plan on Disaster Risk Reduction (MAPDRR) and the Standing Order on Natural Disaster Management. Myanmar's improvement arrangements for disaster risk management are in partnership with international organizations after Cyclone Nargis in 2008 (Tun, 2020). The Natural Disaster Management Law was enacted in 2013, followed by the creation of Disaster Management Rules in 2015. This legislation was designed to align with the Hyogo Framework for Action 2005-2015 (HFA) and comply with the ASEAN Agreement on Disaster Management and Emergency Response (AADMER). However, the law needs to address the Climate Change Adaption (CCA) concept and focus on providing risk information, increasing preparedness and awareness, and improving data management for early warning systems. The Natural Disaster Management Law also

established the National Natural Disaster Management Committee (NNDMC), with several coordinating committees that work under it, as shown in the figure below.

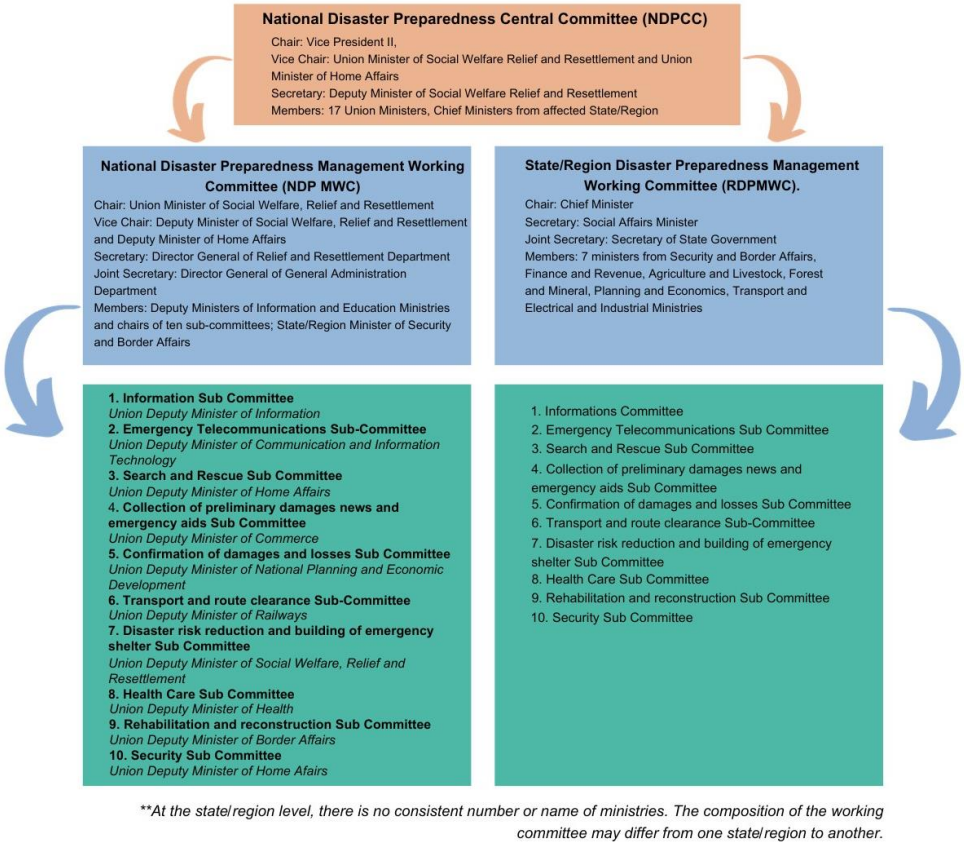


Figure 5 The Administrative Landscape of DRR in Myanmar

Source: OCHA, 2014

The NNDMC is the leading agency responsible for Disaster Risk Management policy, decision-making, strategy formulation, and overall supervision. On 20 April 2011, the Myanmar Disaster Preparedness Agency was established to prepare systematically for potential disasters and effectively respond to relief and support efforts during a disaster. Additionally, on the same day, the Myanmar National Search and Rescue Committee was established to coordinate search and rescue efforts with other countries in Southeast Asia and the Pacific region and to implement national search and rescue measures. These countries' legal backings are summarized in the table below, showcasing major legal provisions and recapitulating both administrations' response mechanisms and mitigation measures.

