



## Stakeholders 'Preparedness for 'the Big One' Earthquake: the Case of Greater Manila and other Vulnerable Provinces

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### ABSTRACT

The 'Big One' earthquake has been predicted to occur in the Philippines at any time. Manila has been forecast to experience a 7.2-magnitude earthquake that would result in several fatalities. The country has developed its management structures at the local, provincial and international levels. However, questions have been asked on whether these measures are enough to show readiness for 'The Big One' earthquake. Literature reveals that a long-term planning and clear cut resource mobilization for disaster management is still lacking. Policies have also failed to spell out what is required of the marginalized, civil society and relevant institutions. The review extends with a tabulation of possible theoretical and conceptual lenses to guide the study.

## **INTRODUCTION**

### **Central role of DRM in Governance and Leadership**

The central role of disaster risk management is evident in its potential to identify and chart local capacities, build resilience, as well as raise policies and strategies to prevent, reduce and manage existing risk. Its indispensability in Governance and Leadership resonates in its ability to deliver effective response to disaster as well as reduce risks of a re-occurrence of similar disasters. ([careemergencytoolkit.org](http://careemergencytoolkit.org))

### **The Philippines' Vulnerability to Disaster and State of the art of DRM in Philippines**

The Philippines' peculiar location makes the country susceptible to natural disasters such as floods, volcanic eruptions, landslides, fires, as well as earthquakes. As a result of incessant natural disasters, the country has developed its disaster management structures by institutionalizing roles and improving communication at the local, provincial and international levels.

While the country at first focused more on disaster management policy, in the past few decades it however sought ways to integrate disaster risk management and climate adaptation into the framework of the National Disaster Risk Reduction and Management. Also, the Philippine Congress enacted the National Disaster Risk Reduction and Management Act in 2010 to initiate a multilevel disaster risk management system. ([reliefweb.int](http://reliefweb.int))

However, it has been observed that disaster management systems in the Philippines seem to rely more on a response or reactive approach, rather than on a more effective proactive approach. ([openknowledge.worldbank.org](http://openknowledge.worldbank.org))

However, questions have been asked on whether these measures are enough to show for readiness for 'The Big One' earthquake.

## **LITERATURE REVIEW**

### **Theoretical Framework**

The theoretical framework of this study is built on the Stakeholder Theory and Decision-Making Theory as expounded by (Mojtahedic and Lan Oo, 2013) as well as on the Cybernetics tradition of communication theory with substantial contribution from the general systems theory.

The Stakeholder theory determines power and legitimacy and whether they have a tendency toward proactive and reactive approaches, while the Decision- Making Theory provides optimized decisions for stakeholders for them to minimize all negative consequences of disasters.

In their proposed theoretical framework from their study titled 'Theoretical Framework for Stakeholders' Disaster Response Index in the Built Environment' they opined that a critical issue for the disaster management team is to identify and analyze those stakeholders who can have influence over disaster management phases. This, according to them paves way for managing a process that maximizes stakeholder positive input and minimizes any adverse effect. Furthermore, disaster management is a decision-making process. In this

process, we are expected to make choices over alternatives bearing in mind the possibilities of a deficiency in knowledge and future uncertainty.

The cybernetics tradition is regarded as information processing with an attitude that appreciates the complex nature of communication problems (Craig, 1999). The general systems theory emphasizes interaction among the parts in the systems while the interaction also recognizes the importance of communication (Banathy, as cited in environment ecology.com, 2016).

Even though the general systems theory emerged from biology and engineering, its systems concepts can be easily applied to the natural and social sciences. The concepts are aimed at understanding the totality of the interaction among elements to be able to grasp the dynamism and complexities of systems with changing relationship among things, people, and events, believing that social structures are built and exerted partly by meanings shared by the people who belong to the system (Windahl et al., 1992 as cited by Paner Alba-2003 in Monthivuth, 2007).

The cybernetic tradition emphasizes system as a unique factor that can be recognized by a pattern of relationships and believes that any part of a system is always influenced or constrained by its dependence or other parts. This pattern of inter-dependence organizes the system (Littlejohn and Foss, 2008).

