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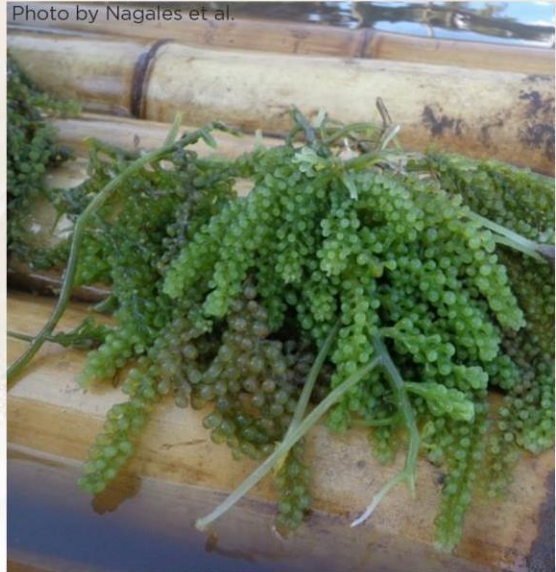
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Editor's Note

The second issue of the Asian Journal of Resilience (AJR) presents a varied collection of research articles that show the different faces of resilience amid challenges or difficulties. The first article, Critical Junctures in Disaster Governance: Lessons from Marikina City, Philippines Post-Ketsana, investigates how a disaster can be an opportunity to build a resilient system. Prof. Ron Jay P. Dangcalan, Prof. Jennifer Marie S. Amparo, Prof. Maria Emilinda T. Mendoza, Prof. Carla Edith G. Jimena, Prof. Diana A. Torio, and Dr. Nicomedes B. Alviar describe how Typhoon Ketsana influenced the different levels of resilience in Marikina City's disaster governance. Their paper also examines whether the City of Marikina has built a better disaster governance institution after the typhoon's onslaught. The article likewise includes lessons on disaster risk management. In addition, their paper proposes a framework to describe the dynamic process of institutional change after a disaster.

The second article, Food, Nutrition, and Well-being of Filipino Adults While in Enhanced Community Quarantine (ECQ), explores the coping strategies of Filipino adults concerning the said aspects during the ECQ due to the COVID-19 pandemic. In the said cross-sectional study, the authors Prof. Anna Teresa O. Orillo, Dr. Aimee Sheree A. Barrion, Dr. Clarissa B. Juanico, Dr. Marites G. Yee, and Prof. Diorella Marie M. Tria also report the health-related as well as food and nutrition-related expectations of the participants after the ECQ.

In the third article, Children of the Flood: The Effect of Flood on the Psychological Resilience of Children, the authors delve into the impact of the flood on children's psychological resilience. Utilizing a phenomenological research framework, Mr. Visidro II P. Songcayaon, Mr. Michael Angelo A. Legarde, and Ms. Jezybell A. Jungco also identified the factors influencing children's coping strategies.

In the fourth article, Dr. Rosario del Rosario, Prof. Genevieve F. Nagales, Dr. Marjorie A. Española, Dr. Ma. Rosario Aynon A. Gonzales, Prof. Hermenegildo P. Dela Peña, and Dr. Michael D. Pido describe aspects of *lato* (*Caulerpa lentillefera*) production. These aspects include the profile of the *lato* farmers, associations related to *lato* growing, aspirations of *lato* growers, growing and marketing *lato*, and initiatives under the Biodiversity Conservation Project. The findings of their study titled Establishing a Conservation-Friendly Livelihood: The Case of Lato Farming in Rizal, Magsaysay, Palawan, Philippines, highlights the necessity of providing support for seaweed production to address poverty alleviation, food security, and inclusiveness. The Editorial Board is grateful to the authors and the reviewers of the abovementioned studies. Their contributions have immensely helped the AJR complete its second issue.

Jonalyn B. Villarosa
Editor-in-Chief

Critical Junctures in Disaster Governance: Lessons from Marikina City, Philippines Post-Ketsana

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Abstract

Disasters as opportunities are an emerging niche of investigation, but empirical evidence remains sparse. As such, this paper described how Typhoon Ketsana affected various levels of resilience in Marikina City's disaster governance institution. This determined whether the city has built a better disaster governance institution post-Ketsana. This also highlighted lessons for Disaster Risk Management (DRM) scholarship and practice. The study proposed a framework to describe the dynamic process of institutional change post-disaster. Data were collected using key informant interviews, document analyses, and literature reviews and interpreted using thematic analysis. The study revealed that Ketsana stimulated systemic interactions leading to policy reforms at the national and local levels, and significant improvements in the city's disaster governance institution. Extreme events also heightened issue awareness for better disaster governance and emphasized the value of science-driven policy approaches. Furthermore, institutional change after the typhoon highlights the value of human ecology in understanding how non-human factors affect social systems, thus providing an opportunity for theory-testing and exploratory theoretical framework building to explain lesson learning from disruptive events. However, comparing pre and post-mandate delivery of disaster governance institutions, using bigger case samples for theory-testing, and focusing on micro-level analysis can be explored in future research.

Keywords

creative destruction, critical juncture, disaster governance, disaster risk management

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opportunity to build back better. Although interest in disasters as opportunities to build more resilient systems is gaining momentum, empirical evidence to support this argument remains sparse (Jha et al., 2018).

The study of politics provides a useful lens to frame this issue, as Guggenheim (2014) notes that disasters alter human norms and behavior and inflict changes to man's material environment. This opens questions on accountability, social organization, transparency, and good governance, among others, thus making them highly political. New developments in the social sciences enrich this area of investigation as the study of politics increasingly focuses on ruptures rather than continuity, and there is a greater reconceptualization of the non-human and nature as actors in themselves (Guggenheim, 2014). There is a two-way relationship between disasters and politics. Disasters affect politics as much as the quality of a country's politics may determine extreme events (Guggenheim, 2014). Disasters are conceptualized as the interface of natural or man-made hazards and vulnerable human activities (Helvetas, 2012) or resulting from the "lack of mutuality between environment or human activity over time" (Bankoff, 2003, p. 224). Both conceptualizations touch on how society is constructed and how development is

1. Introduction

1.1. Background of the Study

Disasters in both theory and practice are often framed negatively. The UN Office for Disaster Risk Reduction [UNISDR] (2009, p.9) defines a disaster as "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its resources." Its effects may be immediate or long-term and often occur when it exceeds the community or system's capacity to cope using its resources (UNISDR, 2017a). While disasters result in human and economic losses, a less explored aspect is beginning to draw interest from academics and practitioners –disasters can also be an



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designed, which are key interests to scholars and practitioners of politics.

Building back better after a disaster is particularly relevant in the Asia-Pacific as it is the region that is most prone to natural disasters in the world (ADB, 2013, & ADBI 2013 as cited in Jha et al., 2018). It is estimated that 1.6 billion people living on \$2 a day are exposed to life-threatening conditions from disasters, which in the last decade resulted in close to 350,000 deaths and economic losses amounting to \$500 billion. Extreme events push people and countries in the region on a slower path of economic growth and may lead to a more persistent form of poverty. Adaptation strategies are crucial, and they require learning from past experiences to cope with future extreme events, granted that disasters often have a familiar pattern and that past experiences would prove to be useful in responding to external shocks (Blaike et al., 1994, as cited in Francisco, 2015).

However, the changing climate requires adaptation strategies that are flexible, comprehensive, holistic, and have the foresight to prepare for extreme events. Hence, there is a need to build resilience – the capacity of a system to adjust to extreme events “by resisting or changing to reach and maintain an acceptable level of functioning and structure” (Manyena, 2006 as cited in Adviento & De Guzman, 2010, p. 103). Disaster risk management captures efforts to strengthen resilience as it refers to “the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to strengthening resilience and reduction of disaster losses” (UNISDR, 2017a, para.1). It also refers to plans that set out goals related to coordination, creation, and implementation of relevant development plans, resource allocations, linkages to sustainable development, and climate change strategies of countries. Managing disaster risks is associated with the achievement of several Sustainable Development Goals (SDGs) including “SDG 1 (End poverty in all its forms everywhere); SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture); SDG 11 (Make cities and human settlements inclusive, safe, resilient and sustainable); and SDG 13 (Take urgent action to combat climate change and its impacts)” (Sustainable Development Knowledge Platform as cited in Philippine Statistics Authority [PSA], 2016, p. 3).

The Philippines is among the most vulnerable countries in the world regarding disasters (World Risk Report, 2018, as cited in Dangcalan et al., 2019). The country’s archipelagic nature and location in the Asia-Pacific Ring of Fire expose it to multiple hazards, such as typhoons, earthquakes, and flooding. More than a thousand disaster events occurred in the country from 2006-2015, according to the PSA (2016), with 2011 being the year with the highest occurrence of disasters (see Figure 1).

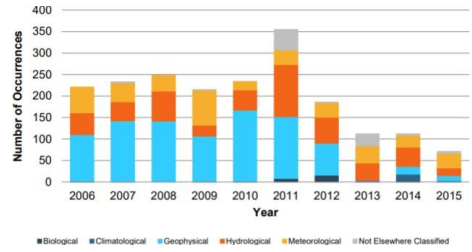


Figure 1. Number of occurrences of natural extreme events from disasters by type from 2006-2015; adapted from “component four: extreme events and disasters,” by National Disaster Risk Reduction and Management Council as cited in PSA (2016, pp. 4-5)

There were around 4,815 disaster-related deaths from 2006-2011, the highest being in 2006 and 2009. Most of these deaths can be attributed to tropical cyclones, which account for 3,072 deaths, as shown in Figure 2.

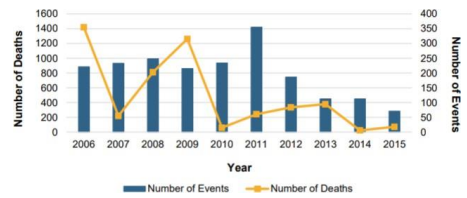


Figure 2. Number of incidents and deaths due to natural extreme events and disasters from 2006-2015; adapted from “component four: extreme events and disasters,” by the National Disaster Risk Reduction and Management Council as cited in PSA (2016, pp. 4-6)

Meanwhile, economic losses from 2005-2015 were estimated to be around Php 133 billion (PSA, 2016). Data show that 2009 had the highest economic losses at Php 45 billion. Typhoons Ondoy (Ketsana) and Pepeng were the most disastrous economically, with Ketsana alone incurring an amount of Php 10 billion among the 14 meteorological disasters that year.

Extreme events exacerbated by changing climates are major stumbling blocks to inclusive development in developing countries like the Philippines. Disaster risk management approaches in the country require the strengthening of its institutions. Population centers, particularly urban areas, are disaster hotspots. UNISDR (2012) released a checklist comprised of 10 action points for cities to be resilient. First on the list is the creation of an organization responsible for coordinating disaster risk management policies and facilitating citizen, private sector,

and civil society participation to reduce and manage risks. Institutions serve as an instrument of the State to fulfill its mandate to its people. The 1987 Philippine Constitution Article II, Section V specifically calls for the State to protect the lives and well-being of its citizens. The Sendai Framework for Disaster Risk Reduction considers the state to be the primary actor responsible for reducing disaster risks. However, it should facilitate an environment where this responsibility to enhance resilience is shared across different stakeholders. There is, however, a need to probe whether institutions change or adapt after experiencing extreme events. Guggenheim (2014, p. 9) emphasizes that disasters can be "the very origin of radical change" or facilitators of critical junctures that account for creative destruction. It is essential to understand how these transformations occur at different levels. There is also a need to complement existing research that places a heavy weight on political leaders as champions of Disaster Risk Management (DRM) governance reforms. Research on institutionally driven reforms and its evidence in developing Asia as "the most natural disaster-prone region in the world" is essential (Jha et al., 2018, p.1). Furthermore, the literature highlights that disaster scholarship should focus more on political barriers and ways of overcoming them (McEntire, 2005). As such, the paper answered three research questions:

1. How did Typhoon Ketsana interface with various levels of resilience (systems-institutional, organizational, and individual) in facilitating institutional change in Marikina City's disaster governance institution?
2. How did Marikina City build back better disaster governance institutions after Typhoon Ketsana?
3. How do the lessons in the case of institutional change in Marikina City's disaster governance institution after Typhoon Ketsana contribute to DRM scholarship and practice?

In this connection, the study has at least four contributions to disaster risk management scholarship and practice. First, it adds to the growing literature on disasters as opportunities. The persistent challenge to scholarship and practice is that lessons from disasters are often lost from institutional memory due to "organizational reconfigurations, personnel turnover," among others (Rice & Jahn, 2019, p.142). Second, the study uses an institutional lens to frame lesson-building after a disaster to understand the dynamic interplay of macro, micro, and meso factors that facilitate collective learning from disruptive events. Third, a human ecological perspective of institutional development complements demands from social science disciplines to incorporate non-human factors in theorizing disasters and their impact on society (Guggenheim, 2014). Lastly, by using a deductive approach in qualitative research, the study complements efforts for theory testing and theoretical framework building in disaster risk management scholarship and practice.

1.2. Disasters as Opportunities

Disasters as opportunities is an emerging line of investigation (Jha et al., 2018). However, the authors recognize that empirical evidence to support this assumption is needed. There are different streams in the literature on how to

approach resilience after a disaster. Some scholars, as noted in Rice and Jahn (2019) and Carlson (2018), focus on the functioning of a community or bouncing back after a disaster, while recent studies suggest creating new normal conditions that are much better than previous levels of resilience for societies to learn from disruptive events. While resilience is often framed from a national, community, organizational, or individual level, there is a need to understand the interplay of various levels of resilience from a systems perspective to analyze how society remembers or forgets lessons from a disaster.