Table 1 The Administrative Legal Provisions of Myanmar and Philippines for DRR

Major Legal Provisions	**Myanmar**	**Philippines** (Rey, 2015)
Natural Disaster Management	Natural Disaster Management Law (The Pyidaungsu Hluttaw Law No. 21,2013) The 9th Waning of Waso,1375, M.E. (31 July 2013) ● Gives the Ministry of Social Welfare, Relief, and Resettlement the prerogative over DRR and disaster mitigation in Myanmar as guided by the National Committee. Disaster Management Rules (2015) ● Ensures the application of the 2013 Disaster Management Law, taking into account every stage of the disaster management process. Action Plan on Disaster Risk Reduction 2017 ● Presents a plan for minimizing the impact of various hazards and climate-related risks in Myanmar, encompassing a comprehensive approach to disaster and climate risk reduction.	Presidential Decree No. 1566 ● For creating the National Disaster Coordinating Council, which spearheads disaster control in 1978. Republic Act No. 8185 ● It identifies areas of expenditure like reconstruction, relief, and rehabilitation related to calamities. Republic Act No. 7160 ● Also known as the Local Government Code of the Philippines, it aims to give access to LGUs by 5% from the regular revenues in terms of unforeseen expenditures like calamities. Philippine Disaster Risk Reduction and Management Act of 2010 ● It aimed to strengthen disaster management in the country and established NDRRMC as the focal body.

Table 1 The Administrative Legal Provisions of Myanmar and Philippines for DRR (continued)

Major Legal Provisions	**Myanmar**	**Philippines** (Rey, 2015)
Environmental Conservation/ Climate Change	The Environmental Conservation Law The Pyidaungsu Hluttaw Law No. 9 / 2012 The 8th Waxing Day of Tagu, 1373 M. E. (30 March 2012) ● Amongst its goals is to promote international, regional, and bilateral cooperation in environmental conservation. Myanmar Climate Change Strategy (2018-2030) ● It offers a forward-looking plan to steer Myanmar towards sustainable, climate-resilient, and environmentally friendly development, aligning with the post-2015 development agenda.	Philippine Agenda 21 ● Committed to poverty reduction, peace and solidarity, social equity, ecological integrity, empowerment, and good governance. Presidential Task Force on Climate Change ● It aimed to assess the climate situation in the country and comply with air emission standards. Climate Change Act of 2009 ● For resilience and climate change adaptation.
Social Welfare, Relief, and Resettlement	The Ministry of Social Welfare, Relief and Resettlement Notification No. 22 / 2014 The 4th Waning Day of Tagu, 1376, M.E. (7 April 2015) ● to implement natural disaster management programs systematically and expeditiously to reduce disaster risks.	People's Survival Fund ● Aims to provide long-term financing to projects that safeguard the citizenry from climate change and unanticipated calamities.

Table 1 showcases the legal provisions of both countries related to DRR. It implies that the Philippines has more legal underpinning in DRR, with more particular and all-encompassing provisions on the specificities of risk management, ranging from administrative facilitations to how relief systems are approached in localized settings. It still bags the lead among regional actors in terms of disaster management. Nevertheless, several obstacles still hamper immediate response, including a lack of support for personnel for more effective DRR, a lack of assessment for community networks like *Bayanihan* for community-level backing, and an inclination to respond to experiential and traditional measures, disregarding the socio-ecological change, especially amidst unstable climate and more extreme weather events (Alcayna et al., 2016). Meanwhile, in the case of Myanmar, there are two main governmental gaps despite legal provisions covering the resiliency paradigm. First, it lacks an overarching disaster management law with a clear notion of augmented local partnerships for a more proactive response in the peripheries. Second is the need for more clarity on including DRR in development plans and strategies and a focal ministry that shall coordinate with other ministries (Aung, 2010). The Philippines may have expanded the necessary provisions but still lacks a system for implementing those comprehensive legalities. On the other hand, Myanmar may have to explore the administrative and legal notions that embody sustainable and efficient DRR strategies. Moreover, international bodies are gaining acknowledgment of the integration of DRR in all facets of countries' policies, plans, and programs as informed by sustainable development concepts paired with local, bilateral, regional, and international cooperation. They find cooperation and integration to be integral components and are necessary notions in meeting challenges ahead, like climate change and catastrophic natural calamities and disasters.

