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## **Designing a Disaster Resilient City: A Study of the Institutionalization Process of the Marikina City Disaster Risk Reduction and Management Office**

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### **Abstract**

Disaster risks are major bottlenecks to economic development. In the Asia-Pacific region alone, disasters have caused 2 million deaths and accounted for \$2.4 trillion in economic losses since 1971. The current trend shows that disasters are getting stronger due to climate change and are disproportionately affecting people in developing countries and the poorest of the population. Despite the growing literature on disaster risk management (DRM), there still exist knowledge gaps particularly on how to strengthen local institutions to manage risks. As one of the first of its kind in the Philippines, the institutionalization process of the Marikina City Disaster Risk Reduction and Management Office (MCDRRMO) can provide lessons on how to create and sustain local DRM bodies. Using the institutionalization process framework by [1], interviews and document analysis were conducted. The study identified that variation in political leadership, funding, technology, legislation, and ability to meet the desired outcomes can facilitate or hamper the institutionalization process of a DRM structure. These findings can aid policymaking, especially in improving local resilience.

**Keywords:** MCDRRMO; institutionalization; disaster risk management; resilience.

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## 1. Introduction

The Philippines is an archipelagic state in Southeast Asia with a population of 100.98 million and a land area of 300,000 square kilometers [2]. Owing to its location in the Pacific Ring of Fire and the typhoon belt in the Pacific, the Philippines is a hotspot for calamities such as typhoons, earthquakes, floods, and landslides. Increasing population, high poverty incidence, poor urban planning, among others, interface with natural hazards, making the country one of the ten countries in the world that have the highest proportion of the population affected by disasters [3]. Significant losses to the economy were also incurred, with the author in [4] reporting that the total projected losses from disasters up to 2090 would amount to \$299.3 billion or 81.5% of the country's 2010 Gross Domestic Product (GDP). Disasters, therefore, pose significant human security and economic challenges to the Philippines. The government, private sector, civil society organizations, and citizens are compelled to respond to these challenges by strengthening resilience.

**Table 1:** World Risk Report 2018

Rank	Country	Risk %
1	Vanuatu	50.28
2	Tonga	29.42
3	Philippines	25.14
4	Solomon Islands	23.29
5	Guyana	23.23
6	Papua New Guinea	20.88
7	Guatemala	20.60
8	Brunei Darussalam	18.82
9	Bangladesh	17.38
10	Fiji	16.58

Over the years, the term resilience had received various definitions from different disciplines such as the engineering field, biological sciences, and social sciences among others. In this study, resilience is used to pertain to what [5, p.14] calls “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”. Drawing ideas from various studies on resilience, the authors in [6] enumerated six characteristics of resilience, specifically in relation to planning for climate disturbances and related hazards: (i) attention to the current

situation; (ii) attention to trends and future threats; (iii) ability to learn from previous experience; (iv) ability to set goals; (v) ability to initiate actions; and (vi) ability to involve the public. This establishes that planning for resilience entails the participation of stakeholders and an understanding of both the present conditions and foreseen future threats. Further, deepening what resilience means in a specific context—in the case of this study, an urban city context—involves answering the fundamental questions of who, what, when, where, and why of resilience [7].

**Table 2:** Fundamental questions related to urban resilience [7]

Questions to Consider	
Who?	Who determines what is desirable for an urban system?  Whose resilience is prioritized?  Who is included (and excluded) from the urban system?
What?	What perturbations should the urban system be resilient to?  What networks and sectors are included in the urban system?  Is the focus on generic or specific resilience?
When?	Is the focus on rapid on-set disturbances or slow-onset changes?  Is the focus on short-term resilience or long-term resilience?  Is the focus on the resilience of present or future generations?
Where	Where are the spatial boundaries of the urban system?  Is the resilience of some areas prioritized over others?  Does building resilience in some areas affect resilience elsewhere?
Why?	What is the goal of building urban resilience?  What are the underlying motivations for building urban resilience?  Is the focus on process or outcome?

While resilience is often viewed as a community’s ability to bounce back, it was pointed out by [8, p. 198] that this view assumes that communities can come to a steady state when, in reality, cities are “socio-ecological

systems that are not stable and must evolve.” This idea coincides with what Keith Shaw as cited in [8, p. 198] calls “bouncing forward” which give resilience a more progressive direction. In a post-disaster or shock situation, however, this direction may take either one of two trajectories: static resilience or dynamic resilience [9]. Static resilience refers to the ability to resist damage and restore conditions to the same state before the shock, while dynamic resilience means reaching a different state, either better or worse than before the shock.