Several system-level approaches have been advanced, particularly in the field of communication, such as the practice approach which seeks to explain how lessons from disasters manifest in actions and discourses among individuals. Rice and Jahn (2019) used the practice lens to study post-disaster United States learning. They found that national-level policies provided by the Federal Emergency Management Agency (FEMA) were crucial in institutionalizing lessons from disasters by shaping discourses among local responders at the Office of Emergency Management (OEM), particularly the concept and practice of self-sufficiency during crises among US counties. Meanwhile, the failure to recognize the pressing concerns of citizens, especially their social values, can create conflicts among stakeholders and stall learning from disruptive events, as evidenced by the case of the US Forest Service (USFS) and the citizen action group in addressing recurrent wildfires in Lodgepole County.

On the other hand, Discourse Renewal Theory frames disasters as a form of renewal by "making sense of a crisis or disaster by revealing the crisis-induced opportunities" (Ulmer et al., 2007, p. 132 as cited in Carlson, 2018, p. 218). A greater state of vigilance allows societies during the "new normal" to be better prepared than pre-crisis. Carlson (2018) argues that instead of focusing on recovery, looking into preparedness where new normalcy is enacted can be the basis for determining whether post-crisis conditions are better than those during pre-crisis. This was demonstrated in the case of the Enbridge Company following the Kalamazoo Oil Spill, the largest oil spill that happened inland in the United States, where renewal attempts have failed but succeeded in enriching dialogue among stakeholders, especially on their interdependency and competing interests (Carlson, 2018). In a sense, the increased issue awareness brought by the crisis has helped organizations and the community to better prepare for future disaster events.

Institutional change, meanwhile, can enrich the lesson-learning analysis. Extreme events alter institutional arrangements congruent to how Guggenheim (2014, p. 13) frames disasters as "cosmopolitics" where "disaster is a way to understand how the world is reorganized on multiple levels through and after a disaster." Cases from the United States and Japan similarly point to disasters as catalysts of institutional change. In the case of FEMA, the US government before 1979 had a dismal response to several disasters such as the Ash Wednesday Storm, Prince William Sound Earthquake and Tsunami, Hurricanes Betsey and Camille, and the San Francisco 1971 Earthquake. Civil defense directors Lacy Suiter of Tennessee and Erie Jones of Illinois lobbied through the National Governor's Association



(NGA) for the creation of a national disaster governance institution. This led to Executive Order 12127 of President Jimmy Carter which created FEMA. In Japan, Typhoon Isewan hit Nagoya in 1959 killing 5,000 people. It sparked a big debate in the country, which resulted, among other factors, in the passage of the Disaster Countermeasures Basic Act (DCBA), which bore a new body, the Central Disaster Management Council (CDMA) (Nazarov, 2011). The cases of FEMA and DCBA demonstrate that crises can trigger the creation of new structures (Dangcalan et al., 2019; FEMA, 2014; Haddow et al., 2013).

1.3. Theoretical and Conceptual Frameworks

The paper derived a theoretical framework from several theories and concepts, including Coleman's (1986) Boat Model, Institutional Theory, Schumpeter's Creative Destruction, Path Dependence, and Critical Juncture. The human ecological approach weaves these concepts together to account for institutional learning after a disaster, from which a conceptual framework was developed and applied in the context of Marikina after its experience with Typhoon Ketsana.

Disaster governance institutions strengthen society's resilience (UNISDR, 2012). Institutions refer to processes (Bell, 2002) or humanly devised constraints that shape behavior (North, 1990) as either formal (laws, constitutions) or informal (culture) (Bell, 2002). The different schools of institutional theory describe the role of actors as either passive or active in shaping institutions. This is shown in the figure at the framework's base (see Figure 3), which recognizes that institutions are products of the historical process posited by Historical New Institutionalism (Immergut, 2011). In a sense, new institutions build on past institutions and are shaped by the dynamic structures and relationships derived from the historical process. However, the framework also recognizes that actors are conscious of the development of institutions (Coleman, 1986). Decisions to alter institutional arrangements stem from their interest in reducing transaction costs and addressing a specific problem (Immergut, 2011)—in this case, an extreme event. Coleman's Boat Model (1986, p. 1309) also builds on the concept of purposive action as a foundation of social theory.

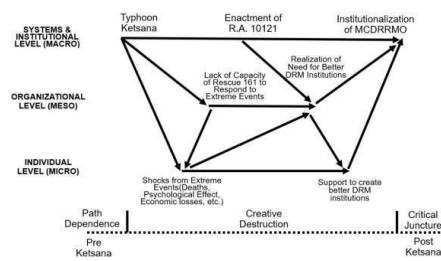


Figure 3. Ketsana as a critical juncture in Marikina City's disaster governance institution

In the framework, an extreme event (Ketsana) is an independent variable that stimulates institutional change. This builds on the assumption of disasters as cosmopolitics or responsible for a social and

material change in society (Guggenheim, 2014). It also considers disaster, a non-human, as an actor in shaping social institutions. The shock in the system results in creative destruction as "catastrophic events are now increasingly seen as catalysts for political action and policy change" (Pelling & Dill, 2006, as cited in Jha et al., 2018, p.1). Creative destruction in the context of product innovation means replacing outdated production processes with more effective and efficient ones. In the context of disasters, Jha et al. (2018, p.1) used it as the "replacement of destroyed and outdated capital with technologically more advanced assets". The researchers define creative destruction as developing new institutional arrangements after a disaster. In a way, creative destruction means the reorientation of people's values and realignment of institutions stemming from increased issue awareness that current set-ups are inadequate to meet the challenges of extreme events. DiMaggio and Powell's (1983) reasons for institutional adaption are also useful in the analysis. Institutional adaptation may come as an externally imposed change through legal means (coercive isomorphism), a response to uncertainty (mimetic isomorphism), or a means to cut transaction costs and improve efficiency (normative isomorphism).

Using Coleman's (1986) Boat Model, the researchers demonstrate that a disaster in the macrosystem affects the micro level or the individuals, as well as the meso or the organizational level. On the other hand, the effects on the meso and micro redound back into the macro. This micro-macro connection is essential to unpack the dynamic process in which individual actions influence the system's functioning (macro). A micro-macro connection has been expressed in various ways, with sociology calling it a problem of transformation, economics as the problem of aggregation and political science as an issue of social choice (Coleman, 1986). In the tiered understanding of institutional change, it is assumed that individuals are purposeful and goal-directed, and their actions have macrosocial consequences, which may create a new structure. This process of creative destruction accounts for the critical juncture wherein the path-dependent institutional arrangements (old structures) shift into new institutional pathways with the creation of a new structure.

Assuming that societies build back better, the new path or structure created after a disaster is a positive form of institutionalization. There are negative institutionalizations that lead to more persistent and deeply rooted problems that hinder resilience. As in the case of flooding in Thailand, "dysfunctional or perverse institutional arrangements may increase vulnerability to floods and risks of flood-related disasters" (Manuta et al., 2006: p. 10). Furthermore, institutionalization not only creates enduring social groups (Berger & Luckman as cited in Freitas & Guimaraes, 2007) but also denotes some institutional persistence (Tolbert & Zucker, 1996). One of the framework's assumptions is that institutional arrangements post-Ketsana are characterized by higher institutional persistence (Dangcalan et al., 2019), as evidenced by supporting national legislation. However, in framing this from a build-back better approach wherein society develops more resilient systems after an extreme event, the new institutions that emerge are better at cutting transaction costs and provide a more holistic and integrative approach to dealing with disaster risks.

Finally, the human ecological approach weaves these theories and concepts together to account for the role of non-human factors (extreme events) in shaping social systems. Human ecology not only provides an ontological blueprint in framing social realities as deeply connected to the natural and physical aspects of the world but also deals with axiological imperatives – or questions of “value” within a system. Dyball (2011, p. 13) defines human ecology as a holistic approach that investigates the “interrelationship between humans, their cultures, and their ecosystems,” where an important point of inquiry is whether current and alternative arrangements are sustainable, fair, just, or ethical. These dynamic interrelationships are framed in a transdisciplinary perspective, where conceptualizations are not just exclusive to academic disciplines but mindful of the key role of local people in “understanding and solving environmental problems” (Knapp, 2007, p. 884).

2. Methodology

2.1. Study Area

Marikina City is a city within the Metropolitan Manila with an area of 2,150 hectares or 21.5 square kilometers (see Figure 4) (Marikina City Government, 2018). Marikina was founded in 1630 by Jesuit priests, forming one of the many barrios outside the wall of Manila or Intramuros (Reyes, 2004). Agricultural lands and rice fields concentrated on the flood plains in Barangays Nangka, Concepcion Uno, Malanday, and Jesus dela Peña were converted into residential and industrial areas as the population grew from just 8,187 in 1903 (Reyes, 2004) into 450,741 in 2019 (PSA, 2019). The city is situated in the Marikina River Basin, which has a drainage area of 582 square kilometers starting on the western slopes of the Sierra Madre Mountain Range (Abon et al., 2011). Several rivers, which include Montalban, Wawa, Tayabasan, Boso Boso, Manga, and Nangka, feed into the Marikina River. Marikina City also falls into the Valley Fault System, which exposes it to earthquakes. Being a valley, it is a low-lying area and a catch basin for higher elevation areas such as Antipolo City to the east and Diliman plateau to the west (Abon et al., 2011).

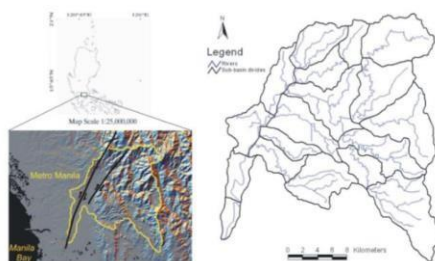


Figure 4. Marikina River Basin transversed by the east and west Marikina Valley faults (black lines). Adapted from “Reconstructing the Tropical Storm Ketsana flood event in Marikina River,” by Abon, David, and Pellejera, 2011, *Hydrology and Earth Systems Science* (15), p. 1254

2.2. Research Design

The study is qualitative and utilizes a case study design. A case study reveals the details and complexity of a single case (Harrison et al., 2017). It also sheds light on the contexts of important circumstances (Stake, 1995). As such, it is often effective in understanding complex real-world issues (Harrison et al., 2017). A case study is essential in unpacking meanings, especially social processes underpinning institutional change. Historical case studies help “address questions related to change, continuity, development and evolution” (Widdersheim, 2018, p. 144). A deductive analysis was also used in the study. While the use of the inductive approach is often used in qualitative research (Hyde, 2000), deductive analysis has value in theory and testing as it addresses some of the shortcomings in inductive approaches, particularly in developing the body of knowledge or theory-building (Pearse, 2019). Furthermore, the use of a single case study design was valuable in testing the assumptions of the theoretical framework as it provided an in-depth analysis of the viability of the framework’s assumptions (Gustafsson, 2017), which can be replicated later in multi-case study research to test the robustness of the findings.

Data collection and analysis undertaken by the researchers consisted of three parts. The first was the preparation phase which involved literature and document reviews related to Typhoon Ketsana and Marikina City’s disaster governance as well as initial coordination and consultations with the local government unit (LGU), particularly the Office of the City Mayor, the Marikina City Disaster Risk Reduction and Management Office (MCDRRMO), Office of the City Administrator, the City Planning and Development Office (CPDO), and the University of the Philippines Diliman’s National Institute of Geological Sciences (UPDNIGS). These initial steps informed the researchers in designing the KII guide. Documents and related literature were databased. Local ordinances were obtained from different offices in the Marikina City Government, whereas national legislations and previous studies were obtained mainly through online sources. The second part is the primary data collection through key informant interviews. Thirteen key informants were interviewed from June 2014 to March 2015, 11 of whom were from the local government of Marikina City and two from UPD NIGS. For post-collection and data analysis, thematic analysis was used to collate, organize, and analyze data from the KII and those from the literature and documents reviewed. Three stages in the thematic analysis were performed as adapted from Clarke (2006), which included (1) familiarizing with the data, (2) searching and defining themes, and (3) producing the report. Following a deductive approach, the data were thematized and grouped in Excel into (1) previous institutional factors, (2) push factors for institutional change, (3) macro (laws, ordinances, etc.), (4) meso (organizational), (5) micro (individuals) aspects that shaped institutional transitions from Rescue 161 to MCDRRMO, and (6) institutional characteristics. The themes that emerged from the KII were triangulated with the data from document analysis and previous studies as the researchers proceeded with the write-up.



3. Result and Discussion

Disasters reconfigure institutions. It creates ruptures which means that it does not just test or alter people's values and norms but also changes the material aspect of the world (Guggenheim, 2014). Ketsana is an extreme event or "rare within its statistical reference distribution...while a disaster is often described as a result of exposure to an extreme event" (UNFDES, 2013 as cited in PSA, 2016, pp. 4-3). Extreme events can either be (1) natural extreme events and disasters or (2) technological disasters. Ketsana falls under subcomponent number one. Ketsana brought an unprecedented rainfall of 448.5 mm of rain in just 12 hours (see Figure 5) (NOAH, 2009 as cited in De Lara-Tuprio et al., 2018) wherein Marikina River's water rose to a record 23 meters above sea level, which flooded up to 70 percent of the city, wherein 30 percent of which was submerged in six meters of water (Francisco, 2015). Available records show that Ketsana brought Marikina River to its highest level compared to previous records before 2009. Many residents in the city have not seen a typhoon of this intensity (Adviento & De Guzman, 2010; Francisco, 2015). A headline from one of the major dailies in the country, the Philippine Daily Inquirer (2009), as cited in Siddique (2009, slide 4), states that

Nearly a month's worth of rain fell in just six hours over Metro Manila Saturday, triggering the worst floods in nearly 40 years, stranding people on rooftops, causing wide-spread blackouts, and killing at least 40 people, officials said. In my experience, this is the worst that I have seen, Defense Secretary Gilbert Teodoro said as he described how authorities grappled with deploying limited resources amid a barrage of pleas for help after Storm Ondoy [Ketsana] slammed ashore.