The Disaster Risk Reduction Investment in Terms of Structural and Non-Structural Schemes: Comparative Analysis of Myanmar and Philippine Cases

This aspect discusses two notions: (1) the financial and budgetary situation for DRR in both countries and (2) the exploration of existing structural and non-structural investments to uncover the allocation of national DRR funds. These are necessary segments to glimpse the financial considerations of both contexts as inferred by the DYNAMMICs model's classification of investments.

National Disaster Risk Financing Strategy of Myanmar and the Philippines

Both countries abide by the risk-layered approach, employing a risk financing (DRF) strategy to enhance their financial capability to withstand geophysical hazards and extreme weather events. The risk-layered approach caters to:

1. low risk, which pertains to frequent but relatively low-impact events;
2. moderate risk, which focuses on the moderate frequency and medium-impact events; and

3. high-risk layer, which emphasizes rare but high-impact events.

This layered approach enables the identification of cost-effective instruments suitable for each risk layer. It encompasses two risk retention categories and two risk transfer mechanisms, ensuring efficient risk management. In Myanmar, the national disaster risk financing (DRF) strategy aims to enhance the country's financial resilience against extreme weather and geophysical hazards. It is a collaborative effort involving multiple stakeholders and requires the active participation of various government agencies. The strategy adopts a risk-layered approach by categorizing risks into low, middle, and high layers. This approach facilitates identifying the most cost-effective risk retention and transfer instruments. For a detailed overview of Myanmar's existing disaster risk financing instruments, please refer to Figure 6. The low-risk layer includes disaster-specific reserves and contingencies such as the contingency fund from the national budget, National Disaster Management (NDM) fund, State/Region Disaster Management funds, and budget lines allocated by line ministries. In the middle-risk layer, various post-disaster financing mechanisms are employed. As for the high-risk layer, insurance/reinsurance, catastrophe bonds, and other insurance-linked instruments are utilized with a time frame of over 50 years (World Bank, Disaster Risk Financing and Insurance Program, 2017).

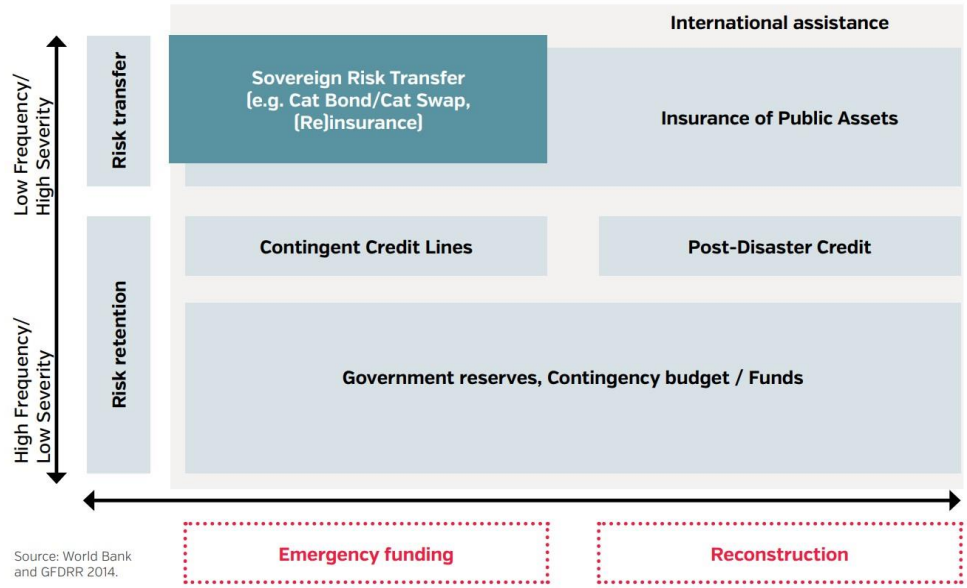


Figure 6 Risk Layered Approach Applied in Myanmar

Source: World Bank, Disaster Risk Financing and Insurance Program, 2017

The government's general revenue, including tax and other income sources, is the primary funding source for disaster response in Myanmar. International assistance and humanitarian aid also play a role, especially in major disasters. However, there is a