The physical and social spheres of a community can both enhance and suppress that community’s disaster resilience [10]. These spheres include resources and processes for the physical sphere, and people, institutions, and activities for the social sphere. Building resilience requires managing risks as encapsulated in the term Disaster Risk Management (DRM) defined as “the systematic process of using administrative directives, organizations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” [5, p.10]. Specifically for urban and infrastructure resilience, the authors in [11] pointed out two key components that risk managers must put attention to, such as (i) characterizing disaster vulnerabilities and resilience within existing systems, and (ii) setting priorities for mitigation efforts to improve resilience. These two components entail complexities and can only be addressed within existing governance and planning processes [11].

Governance is always an essential factor in planning, strengthening, and even in failing to build resilience. The quality of governance affects the quality of living, and these two are both affected and challenged in the face of crises and disasters [12]. These adverse events may stem from different stressors that can be broadly categorized as natural, technological, economic, and human stressors [10].

As stressed by the author in [13], politics significantly accounts for most of the world’s disaster problems. The strategy of countries must, therefore, include the creation and sustenance of governance institutions that reinforce disaster risk management both during times of crises and times of normalcy. In the case of the Philippines, existing legislation support the placing of risk reduction and management mandates on all local government units (LGUs). However, many LGUs are faced with many constraints, such as short political cycles, limitations with funding, politicking, and other factors that hamper the continuity of government projects and programs.

The use of a “disaster-resilient eco-community approach” was proposed by [14, p. 249] which recognizes local initiatives in pro-actively addressing disaster and environmental management issues within the development context. The authors used the case study of Puri, India, a coastal community where an Eco-City Development Plan for Puri was developed by the local government in partnership with the School of Planning and Architecture in New Delhi. The plan identified four key areas of concerns: conservation of cultural heritage, improvement of traffic flow, infrastructure improvement, and landscape treatment. This case argues that for initiatives for DRRM to be sustainable and effective, it should be integrated into a city’s development and not seen as a separate endeavor. Several authors in [14, 15, 16] recognize the importance of co-management or engaging different and local stakeholders in planning, designing, and implementing DRR for an effective institutionalization process of DRR. Using a political economy lens, the author in [17] identified several disincentives for a government to adopt DRR compared to disaster relief. These include disincentives towards

public goods provision, rent-seeking and corruption, political cost of controlling settlements and land use, powerful interest group that creates environmental risks, vested interests that block organizational reforms, and political costs of disasters. It should be noted that a government is a highly political institution in which governance decisions are primarily made not always for the public good but also for political survival and power retention. The author in [17] argues that these should be recognized in advocating and designing DRR institutionalization at the government level. Further, the authors in [18] advocated in developing and building local institutional adaptive capacities for effective DRR mainstreaming.

Given the vulnerability of the Philippines to disasters, it is critical to build insights and lessons on local initiatives on DRR. This study documented and analyzed the institutionalization process of the Marikina City Disaster Risk Reduction and Management Office in order to highlight Marikina City's experience in creating and mainstreaming its local DRM institution. Marikina City is one of the Philippines' model cities in local governance and is commonly used as an example for innovative and effective local government management. Specifically, the study 1) described the institutionalization process of MCDRRMO; 2) determined the factors affecting the institutionalization of MCDRRMO, and 3) provided recommendations to theory and practice based on the study's findings.



**Figure 1:** Maps of the Pasig-Marikina-Laguna Lake Complex (adopted from the NAMRIA Geographical Map from [19])

Effective DRM strategies can be very context-specific, but there are some principles and practices that can be applicable, with zero to minimal tweaks, to other areas especially those with similar political, topographical, and risk profiles. This study, aside from reviewing the institutionalization of MCDRRMO, aimed to provide some practical and theoretical insights on institutionalizing local DRRM offices, especially in urban cities.

## **2. Methodology**

### **2.1. Study Area**

Marikina City is one of the 16 cities comprising Metropolitan Manila. The city is in a valley with the Sierra Madre Mountains bordering the east and the hills of Quezon City in the west. By virtue of being in a valley, Marikina City is exposed to riverine flooding from the Marikina and Nangka Rivers. It is the catch basin for the rainwater of San Mateo, Montalban, Antipolo, and Quezon City. The Valley Fault system also runs through the city, which also makes Marikina vulnerable to earthquakes [20].