To understand the implications of Typhoon Ketsana to Marikina City's disaster governance institution, the study first discusses how the typhoon catalyzed institutional reform by looking into the systems-institutional, organizational, and individual levels. Second, pre- and post-Ketsana DRM institutions were compared to determine whether the city has built back its governance systems better. Finally, the discussions centered on the lessons learned from Ketsana and their implications for disaster risk management scholarship and practice.

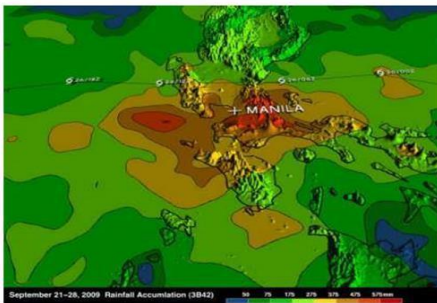


Figure 5. Image from NASA showing the amount of rain dropped by Typhoon Ketsana; adapted from the "Aftermath of Tropical Storm Ondoy", Siddique (2009)

3.1. Typhoon Ketsana as a Catalyst for Institutional Reform in Marikina City's DRRM Governance

3.1.1. Systems-institutional Level

As a disaster-prone country, the Philippines has established various institutional mechanisms to address disaster risks. One landmark legislation in the country is the Republic Act 7160 (Local Government Code of 1991), which led to the devolution of powers and functions from the national to local government (Pellini et al., 2013). Local governments were given a mandate over many administrative, economic, and political functions, including addressing disaster risks. Before the LGC, disaster governance in the country was highly centralized and reactive, as stipulated in Presidential Decree No. 1566 of President Ferdinand Marcos (Pellini et al., 2013). The LGC, in some aspects, has unleashed the creativity of local leaders to develop their disaster governance initiatives. In the mid-1990s, Marikina City created its disaster governance institution, Rescue 161, which integrated its response (police, fire, and health offices) to emergencies and disasters (Dangcalan et al., 2019).

At the national level, increasing disaster incidences and losses led to calls to reform the country's disaster governance strategy. Global and regional discourses on climate change and disasters also heightened. Despite this, a bill on reforming the country's disaster governance system remained pending in the legislature for some time. In 2009, from September 25-26, heavy rains pummeled the country's capital with more than 400 mm of rain within 24 hours. This was not seen for more than 150 years, according to the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAG-ASA) (Sato & Nakasu, 2011). While disasters are common in the country, Metro Manila did not experience such devastation in 2009. One of the cities that were hit the hardest was Marikina, where the floodplain was inundated with water as river channels overflowed when excess water had more than doubled its discharge capacity (Sato & Nakasu, 2011). Hundreds of thousands of people were affected, and some have estimated that economic losses to be as high as \$4 billion (Php 175.6 billion) (SURGE Consortium, 27 September 2014, para. 2). The images of Metro Manila grappling with the devastation caused by Ketsana left an indelible mark in people's memory. It finally became the final push for the government to approve reforms in the country's disaster governance mechanisms. The SURGE Consortium (27 September 2014, para. 2) noted that

...the immense havoc caused by Ondoy (Ketsana) – more than 1,000 deaths, more than \$4 billion (Php 175.6 billion) economic losses, and more than 10 million people displaced and affected – has led to a rethinking of disasters from those which require mere rescue and relief to those which require mapping of risks, prevention and mitigation of losses and climate change adaptation. It gave birth to R.A. 10121 and the People's Survival Fund (R.A. 10174).

The new rethinking of the law allowed for a more holistic approach to disasters. A change in approach was introduced by the Philippine Disaster Risk Reduction and Management (PDRRM) law or R.A. 10121, from reactive—

emergency or disaster management—into a pro-active disaster risk management approach (Ofreneo, Manasan, & Orbeta, 2012). R.A. 10121 stipulated the following in its declaration of policy:

(d) Adopt a disaster risk reduction and management approach that is holistic, comprehensive, integrated, and proactive in lessening the socioeconomic and environmental impacts of disasters, including climate change, and promote the involvement and participation of all sectors and all stakeholders concerned, at all levels, especially the local community;

(g). Mainstream disaster risk reduction and climate change in development processes such as policy formulation, socio-economic development planning, budgeting, and governance, particularly in the areas of environment, agriculture, water, energy, health, education, poverty reduction, land-use, and urban planning, and public infrastructure and housing, among others; and

(j) Ensure that disaster risk reduction and climate change measures are gender-responsive, sensitive to indigenous knowledge systems, and respectful of human rights.

R.A. 10121, as stipulated in Section 11, mandated the creation of a Local Disaster Risk Reduction and Management Office (LDRRMO). Marikina City was one of the local governments that followed the law in creating its LDRRMO (Pellini et al., 2013). This was adopted in the following passages of “Ordinance No. 53 Series of 2011,” which created the MCDRRMO, also known as the “Ordinance Amending Ordinance No. 32 Series of 2011” entitled “Institutionalizing the Organizational Capability of the City of Marikina for Disaster Risk Reduction and Management, and Other Purposes”, which states that

The City of Marikina hereby adapts and upholds the national Disaster Risk Reduction and Management policies pronounced under Republic Act No. 10121 as part of this Ordinance. Likewise, the city shall ensure the realization of the following local policies (Ordinance No. 32, Section 3).

Ketsana was one of the important factors that led to reconfiguring disaster governance institutions in the country and the city. In a sense, Ketsana served as one of the catalysts for national disaster governance reforms in the country, where national legislation influenced Marikina City in creating a new institution—MCDRRMO.

3.1.2. Organization Level

Marikina City has been flooded throughout its long history, being a valley and, therefore, a catch basin of water from higher elevation areas such as Quezon City and Antipolo (Abon et al., 2011; Francisco, 2015). Flood risk is widely recognized as one of the City’s main problems, particularly after the huge flood in 1992, which inundated around 27.52 percent of Marikina’s land area

(Francisco, 2015). Rescue 161 was created in 1993 as the Oplan Ligtas Bayan line unit of then-Mayor Bayani Fernando. It formed part of the City’s Public Safety Center along with the Philippine National Police (PNP), the Bureau of Fire Protection (BFP), and the Office for Public Safety and Security (OPSS). Before this, Marikina City had no systematic response to disasters, as the usual response involved “*pamimigay ng canned goods*” (provision of canned goods”) (personal communication, 25 February 2015). However, Rescue 161 was mostly focused on disaster response, particularly in dealing with flooding once it has caused devastation to the city or to respond to fire and health emergencies. The mindset of reactive disaster governance was further reflected in Ordinance 168 Series of 2007, which stated that during normal times and when there were no occurrences of disasters, Rescue 161 would serve as the Emergency Medical Service (EMS) and the Central Communication and Command Center (4C) of Marikina City.

Disaster mitigation programs, albeit fragmented as an approach, also existed, particularly in preventing flooding. From the mid-1990s to the early 2000s, the local government worked to reduce flooding through improvements in road drainage, dredging a large portion of the Marikina River, clearing obstruction (especially informal settlements) in the waterways, and improving diversion channels (Francisco, 2015). The City Government claimed it had reduced flooding by 31 percent from the 1992 flood event. Marikina City sought to strengthen its flood control mechanism in cooperation with various partners from the national government, multilateral organizations, and NGOs (Dangcalan et al., 2019). The local government also instituted various ordinances and resolutions to address disaster risks in the city (Yu & Sajor, 2008, as cited in De Lara-Tuprio et al., 2018). For this, Marikina won numerous awards from the Office of Civil Defense, the Department of Interior and Local Government, and the World Health Organization (Francisco, 2015).

However, this reactive approach proved ineffective in dealing with an extreme event with an intensity like Ketsana. As Francisco (2015, p. 6) narrated:

However, in 2009, unprecedented rainfall brought by Typhoon Ondoy (Ketsana) seemed to have caught the city off guard. The Marikina River rose to a record of 23 meters above sea level. Up to 70 percent of the city was flooded, with 30 percent of the city’s land area submerged under six meters of water. The flood sent thousands of families to evacuation centers and left 44 people dead.

Similarly, another study noted:

The progress [of the city in terms of managing disaster risks], however, [experienced] a setback in September 2009 when Typhoon Ondoy (Ketsana) brought in a record 448.5 mm of rain in just a span of 12h, flooding the central part of Luzon and causing a drastic 10.99 m rise in the water level of Marikina River. Ondoy (Ketsana) wreaked havoc in Marikina City, one of the most affected by the disaster. It showed that



despite all progress, Marikina is not prepared for calamities of this magnitude (NOAH, 2009 as cited in de Lara-Tuprio, 2018, pp. 373-374).

Figure 6 shows that the elevation in water levels of Marikina City was the highest based on available records from 2002-12 (De Lara-Tuprio et al., 2018). Some estimates suggest that Ketsana brought the highest amount of rain in 24 hours in Metro Manila in the last 150 years (Sato & Nakasu, 2011). At the onset of Ketsana, the rescuers themselves needed rescuing as they were trapped on the third floor of the Justice building, making further rescues of affected citizens almost impossible (personal communication, 30 March 2015). In a special report, the Philippine Daily Inquirer (26 September 2016, para. 14-20, 28) wrote that

Marikina could be considered the most equipped and prepared local government unit for flooding compared to other cities in Metro Manila. Jenny Fernando, head of the local disaster risk reduction and management office, said that before Ondoy, the city believed it had finally found the solution to flooding, especially with the various programs and mechanisms it put in place. Among these were the squatter-free program, which relocated 7,500 families living along the riverbank to Barangays Tumana, Mandalay, and Nangka; the 96-meter easement set up along the river; and the construction of various drainage systems and canals. Looking back, Fernando said government interventions would not have made much of a difference because of the heavy rain dumped by Ondoy. "The end will be the same because Ondoy was the first worst event that we now call our new normal. We planned to prevent flooding long ago, but not of this kind. Fernando said that it was more than what we planned for." The local government now knows better as it has learned "not to control the flood but to adapt to it", Fernando said. "We tried to control flooding with good drainage systems and the like, but that is not [the way]. We should adapt [because of climate change], the system has become nonstructural," he said.

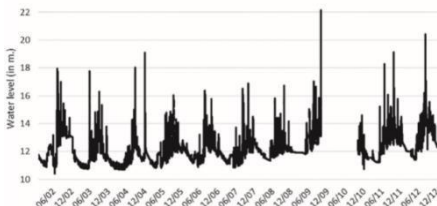


Figure 6. Plot of hourly measurements of the water level at the Sto. Nino Station of EFCOS project from 1 January 2002 to 31 December 2012; adapted from "Marikina flood hazard models using historical data of water level," by De Lara-Tuprio et al., 2018, *Philippine Journal of Science* (147) 3, p. 376

While the statements from the city's Chief Disaster Risk Reduction and Management Officer (DRRMO) (see Figure 6) presented a point of reflection post-Ketsana, the institutional pathologies underpinning a reactive and fragmented disaster management philosophy began to emerge. Despite its progress in disaster governance pre-Ketsana, Pellini et al. (2013) believe that Marikina City had a weak capacity to deal with extreme events. While disaster risks threaten people's lives and economies, they did not result in concrete policies commensurate to the level needed to deal with extreme events such as Ketsana (Pellini et al., 2013). Ketsana became a point of reflection for the city's political and administrative leaders. After the passage of R.A. 10121, Marikina City was one of the first local governments to follow the law's mandate in creating a Local Disaster Risk Reduction and Management Office (LDRRMO) (Pellini et al., 2013). This was reflected in Ordinance No. 53 Series of 2011, which created the MCDRRMO, also known as the Ordinance Amending Ordinance No. 32 Series of 2011, also known as the Institutionalizing the Organizational Capability of the City of Marikina for Disaster Risk Reduction and Management. Rescue 161 and other bodies related to disaster governance were converted to the Marikina City Disaster Risk Reduction and Management Office (MCDRRMO). The shift was not merely organizational or a matter of semantics but also a movement from reactive to pro-active disaster governance, a more unified institutional arrangement, and better alignment or configuration of relationships with other government institutions, non-government organizations, the private sector, and citizens. This can be seen in Figures 7 and 8.

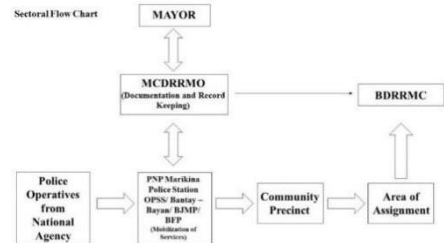


Figure 7. Organizational structure of Rescue 161. Adapted from the Marikina City Local Disaster Risk Reduction and Management Plan

Previously, Rescue 161 embodied an emergency management perspective, as evidenced by its high emphasis on the role of responders in the Bureau of Fire Protection (BFP) and Philippine National Police (PNP), among others. For the time being, Rescue 161 was also transferred to the City Health Office, reflecting that managing disaster risks was a matter of responding to health emergencies. However, under a new MCDRRMO structure, the city shifted from disaster management to disaster risk management. It began to work on the four thematic areas in disaster risk management: disaster prevention and mitigation, disaster preparedness, disaster response, and disaster recovery and rehabilitation.

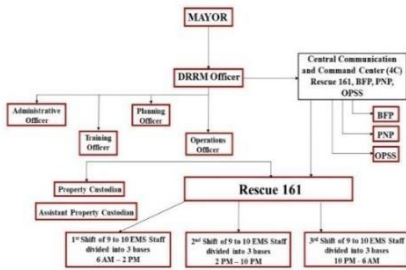


Figure 8. Organizational structure of MCDRRMO; adapted from the Marikina City Local Disaster Risk Reduction and Management Plan

As an MCDRRMO personnel emphasized:

The number one benefit when we got it [RA 10121] was the reduction of risks. That is the number one thing because if you look at how this office works, there are four thematic areas, right? However, during Rescue 161 days, if you are going to look at it, it was only a response, and most of the response was more on the medical [side]. However, when MCDRRMO was established, we could at least cover the four thematic areas. Unlike with [Rescue 161], that was the only response. Second, we became more grounded in the community. So, what do I mean by that? If you would notice, one of the mandates of RA 10121 is that you must disseminate information on how the community tries to be resilient regarding disaster. No, that is number one, right? We conducted training on basic disaster management, basic life support, first aid....and what else...information dissemination. The mitigation you meant was more on infrastructure. Number one was the addition of pumping stations, etc. (personal communication, 11 March 2015).