Cybernetics views phenomenon as a process that controls or regulates the way a group or community responds to an external stimulus. In this study, the external stimulus represents 'The Big One' earthquake. As a system, disaster management has sub-systems that include the community stakeholders' profile and their readiness for the said 'Big One' earthquake.

### **Conceptual Framework**

The Tri-Ethnic Centre for Research at Colorado State University USA developed a model that identifies the dimensions of community readiness. The community readiness assessment guidelines and questions of the model will be adapted as the conceptual framework of this study. The model comes with an instrument for determining community readiness. "Readiness," according to the center, is the degree to which a community is prepared to take action on an issue.

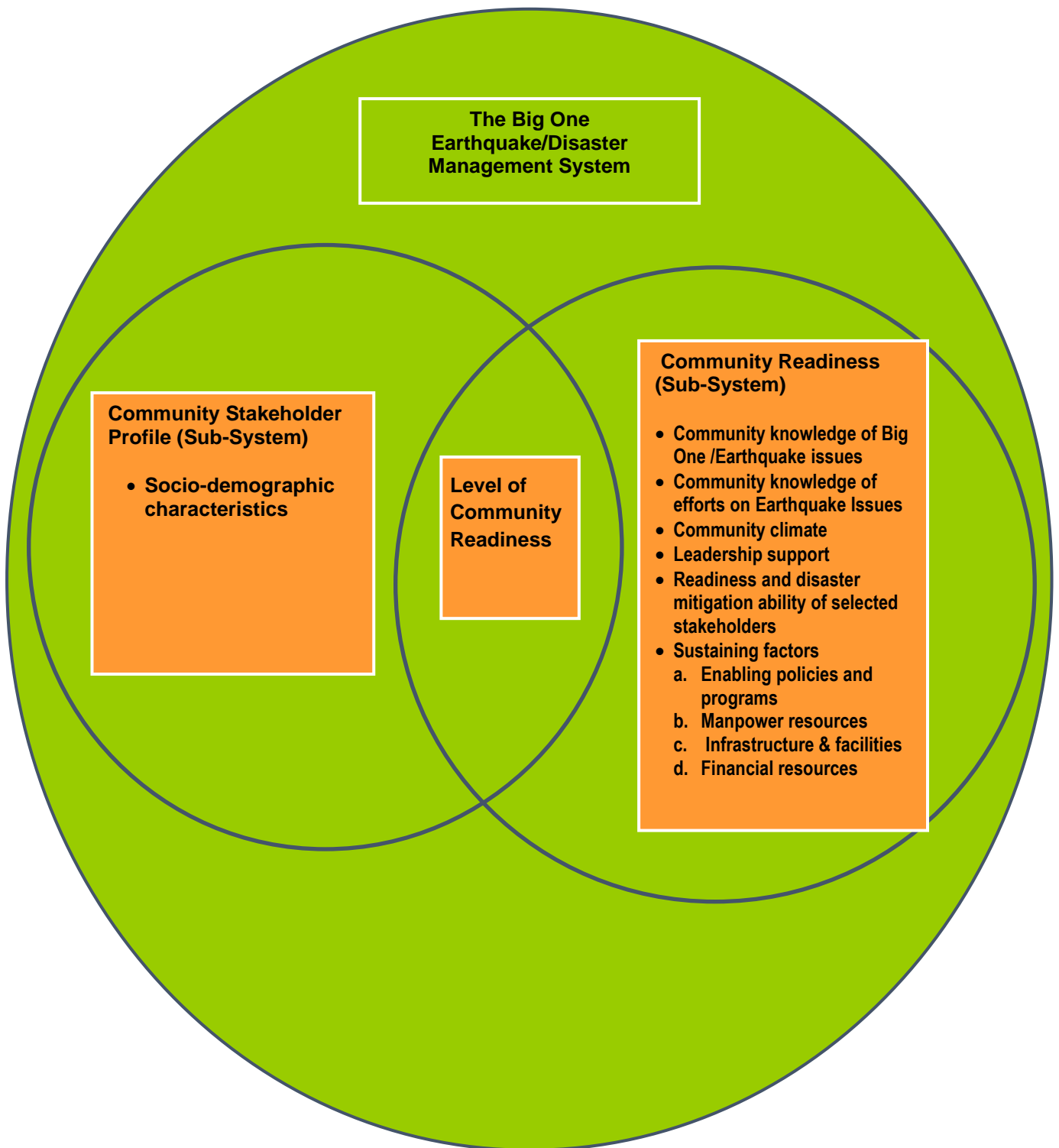
The six dimensions identified by the Tri-ethnic Center for Prevention Research at Colorado State University, USA, consist of the following: (1) extent to which there are efforts, programs, and policies that address the issue; (2) extent to which community members know about local efforts and accessibility of such efforts to all segments of the community; (3) extent to which leaders and influential community members are supportive of the issue; (4) prevailing attitude of the community towards the issue; (5) extent to which the community members know about the causes of the problem, their consequences and impacts on the community; and (6) extent to which local resources such as people, time, money, and space are available to support the efforts.(As adopted from an earlier unpublished study by this researcher).