As recorded in [20], the Jesuits founded Marikina in 1630, forming one of the barrios outside the walled city of Manila or Intramuros. Marikina was then elevated to a municipality status under the province of Rizal in 1910 and later on to a city status under Metropolitan Manila. Its population increased significantly from 9,187 in 1903 to 424,160 in 2010, as the author in [20] recorded. Currently, Marikina City has a population of 755,000 with an area of 21.52 square kilometers [21]. It is estimated by [22] that 80 percent of the city's barangays are affected by flooding. Also, as reported in Marikina's 2013-2019 Local Disaster Risk Reduction and Management Plan, floods could cover as high as 90 percent of the city's land area during a worst-case scenario. Malanday, Industrial Valley Complex (IVC), Tañong, Jesus Dela Peña, Santo Niño, Nangka, and Tumana are the barangays that are most susceptible to flooding.

### **2.2. Research Design**

The research employed a qualitative research design and used a case study approach. A case study, as noted by the author in [23], presents a realistic, complex, and contextually rich situation of conflict, or problem where actors must negotiate. As such, the case study approach was used to describe the institutionalization process of MCDRRMO and to understand the factors, relationships, and challenges that underpin its institutional development. Meanwhile, data were collected through key informant interview (KII) and document analysis. Face-to-face KII was used to gather primary data. Key actors involved in the institutional development of MCDRRMO were interviewed including City Government Officials, members of the academe, and personalities from national government agencies. They were asked regarding the a) institutionalization process of MCDRRM); and b) factors affecting MCDRRMO's institutionalization.

Thematic analysis was used in analyzing the data. The institutionalization process was analyzed using the three types of isomorphism as seen in [24]. The first type is coercive isomorphism which can be brought by formal and informal pressures from other organizations. Meanwhile, mimetic isomorphism happens when organizations adopt effective structures when faced with uncertainty. Lastly, normative isomorphism occurs when organizations adopt new structures to improve efficiency and organizational performance and increase social acceptance. The institutionalization framework developed by [1] was also used to describe the different stages of institutional development. The first stage is habitualization (pre-institutionalization) which involves the creation of new structures in response to an organizational problem and the formalization of these structures through policies or rules. This stage is characterized by varying levels of implementation, limited knowledge of

the structure among non-adopters, and impermanence of the structure. The second stage is objectification. Set of organizations in this stage increasingly adopt the structure with new structures replacing older ones. Structures at this stage tend to be more robust than those at the habitualization stage. The last type is sedimentation wherein the structure is fully-institutionalized, having survived different generations of organizational actors.

Meanwhile, thematic analysis was also used to determine the factors affecting the institutionalization of MCDRRMO. Factors identified in the KII were triangulated with document analysis of national legislation, local ordinances, relevant studies, and newspaper clippings.

### ***2.3. Limitations of the Study***

The study has several limitations. First, it focuses more on the public policy domain in explaining the institutionalization process of MCDRRMO. There are other underlying factors that fall within the bounds of natural sciences and engineering which were given less attention but could enrich the understanding of how institutions are created and maintained. Secondly, a qualitative approach using document analysis and key informant interview could not capture all the necessary data in examining the institutionalization process. This includes, but is not limited to, the level of compliance of institutional actors and the satisfaction rating of stakeholders which a quantitative or mixed research design may be able to capture. Also, it should be noted that while the study was able to highlight a successful case of local DRM institution such as MCDRRMO, not all lessons from Marikina City's experience may apply to other LGUs given that vulnerability, hazards, and the ability to manage risks can be highly context-specific.

## **3. Results and Discussion**

### ***3.1. Institutionalization Process of MCDRRMO***

Prior to Rescue 161 (the predecessor of MCDRRMO), there was no systematic approach to addressing disaster risks in Marikina City. One high ranking local officer reported during a KII that the local government's strategy in responding to a disaster would usually involve giving canned goods. Different offices within the local government were also disorganized. As he noted,

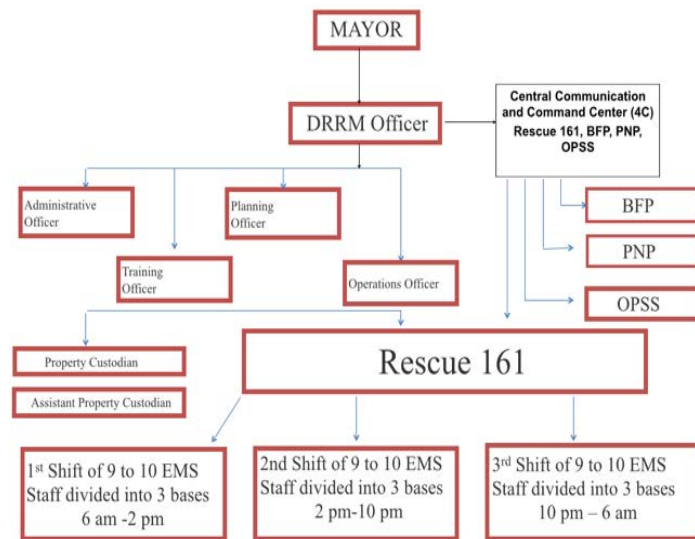
“There was no DRRM office. We relied on the regular police. DRRM institutions were not yet the trend. The barangay performed rescue operations but there was no organized DRRM body on the ground” (personal communication, 25 February 2015).