As such, Ketsana provided a stimulus for political and organizational leaders in Marikina to realize that the current institutional arrangement in the city was not enough to deal with extreme events. The growing discourse on climate change and Marikina City's own experience with Ketsana's devastation stimulated the creative destruction of old structures and fast-tracked the adoption of R.A. 10121 into the city's disaster governance. The confluence of institutional dynamics at the national level, R.A. 10121, served as an external factor that mandated the city to reform its institutional arrangements, which characterized a form of coercive isomorphism. The evolution of the disaster governance institution in the city is a response to the uncertainty brought by the "new normal" or extreme events (mimetic isomorphism) and a view that a proactive approach to managing disaster risks would help it become resilient from future extreme events (normative isomorphism) (Dangcalan et al., 2019).

3.1.3. Individual Level

Citizens in Marikina City were not prepared to deal with an extreme event like Typhoon Ketsana (Philippine Daily Inquirer, 26 September 2016), given that it was a one in a 150-year disaster (Sato & Nakasu, 2011). Abon, David, and Pellejera (2011, p. 1283) affirmed this, noting that "a significant factor in the damage brought by the floods can be attributed to the lack of preparedness of the populace. No warning or monitoring system was in place. With high intensity and short duration rainfall events like Typhoon Ketsana, it was necessary to have an early warning system that could issue rapid flood forecasts." In the aftermath, the damage became apparent. Marikina City was among the hardest hit, with around 180,000 people affected by the flooding, 70 of which were killed, 1,083 houses were destroyed, and infrastructure losses amounted to more than Php 39 billion (Sato & Nakasu, 2011). The City Government estimated that Php 385 million was needed for recovery. In a survey by Francisco (2015) among 400 households, the reported damage of the typhoon to each respondent amounted to Php 33,142 or 165 percent of their household income per month or 13.8 percent of their average income annually. Anecdotal stories showed increased issue awareness on shifting mindset from reactive to proactive disaster risk management. As one resident shared:

Whenever heavy rains pummeled the city, Pascual hoped that the flood these spawned might not be as bad as what Ondoy (Ketsana) had brought. Resiliency and adaptation appeared to be Pascual and his family's refuge, pointing out that they learned to prepare to move to the second floor whenever floodwaters rose. He now pays close attention to weather advisories and warnings whenever floodwaters rise (Philippine Daily Inquirer, 26 September 2016, para. 24-25).

Similarly, the study of Francisco (2015) with a much bigger sample showed that experience appeared to be a determinant of heightened disaster preparedness in Marikina as indigenous knowledge helped them prepare and cope better with floods as they have learned from previous experiences of extreme events. Meanwhile, the study of Adviento and De Guzman (2010: p.1) showed that in the light of Ketsana's devastation, the positive characteristics of residents were used as both resources and outcomes, which included: (1) "*pakikibagay sa kalikasan*" / adaptation with nature, (2) "*malasakit*" / concern for others, (3) "*bayanihan*" / solidarity, (4) "*tiwala*" / trust, (5) "*pagtitis*" / endurance, (6) "*pagkamamayahin at palabiro*" / cheerfulness, (7) "*lakas ng loob at tapang sa gitna ng takot*" / strength of mind and courage despite adversities, (8) "*pagkamaparaan*" / resourcefulness, (9) "*pasasalamat*" / gratitude and (10) "*pananalig sa Diyos*" / faith in God.

However, data on the micro-macro connection, or how the citizens' experience with Ketsana led to a demand for better institutions in the context of the post-Ketsana experience of Marikina City, remain sparse. Studies pre-Ketsana, such as that of Pellini et al.'s (2013), noted that awareness did



not always translate to concrete political actions. The study observed that despite being exposed to a multi-hazard environment, Marikina City's disaster governance mechanisms, unlike Albay, were insufficient to develop a resilient mechanism against powerful disasters such as Ketsana (Pellini et al., 2013). According to the study, the major difference between Marikina City and Albay was that the political leadership in the latter understood the political capital to be gained should issues related to natural disasters and resilience be addressed (Pellini et al., 2013). However, it was also possible that Marikina's location in the metropolis near other highly urbanized cities (HUCs) with higher and faster migration in-cities compared to relatively rural Albay might explain the disparity between the levels of resilience between the two areas. Household-level surveys are necessary to explore this micro-macro connection further. Nonetheless, the discussions in this paper provided initial insights that citizens in Marikina City had a greater awareness of the need to be proactive instead of reactive in managing disaster risks post-Ketsana.

3.2. Building Back Better Institutions After Typhoon Ketsana

Build Back Better (BBB) encapsulates the idea behind framing disaster as an opportunity to improve resilience. It refers to the

use of the recovery, rehabilitation, and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems and into the revitalization of livelihoods, economies, and the environment (United Nations General Assembly, 2016 as cited in UNISDR, 2017b, p. 6).

The concept emerged after the 2004 Indian Ocean earthquake and tsunami and the subsequent recovery efforts in Aceh, Indonesia (UN World Conference on Disaster Risk Reduction, 2015). In the context of post-Ketsana Marikina, this is framed in the study regarding improvements in a disaster governance institution. The researchers have identified three categories to determine whether Marikina City's disaster governance institutions improved after Ketsana: (1) institutional persistence, (2) disaster governance approach, and (3) disaster governance structure (see Table 1).

Table 1. Categories of pre and post-extreme event disaster governance institutions in Marikina City

CATEGORY	PRE-KETSANA	POST-KETSANA
Institutional persistence	Weak institutional persistence	Strong institutional persistence
Disaster Governance approach	Reactive disaster governance	Pro-active disaster governance
Disaster Governance Structure	Weak consolidation of disaster governance structure	Strong consolidation of disaster structure

Institutional persistence in this study refers to the ability of structures to survive different generations of political actors (Dangcalan et al., 2019; Tolbert & Zucker,

1996). Like many local governance initiatives, disaster governance institutions are threatened by discontinuity due to changes in political leadership. As disaster risk management (DRM) requires long-term investments sustained through time, institutional persistence is an important indicator of lesson learning in disaster governance. In the case of Marikina City during Pre-Ketsana, Rescue 161 relied on a local ordinance, the Ordinance 264 Series of 1998, otherwise known as the "Ordinance Creating the Disaster Management Office, also known as "Rescue 161", Defining its Functions and Responsibilities, and Appropriating Funds Annually for Its Operational Expenses." This was amended in 2007 with Ordinance No. 168 Series of 2007, which converted Rescue 161 into the Emergency Medical Services (EMS) and Central Communication and Command Center (4C) in normal times and when there were no occurrences of disasters. While Rescue 161 had a local ordinance that supported its existence, it remained incumbent upon the government of the day in Marikina City if the agency would continue in existence. The legal landscape changed with the enactment of the law R.A. 10121, which mandated all local governments to create a local disaster risk reduction and management office. Marikina City complied with the law by passing Ordinance No. 32 Series of 2011, otherwise known as the Institutionalizing the Organizational Capability of the City of Marikina for Disaster Risk Reduction and Management and for Other Purposes. Later amendments were made through Ordinance No. 53. The passing of the national law and local ordinances strengthened the level of institutional persistence of MCDRRMO. It meant that the office no longer relied on the prerogative of local leaders since a national law had already called for the creation of a local disaster governance office for all Local Government Units (LGUs).

This was reflected in the shift from emergency and disaster management to disaster risk management on the governance approach. This entailed moving from a reactive to a proactive approach to disaster governance in the country (electronic communication, 22 April 2015). In perspective, a governance approach focused on the response, but it did not lead to better recovery outcomes for citizens, as shown in the study by Francisco (2015). The four thematic areas that were introduced post-Ketsana included (1) disaster prevention and mitigation, (2) disaster preparedness, (3) disaster response, and (4) disaster mitigation and rehabilitation. These reforms contrasted with Rescue 161, which was heavily reactive as its programming was framed from an Emergency Management perspective (personal communication, 11 March 2015).

In terms of governance structure, whereas disaster governance in the city was heavily focused on response and other preventive efforts were distributed across different offices, the new structure under MCDRRMO provided a coherent framework on how these different responsibilities was configured under the four thematic areas (personal communication, 11 March 2015). This can be seen in Figures 7 and 8. The new structure also had a renewed emphasis on integrating information and capacity sharing between national government agencies, non-government organizations, and the private sector in terms of preventing risks and issuing warning systems and predictions in the event of disasters.

Given all these, it appeared that in three categories of institutional persistence, governance approach, and structure, the disaster governance institution of Marikina City after Ketsana has improved.

3.3. Lessons for Disaster Risk Management Scholarship and Practice

Several lessons for scholarship and practice can be derived from the reforms made in Marikina City's disaster governance institution after Typhoon Ketsana. These lessons may be relevant to the theoretical discourse on disaster governance and in understanding local dynamics and national policies related to institutional learning from disruptive events.

In terms of disaster risk management (DRM) scholarship, first, Typhoon Ketsana has pushed policymakers to finally enact Republic Act (R.A.) 10121 to reform the country's disaster governance and encouraged local leaders in Marikina to immediately follow its provisions by creating a local disaster risk reduction and management office (LDRRMO). This shows that extreme events can provide a sense of renewal for societies or stimulate demands to alter mechanisms that have inadequately dealt with crises. Second, the framework used in the study demonstrated how these transformations occur at the system level through interactions between systems-institutional, organizational, and individual levels. These multi-level relationships are characterized by multi-directional feedback between and within macro, meso, and micro levels. This leads to the third implication of scholarship, which highlights the value of the human ecological perspective in unpacking this dynamic process of institutional change after a disaster by considering the role of non-human factors concerning social systems. Extreme events are non-human causal factors that stimulate institutional change, as shown in the case of Marikina City, where Typhoon Ketsana facilitated the transition from Rescue 161 to MCDRRMO. Initial findings on the micro-macro and micro-meso connections have shown the value of transdisciplinary research in capturing the role of community members in shaping meaning and concept-making in disaster scholarship. Finally, attempts to theorize disasters as opportunities show some notable characteristics whereby an abrupt phenomenon may significantly alter the institutional landscape, the role of conscious actors in facilitating change in the structure, and the multiple levels of interactions amongst different factors that may give birth to new institutional arrangements. The changes in Marikina City also implied that non-person-centric approaches in disaster governance reforms could be facilitated by national legislation and collective demands for institutional change, among others. This shows that learning from disasters is a matter of political leadership and necessitates systemic reforms to enhance resilience.

In practice, it was seen that extreme events may result in increased awareness of the importance of effective disaster governance institutions among citizens, which may lead them to demand better service delivery. Effective DRM policy can then be a source of political capital. Secondly, national legislations are important in shaping discourse, action, and policies at the local level.

These are essential to facilitate "remembering" of the lessons from previous disasters. Thirdly, the case of Typhoon Ketsana has shown the importance of not just relying on historical but also geological data. Low-probability but high-risk disasters or those that occur once in a decade or once in a century may not necessarily be captured in people's memory or historical records, but geological data may help simulate and predict areas that are exposed to hazards and calculate the magnitude of potential disruptions. This is particularly relevant as cyclical occurrences of low-probability but high-impact disasters may stretch back hundreds, if not millions, of years. Furthermore, as climate change alters the magnitude and occurrence of extreme events, policymakers at the local and national levels should employ geological data to help inform policies that seek to strengthen the resilience of local communities. Improving disaster governance institutions at various levels of governance enables these approaches to be utilized to strengthen resilience.

4. Conclusion, Limitations, and Recommendations

Several limitations in the study can be noted, which open avenues for future research. First, the focus of this paper is on the institutional structure. The discussions have centered on developing Marikina City's disaster governance institution, MCDRRMO, after Typhoon Ketsana. The premise is that MCDRRMO's governance structure has improved compared to its pre-crisis counterpart, Rescue 161. In theory, enhancements in institutional structure facilitate improvements in organizational performance. However, this should be validated by comparing how pre and post-Ketsana disaster governance institutions have dealt with disaster risks in the city.

Second, the paper proposed a theoretical framework on how a Local Government Unit (LGU) has built back better disaster governance institutions post-disaster using a single historical case study design. This attempt to theorize must be complemented with efforts to include multiple cases involving highly urbanized and rural contexts and potentially other categories that may affect efforts to build back better after a disaster, such as income levels, geographic location, political structures and history, and migration.

Third, while the paper has demonstrated the role of macro-meso, macro-micro, meso-macro, and meso-micro connections, there is a need to utilize approaches such as practice theory, participatory development, and deliberative democracy to further attempts to study the micro-macro and micro-meso aspects of building back better institutions after a disaster. This also entails employing household surveys, focus group discussions, participatory mapping, and other tools to capture these aspects, which can be significant to disaster risk management scholarship and practice.

Nonetheless, the study highlighted the dynamics of a critical juncture in the disaster governance institution of Marikina City after Typhoon Ketsana. The paper used a framework that incorporates the dynamic processes of this institutional change, drawing from the concepts of path dependence and critical junctures, Schumpeter's creative destruction, and Coleman's (1986) macro-micro, micro-macro connections. It was found that institutional change



occurred at the level of system institution with the enactment of R.A. 10121, at the organizational level through increased awareness of the need for institutional change following the inadequate disaster governance capacity of the Marikina City Government during Typhoon Ketsana, and at the individual level through citizens' exposure to shocks from the typhoon which led to increased awareness of the need for a pro-active disaster governance approach.