significant funding gap in public financing resources to cover the average annual government contingent liabilities. The estimated average yearly liabilities amount to MMK 1,181 billion, while the available funds from the National Disaster Management Fund and Contingency Fund reached only MMK 170 billion in 2020/21. Figure 7 visually represents the estimated funding gap in public financing resources. As a result, there is a heavy reliance on reallocating funds post-disaster within the budget year and diverting capital development expenditure towards post-disaster reconstruction (Ministry of Planning, Finance, and Industry, 2021).

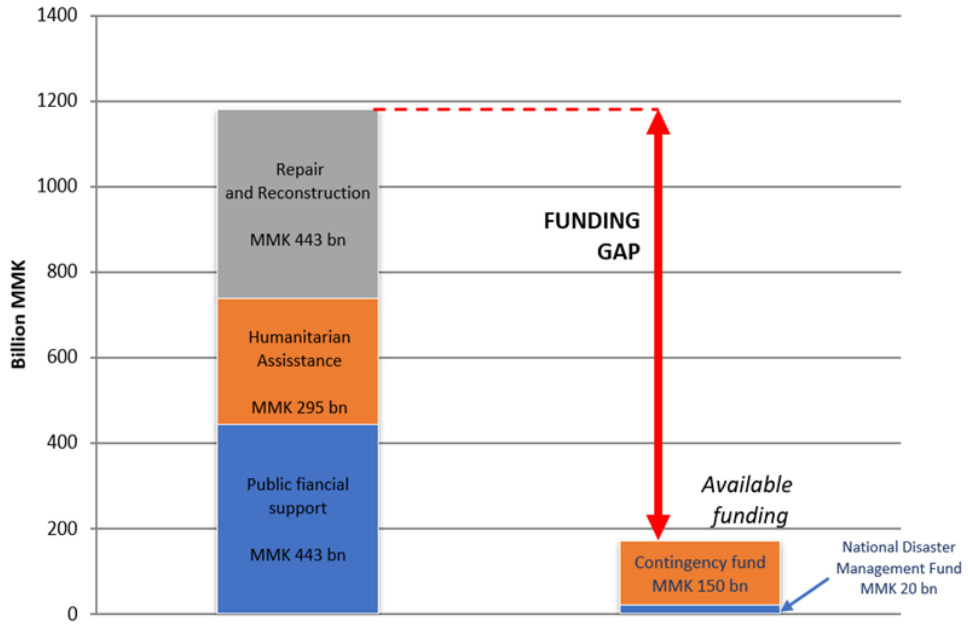
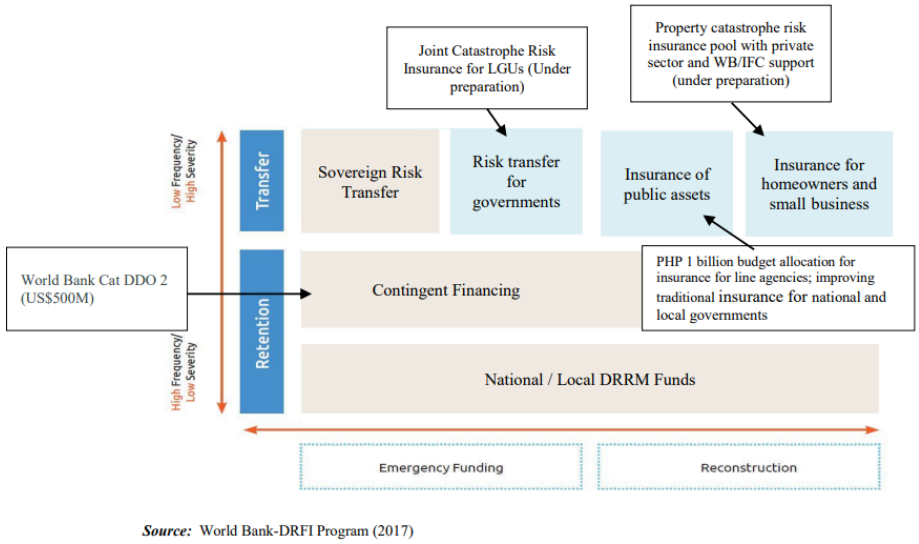