Such situations, including the institutional fragmentation and lack of local government capacity in addressing disaster risks, are features that were not only limited to Marikina but also in many parts of the Philippines. Dr. Dante Tanjuakio, Director of Project NOAH, shared that during those times,

“The disaster management in the Philippines was reactive. The Philippine government's policies were geared towards managing the effects of a hazard. It was also a top-down centralized approach, which means that the national government would usually take the role of addressing the needs of each and every LGU in times of

disasters” (electronic communication, 22 April 2015).

In response to this, the Marikina City Government, under the administration of Mayor Bayani Fernando, created Rescue 161 in 1998 by virtue of City Ordinance 264. Rescue 161 was named after the three-digit telephone number of the emergency service. It is mandated to respond to disasters, health emergencies, and other similar events. Emergency responders came from different offices within the City Government such as the police, fire, and emergency departments. On average, the response rate of Rescue 161 is 3 minutes for the police, 3.2 minutes for the ambulance services, and 4 minutes for the fire department, as reported by [21]. Rescue 161 was expanded and became the Marikina City Disaster Risk Reduction and Management Office (MCDRRMO) by virtue of the Republic Act 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010. Under the current structure of MCDRRMO, the response unit of the office remained to be Rescue 161 to keep the iconic program (see the figure below).



**Figure 2:** Organizational Structure of the Marikina City Disaster Risk Reduction and Management Office

The presence of a local disaster risk management body in Marikina City is considered as one of the first of its kind in a local government in the Philippines. In 1999, the Department of Interior and Local Government (DILG) awarded the Marikina City Government the Galing Pook Award, a prize given to outstanding local government programs, and inducted them in the hall of fame of the said title in recognition of its effort to reduce disaster risks in the city through Rescue 161. The World Health Organization (WHO) also listed Marikina City as one of the Pacific health cities in 2009. As one of the first DRRM offices and being known as an LGU practicing good local governance, it is relevant to study Marikina City’s experience in institutionalizing MCDRRMO as it can provide important lessons in strengthening local capacity through the creation of institutions.

### 3.2. Factors Affecting the Institutionalization of MCDRRMO

In a report on the issues surrounding the DRM in Asia and the Pacific, the authors in [25] identified, among



others, the linking of local and national aspects and the changing nature of disasters as some primary issues in the local level--the localized nature of some hazards is creating an increasing need for local capacities. However, at events of large-disasters, this local capacity may be insufficient and should therefore be linked to efforts and supporting policies and plans from the national and international level [25].

Up to this date, however, there is little incentive to implement policies to reduce risks. Disaster relief and early recovery are preferred by many political leaders over mitigation and preparedness as these policies are more visible to their constituents. Some DRM policies can also be politically costly. Resettling communities, for example, could mean fewer votes. The prevailing notion is that DRM policies have a low net return in the political process.

Short and negatively disruptive political cycle is also a major bottleneck in instituting long-term policies such as DRM. In the Philippines, local elections normally happen every three years. Not only were disruptions to local DRM programs costly as the government invested time and resources to institute them, but they also hinder the ability of the government to increase resilience from disasters as infrastructure investment, policy and planning enhancement, and capacity development requires having a long-term net return. Moreover, institutionalizing DRM structures should not only be sustainable but should also be measured in terms of effectiveness. The authors in [26], upon observing the flood situation in Thailand, noted that dysfunction or perverse institutional arrangements may increase vulnerabilities to floods.

The LGUs are important actors in ensuring that communities are resilient from disasters due to their proximity to their constituents which enables them to know their needs better and address problems much faster. Local executives are particularly effective in championing resilience as they have cross-cutting powers over different departments across the government. Trends in governance around the world are also shifting towards giving more autonomy to local governments. Marikina City's case as one of the pioneers of creating a DRM body demonstrates that institutionalization can be driven by (1) political leadership, (2) access to new technology, (3) effectiveness, and (4) supporting legislation.