Moreover, the researchers noted that the post-Ketsana disaster governance institution in Marikina City has improved in three categories: institutional persistence, governance approach, and governance structure. Various lessons can be deduced from Marikina's case. Regarding DRM scholarship, the study has shown that disasters can be periods of renewal often produced by different layers of interactions in the system. The human ecological approach provides a means to account for non-human factors' role in stimulating social system changes. This was essential in the study's attempt to explore generalizable patterns as it proposes a theoretical framework on how societies build back better systems after a disaster. Meanwhile, in practice, it was shown that disasters may lead to increased awareness among citizens to demand improvements in disaster governance. National legislations are crucial in shaping local dynamics in disaster risk management. Lastly, geological data was shown to be important in complementing historical data better to prepare societies for extreme events such as Ketsana.

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Declaration of Conflict of Interest

The authors declare that there is no conflict of interest whatsoever in this study.

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Food, Nutrition, and Well-being of Filipino Adults While in Enhanced Community Quarantine (ECQ)



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Abstract

The drastic lifestyle change prompted by COVID-19 has affected the overall well-being of populations. A total of 223 Filipino adults participated in a cross-sectional study exploring coping strategies related to food, nutrition, and well-being while in ECQ. The majority were from Region IV-A (70.0%), college graduates (70.4%), unemployed (40.0%), and with a household size of four to five (46.2%). They provided their needs by stocking food (89.0%), using the internet (80%), obtaining credible information (79.0%), and preparing their food (61.8%). Rice (64.67±45.08), bread (56.33±49.54), cooking oil (53.33±11.93), vegetables (53.00±30.45), and fruits (51.33±15.04) mainly comprised their meals, and more than half (57.40%) were taking nutrition supplements. Coping strategies frequently cited were relaxation-recreation (72.8%), problem-solving (68.9%), and religiosity (66.8%). Overactivity was associated with challenges pertaining to relationship with friends ($r = .191, p < .01$), housing ($r = .133, p < .05$), finances ($r = .133, p < .05$), and access to communication and technology ($r = .149, p < .05$), healthcare ($r = .139, p < .05$), and community services ($r = .150, p < .05$). It was expected that post-ECQ, more will resolve to adhere to healthy lifestyles. Active coping strategies demonstrate how individuals can use resources within reach and take responsibility for ensuring good health and well-being.

Keywords

coping strategies, enhanced community quarantine, COVID-19

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1. Introduction

On March 11, 2020, the World Health Organization (WHO) declared the Corona Virus Disease 2019 (COVID-19) a pandemic, a disease affecting a high proportion of populations worldwide. In response to this, the Philippine government mandated the Enhanced Community Quarantine (ECQ) in Luzon, Philippines, implementing a total lockdown and restricting movement to control the spread of COVID-19. The COVID-19 outbreak and the ECQ posed several challenges to the economy, government, scientists, and the medical community and have become a source of stress to the general public.

Stress is the body's natural response to a perceived threat that may result in anxiety, discomfort, emotional tension, and difficulty adjusting (Fink, 2016). The growing interest in stress over the past five decades is attributed to its role in the etiology of chronic illnesses and mental health disorders. With the COVID-19 pandemic, fear of infection and transmission, social isolation due to lockdown restrictions, and the uncertainty of events have led to stress-related reactions such as changes in concentration, irritability, anxiety, insomnia, reduced productivity, and interpersonal

conflicts (Vinkers et al., 2020). In a study measuring the psychological impact of COVID-19 in the Philippines, it was reported that females are more affected than males. In contrast, the less educated, the singles, children, adolescents, and those who have no children reported higher stress levels, anxiety, depression, and psychological impact (Tee et al., 2020). Dysfunctional eating behaviors, such as emotional eating, may also result from the psychological and emotional stress brought about by boredom and anxiety while in quarantine (Montemurro, 2020; Wang et al., 2020). Unhealthy eating habits, including an increase in sweets and salty food (Scarmozzino & Visioli, 2020), snacking more often, and less frequent consumption of vegetables, fruit, and legumes (Sidor & Rzymiski, 2020) were among the changes in food consumption reported. Moreover, some tend to follow fad diets to lose weight from overeating (Ritchie, 2018). In the long term, these practices can further trigger physiological and behavioral disturbances and nutritional insufficiency, ranging from immune system dysfunction to psychiatric disorders.

Coping mechanisms are remedial actions undertaken by people whose survival and livelihood are compromised and threatened (WHO, 1999). Thus, our body can minimize, reduce, and tolerate stress from threats and dangers (Okoro, 2018). With the anxiety and stress brought about by the COVID-19 pandemic and the ECQ, this study aimed to describe young Filipino adults' coping strategies related to food, nutrition, and well-being. Also, it explored how these coping strategies relate to the challenges faced during the



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ECQ. Understanding how individuals cope and the resources needed to promote overall well-being can be provided, such as better access to healthcare services, information technology, risk communication, and livelihood support during emergencies. This study's findings can contribute to local literature investigating the effects of COVID-19 on health, nutrition, and well-being, which are relevant in crafting and implementing evidence-based policies and programs. Social services and health interventions can be tailor-fit based on the population's needs and characteristics. Aside from the collective efforts to improve Filipinos' overall well-being, this study also hopes to strengthen self-care practices that promote resilience.

2. Methods

2.1. Study Design

A cross-sectional study design was used to determine young Filipino adults' coping strategies related to well-being, food, and nutrition, while in ECQ. Online platforms were used to survey because of the ECQ guidelines, which limited the researchers' mobility and face-to-face interactions.

2.2. Participant Recruitment and Selection

Purposive sampling was done based on the following inclusion criteria: participants must be Filipino, 21 to 30 years old, connect to the internet, and navigate through online survey platforms. The survey link was sent to the target participants who met the inclusion criteria via email and social networking sites. A total of 223 participants participated in the online survey.

2.3. Data Collection

The participants answered a 20-item survey using an online platform accessible through any device. The questionnaire, generated using Google Forms, was divided into four sections: (1) socio-demographic and socio-economic information, which were used to describe the characteristics of the participants; (2) preparations done and challenges encountered before ECQ; (3) activities done and coping strategies implemented during ECQ; and (4) the expectations related to health, food, and nutrition after ECQ. Excluding the first section, all were scored using a 5-point Likert scale. The set of questionnaires that described the coping strategies was adapted and modified from the study entitled, Filipino Coping Strategies Scale (Rilveria, 2018). The food intake of the participants was measured qualitatively using a food frequency questionnaire (FFQ) by describing the number of times eaten in a particular period (once a day, twice a day, thrice a day, more than three times, at least once a week, at least once a month, at least once a year, never). The data collection was conducted from April to May 2020.

2.4. Data Analysis

The data collected from the survey were downloaded in MS Excel format. Statistical analyses were done using the same tool to generate descriptive statistics such as proportions, percentages, frequencies, means, and standard deviations of the distributions. The Chi-Square Test of Association and Spearman's Rank-Order Correlation were used to determine relationships between socio-demographic characteristics and coping strategies, and challenges during the ECQ and coping

strategies. IBM SPSS Statistics version 23 was used. Significance levels were set at 0.01 and 0.05.

3. Discussions

3.1. Profile and Participants

Table 1 shows the profile characteristics of the 223 participants in the online-based survey. The majority of the participants were females (76.7%), and the highest number was 21 years of age (35.9%). About 70% of the total participants came from Region IV-A. Almost all participants were single (96.9%), and most were college graduates (70.4%). From the classification of jobs, the number was highest in the category of health science (22.4%); however, a high percentage (40.0%) of unemployment was observed. The lowest (<20,000php) and highest (>50,000php) income ranges had an almost similar result of percentage among the participants, with 30.0% and 30.9%, respectively. The subcategory having four to five persons in the household set-up had the highest rate (46.2%).

A high summed-up percentage of the participants declared overall preparedness (prepared: 31.8%; very prepared: 3.1%). However, more participants were neither prepared nor unprepared (38.7%), as shown in Table 2. A study that focused on assessing public risk perception of COVID-19 across Europe, America, and Asia found that the perceived risks were significantly correlated with the level of adoption of preventative health behaviors (Dryhurst et al., 2020). Although 34.9% of the participants perceived outbreak preparedness, 38.7% may not be adopting preventive health behaviors, which may also put them at higher risk of stress.

Table 1.

Demographic data of the participants (n=223)

Characteristics	Frequency	Percentage
Sex		
Male	52	23.3%
Female	171	76.7%
Age ^a		
21	80	35.9%
22	32	14.3%
23	32	14.3%
24	20	9.1%
25	15	6.7%
26	9	4.0%
27	12	5.4%
28	10	4.5%
29	7	3.1%
30	6	2.7%
Region/Location		
National Capital Region (NCR)	32	14.3%
Ilocos Region (I)	6	2.7%
Cagayan Valley (II)	4	1.8%
Central Luzon (III)	10	4.5%
CALABARZON (IV-A)	156	70.0%
MIMAROPA (IV-B)	2	1.0%
Bicol Region (V)	4	1.8%
Western Visayas (VI)	1	0.4%
Central Visayas (VII)	6	2.7%
SOCCSKSARGEN (XII)	1	0.4%
Caraga Region (XIII)	1	0.4%

Table 1. cont.

Characteristics	Frequency	Percentage
<i>Civil Status</i>		
Single	216	96.9%
Married	7	3.1%
<i>Educational Attainment</i>		
Highschool Graduate	50	22.4%
College Graduate	157	70.4%
Post Graduate	16	7.2%
<i>Employment Status</i>		
Unemployed	89	40.0%
Self-employed	16	7.2%
Regular	53	23.7%
Casual	5	2.2%
Contractual	47	21.1%
Student	13	5.8%
<i>Occupation Classification</i>		
Not Applicable	78	35.1%
Agriculture and Natural Resources	8	3.6%
Arts and Communication	1	0.4%
Engineering and Architecture	8	3.6%
Business Management and Administration	9	4.0%
Education and Training	14	6.3%
Government and Public Administration	17	7.6%
Health Science	50	22.4%
Hospitality and Tourism	4	1.8%
Human Services	6	2.7%
Information Technology	7	3.1%
Marketing, Sales, and Services	14	6.3%
Science, Technology, and Mathematics	7	3.1%
<i>Household Income^a (Php)</i>		
<20,000	67	30.0%
20,000-29,999	40	17.9%
30,000-39,999	29	13.1%
40,000-49,999	18	8.1%
>50,000	69	30.9%
<i>Number of persons in the Household</i>		
1	10	4.5%
2-3	40	17.9%
4-5	103	46.2%
≥6	70	31.4%

^aFor Age characteristic: $\mu=23.3$; $\sigma=6.7$; $SD=2.6$; $Min=21$; $Max=30$

^aHousehold income before Enhanced Community Quarantine (ECQ)

Table 2.

Description of the participants based on overall ECQ preparedness (n=223)

Characteristics	Frequency	Percentage
Very unprepared	19	8.5
Unprepared	40	17.9
Neither unprepared nor prepared	86	38.7
Prepared	71	31.8
Very prepared	7	3.1

3.2. Before the Enhanced Community Quarantine(ECQ)

A fast-approaching pandemic was anticipated due to the coronavirus outbreaks from other countries early this year. Subsequently, fears of supply shortages and the likelihood of getting infected led to panic-buying worldwide. Because of this, the preparedness of the participants in a pandemic situation was evaluated. Data shown in Figure 1 revealed that most participants were most prepared (very prepared: 28%; prepared: 49%) in terms of information acquired from news and articles related to the COVID-19 pandemic before the implementation of ECQ in Luzon. The result was followed by the participants' ready supply of food and personal care products (very prepared: 18%; prepared: 51%), illustrating higher rates on the positive side of the graph. It was also observed that the option to schedule a consultation from a physician was the least (very unprepared: 17%; unprepared: 35%) concern that the participants will most likely prepare before the advanced quarantine protocols. As restrictions were still being implemented, the media played a vital role in the COVID-19 response. The increasing population is observed to rely on news updates for preparation due to the health crisis caused by the outbreak (Casero-Ripolles, 2020; Hussain, 2020). However, studies also show the significant negative effect of media platforms in spreading anxiety and panic worldwide (Ahmad & Murad, 2020; Wang et al., 2020). The possible distress brought by the news regarding the still-rising cases of the COVID-19 outbreak had led more people to procure food and medical supplies in advance to secure their basic needs during the lockdown.

Participants were also asked to identify other preparations that they did before the ECQ. Among the top answers were stocked supplies of food, personal care products, medicines, disinfectants, masks, gloves, and a secured cash source from their banks. When there is danger in the environment, as in a pandemic, fear responses and threat-avoidance systems are activated, countering complacency. In concurrence with Maslow's hierarchy of needs and contemporary literature on fundamental functional requirements (Kenrick et al., 2010), physiological followed by self-protection and safety motives operate for survival. Other answers included staying at home, mental and emotional preparations, scheduling, transportation arrangements to work, securing belongings or units located in the Metro, returning to the hometown province, and work-from-home arrangements.

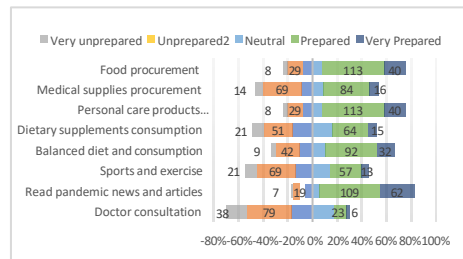


Figure 1. Preparations of the participants before the ECQ (n=223)



3.3. Nutrition and Well-being During ECQ

The Philippine government's strategy to contain the outbreak in the country has led to various closures of work, stores, schools, and roads, with healthcare facilities getting crowded over time. Among the precautionary measures done in the country, ECQ was the strictest, obstructing the flow of essential commodities nationwide. In this study, various challenges encountered, necessary items, and security during the ECQ were identified. As shown in Figure 2, most participants admitted (strongly agree: 19%; agree: 48%) that keeping themselves healthy was the most challenging of all. The result was followed by the difficulty in accessing healthcare services (strongly agree: 21%; agree: 38%) and community services (strongly agree: 17%; agree: 43%). Although more identified these as challenging, right housing conditions (strongly disagree: 11%; disagree: 29%) and good relationships among family members (strongly disagree: 18%; disagree: 18%) were found to be the least difficult to achieve during ECQ. The graph also diverges to the right illustrating that all categories were considered a challenge among the participants. For further evaluation, participants were again asked to identify other challenges faced while the ECQ was still imposed. Results revealed that the top answers were having no means of transportation and addressing mental issues (i.e., difficulty sleeping and depression). Other responses listed in order from higher to lower ratings included: difficulty in completing online classes and academic requirements, being stranded, abiding by new policies, lack of trust in the government for handling the outbreak, finding job opportunities, lack of fund sources, physical methods of food procurement (i.e., mobility, long queues in markets), setting up work-from-home arrangements, restrictions to religious gatherings, and addressing health emergencies unrelated to the COVID-19 (i.e., dental and veterinary services).