Guided by the cybernetic tradition, general systems theory, and community readiness assessment model of Colorado State University, this study considers the 'Big One' earthquake as the external stimulus. As a system, the stakeholders interact with its sub-systems that enable it to operate and function. The sub-systems may have a common or mutual ground where some of its elements may converge.

People or stakeholders are primary components of any disaster management intervention as it directly affects them. Thus, this study considers the stakeholders as an important sub-system of any disaster management intervention. In particular, the profile of community stakeholders may affect how disaster management will take shape. Community stakeholders' profile includes socio-demographic characteristics.

Another sub-system of disaster management is the community's readiness. Based on the University of Colorado's dimensions of readiness, the sub-variables that can measure a community's readiness consist of the following: (a) community knowledge of earthquake issues and concerns; (b) community knowledge of efforts on the 'Big One' Earthquake; (c) leadership support; and (d) community readiness and disaster mitigation ability of selected stakeholders.

Also, as part of community readiness, this study adds another sub-variable which is sustainability. The factors considered for sustainability are: (a) enabling policies and programs; (b) manpower resources; (c) infrastructure and facilities; and (d) financial resources. Data on these factors can indicate the state of readiness for the 'Big One' earthquake.



Scolobig et al, (2015) critically examine the transition of disaster risk management from a top -down approach to a people centered approach and local participation especially in the past two decades. They call for a need to transfer much of risk management responsibility from the government to the

people. They also make a case for the citizens to take pre- cautionary actions that are peculiar to their own situations. They opine that such a transition has inherent benefits such as increased stakeholder participation, greater transparency in risk/uncertainty communication, as well as the enhancement of social/institutional capacity building.

The paper examines the teething problems that emerge in adopting people-centered approaches with a focus on the transfer of DRM responsibility to private citizens by the agencies. The authors review traditional top-down

## **REVIEW OF RELATED STUDIES**

Scolobig et al, (2015) critically examine the transition of disaster risk management from a top -down approach to a people centred approach and local participation especially in the past two decades. They call for a need to transfer much of risk management responsibility from the government to the people. They also make a case for the citizens to take pre- cautionary actions that are peculiar to their own situations. They opine that such a transition has inherent benefits such as increased stakeholder participation, greater transparency in risk/uncertainty communication, as well as the enhancement of social/institutional capacity building.

The paper examines the teething problems that emerge in adopting people-centred approaches with a focus on the transfer of DRM responsibility to private citizens by the agencies. The authors review traditional top-down approaches in line with growing global calls for people-centred approaches by comparing the features of both approaches. They achieve this with three case studies that discussed how the personal demands and responsibilities of citizens stand side by side those of local authorities. The results show issues and concerns like lack of willingness by public to share disaster risk management responsibilities with authorities, as well as inadequate resources at the local level. They also discover that with local participation, issues of conflict between the private and public may not be avoided.

The paper also suggests that for official authorities to be better able to implement the people-centred approach, they must better understand residents' views and expectations, and also become better communicators. In addition, the authors suggest that authorities must be willing and ready to enter extensive dialogue with communities. They are of the opinion that this requires a need to give up some responsibility to the people. The authors argue for a well thought out plan to see a combining and integrating of the strengths of the techno-centric and the people-centred approaches. They express a belief in the added value of creating synergies between experts, local agencies and the public as this will promote resilience to hazards and disasters in the community.