#### **4. Analysis of Factors Affecting MCDRRMO Institutionalization**

##### ***4.1.1. Push Factors in the Institutionalization of MCDRRMO***

###### *Political Leadership*

The role of political leadership in the institutionalization of MCDRRMO can be characterized by strong leadership and continuity. Strong leadership, particularly applied to the context of local governance in the Philippines and explained by [27], refers to democratically-elected representatives having monopolistic control over the government. The administration of Mayor Bayani Fernando is credited for the establishment of MCDRRMO. Fernando won many admirers and critics for his firm and heavy-handed approach as Mayor of Marikina and Chairman of the Metro Manila Development Authority (MMDA). As Mayor of Marikina from 1992-2001, he aggressively pursued to improve Marikina City's response to disasters. His administration sought to resettle illegal settlers living near the rivers around Marikina and small scale vendors in the street who were

often cited as reasons behind the flooding in the city. His firm approach stemmed from his admiration of the attitudes and resilience of the Japanese people during disasters. As one former colleague recalls,

“[He was inspired] especially by the Japanese because they disciplined. The Japanese experiences earthquakes. Marikina is likewise lying on a fault line plus the flooding is regular. It was the discipline of the Japanese...the attitude that we ought to copy.”

In order to address disaster risks, Fernando sought for the creation of Rescue 161. As one former colleague recalls, “*Mayor Bayani Fernando was a mechanical engineer and he was very dynamic. He knows how to set up [an organization] so he was able to do it.*” Rescue 161 benefited from his leadership because, as his brainchild, he had a strong sense of ownership of the structure. Being a mayor and having a strong personality gave him an almost monopolistic control of the local government. Philippine political culture features strong adherence to local chief executives which could have been instrumental in the survival of MCDRRMO especially in its early stages. As implied by the authors in [1, 27], the early stages is where structures are most vulnerable of being phased out when faced with fierce resistance.

Continuity in political leadership is a crucial element in the institutionalization of a DRM body as it ensures that the structure persists through time. This is founded on two key assumptions: first is that continuous political support is necessary to keep resistance within and outside the organization, and second is that investment in resilience takes time. An example for the latter is the certain length of time it takes before a community perceives and measures the impacts of projects like building a road system away from landslide-prone areas or relocating communities from flashflood-prone areas. Continuity, on the other hand, pertains to the political continuity in elected positions and continuous sense of ownership by political actors.

The Fernandos’ length in office, spanning over 20 years, was crucial in ensuring that Rescue 161 would continue. Bayani Fernando, who served as mayor from 1992-2001, was succeeded by his wife, Marides Fernando, who was elected to the same position from 2001-2010. Marides continued the program of her husband, allowing Rescue 161 to persist through another 10 years. The election of a non-Fernando was a litmus test in the survival of the structure. The program continued in part due to the sense of ownership of Del De Guzman who succeeded Marides. As De Guzman puts it,

“Actually, during the start of this program [Rescue 161], I was part of it—when I was his [Mayor Bayani Fernando] Vice Mayor in 1992. So the backbone and policies were conceptualized during our time. We just continued it and also injected [something new] in the approval of the [R.A. 10121]. We have to adopt the law. That was what we did. Rescue 161 basically from a quick response unit [changed focus] from emergency management to disaster risk reduction and management office”.

Since Mayor Del was part of those who created Rescue 161 as Vice Mayor and saw it through its transition as MCDRRMO as Mayor, he saw the structure as his own too, thereby continuing it through his administration.

*Access to New Technology*

Technology is a crucial factor in facilitating institutionalization because it introduces new ways of doing things to make the structure and processes more effective and efficient. Rescue 161, and later MCDRRMO, was able to access new technologies primarily through capacity development programs with local and international counters and partnerships with the private sector. This technological support not only aided Rescue 161 in terms of capacity and equipment but also boosted the officers' sense of competence.

The founders of Rescue 161 did not have any models to imitate by virtue of being the first to establish a local disaster response office. With this, the Marikina City Government sought the help of people from 911 in the United States (US) to help train their personnel. As one former City Administrator recalled,

“We got people from 911 to come in here. Before the National Disaster Coordinating Council (NDCC) imitated our training, where we sent our people over to train, we were the ones who first contacted [911 from the US]”.

It can be observed that Rescue 161 was developed by imitating existing practices through training from the US in pursuit of improving organizational effectiveness. Government-to-government knowledge transfer was also instrumental in allowing Rescue 161, and later MCDRRMO, to get the latest technology. As Dr Dante Tanjuakio of Project NOAH noted, “Marikina is one of the best users of Project NOAH tools and services. They fully understand the information we provide and view the website on a regular basis to monitor the weather. Furthermore, Marikina was chosen as the test area for the MOSES tablet. Each Barangay in Marikina was given a MOSES tablet to study its effectiveness in a real-world setting”. Partnerships are also crucial in introducing new practices to the organization, augmenting manpower and funding, and providing other forms of assistance crucial in the delivery of its mandate. The City Council Resolution No. 283 series of 2000 established and accredited civilian and non-government organizations (NGOs) volunteer brigades such as the Marikina Valley Medical Society, Philippine Red Cross-Marikina Chapter, Tzu Chi Foundation, Marikina City Disaster Volunteer Group, Philippine Contractors Association, and Civic Action Team Marikina.