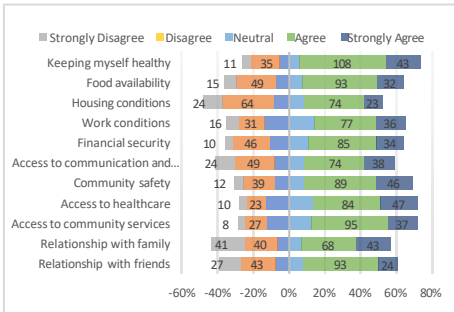


Figure 2. Challenges encountered by the participants during the ECQ (n=223)

The data shown in Figure 3 is strongly diverging to the right. Results revealed that all the listed items were identified as essentials by a majority (>90%) with food availability (strongly agree: 84%; agree: 13%) followed by credible news updates (strongly agree: 78%; agree: 18%) and then money (strongly agree: 71%; agree: 23%) as the topmost items considered as necessary. Further evaluation revealed that other essentials with mental health and awareness, internet and gadget availability, and spiritual routines were the top responses. Zarrabian and Hassani-Abharian (2020) purported that COVID-19 is a pandemic of two sorts. One pertains to the disease and the other to fear (Ren, Gao, & Chen, 2020).

The results reflect how the participants value protective factors, threading both the physiological and psychological domains. Besides food availability, which remains their top priority, information-seeking behaviors aim to combat fear arising from uncertainty and lack of knowledge about the disease. Other answers listed in order, from higher to lower ratings, included self-growth routines, recreational activities, communications, cooperation and understanding of co-workers, delivery services, competent government, accurate and transparent data updates or news, access to veterinary supplies and services, mass testing, and security.

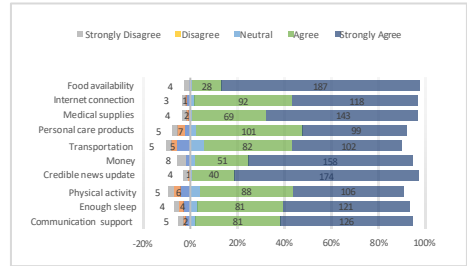


Figure 3. Essentials identified by the participants during the ECQ (n=223)

Figure 4 shows data on essentials accessible to the participants during the quarantine, which provided a sense of security. Among the needs that the participants felt most secure with during the ECQ were food (strongly agree: 37%; agree: 52%), internet connection (strongly agree: 30%; agree: 50%), credible news update (strongly agree: 30%; agree: 49%), and personal care products (strongly agree: 20%; agree: 58%). The results were found congruent with the participants' preparations before the ECQ (Figure 1), suggesting that the anticipation of positive outcomes drives choice and subsequent behavior. On the contrary, it was observed that the participants were least secure when it comes to transportation (strongly disagree: 11%; disagree: 27%) and medical supplies (strongly disagree: 4%; disagree: 18%), which pertain to factors that are more extrinsic and determined by the macroenvironment. However, noting that the graph is also diverging to the right means, most participants felt secure with all stated categories. Other responses listed, from higher to lower ratings, include shelter, safety, family support, God's providence and protection, gadgets and appliances, and entertainment.

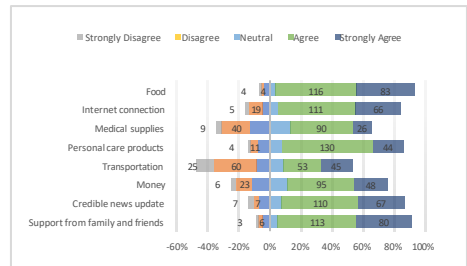


Figure 4. Essentials that were accessible to the participants during the ECQ (n=223)

As an effort to contain the outbreak, the community quarantine, in modified forms, is still being implemented. Maintaining good health and keeping a balanced lifestyle remain challenging amid the continuing health crisis. Limited access to the food supply, healthcare, and community services due to the restrictions may lead to the consumption of convenient foods such as canned goods, junk foods, and instant meals, as well as an increased risk of health issues other than COVID-19 and psychological distress (Deschasaux-Tanguy et al., 2020; Di Renzo et al., 2020; Wang et al., 2020). Increasing evidence shows that lockdowns and various restrictions continue to impact food, financial, and health resource availability (Dryhurst et al., 2020; Naja & Hamadeh, 2020; Perez & Abadi, 2020).

This study also investigated food consumption variations, food availability, and healthy precautionary measures among young adult Filipinos during the ECQ. Based on the data, more than half of the participants (57.8%) declared to opt for home-cooked meals during the ECQ, followed by food consumption through the combination of home-cooked, processed, and delivered foods (41.3%). The lowest rates were found in individuals eating purely processed foods (0.9%) and delivered meals (0%). Frequency data of specific food items were also studied. It can be inferred, as shown in Table 3, that the most consumed items daily were rice (64.67±45.08), bread (56.33±49.54), cooking oil (53.33±11.93), vegetables (53.00±30.45), and fruits (51.33±15.04). In contrast, the least consumed items belong to miscellaneous foods, fats and oils, and sweet desserts. These food items are alcoholic drinks (12.67±17.62), salad dressing (17.67±18.48), native sticky rice snacks (20.00±19.92), cakes and pastries (22.00±23.52), ice cream (22.67±24.58), and soda (21.67±15.82). Similar findings confirm that more people are shifting towards home-cooking (Hunter Survey 2020, as cited in Wilkins, 2020). Some also reported attempting to commit to a healthier lifestyle, i.e., consuming organic foods and preparing a meal from scratch (Di Renzo et al., 2020). It is sufficient to say that the ECQ has limited the participants' dining-out options, thereby resorting to home-cooked meals. More time spent at home also makes it possible to prepare home-cooked meals. Results also imply that the tendency to adopt a healthier lifestyle reflects protective, health-seeking behaviors as a coping strategy amid a life-threatening pandemic. Participants were asked to specify the fruits and vegetables that were commonly consumed. Among the top answers for fruits were banana, mango, apple, orange, watermelon, cabbage, carrots, squash fruit, eggplant, and *kangkong* leaves for vegetables. Vitamin and mineral supplementation was noted to evaluate if the participants were, more or less, getting enough nutrients despite a lack of accessibility to a variety of food. Data revealed that more than half (57.40%) of the participants routinely consume these supplements during ECQ with multivitamins (500mg/day), vitamin C (500mg/day), and vitamin B complex (1000mg/day) as the top answers.

Table 3.

Food Frequency Data During the ECQ (n=223)

Food Type	Frequency (%)							
	1/day	2/day	3/day	3-5/day	2/week	2/month	2/year	Never
Rice	16 (7)	73 (33)	105 (47)	23 (10)	1 (0)	2 (1)	0 (0)	3 (1)
Bread	109 (49)	54 (24)	8 (4)	11 (5)	31 (13)	9 (4)	0 (0)	3 (1)
Noodles/Pasta	84 (38)	18 (8)	1 (0)	17 (8)	74 (33)	21 (9)	2 (1)	6 (3)
Cereals	96 (43)	23 (10)	3 (1)	13 (6)	70 (31)	26 (12)	4 (2)	18 (8)
Root crops	30 (13)	10 (5)	1 (0)	6 (3)	31 (14)	12 (5)	2 (1)	8 (4)
VEGETABLES								
All vegetables	47 (21)	86 (39)	26 (12)	37 (17)	22 (10)	3 (1)	1 (0)	1 (0)
FRUITS								
All fruits	59 (26)	61 (27)	34 (15)	35 (16)	23 (10)	7 (3)	0 (0)	1 (0)
PROTEIN-RICH FOODS								
Meat	51 (23)	23 (10)	7 (3)	8 (4)	62 (28)	32 (14)	8 (4)	32 (14)
Eggs	56 (25)	48 (22)	21 (9)	32 (14)	48 (22)	6 (3)	2 (1)	10 (4)
Fish/Shellfish	61 (28)	42 (19)	15 (7)	25 (11)	28 (13)	10 (4)	0 (0)	6 (3)
Processed meat	52 (23)	28 (13)	15 (7)	68 (30)	68 (30)	5 (2)	4 (2)	4 (2)
Processed fish	56 (25)	23 (10)	0 (0)	11 (5)	60 (27)	20 (9)	6 (3)	31 (14)
Poultry	61 (28)	24 (11)	24 (11)	35 (16)	36 (16)	7 (3)	0 (0)	2 (1)
Eggs	50 (23)	36 (16)	23 (10)	34 (15)	36 (16)	1 (0)	0 (0)	1 (0)
Milk	49 (22)	17 (8)	11 (5)	14 (6)	5 (2)	4 (2)	0 (0)	4 (2)
Cheese	84 (38)	11 (5)	0 (0)	67 (30)	61 (27)	17 (8)	1 (0)	15 (7)
FATS & OILS								
Cooking oil	45 (20)	67 (30)	48 (22)	50 (22)	8 (4)	5 (2)	0 (0)	0 (0)
Butter	64 (29)	24 (11)	15 (7)	15 (7)	31 (14)	10 (4)	7 (3)	28 (13)
Margarine	32 (14)	19 (9)	10 (5)	10 (4)	22 (10)	9 (4)	2 (1)	26 (12)
Salad dressing	39 (17)	7 (3)	3 (1)	8 (4)	17 (8)	23 (10)	20 (9)	38 (17)
SWEETS & DESSERTS								
Sugar	67 (30)	51 (23)	26 (12)	31 (14)	23 (10)	5 (2)	1 (0)	11 (5)
Candy/Chocolates	60 (27)	26 (12)	12 (5)	22 (10)	56 (25)	25 (11)	3 (1)	8 (4)
Ice cream	51 (23)	10 (4)	7 (3)	11 (5)	48 (22)	8 (4)	11 (5)	23 (10)
Cakes/Pastries	49 (22)	11 (5)	6 (3)	14 (6)	54 (24)	24 (11)	16 (7)	19 (9)
Native ikatam	43 (19)	9 (4)	8 (4)	14 (6)	45 (20)	50 (22)	12 (5)	32 (14)
MISCELLANEOUS								
Toys, paint, bagong	71 (32)	25 (11)	21 (9)	32 (14)	41 (18)	18 (8)	4 (2)	11 (5)
Alcoholic beverages	19 (9)	2 (1)	3 (1)	5 (2)	12 (5)	18 (8)	27 (12)	121 (55)
Coffee/tea	66 (30)	40 (18)	19 (9)	21 (9)	21 (9)	12 (5)	11 (5)	14 (6)
Soda	39 (17)	18 (8)	8 (4)	15 (7)	44 (20)	28 (13)	18 (8)	53 (24)

Food access and availability are hampered due to limitations in transportation, distribution, and delivery. The present study evaluated food accessibility and the practice of precautionary measures to assess the risk of food insecurity. The data in Figure 5 revealed that most of the population (>60%) never experienced food scarcity and inaccessibility during the ECQ. The majority (61.8%) also try to cook their food while only some (35.9%) live with at least one household member who explores new cooking methods always or most of the time. Also, only a few participants (33.2%) were engaged with home gardening, and the lowest (7.6%) rating was observed from those who availed themselves of food delivery services during the ECQ.

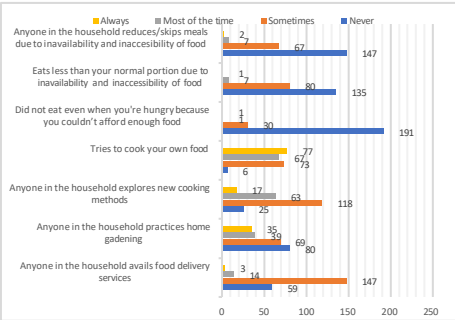


Figure 5. Precautionary measures during the ECQ related to food preparation (n=223)

Frequent practice of restorative precautionary measures during the ECQ is illustrated in Figure 6. Among the measures, participants exhibited little to no effort to exercise regularly (63%) and to vitamin and mineral supplementation (56%). Frequent handwashing (98.7%), staying at home (96.0%), and regular hand sanitizing (89.2%) were the top measures being always practiced most of the time. The study was conducted during the early stages of the ECQ, which explains why the participants were compelled to resort to essential, practical, and mandated safety measures mandated by the government. Engaging in regular physical activity and micronutrient supplementation are behaviors influenced by coping strategies, increased awareness of the quarantine's long-term effects, and internal motivational factors that aim to improve physical and mental health during lengthened periods under quarantine.