They recommend that future research in DRM theory and practice should focus intensely on how to foster a better understanding of responsibility sharing between the state and civil society with a focus on the benefits and challenges of such an arrangement.

Jahangiria, et al (2017) focus on foresight practices in avoiding systematic failures in the management of disasters. The researchers observe that 'Foresight

studies' were not common in 'disaster management' studies, and that the information collected and analysed in this paper was based on theoretical and fundamental concepts of two fields of studies including 'disaster management' and 'Foresight', as well as available resources of the practical Foresight studies in disaster managing. In their research, the authors attempt to expand the relations between 'disaster management', 'risk management', and 'disaster risk management' in Foresight practices and philosophies and reviewed literature of related concepts. Their study reviewed literature in disaster management, Foresight, and related fields, as well as evidence of Foresight and disaster risk management projects as well as analysed global statistical data related to natural disasters. In their review of global trends of natural disasters, they reveal that disaster impacts were increasing in dramatic proportions. They opine that the precariousness associated with future disasters has grown too. According to them this will no doubt surprise decision-makers in future disasters. They believe that to resolve this concern, there is a need for comprehensive, in-depth review of fundamental concepts of Foresight being specifically applied in managing disasters.

They believe that imagination and comprehension of a future situation after a probable disaster are indisputable needs for practitioners to properly improve the efficiency in prevention and preparedness phases.

The authors also raise the following point:

Foresight will help to improve visioning by its approach and tools. Foresight practitioners in disaster management must pay attention to the in-depth level of studies, especially about uncertainties. Previous experiences have shown that Foresight methods are usually used alone, or in a limited atmosphere without any systematic design and combination with different other suitable Foresight methods.

Lina (2018) investigated how the requirement to conduct a National Risk Assessment (NRA) has affected an existing DRM system using Sweden as a case. The study examines how the NRA process has been integrated into the multi-level, multi-stakeholder, bottom-up Swedish DRM system. The study was conducted by collecting empirical data through 21 semi-structured interviews with representatives from 13 national authorities which was supported by secondary data by Swedish and EU documentation. The results were analysed following the ISO 31000 risk assessment process. The findings indicate how NRA work had been integrated into DRM activities, and also showed the level of integration. The results also indicate the extent of stakeholder involvement in the NRA process, the quality of DRM information communication among stakeholders, as well as how the NRA has been implemented in the Swedish context with its potential to expand the NRA throughout the world.

Mashia et al, (2019) assessed Nigeria's NEMA (National Emergency Management Agency) Act to establish how effective and efficient it is in handling disasters in Nigeria. They observe that the Act relates more to the establishment and functioning of (NEMA) for disaster management rather than

focusing on the development of action plans for mitigating or preventing or minimizing the risks of disasters in the country. The paper also observes that the Act was lacking in the clear-cut direction on resource mobilization for disaster management by the stakeholders. It also does not seem to confer on the Agency the power to compel other private and government agencies to include disaster risk reduction in their operations.

The researchers suggest that there is the need to advance policies and practices to reduce the risk of disasters by ensuring that laws are put in place to ensure effective integration of DRR (Disaster Risk Reduction) policies in disaster management processes like many nations have accordingly formulated disaster management and are using same in their countries.

Fleming et al, (2020) in their study on using games for engaging stakeholders in disaster risk reduction opine that Disaster Risk Reduction (DRR), Disaster Risk Management (DRM), and Climate Change Adaptation (CCA) involve various stakeholders from diversified backgrounds, competing agendas, organizational frameworks and perspectives. As a result, such groups of a necessity need to meet to be able to reach an understanding, reconcile their views, and be able to assist one other in meeting their different goals. The authors believe that serious *games* offer the means to establish that needed commonness if adopted by the groups. According to them, during the ESPRESSO (Enhancing Synergies for disaster Prevention in the European Union) project, three such games, referred to as RAMSETE (Risk Assessment Model Simulation for Emergency Training Exercise), were developed. The games were based on table-top, role-playing, scenario-based exercises. The purpose was for stakeholder information elicitation about policy issues related to DRR, DRM, and CCA. Participants in the exercises were given roles that made them interact and negotiate to be able to immerse themselves in and to deal with the presented situations. The situations were primarily about selecting a required set of policies to deal best with the issue or concern in question. The games sometimes included an operational element which was meant to determine the motivations behind the decisions made, rather than to test or to train in response protocols. The authors report that participants found the games useful in framing their discussions about difficult issues, while it brought out their problem-solving potential. Not only that, but the games also allowed stakeholders to discuss without inhibitions as well as challenge ideas, policies, and processes without the fears they would normally have in their daily activities, with other professionals they would not necessarily have access to.