Rescue 161 and MCDRRMO made use of partnerships to augment its limited human resources. The following organizations were involved in the disaster efforts of the Marikina City government.

**Table 3:** Partner organizations of MCDRRMO

1. Civic Action Team (Marikina)
2. Marikina City Disaster Volunteer Group
3. Marikina Valley Medical Society
4. Philippine Contractors Association
5. Philippine Red Cross – Marikina Chapter
6. Tzu Chi Foundation

The ability of the structure to achieve the desired results provides a rationale for organizational decision makers to continuously support the institution. Rescue 161, and MCDRRMO later on, has been considered as an effective government program primarily because of its quick response to emergency and disaster events as well as effective utilization of technology.

Rescue 161's average response time was 3 minutes for the police, 4 minutes for the fire department, and 3.2 minutes for the ambulance [22]. The presence of Rescue 161 as a venue where different departments in the city government can work together in a quick and effective manner is a hallmark of governance that has been repeatedly recognized by the Galing Pook Award of DILG and Gawad Kalasag of the Office of Civil Defense-Department of National Defense (OCD-DND).

The MCDRRMO is also known for its effective cooperation with the national government. As Dr. Dante Tanjuakio noted,

“Marikina is one of the best users of Project NOAH tools and services. They fully understand the information we provide and view the website on a regular basis to monitor the weather” (personal communication, 22 March 2015).

#### *Supporting Legislation*

Legislations are crucial in the creation of Rescue 161. In particular, the Local Government Code (LGC) of 1991 increased the powers of LGUs with regard to DRM. The following are the salient provisions of the LGC regarding DRM:

- i. LGUs are encouraged to “adopt measures to protect the inhabitants of the city from the harmful effects of man-made and natural disasters and calamities and to provide relief services and assistance to victims during and in the aftermath of said disasters or calamities and their return to productive livelihood following said events” (Section 458, I-IV)
- ii. Calls for the creation of “such offices as may be necessary to carry out the purposes of the city government” (Section 454, c.2.).
- iii. Mandates the allotment of “5% of the estimated revenue of the city from regular sources such as a lump sum appropriation for unforeseen expenditures arising from the occurrence of calamities (Section 324, d).

The LGC served as the legal basis for the creation of Rescue 161 despite the absence of a corresponding city-level ordinance. The law served as a framework that guided local policymakers in Marikina in creating Rescue 161. However, while the LGC remains as important legislation supporting the creation of local DRRMOs, it did not have enough enforcing mechanisms as it did not provide any sanctions to LGUs that fail to comply to the abovementioned provisions. The LGC, therefore, might have served as a legitimizing factor in the creation of Rescue 161 rather than an external factor that coerced local policymakers in Marikina to create its local DRRMO.

The development of Rescue 161 was largely organic as the corresponding local ordinance was enacted at least five years after its creation. Ordinance No. 264 was passed in 1998 which served as the local legislation to justify the presence of Rescue 161. Related local resolutions followed, including the MMDA Resolution No. 04-03 Series of 2006 that called on different LGUs in Metro Manila to ensure the safety of their citizens and for them to collaborate during seismic disasters. In the same year, Ordinance No. 109 Series of 2005 or the Ordinance Adopting a Comprehensive Earthquake Disaster Reduction (CEDR) Program and Action Plan of the City of Marikina was passed.

Local resolutions strengthened the institutionalization of Rescue 161 as they provided inter-weaving sets of rules that legitimized the structure as well as device arrangements to address organizational bottlenecks. In the case of funding, bottlenecks usually stem from stringent rules imposed under the National Disaster Coordinating Council (NDCC) Memorandum Order No. 4, dated 04 March 1998, which stipulates that the state of calamity and utilization of calamity fund can only be made when the following conditions are met:

- i. At least 20% of the population is affected and in need of emergency assistance or those dwelling in units have been destroyed;
- ii. At least 40% of the means of livelihood such as *bancas* (fishing boats), vehicles, and the like are destroyed;
- iii. Major roads and bridges are destroyed and impassable for at least a week, thus disrupting the flow of transport and commerce;
- iv. Widespread destruction of fishponds, crops, poultry, livestock, and other agricultural products;
- v. Epidemics.