Figure 7 Estimated Funding Gap in Public Financing Resources to Meet Average Annual Government Contingent Liabilities

Source: Ministry of Planning, Finance, and Industry, 2021

The financial response to disasters in the Philippines involves a combination of ex-post and ex-ante DRF instruments. Ex-post instruments include budget realignments, international assistance, and donations, while ex-ante mechanisms aim to provide pre-arranged funding for disaster events. The country has the National Disaster Risk Reduction and Management Fund (NDRRM Fund) at the national level and its local counterpart, the Local Disaster Risk Reduction and Management Fund (LDRRMF). These funds are specifically designated for disaster response and are included in national and local government budgets (Villacin, 2017). The budget for disaster response and recovery in the Philippines comes from various sources, such as the NDRRM Fund, budget appropriations, budget realignments, reconstruction loans, and donations. The Philippines has the National

Disaster Response Plan (NDRP) outlining the processes and mechanisms for a coordinated response to disasters at the national and local levels. Different DRF instruments exist for various risk layers, including the NDRRM Fund and LDRRMF for lower layers of risk, contingent credit lines for middle layers of risk, and GSIS indemnity-based insurance for higher layers of risk. Budget appropriations, realignments, and reconstruction loans are also utilized to finance recovery and reconstruction. Regarding adhering to a disaster risk layering framework in the Philippines (see Figure 8 below), there are currently existing DRFI instruments for the various risk layers, as mentioned above.



Source: World Bank-DRFI Program (2017)

Figure 8 The Risk-Layered Approach Applied in the Philippines

Source: World Bank-DRFI Program, 2017

However, the Philippines faces significant funding gaps, ad hoc management, and project implementation delays during post-disaster recovery and reconstruction. Insufficiency and inefficiency of DRF instruments, as well as constraints in fund flow and budget execution, contribute to these challenges. The Philippines is actively improving its DRF instruments' adequacy, effectiveness, and efficiency. While Myanmar and the Philippines generally recognize the importance of risk transfer and employ a risk-layered approach in their DRF strategies, the Philippines has a more advanced and comprehensive approach to risk transfer mechanisms than Myanmar. Nonetheless, Myanmar is grappling with a substantial funding gap, whereas the Philippines is actively addressing challenges to enhance the effectiveness and efficiency of its DRF instruments. The Philippines utilizes a combination of tools tailored to different levels of risk, such as contingent credit lines and indemnity-based insurance. On the other hand, Myanmar may still be developing and implementing specific risk transfer instruments as part of its national disaster risk financing strategy.

Disaster Risk Reduction (DRR) Investment: A Comparative Analysis of Philippines and Myanmar

Managing DRR and climate change adaptation (CCA) in Myanmar is a mountainous task, not to mention the efforts to reduce poverty, increase resilience, and improve the management of resources. However, efforts are in place to strengthen disaster and CRM in the country, and concrete steps have been taken to further integrate the post-2015 Development Agenda into policymaking and actions on the ground. The following sections provide an overview of the country's process vis-à-vis the mandates of international agreements and frameworks (the Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals, and the Paris Climate Agreement), highlight some of the critical issues, and provide suggestions for improving the further implementation of DRR, CCA and sustainable growth.

Table 2 Selected DRR Investment in the Philippines and Myanmar

Category	**Myanmar**		**Philippines**	
	Structural (Reservoir)	**Non-Structural (Drought-Resistant Crops)**	**Structural (Reservoir)**	**Non-Structural (Drought-Resistant Crops)**
Case (Context Samples)	Zaung Tu Dam (built-in 1994) and the Kodukwe Dam, Shwelaung Dam, and Salu Dam (built-in 2012) in the Bago River Basin (Kawasaki, 2017)	Identifying Lowest Risk Options in Dryland Cropping Systems Through Crop Soil Analyses for Optimal Farm Management Decisions (Andutan, 2016)	Imus Retarding Basin (JICA, 2021)	Priority Commodity Investment Plans (PCIPs) which identifies the commodity value chain and subprojects for rural infrastructure priority to mitigate the impact of drought (UN Convention to Combat Desertification, 2020)