They conclude that while these exercises focus on information elicitation, there is a potential to transfer or convert the format followed to other purposes. Such purposes include trust building exercises between NGOs, local authorities and the military. This according to them can be achieved by adapting the roles employed, and the relative importance of policy, response and interaction. They suggest that the format may also be adapted to the training and testing of the participants and relevant response procedures. However, the accuracy of the proposed protocols must be ascertained and this calls for more details.



Anen et al, (2020) identify three dominant views of conceptualizing community which according to them are (place-based community, interaction-based community, community of practice and interest). They further discuss the relevance of these concepts through a quantitative and qualitative empirical and policy document data regarding flood and storm risk management in Finland, wildfire risk management in Norway and volcanic risk management Iceland. Findings show that even though the conceptualizations of community are in different situations they are visible. The findings underscore the major role of the public sector in DRM in the locales for the study. The researchers observe the prominent role of a professionalized community of interest as well as of practice in disaster preparedness and response in the three counties under study. They note that the community of informal networks is of less importance but admitted that its role is seen more in disaster response and recovery. According to them the place-based local community is visible in some of the policy documents, with a rather limited role. On a final note, they argue that a community's resilience is dependent on the way the community is conceptualized and operationalized. They conclude that steps taken to strengthen resilience of a particular community should be dependent on what the focal community is.

Clark and Chongtay (2020) focused on technology as a channel for reconciling the production and exchange of information and knowledge in disaster risk management. They are of the view that technology now acts as a major reconciliatory infrastructure for communication and collaboration among stakeholders at different levels and phases of a disaster management cycle. They believe that these days, professional disaster management systems and bottom-up, volunteer initiatives processes continue to rely on digital data, information communication technology (ICT), social media platforms and geospatial information to assess risks, organize recovery efforts, and perform early warnings. According to them, technologies furthermore enhance the collective learning processes and consequently broaden an understanding of disaster. They therefore address the evolving socio-technical connection, in which technology, through mediation, has the double potential to support effective disaster risk management processes. They provide an insight into theoretical and practical aspects of technological mediation in disaster risk management. The different views are presented within multiple political, social, technical and ethical contexts. This according to the researchers is with the hope to motivate relevant stakeholders including government, private and public sectors as well as the public in general, to collaborate while using the exposed social, political and ethical patterns to design strategies to effectively leverage the technologies needed to improve disaster risk management.

Nikolic et al (2020) in their study on disaster risk management and building community resilience opine that an effective community response involves developing strategies to cut the risk of natural disasters which involve diverse issues. The issues include developing warning systems and developing knowledge and capabilities for community response as well as maintaining a built environment among others. They believe that the development of a

resilient society should pay attention to learning and developing community knowledge, understanding the dangers and developing the ability to respond and adapt. They believe that the promotion of learning and non-formal education in the concept of disaster risk management will focus to jointly build community resilience.

The study opines that non-formal disaster learning educates and prepares individuals on how to cope with disasters, and connects community members to cope with changes, as well as adapt and return to their earlier lives.

The authors highlight previous studies that indicate the importance of learning that builds community resilience. They believe that focusing on non-formal learning begins with appreciating the opportunities that non-formal education opens to the integration of learning about natural disasters/from natural disasters into community processes, especially given the need to personalize education in a way that enhances its usefulness in local contexts where people experience natural hazards.

The need for community adjustment is recognized because of the role that social relationship plays in risk reduction through the personalizing and localizing their risk. The authors believe that the impact of learning about community resilience can be evident in the building of local capacities in assessing the local situation, gathering information during disasters especially where community members can gather and report information related to the number of injuries and casualties, the number of people in need, the types of assistance needed, and a host of others. They also believe that policies have also failed to spell out what is required of the marginalized, civil society and relevant institutions.