In order to address these constraints, the Marikina City Council passed Ordinance No. 54 of 2005 that authorizes the use of 20% of the calamity fund of the city government for disaster preparedness. The City Council also enacted Ordinance No. 073 of 2006 which cascades this provision to all barangay level governments.

Legislations have also been instrumental in addressing issues on how equipment and facilities are used. One former head of Rescue 161 noted that ambulances and employees were sometimes called on by Marikina City officials to go as far as Batangas province. In response, Executive Order No. 011-16 of 2006 was enacted to clarify the scope of Rescue 161's duties and responsibilities, stipulating the following situations that are outside the scope of the unit:

- i. Hospital to hospital transfer within and outside Marikina City;
- ii. Hospital to home of the patient;
- iii. Response to non-emergency cases;
- iv. Assistance to patients outside Marikina City;
- v. Assistance to other LGUs in case of disasters and/or major accidents; and
- vi. Borrowing of equipment.

These exceptions may only be waived upon the permission of the Mayor, City Administration, City Health

Officer, and Assistant City Health Officer. A designated representative shall be appointed in the event that the abovementioned individuals are not present.

The passage of R.A. 10121 was crucial in securing the full institutionalization of MCDRRMO since it was then that local governments are required in Section 12 to create their own disaster risk reduction and management office. As former Mayor De Guzman emphasized,

“So basically we just continue Rescue 161 and adopted MCDRRMO with the passing of R.A. 10121 since we have to adopt that law. That was what we did. So basically, Rescue 161 developed from an emergency quick response unit into a disaster management to risk reduction and management office” (personal communication, 30 March 2015). R.A. 10121 in Section 21 also required LGUs to allot not less than 5% of their estimated revenues to the Local Disaster Risk Reduction and Management Fund (LDRRMF). Thirty percent (30%) of the LDRRMF shall be allotted to the Quick Response Fund (QRF) for relief and recovery programs. This money can be used to support DRM activities such as pre-disaster preparedness programs, training, and procurement of life-saving equipment, supplies, medicine, and calamity insurance among others. In a sense, R.A. 10121 not only supported the institutionalization of Rescue 161 but also expanded its mandate. R.A. 10121 transformed the unit into an Office with a bigger mandate and capacity supported through increased funding and capability to procure new technologies.

#### ***4.1.2. Pull factors in Institutionalizing MCDRRMO***

##### *Insufficient Funding and Limited Access to New Technology*

One of the major challenges for Marikina City’s DRRM Office was insufficient funding for purchasing equipment and covering operational costs, particularly the salary for employees. As one official noted, “The most difficult part is money. It was really money. Bayani Fernando at the time was keen. He knows what equipment to purchase since he is a mechanical engineer. But we were only able to buy secondhand equipment because we did not have enough money” (personal communication, 5 February 2015).

##### *Limiting Legislations*

Legal and institutional problems are major stumbling blocks of MCDRRMO. Unfilled plantilla positions and the alignment of the organization had negative implications for the office. Another recurring issue faced by MCDRRMO is the lack of human resources. Most employees of Rescue 161 and MCDRRMO are casual and have no security of getting tenure. Section 3 of Ordinance No. 264 Series of 1998 allotted 39 plantilla positions for Rescue 161, and this has been increased to 45 positions by Ordinance No. 228 of 1999. Until 2016, however, only the head of Rescue 161 was a regular employee.

##### *Ineffectiveness*

Marikina City’s disaster preparedness was tested during Tropical storm Ondoy (international name: Ketsana) in 2009. Around 455.00 mm of rain fell within a 24-hour period, an amount of precipitation not seen for more than

150 years, as recorded in [19]. As reported by [28], the level of the Marikina River rose rapidly causing a drastic 10.99 m rise in the Marikina River water level. Large-scale damages were seen across Metro Manila, affecting approximately 180,000 people and causing more than a hundred fatalities [29]. Rescue 161 was overwhelmed by the storm. This disaster that plagued Marikina and the rest of Metropolitan Manila sent a strong signal for policymakers to reform the country's DRM law. Rescue 161 had years of experience in dealing with disasters but was unable to deal with Tropical storm Ondoy. This failure to adequately mitigate and respond to the catastrophic impacts of Ondoy can be attributed to several factors.