Table 2 Selected DRR Investment in the Philippines and Myanmar (continued)

Category	Myanmar		Philippines	
	Structural (Reservoir)	**Non-Structural (Drought-Resistant Crops)**	**Structural (Reservoir)**	**Non-Structural (Drought-Resistant Crops)**
Primary Objective	Flood disaster mitigation and basin control	Food security in flood season	Flood protection experiencing extreme inundation	To have national strategic priority on food security, stability, and affordability amidst climate change.
Secondary Objective	Hydropower generation for enterprise and implementation and irrigation purposes	Increase the country's agricultural productivity through goods diversification.	Recreational areas during the dry season, such as a soccer field or open park	Help agricultural communities increase yield and provide employment opportunities.
Financing Source	Mainly through NDM and external sources (like JICA, UN agencies, and other NGOs)	CGIAR Research Program on Climate Change, Agriculture and Food Security in Southeast Asia (CCAFS SEA)	PHP 3 billion (JPY 7.54 B) Flood Risk Management Project by Japan International Cooperation Agency (JICA) and Department of Public Works and Highways (DPWH)	Department of Agriculture, PPP, etc.

Table 2 Selected DRR Investment in the Philippines and Myanmar (continued)

Category	Myanmar		Philippines	
	Structural (Reservoir)	**Non-Structural (Drought-Resistant Crops)**	**Structural (Reservoir)**	**Non-Structural (Drought-Resistant Crops)**
Status	Operational	Operational	Operational	Unknown

The structural DRR investments are portrayed by the two case sample reservoirs built primarily to mitigate flood risks. For Myanmar, the dams in Bago City withhold the importance of flood disaster mitigation as its purpose over economic reasons. The biggest one, Zaung Tu Dam, was completed in 1995 and has the largest storage capacity for power generation, with an electric generating capacity of 20 MW. Three additional dams were built in 2012 – Kodukwe, Shwelaung, and Salu. These dams are secondarily used for irrigation purposes (Kawasaki, 2017). Meanwhile, for the Philippines, the Imus Retarding Basin is the case example which was a perceived governmental response to the worsening climate situation and unpredictable weather conditions for flood-prone and extreme inundation areas. It has a holding capacity of 35 hectares. It was a joint project of the Japan International Cooperation Agency (JICA) and the Department of Public Works and Highways (DPWH) (JICA, 2021). Non-structural investments are represented by drought-resistant crop strategies employed by both countries. Myanmar has a clear-cut program that explicitly caters to this investment. The project was under the leadership of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), where the main goal was to determine promising rice-fallow intensification options that will augment production for regions of Monwya, Pakoku, and Magway. Such initiatives analyze weather records, seasonal climate observations, and advanced crop soil models to develop the most optimal crop suggestions for local farmers (Andutan, 2016). In the Philippine case, the same drought-resistant crop objective was also ensured by the Department of Agriculture (DA), especially in the national color-coded agriculture guide derived from analysis of on-trend agricultural innovations, weather predictions, soil types, geographical hazards, and the foreseeable climate impacts. DA also supports Priority Commodity Investment Plans (PCIPs) at the provincial level, which allows the identification of priority commodity values for local farmers and the necessary rural infrastructures and subprojects (UN Convention to Combat

Desertification, 2020). These cases, although not wholistically, elucidate how each country reacts to disaster risk hazards in terms of DRR investments.

Additionally, it is critical to note that the non-structural dimension of the DYNAMMICs framework includes management planning, which encompasses relocation measures and insurance systems, which are not visible in this comparative analysis. These aspects are difficult to oversee as Myanmar is still under political turmoil, which is an utmost consideration when seeking relevant data and contextual inference. Nevertheless, the table above showcases the DRR investments of both countries, covering the non-structural and structural concerns.

At a glance, the study showcases the different cases of DRR investment and an overview of the facilitation of both countries to the holistic DRR response. As the financing is often referred to as an administrative role, as budgetary considerations, it is necessary to have an encompassing and coordinated internal and external response that considers on-the-ground reviews or the hindsight from direct respondents. It is the conception purported by the ICBRR, human-centered development, foresight, coordination, and planning, that would paddle both countries to economic prosperity and mitigate disaster risk impacts, especially amidst environmental catastrophes that the global population has been facing. Further explication of this notion is explained in the next section.