They recommend education on food and water storage, household evacuation plan, household safety and security, early signal identification, first aid skills, occupational health and safety are key contents to raising community readiness and response capacity. According to them, this knowledge should not only relate to any specific disaster but also the benefit of everyday life and the safety of community members. They emphasize the importance of the readiness of informal educators and the development of a strategy for integrating existing expertise and knowledge on disaster risk reduction into various social activities and contents.

Cvetkovi´c et al, (2021) examined the capacity development of local self-governments in the field of disaster risk management (DRM). The aim of the research was to enable both decision makers and citizens to competently and effectively respond to challenges of existing DRM policy in accordance with the principles of prevention, proactive action, coordination, cooperation, partnership, and responsibility, as well as to suggest new research perspectives.

The quantitative research examined the degree of implementation of strategic, legislative, and institutional frameworks, as well as the capacity of local authorities to apply related policies through five analytical scopes: (1) degree of preparedness and legal framework; (2) financial framework; (3) policy aspects; (4) cooperation and partnership; (5) communication. The ability of municipalities and towns to respond to disasters was also analysed and

compared. Their initial hypothesis was that the effective implementation of the concept of DRM policy in towns of Serbia requires the continual strategic, tactical, and operational transformation of the public administration and public management system in order to strengthen the capacity of local self-governments for disaster prevention, preparation, response, and recovery. Their multimethod research was conducted over the period of 2014–2017 and included (a) heads of disaster sectors in local self-government units (mayor) and (b) employees of the DRM sector in local self-government units.

According to observations of the study:

The normative and functional incompleteness and partial non establishment of the DRM system at the central level has resulted in the fact that the system has not been established at the local level to a great extent either. Also, disaster risk management at the local level is carried out in a uniform manner because all local government units have the same type and scope of competencies. No differences were perceived between towns and municipalities with respect to the degree of establishment of competencies, whether normatively, institutionally, functionally, operationally, or financially, except in individual cases in favor of municipalities, which should be the subject of separate research.

The competencies of towns in the operational sense, such as the establishment of headquarters and the adoption of accompanying documents, have only been partially fulfilled. Obligations that reflect the functional establishment of competencies that require full political, organizational, and financial commitment and the incorporation of the security concept into the organizational system have not been established. Supervision over the exercise of competencies in the domain of disasters in local self-government units is not visible in the system. Additionally, liability does not exist in practice, and neither do the procedures and mechanisms for determining the fulfilment of the legally prescribed competencies of local self-government units. Individual, legal, and criminal liabilities have not been made clear, with the assumed liability being primarily political in nature. Cooperation with neighbouring municipalities during disaster events was deemed to be poor while implementation of projects was generally low. Employees in local self-government units were not additionally motivated to develop projects, as they generally will be given more money for extra work. The projects were developed mainly by the local economic development offices, which serve as developmental organizational units, and were implemented by various sectors of local self-governments within the project-related area.

Additional motivation is needed to encourage employees in local self-government units to develop and implement projects in the field of DRM. Cooperation and communication.

Organizational constraints relating to disaster risk management include a lack of staff, insufficient staff education, and financial and technical constraints.

On the other hand, cooperation and communication between actors at the local level have been reduced to formalized meetings, without substantial insight being gained into the capacities of actors, vulnerability assessments being carried out, or developed informal contacts being created between people before disasters occur. Resource databases for disaster risk management are not sufficient.

Ong et al (2021) expressed a lack of studies on Filipinos preparedness in natural calamities such as earthquakes, specifically “The Big One” According to them, this makes it necessary for researchers to look into preparedness and disaster mitigation. Their study focused on assessing the propelling factors that influence the intention to prepare among Filipinos for mitigation of The Big One earthquake. The study integrated Protection Motivation Theory and Extended Theory of Planned Behaviour and the study considered 727 valid responses to measure the intention to prepare. Eight latent were measured namely: (1) perceived vulnerability, (2) perceived severity, (3) subjective norm, (4) perceived behavioural control, (5) attitude, (6) media, (7) understanding of The Big One, and (8) intention to prepare. By using Structural Equation Modelling, the research discovered that Media, Attitude, Perceived Severity and Subjective Norm are all critical factors affecting the intention of the people to prepare for the Big One. In addition to this, it was also discovered that the Understanding of the Big One has an indirect effect on the intention to prepare. The study came up with a model construct which is believed could be useful in evaluating similar natural disasters in any part of the world.