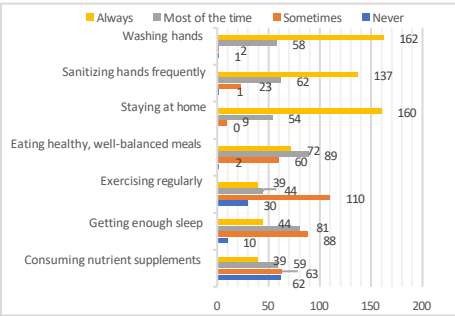


Figure 6. Frequent practice of health-related precautionary measures during the ECQ (n=223)

3.4. Coping Strategies During the ECQ

Following survey data from other countries, restrictive measures to contain the outbreak of Covid-19 hinder populations' daily routine (Azlan et al., 2020; Olaimat et al., 2020; Wolf et al., 2020). Table 4 presents the coping strategies used by the participants. Relaxation-recreation (72.8%), problem-solving (68.9%), and religiosity (66.8%) were the top three most commonly used strategies during the ECQ. A recent study on psychological responses during the COVID-19 lockdown period suggests that the outbreak's increased anxiety can influence a person's behavior and decision-making process, making all ages vulnerable (Vijayaraghavan & Sigbal, 2020). More people are reported

to suffer from the overwhelming stress of COVID-19 (Kar et al., 2020; Wang et al., 2020). Engagement in relaxation and other recreational activities while at home can help in lessening the psychological burden. A study also showed that general coping responses are improved by increasing positive problem-solving attitudes because they positively promote coping performances (Chinaveh, 2013). A study that focused on the impact of COVID-19 on stress and coping strategies purported that the perceived stress of the current outbreak has a positive association with religious beliefs (Umucu & Lee, 2020), wherein those with higher levels of beliefs exhibited more substantial meaning in life which in turn improved coping strategies. Religion is rooted in Philippine history and culture, as seen in the Filipino socio-cultural normative and lifeworld, being deeply imbued with religious cosmologies and expressions (Del Castillo et al., 2020; Macaraan, 2019). Despite the constraints imposed on religious gatherings, the demand for religious rituals, comfort, and support has presumably increased by the pandemic (Baker et al., 2020).

Table 4

Coping strategies during the ECQ (n=223)

COPING STRATEGIES	Frequency ¹ (%)
1. Cognitive Reappraisal	135 (60.8)
a. I think of something positive about my problem	
b. I think I can overcome my problem	
2. Social Support	93 (41.7)
a. I solicit advice from my friends	
3. Problem-solving	153 (68.9)
a. I think of ways to solve my problem	
b. I make ways to solve my problem	
c. I consider all possible solutions just to overcome my problem	
4. Religiosity	149 (66.8)
a. I pray my problems to God	
5. Tolerance	114 (51.1)
a. I tend to accept the stressful feeling until it is gone	
6. Emotional Release	59 (26.6)
a. I cry my problems out	
b. I find something to release my anger because of stress	
c. I let others feel my negative emotion	
7. Overactivity	91 (40.8)
a. I burden myself with other things to do to redirect my thought	
b. I eat a lot and sleep more extended hours to lessen the stress load temporarily	
8. Relaxation-Recreation	162 (72.8)
a. I entertain myself	
b. I go to places where I can rest	
c. I engage in activities that would make me calm	
9. Substance use	15 (7.0)
a. I smoke to ease my negative feeling	
b. I take a medicine that would help me feel and think better	

¹Frequency rates based on the average scores of participants who practice the coping strategies (a) most of the time and (b) always

Nine coping strategies were analyzed across socio-demographic characteristics. Table 5 shows how cognitive reappraisal as a coping strategy relates to age, gender, civil status, employment status, and household income. There is a significant association between cognitive reappraisal and employment, (3, N=223) = 10.57, p<.05. More employed participants (32.8%) always use cognitive reappraisal compared with those unemployed (14.6%).

Cognitive reappraisal refers to changing assumptions about the problem, particularly involving optimism and hopeful-thinking (Rilveria, 2018). The ECQ has led to public transportation's shutdown, which could be a concern among those employed. Malls, restaurants, and those in the service sector are affected by temporary closures. The employment rate dropped to 82.4% from 94.9% during the same period last year (PSA, 2020). With the growing fear of viral transmission and the risk of losing jobs, cognitive reappraisals seem to be the most accessible and appropriate coping strategy at this early stage of quarantine. In a study conducted by Guo et al. (2020) among Chinese adults, it was found that problem-focused coping, a positive strategy entailing active methods, and everyday behaviors such as positive cognitions and getting more information about the virus were associated with fewer mental health problems. Interestingly, cognitive reappraisal is not significantly associated with household income, (12, N=223) = 7.39, $p>.05$. This result suggests that cognitive reappraisals are related to factors that involve stability rather than financial status at this particular point in time. In concurrence, reappraisals enable employees to cope with the demands at work for stability and financial security (Paskvan et al., 2016).

Table 5.

Chi-square test results indicating relationships in coping by cognitive reappraisal across socio-demographic characteristics

	Cognitive Reappraisal (%)*				Total N=223
	Never	Some times	Most of the Time	Always	
Age					18.39 .10
21-22	1 (0.9)	31 (27.7)	59 (52.7)	21 (18.8)	112 (50.2)
23-24	0 (0.0)	13 (25.0)	25 (48.1)	14 (26.9)	52 (23.3)
25-26	0 (0.0)	4 (16.7)	12 (50.0)	8 (33.3)	24 (10.8)
27-28	0 (0.0)	4 (18.2)	9 (40.9)	9 (40.9)	22 (9.9)
29-30	1 (7.69)	0 (0.0)	7 (53.8)	5 (38.5)	13 (5.8)
Gender					4.29 .23
Male	0 (0.0)	17 (52.7)	25 (48.1)	10 (19.2)	52 (23.3)
Female	2 (1.2)	35 (20.5)	87 (50.9)	47 (27.5)	171 (76.7)
Married	0 (0.0)	2 (28.6)	4 (57.1)	1 (14.3)	7 (3.1)
Employment Status					10.57 .01
Employed	1 (0.7)	25 (18.7)	64 (47.8)	44 (32.8)	134 (60.1)
Unemployed	1 (1.1)	27 (30.3)	48 (53.9)	13 (14.6)	89 (39.9)
Household Income					7.39 .83
Below 20,000	1 (1.5)	17 (25.4)	28 (41.8)	21 (31.3)	67 (30.0)
20,000- 29,999	1 (2.5)	8 (20.0)	22 (55.0)	9 (22.5)	40 (17.9)
30,000 - 39,000	0 (0.0)	7 (24.1)	16 (55.2)	6 (20.7)	29 (13.0)
40,000 - 49,999	0 (0.0)	5 (27.8)	7 (38.9)	6 (31.3)	18 (8.1)
Above 50,000	0 (0.0)	15 (21.7)	39 (56.5)	15 (21.7)	69 (31.0)

*percentages are based on within-group totals

As shown in Table 6, there are no significant associations found between social support and all socio-demographic variables. The item on social support pertains to solicited advice from friends. In the context of the ECQ, it is more likely that participants are staying at home with family and

have limited interaction with friends. Perceived benefits from asking friends' advice may not be as beneficial since all are experiencing similar, if not the same, situations. Furthermore, according to a study conducted by Paykani et al. (2020) among adults in Iran, it was found that perceived social support both fostered and hindered people's compliance with home quarantine, depending on the source of support. Thus, it confirms that the source of support is an important factor in using this type of coping strategy. Moreover, considering the strong family ties among Filipinos, it is more likely that the participants will seek support from kin.

Table 6.

Chi-square test results indicating relationships in coping with social support across socio-demographic characteristics

	Social Support (%)*				Total N=223
	Never	Some times	Most of the Time	Always	
Age					4.82 .96
21-22	13 (11.6)	52 (46.4)	33 (29.5)	14 (12.5)	112 (50.2)
23-24	6 (11.5)	27 (51.9)	10 (19.2)	9 (17.3)	52 (23.3)
25-26	2 (8.3)	12 (50.0)	7 (29.2)	3 (12.5)	24 (10.8)
27-28	2 (9.1)	10 (45.5)	8 (36.4)	2 (9.1)	22 (9.9)
29-30	1 (7.7)	5 (38.5)	4 (30.8)	3 (23.1)	13 (5.8)
Gender					0.31 .98
Male	5 (9.6)	25 (48.1)	14 (26.9)	8 (15.4)	52 (23.3)
Female	19 (11.1)	81 (47.4)	48 (28.1)	23 (13.5)	171 (76.7)
Civil Status					1.23 .75
Single	23 (10.6)	102 (47.2)	60 (27.8)	31 (14.4)	216 (96.9)
Married	1 (14.3)	4 (57.1)	2 (28.6)	0 (0.0)	7 (3.1)
Employment Status					2.33 .51
Employed	12 (9.0)	66 (49.3)	35 (26.1)	21 (15.7)	134 (60.1)
Unemployed	12 (13.5)	40 (44.9)	27 (30.3)	10 (11.2)	89 (39.9)
Household Income					16.50 .17
Below 20,000	5 (7.5)	24 (35.8)	27 (40.3)	11 (16.4)	67 (30.0)
20,000- 29,999	6 (15.0)	21 (52.5)	9 (22.5)	4 (10.0)	40 (17.9)
30,000 - 39,000	2 (6.9)	11 (37.9)	11 (37.9)	5 (17.2)	29 (13.0)
40,000- 49,999	2 (11.1)	11 (61.1)	3 (16.7)	2 (11.1)	18 (8.0)
Above 50,000	9 (13.0)	39 (56.5)	12 (17.4)	9 (13.0)	69 (30.9)

*percentages are based on within-group totals

As shown in Table 7, there is a significant association between problem-solving as a coping strategy and employment status, (3, N=223) = 10.47, $p<.05$. Problem-solving involves taking action to confront and address the stressor. It is considered a positive and active method of coping, which is related to cognitive reappraisal. A larger percentage of employed participants (60.0%) always use problem-solving for coping than those who are unemployed (39.9%). Thus, it confirms that the participants seem to deem work as a primary concern during the ECQ. Labor Advisory No. 09-20, issued by the Department of Labor and Employment (DOLE) in March 2020, encouraged employers to use flexible work arrangements, including work-from-home, as a remedial measure to control the outbreak of COVID-19. All non-essential workers were also advised to stay at home upon the declaration of the ECQ. Many Filipinos were left grappling at the outset of this new norm as employers were also creating policies anchored on



the guidelines. Furthermore, among the challenges cited in literature include maintaining work productivity in the home setting, emotional and physical drain from extended screen times, difficulties in communicating with colleagues, and lack of motivation (Gorlick, 2020; Routley, 2020). The changing consumer needs also led to a shift in demand for goods, which may have affected the livelihood of those who were self-employed.

Table 7.

Chi-square test results indicating relationships in coping by problem-solving across socio-demographic characteristics

	Problem-Solving (%)*				Total N=223	
	Never	Some times	Most of the Time	Always		
Age					12.54	.40
21-22	1 (0.9)	33 (29.5)	50 (44.6)	28 (25.0)	112 (50.2)	
23-24	0 (0.0)	10 (9.5)	23 (44.2)	10 (19.2)	52 (23.3)	
25-26	0 (0.0)	4 (16.7)	11 (45.8)	9 (37.5)	24 (10.8)	
27-28	0 (0.0)	4 (18.2)	8 (36.4)	10 (45.5)	22 (9.9)	
29-30	0 (0.0)	1 (7.7)	8 (61.5)	4 (30.8)	13 (5.8)	
Gender					0.37	.95
Male	0 (0.0)	14 (26.9)	23 (44.2)	15 (28.8)	52 (23.3)	
Female	1 (0.6)	47 (27.5)	77 (45.0)	46 (26.9)	171 (76.7)	
Civil Status					3.15	.37
Single	1 (0.5)	59 (27.3)	95 (44.0)	61 (28.2)	216 (96.9)	
Married	0 (0.0)	2 (28.6)	5 (71.4)	0 (0.0)	7 (3.1)	
Employment Status					10.47	.02
Employed	0 (0.0)	28 (20.9)	62 (46.3)	44 (32.8)	134 (60.1)	
Unemployed	1 (1.1)	33 (37.1)	38 (42.7)	17 (19.1)	89 (39.9)	
Household Income					6.5	.90
Below 20,000	1 (1.5)	18 (26.9)	31 (46.3)	17 (25.4)	67 (30.0)	
20,000- 29,999	0 (0.0)	8 (20.0)	19 (47.5)	13 (32.5)	40 (18.0)	
30,000 - 39,000	0 (0.0)	10 (34.5)	14 (48.3)	5 (17.2)	29 (13.0)	
40,000- 49,999	0 (0.0)	6 (33.3)	6 (33.3)	6 (33.3)	18 (8.1)	
Above 50,000	0 (0.0)	19 (27.5)	30 (43.5)	20 (29.0)	69 (30.9)	

*percentages are based on within-group totals

Based on Table 8, there are no significant associations between religiosity as a coping strategy across all socio-demographic characteristics. Religion and spirituality in literature were linked to relief of suffering, which can influence mental health outcomes such as hopefulness, fear, worrying, and sadness and minimize the consequences of social isolation (Lucchetti et al., 2020). The effects of prolonged isolation on mental health may not have manifested when the study was conducted, only a month through the ECQ. Also, in a study conducted by Kranz et al. (2020) among US citizens, it was found that highly religious participants scored higher on the somatic component of COVID-19-related anxiety but scored lower on the cognitive aspect. Because the participants in this study resorted to cognitive reappraisal and problem-solving coping strategies, they are more likely to express rationality amid a crisis rather

than religiosity. The problem-solving strategies center on weighing possible solutions and finding ways to overcome challenges.

Table 8.