First, the sheer magnitude of Ondoy was overwhelming for Rescue 161. Typhoons and regular flooding in the city normally cause the Marikina River to rise up to 19 meters, but Tropical storm Ondoy raised the waters to 23 meters. That 4-meter difference is equivalent to a one-storey building, as one former official recalled. Second, Rescue 161 became lax and underestimated the strength of the typhoon. Officials thought that Ondoy was like the disasters that they have dealt with in the past. One official recounted that the City Government has many lifeboats to rescue citizens in times of floods, but these were hardly used in the past. In a sense, the City Government underprepared for Tropical storm Ondoy which posed difficulty later on when the strong disaster came. In fact, Rescue 161 employees were needed to be rescued themselves as they were stuck in the Marikina City Hall where waters rose to as high as 6 feet. Third, the lack of an early warning system was partly responsible since only 3 of the original 7 sirens were installed at that time. This prevented Rescue 161 from giving an early warning to many citizens in Marikina City. Another identified factor that made Rescue 161 ineffective during Typhoon Ondoy is the moving of its office from the Office of City Mayor to the City Health Office. This change of location and leadership pushed the office's focus closer to emergency management and farther from more proactive measures. This brought implications to its performance later on during Ondoy when the Office that was so used to deal with emergencies now had to confront a major disaster situation. This experience of Marikina City confirms the importance of building resilient communities that implement effective, change-responsive, and even change-anticipative strategies. With the high probability of changes in hazards and risks due to climate change and technological advancements, it is high time that DRM policymakers and planners foresee and plan with these changes in mind rather than taking them as unexpected disruptions when they occur [30]. Planning, as stressed by the authors in [31], should anticipate future problems rather than be stuck with the problems of the past. Further, the author in [32] pointed out that sound urban planning necessitates collaboration among different disciplines, and this remains true in the context of DRM planning.

#### ***4.2. Implications for Theory and Practice***

The research revealed several points that can be useful for both DRM theory and practice. First, it was observed that the formalization of DRM structures through legislation does not necessarily entail institutionalization. The ability of the DRM programs and projects to survive through different generations of political actors determines whether a structure is institutionalized or not. Second, institutionalization is a crucial element in managing disaster risks as investments in DRM require long term planning and will take time before the community can reap its effects. Third, a strong leader is needed to create new programs particularly in the face of uncertainty where previous models are scant or non-existent as in the case of Rescue 161. Fourth, decentralization in the Philippines was shown to facilitate innovation on DRM policies on the part of local governments. Allowing

local governments to take charge of DRM allowed them to own DRM initiatives and formulate innovative projects and programs fitting to their need. Fifth, enlightened political dynasties such as the case of the Fernandos in Marikina can be helpful in facilitating the institutionalization of DRM structures. The research, however, was not able to re-evaluate the cost of having a political dynasty in Marikina in relation to the benefits since it only focused on one program. Sixth, there are also negative forms of institutionalization that can hamper the ability of local communities to deal with disasters. Here, the transfer of Rescue 161 from the Office of City Mayor to the City Health Office strengthened the focus of the structure to emergency management, leaving it unprepared for a low-probability but high-risk disaster such as Ondoy. Seventh, effectiveness can provide a strong case for political leaders to continuously support the structure leading to its institutionalization. Eighth, ownership of the structure is crucial in institutionalization as shown in the case of Marikina where former Mayor Del De Guzman continued Rescue 161 and later MCDRRMO because he had a sense of ownership with the program. He was a part of the group who conceived the idea and later on implemented it.

## **5. Conclusion**

The Marikina City Disaster Risk Reduction and Management Office (MCDRRMO) is an example of how DRM structures can be institutionalized. In the research, it was identified that political leadership, supporting legislation, access to new technology, and effectiveness facilitated the institutionalization of MCDRRMO. Meanwhile, limiting legislation, lack of funding, limited access to new technology, and ineffectiveness pose a challenge in the institutionalization of the Office. Given these findings, the research contributes to DRM theory and practice by proposing an institutionalization process model specific to local DRM institutions and by identifying lessons that other LGUs can learn based on Marikina's experience.

## **6. Recommendations**

Basing on the experience of the MCDRRMO, other LGUs may organize their respective DRRMOs starting with their officials and staff who have experience in emergency situations. Internal and external partners may also be tapped to maximize available support that can strengthen DRM planning and implementation. Further, it is of primary importance that LGUs enact local DRM policies on the grounds of R.A. 10121 and DRM-related mandates of the LGC.

Having local ordinances is a starting point to secure DRM-integration in all development plans even through changes in political leadership. A paradigm shift is also critical to institutionalizing an effective DRRMO. Communities need more than effective response and recovery strategies—they also need effective resilience measures that reduce risks and consider future threats that may be brought about by climatic changes, economic and technological issues, and even social problems.

As for all DRRMOs, including the MCDRRMO and those yet to be institutionalized, it is highly recommended to foster collaborations among different disciplines to ensure a holistic DRM strategy. Stronger public participation is also important so that constituents gain a sense of ownership with their city's DRM programs and so that important information like advisories and warnings can be easily communicated.



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