## **RECOMMENDATIONS**

### **Knowledge Gaps**

A synthesis of related literature reveals the following issues and concerns in disaster risk management:

- dependable long-term planning which is essential for the success of disaster risk management is still lacking.
- There are still no clear-cut directions on resource mobilization for disaster management by the stakeholders.
- Acts or policies have failed to clearly stipulate the roles and responsibilities of different stakeholders, especially the vulnerable groups, civil society, scientific institutions, and communities.
- Weak provision for engagement of members of society.
- No provision to ensure people are trained and made well informed about issues of Disaster Risk Reduction (DRR).

There appears to be a yawning gap of a holistic readiness of stakeholders. There is an expressed need and an emphasis on the importance of the readiness of informal educators and the development of a strategy for integrating existing expertise and knowledge on disaster risk reduction into various social activities and contents. Specifically, Ong et al, (2021) in their journal article titled ‘On factors affecting intention to prepare for ‘The Big One’ earthquake admit ‘a lack

of studies on Filipinos' preparedness in natural disasters such as earthquakes, especially 'The big One'. They posed the necessity for a study to assess the readiness and disaster mitigation ability of selected stakeholders.

While Ong et al (2021) came up with a promising model construct that seemed to have set their study apart from other related studies, they were concerned with perhaps an amalgamation of issues and concerns that took up the front burner of these previous studies. Even though their study was more specifically addressed at 'The Big One Earthquake', some of their capstone issues that made it to the model included perceived vulnerability, perceived safety, perceived behavioral control subjective norms, attitude and media.

However, apart from Cvetkovi'c (2021) who examined the degree of implementation of strategic, legislative, and institutional frameworks, as well as the capacity of local authorities to apply related policies by using the five analytical scopes: (1) degree of preparedness and legal framework; (2) financial framework; (3) policy aspects; (4) cooperation and partnership; (5) communication, Ong et al (2021) model construct is observed to be grossly lacking in what has been considered of great importance in preparedness or readiness studies which is a need to incorporate sustainability factors of enabling policies, existing infrastructure, leadership support, manpower resources, as well as financial resources. It is believed that the incorporation of factors such as these as variables in a readiness study are pointers to potential directions for improvement of such a study because it will further strengthen the baseline of the study by taking a more holistic approach at readiness. It is also believed that inclusion of these factors might engender a methodological approach that will enhance a more rigorous as well as evidence-based decision-making in community-based disaster risk management.

There is therefore a need to know who the potential stakeholders of Greater Manila and the susceptible Provinces in Philippines are through a profile describing them, as well as determine the stakeholders' knowledge of: a) disaster risk issues and concerns as they relate to earthquakes, and specifically to 'The Big One earthquake? b) community efforts, c) leadership support, and d) readiness and disaster mitigation ability of selected stakeholders. There is also the need to determine how ready is Greater Manila and the Vulnerable provinces in terms of sustainability factors such as: a) enabling policies and programs. (b) manpower resources, (b)infrastructure and facilities, and (c) financial resources This is to be followed by a recommendation on what actions to take in readiness for The Big One' based on the readiness of Greater Manila and the vulnerable provinces.

## **EXPECTED OUTPUT OF RESEARCH**

It is believed that the research will underscore the significant role of stakeholders as major arbiters in the decision-making process in crisis. The stakeholders' knowledge, skills, attitudes, and personal attributes are critical factors in determining their degree of readiness or preparedness for the crisis. The stakeholders' profile can help identify key players and how their roles can be brought together for a more inclusive disaster risk management.

It is expected that findings of the study will serve to illuminate underlying notions of fostering good governance towards a well informed and educated civil society that uphold the values of responsible citizenship especially where knowledge of and readiness for crisis is concerned.

This study will contribute to the body of knowledge that relates to disaster risk management with emphasis on stakeholders' readiness for disaster.

On the whole, it is expected that this study will enhance a better appreciation of the inter-linkage between stakeholder characteristics and their level of readiness for disaster risk management.

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