Policies to Move Forward: Maximization of Socio-Civic Inclusions to DRR-Related Responses

From the initial analysis, the comparison infers the following points. First, the included sample of DRR investments in the Philippine columns does not solely rely on the government allocation but would seek international or NGO support. These supports are often undermined, especially amidst the 21st century, where it is critical to note that there has been an overarching emphasis on fostering financial coordination across international NGOs, civil society organizations, and host country governments to substantiate cost and respond in disastrous circumstances (Berman & Korosec, 2005). Second, soil analysis initiatives for a much more effective cropping system specified in the non-structural investment in the Myanmar context should be paired with insurance or other initiatives to incentivize the transition to drought-resistant crops. Moreover, these initiatives should also be treated with similar intensity as the structural components, as these have direct connotations to the economic landscape. Thirdly, the secondary objectives of both investments portray the purpose of DRR investments beyond the primary goal of coping with hazards. It embody the second and third dividends in the Multiple Benefits/ Triple Dividends Framework. There are a variety of creative means to augment the macroeconomic capacity of DRR investments, and policy planners must recognize these opportunities to yield better outcomes. Lastly, both

countries could be made more efficient in responding to disaster response (Howe & Bang, 2017).

It is also worth noting that the case mentioned above is only a snippet of the bigger picture regarding the broader policymaking strategies taken by both governmental contexts. Generally, both countries still needed to catch up for different reasons. In Myanmar, the exacerbated impact of Cyclone Nargis was due to the prioritization of military and national security and resistance to international involvement. The same can be said in the present milieu with the regime transition to a military junta. Meanwhile, the Philippines, despite its receptiveness to liberal ideas and international openness, remains shrouded by problems concerning centralized and technocratic means of facilitating disaster-related phenomena and domestic capacity.

As informed by the above analyses of DRR investment strategies, the following can be considered:

- *In the administrative landscape.* The Philippines should focus on strengthening the implementation of existing laws and provisions for disaster risk reduction (DRR) and ensure coordination between different ministries and local governments. Meanwhile, Myanmar should establish an overarching disaster management law emphasizing local partnerships and a proactive response in the peripheries. It should also clarify the inclusion of DRR in development plans and strategies.
- *In Disaster Risk Reduction Investments.* Both countries should continue to adhere to a risk-layered approach in their disaster risk financing (DRF) strategies and explore cost-effective risk retention and transfer mechanisms suitable for each risk layer. Myanmar should also address the significant funding gap in public financing resources for disaster response and consider diversifying funding sources beyond the government's general revenue. Meanwhile, the Philippines should improve its DRF instruments' adequacy, effectiveness, and efficiency to overcome funding gaps, ad hoc management, and project implementation delays. In regard to investments, structural investments, such as reservoirs and hydroelectric dams with flood-regulating capacity, can be considered in both countries to mitigate the impact of disasters, and non-structural investments, such as promoting drought-resistant crops and expanding insurance coverage, can help enhance resilience and reduce vulnerability.

Top-down and hierarchical policymaking process have hindered each government's DRR strategies. With the opaque systems and minimal participation of lower-level departments and grassroots, disparities are created in the administrative structure, which creates oversight on local or technical aspects. These are due to a need for consultative processes (Mulakala, 2016). So, to ensure that people are empowered, and democracy is

upheld, existing institutions, especially ones that will respond to people's needs, must ensure that programs are facilitated through consultative means (Brennan, 2017). The same applies to the financing dynamics of DRR investments, which must incorporate principles of participatory budgeting. The Aquino Administration has tried implementing bottom-up budgeting in the Philippines, encouraging bottom-level administrations like barangay and municipalities to propose programs beneficial to specific localities (Decker, 2008). This program was called BuB (Bottom-up Budgeting), where essential services to the community were met through structured methods of involving citizens in the national appropriation of funds for public utility (Bartocci, 2016). Anchored from this notion of socio-civic inclusion to DRR investment planning and decision-making, the following options can be considered:

- *Risk Information Generation.* Involve citizenry in the creation of reports for risk information so everyone is on the same page in increasing awareness on all facets of DRR responsibilities. With the increased availability or quality localized information, the necessary interventions can also be generated at the contextual level. On the contrary, a disengaged public and a lack of accurate information render the territories to geophysical hazards, risks, and vulnerabilities as the policy and program orientation could be more precise. It is where the necessity for all stakeholders is critical.
- *Consideration of the Third Dividend Through Embodying Sustainability and Resiliency.* To manage economic growth while considering urbanization, one must reinforce notions of sustainability and resiliency. While this paper tackles the Multiple Benefits notion, it must emphasize the Third Dividend, which distinguishes it from other entrepreneurial ventures as it is easy to settle with the Second Dividend with the promise of economic security. Without thoroughly considering environmental factors, policies like land use and unplanned relocation may exacerbate disaster and climate risks. In Myanmar, the Shan and Ayeyarwady are vulnerable to imminent danger of non-consideration of environmental risks due to the relative vulnerability of size and hydrometeorological dangers (HARP-F & MIMU, 2018). Thus, these regions must be included in Myanmar's DRR priorities.
- *Robust Finance System to Manage Climate Risks.* The effective management of climate risk management procedures must abide by robust financing measures. Seeking sources and revenues is one thing, like establishing a post-disaster resource pool, but it can also be appropriately set as a policy priority. For instance, financing could coincide with comprehensive social protection strategies targeting at-risk communities (World Bank, Disaster Risk Financing Program, 2017). These are outlined in Myanmar's Climate Change Strategies and Sustainable Development Plan for 2018-2030, emphasizing the importance of assessing financial needs in

building human resource support and technological capacity (Alkayna, 2016; Ministry of Natural Resources and Environmental Conservation, 2019). Since primacy is the focal matter here, there is a necessity to weigh based on experiential accounts, which can be done through consultative measures. The expansion of coordinated collaborative approaches to climate risk management at all administration segments is integral to diminishing all inefficiencies rooted in centralized, highly technocratic, hierarchical, and inflexible management.

From the outcome of the modeling of non-structural and structural DRR investments, it is inferable that both countries are in a similar position to have disaster risks, with an approach that coincides with second and third dividends. Hence, it is necessary to consider that both countries can consult and deliberate strategies among their stakeholders to harness economic benefits and risks. As the cases were about drought-resistant crops, areas to explore could be:

1. Health, about possibly augmenting freshwater supply through developing new ways of water harvesting or devising strategies to encourage effective water use through education campaigns.
2. Food and non-food, which refers to further distribution and encouragement of using drought-resistant crops and other agricultural innovations.
3. Logistics, infrastructure, and telecoms, which shall provide better information dissemination campaigns amidst calamities.

Overall, it is critical to enunciate that the quality of governance in both countries will only be deemed high once strength and quality of participation are mainly considered, and all community members are given a chance to utilize the economic opportunity each geo-contextual resource can offer.

Conclusion

The study has provided the comparison of Myanmar and Philippines in terms of the administrative landscape, the non-structural and structural DRR investments as informed by the DYNAMMICs model and has also presented recommendatory measures that shall further the ability of both contexts to be capable amidst calamities and disasters financially. Strengthening the financing of disaster and climate risk management is essential, along with establishing post-disaster resource pools and comprehensive social protection systems to alleviate financial burdens on affected communities. Moreover, this paper posits that both countries should enhance the involvement of lower-level departments and relevant authorities in policymaking to ensure a more inclusive and consultative approach. Improving the availability, quality, and accessibility of risk information at the local level is crucial for prioritizing interventions and improving risk assessment efforts. Also, managing economic growth and urbanization sustainably and resiliently should be prioritized, considering the

impact on disaster and climate risks, environmental degradation, and regional disparities. The paper highlights the importance of strengthening administrative structures, improving financial strategies for DRR, investing in structural and non-structural measures, and promoting inclusive and sustainable policies to enhance disaster resilience in Myanmar and the Philippines. As for future research, it is critical to emphasize the macroeconomic consideration of the aforementioned structural and non-structural investments to know whether the investments taken so far by Myanmar and Philippines has augmented the living standards of the recipients and have a coherent understanding of the impacts of the investments.

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