Chi-square test results indicating relationships in coping by religiosity across socio-demographic characteristics

Religiosity (%)*					
	Never	Some times	Most of the Time	Always	Total N=223
Age					19.86 .07
21-22	7 (6.3)	40 (35.7)	24 (21.4)	41 (36.6)	112 (50.2)
23-24	7 (13.5)	14 (15.4)	23 (26.9)	23 (44.2)	52 (23.3)
25-26	2 (8.3)	2 (8.3)	7 (29.2)	13 (54.2)	24 (10.8)
27-28	0 (0.0)	6 (27.3)	4 (18.2)	12 (54.5)	22 (9.9)
29-30	1 (7.7)	1 (7.7)	3 (23.1)	8 (61.5)	13 (5.8)
Gender					0.37 .95
Male	0 (0.0)	14 (26.9)	23 (44.2)	15 (28.8)	52 (23.3)
Female	1 (0.6)	47 (27.5)	77 (45.0)	46 (26.9)	171 (76.7)
Civil Status					3.15 .37
Single	1 (0.5)	59 (27.3)	95 (44.0)	61 (28.2)	216 (96.9)
Married	0 (0.0)	2 (28.6)	5 (71.4)	0 (0.0)	7 (3.1)
Employment Status					10.47 .02
Employed	0 (0.0)	28 (20.9)	62 (46.3)	44 (32.8)	134 (60.1)
Unemployed	1 (1.1)	33 (37.1)	38 (42.7)	17 (19.1)	89 (39.9)
Household Income					6.5 .90
Below 20,000	1 (1.5)	18 (26.9)	31 (46.3)	17 (25.4)	67 (30.0)
20,000- 29,999	0 (0.0)	8 (20.0)	19 (47.5)	13 (32.5)	40 (18.0)
30,000 - 39,000	0 (0.0)	10 (34.5)	14 (48.3)	5 (17.2)	29 (13.0)
40,000- 49,999	0 (0.0)	6 (33.3)	6 (33.3)	6 (33.3)	18 (8.1)
Above 50,000	0 (0.0)	19 (27.5)	30 (43.5)	20 (29.0)	69 (30.9)

*percentages are based on within-group totals

There are no significant associations between tolerance as a coping strategy across the different socio-demographic characteristics (Table 9). Tolerance means enduring difficulty and stress without constant effort of confronting it. Since the implementation of ECQ was mandated, the participants were left with no other choice but to comply. Thereby, there were no disparities noted across socio-demographics in terms of tolerance as a coping strategy. Tolerance may also be further explored in relation to prevailing difficulties in uncertainty. The high degree of uncertainty brought about by the pandemic is likely to cause persistent negative emotions, more so during the early stages of the ECQ. Findings of a study on coping responses, intolerance of uncertainty, and psychological distress in the UK suggest that while intolerance triggers maladaptive coping responses, vulnerable groups are more anxious about their health, but not more intolerant of uncertainty than the nonvulnerable (Rettie & Daniels, 2020). It seems that tolerance, in this context, may not be a strong predictor of mental health, and this furthers our understanding of its relationship with other nonmodifiable factors such as socio-demographics.

Table 9

Chi-square test results indicating relationships in coping by tolerance across socio-demographic characteristics

Tolerance (%)*					
	Never	Some times	Most of the Time	Always	Total
Age					13.71 .32
21-22	5 (4.5)	43 (38.4)	46 (41.1)	18 (16.1)	112 (50.2)
23-24	7 (13.5)	23 (44.2)	13 (25.0)	9 (17.3)	52 (23.3)
25-26	3 (12.5)	11 (45.8)	7 (29.2)	3 (12.5)	24 (10.8)
27-28	2 (9.1)	9 (40.9)	7 (31.8)	4 (18.2)	22 (9.9)
29-30	3 (23.1)	3 (23.1)	3 (23.1)	4 (30.8)	13 (5.8)
Gender					1.76 .62
Male	7 (13.5)	19 (36.5)	17 (32.7)	9 (17.3)	52 (23.3)
Female	13 (7.6)	20 (40.9)	29 (34.5)	7 (7.0)	71 (76.7)
Civil Status					1.28 .73
Single	20 (9.3)	85 (39.4)	74 (34.3)	37 (17.1)	216 (96.9)
Married	0 (0.0)	4 (57.1)	2 (28.6)	1 (14.3)	7 (3.1)
Employment Status					3.87 .27
Employed	15 (11.2)	55 (41.0)	40 (29.9)	24 (17.9)	134 (60.1)
Unemployed	5 (5.6)	34 (38.2)	36 (40.4)	14 (15.7)	89 (39.9)
Household Income					14.48 .27
Below 20,000	5 (7.5)	22 (32.8)	28 (41.8)	12 (17.9)	67 (30.0)
20,000 - 29,999	2 (5.0)	13 (32.5)	17 (42.5)	8 (20.0)	40 (18.0)
30,000 - 39,999	3 (10.3)	11 (37.9)	12 (41.4)	3 (10.3)	29 (13.0)
40,000 - 49,999	2 (11.1)	9 (50.0)	2 (11.1)	5 (27.8)	18 (8.1)

*percentages are based on within-group totals

Likewise, there was no significant association between emotional release as a coping strategy across socio-demographic characteristics (Table 10). Emotion regulation, referring to the ability to exert control over one's emotions, develops with age. Adults were found to be more capable of self-regulating than the younger age groups attributed to their fully developed prefrontal cortex, more or less, by the age of 25 (Arain et al., 2013). Furthermore, cognitive reappraisals were also found to influence the emotional process by modifying the meanings and situations (Gross & John, 2003). Thus, it suggests that when conditions are positively framed and rationalized, emotional responses will also be changed. It was previously asserted that participants more readily resort to cognitive reappraisal and problem-solving coping strategies, as evidenced by the significant associations.

Table 10.

Chi-square test results indicating relationships in coping by emotional release across socio-demographic characteristics

Emotional Release (%)*					
	Never	Some times	Most of the Time	Always	Total
Age					12.56 .40
21-22	19 (17.0)	63 (56.3)	29 (25.9)	1 (0.9)	112 (50.2)
23-24	8 (15.4)	32 (61.5)	9 (17.3)	3 (5.8)	52 (23.3)
25-26	7 (29.2)	14 (58.3)	12 (50.0)	0 (0.0)	34 (10.8)
27-28	4 (18.2)	14 (63.6)	4 (18.2)	0 (0.0)	22 (9.9)

Table 10. cont.

Emotional Release (%)*					
	Never	Some times	Most of the Time	Always	Total
29-30	1 (7.7)	10 (76.9)	2 (15.4)	0 (0.0)	13 (5.8)
Gender					1.00 .80
Male	10 (19.2)	28 (53.8)	13 (25.0)	1 (1.9)	52 (23.3)
Female	29 (17.0)	105 (61.4)	34 (19.9)	3 (1.8)	171 (76.7)
Civil Status					4.89 .18
Single	39 (18.1)	126 (58.3)	47 (21.8)	4 (1.9)	216 (96.9)
Married	0 (0.0)	7 (100.0)	0 (0.0)	0 (0.0)	7 (3.1)
Employment Status					4.01 .26
Employed	20 (14.9)	81 (60.4)	29 (21.6)	4 (3.0)	134 (60.1)
Unemployed	19 (21.3)	52 (58.4)	18 (20.3)	0 (0.0)	89 (39.9)
Household Income					16.79 .16
Below 20,000	11 (16.4)	38 (56.7)	17 (25.4)	1 (1.5)	67 (30.0)
20,000 - 29,999	8 (20.0)	18 (45.0)	14 (35.0)	0 (0.0)	40 (18.0)
30,000 - 39,999	3 (10.3)	20 (69.0)	5 (17.2)	1 (3.4)	29 (13.0)
40,000 - 49,999	5 (5.6)	13 (72.2)	4 (22.2)	0 (0.0)	18 (8.1)
Above 50,000	16 (23.2)	44 (63.8)	7 (10.1)	2 (2.8)	69 (30.9)

*percentages are based on within-group totals

There were no significant associations found between overactivity and all socio-demographic characteristics. Overactivity refers to the overexertion of activities to avoid stress. Furthermore, overactivity is veered as a form of distraction to keep attention away from stressful circumstances. Sheppes et al. (2014) purported that when stimuli are low in intensity, and cognitive demand is low, reappraisal is preferred over distraction. In the event of intense, cognitively demanding situations, distraction was a preferred form of coping. Referring to previous assertions that the salient coping strategies used are cognitive reappraisal and problem-solving, it seems that the stress stimuli at the outset of the ECQ remain at low to moderate levels. While this assumption calls for further investigation in terms of stress perception, findings reveal that most participants do not always resort to distraction strategies such as keeping themselves busy to redirect thoughts, overeating, and sleeping more extended hours to overcome stress. Moreover, there were no disparities across socio-demographic characteristics.

Table 11.

Chi-square test results indicating relationships in coping by overactivity across socio-demographic characteristics

Overactivity (%)*					
	Never	Some times	Most of the Time	Always	Total
Age					14.49 .27
21-22	4 (3.6)	41 (36.6)	53 (47.3)	14 (12.5)	112 (50.2)
23-24	3 (5.8)	20 (38.5)	23 (44.2)	6 (11.5)	52 (23.3)
25-26	3 (12.5)	11 (45.8)	10 (41.7)	0 (0.0)	24 (10.8)
27-28	2 (9.1)	13 (59.1)	6 (27.3)	1 (4.5)	22 (9.9)
29-30	2 (15.4)	5 (38.5)	6 (46.2)	0 (0.0)	13 (5.8)
Gender					0.26 .97
Male	4 (7.7)	21 (40.4)	22 (42.3)	5 (9.6)	52 (23.3)
Female	10 (5.8)	69 (40.4)	76 (44.4)	16 (9.4)	171 (76.7)



Table 11. cont.

	Overactivity (%)*					p
	Never	Some times	Most of the Time	Always	Total N=223	
Civil Status					1.43	.70
Single	13 (6.0)	87 (40.3)	95 (44.0)	21 (9.7)	216 (96.9)	
Married	1 (14.3)	3 (42.9)	3 (42.9)	0 (0.0)	7 (3.1)	
Employment Status					5.77	.12
Employed	12 (9.0)	57 (42.5)	54 (40.3)	11 (8.2)	134 (60.1)	
Unemployed	2 (2.2)	33 (37.1)	44 (49.4)	30 (11.2)	89 (39.9)	
Household Income					18.24	.11
Below 20,000	2 (3.0)	30 (44.8)	27 (40.3)	8 (11.9)	67 (30.0)	
20,000-29,999	1 (2.5)	11 (27.5)	23 (57.5)	5 (12.5)	40 (18.0)	
30,000-39,000	3 (10.3)	8 (27.6)	17 (58.6)	1 (3.4)	29 (13.6)	
40,000-49,999	3 (11.1)	11 (61.1)	3 (16.7)	7 (18.1)	24 (8.1)	
Above 50,000	6 (8.7)	30 (43.5)	28 (40.6)	5 (7.2)	69 (30.9)	

*percentages are based on within-group totals

Table 12 shows the significant association between relaxation-recreation coping strategy and employment status, $\chi^2(2, N=223) = 7.39, p < .05$, with more employed participants engaging in recreation-relaxation activities most of the time (59.0%) to always (24.6%) compared with those who are unemployed (44.9% and 23.6%, respectively). Recreation-relaxation strategies include entertainment, rest, and engaging in activities that would keep them calm. At this early stage of the ECQ, employed participants worked from home, which could have been long hours spent in the workplace or even in traffic. While social interactions remain constrained, staying at home may provide more opportunities to rest, engage in various media forms for entertainment, and spend more time with family.

Interestingly, while civil status did not show a significant association with relaxation-recreation, $\chi^2(2, N=223) = 5.79, p > .05$, the p-value remained close to 0.06. More single participants resorted to relaxation-recreation activities most of the time (53.7%) to always (25.0%), while only 42.9% of the married respondents were engaged in such activities most of the time. Married adults are balancing out roles with childcare and household work. Toniolo-Barrios and Pitt (2020) assert that work-from-home arrangements have blurred the line delineating work and personal life. Furthermore, in the editorial written by Luttik et al. (2020) describing the pandemic as a family affair, they posited that quarantine measures have also invited vulnerability and risk within families. Parents are left to care for children 24 hours a day, without school, daycare, or even special education services to assist. Older family members with dementia or serious illnesses have to be cared for in the home without healthcare institutions' physical assistance.

Table 12.

Chi-square test results indicating relationships in coping by relaxation-recreation across socio-demographic characteristics

	Relaxation-Recreation (%)*					p
	Never	Some times	Most of the Time	Always	Total N=223	
Age					7.68	.45
21-22	0 (0.0)	22 (19.6)	61 (54.5)	29 (25.9)	112 (50.2)	
23-24	0 (0.0)	15 (28.8)	23 (44.2)	14 (26.9)	52 (23.3)	
25-26	0 (0.0)	5 (20.8)	13 (54.2)	6 (25.0)	24 (10.8)	

Table 12. cont.

	Relaxation-Recreation (%)*					p
	Never	Some times	Most of the Time	Always	Total N=223	
27-28	0 (0.0)	3 (13.6)	16 (72.7)	3 (13.6)	22 (9.9)	
29-30	0 (0.0)	5 (38.5)	6 (46.2)	13 (15.4)	24 (5.8)	
Gender					2.46	.29
Male	0 (0.0)	13 (25.0)	23 (44.2)	16 (30.8)	52 (23.3)	
Female	0 (0.0)	37 (21.6)	96 (56.1)	38 (22.2)	171 (76.7)	
Civil Status					5.79	.06
Single	0 (0.0)	46 (21.3)	116 (53.7)	54 (25.0)	216 (96.9)	
Married	0 (0.0)	4 (57.1)	3 (42.9)	0 (0.0)	7 (3.1)	
Employment Status					7.39	.03
Employed	0 (0.0)	22 (16.4)	79 (59.0)	33 (24.6)	134 (60.1)	
Unemployed	0 (0.0)	28 (31.5)	40 (44.9)	21 (23.6)	89 (39.9)	
Household Income					5.19	0.7
Below 20,000	0 (0.0)	16 (23.9)	33 (49.3)	18 (26.9)	67 (30.0)	
20,000-29,999	0 (0.0)	9 (22.5)	26 (65.0)	5 (12.5)	40 (18.0)	
30,000-39,000	0 (0.0)	14 (24.1)	14 (48.3)	8 (27.6)	29 (13.0)	
40,000-49,999	0 (0.0)	5 (27.8)	8 (44.4)	5 (27.8)	18 (8.1)	
Above 50,000	0 (0.0)	13 (18.8)	38 (55.1)	18 (26.1)	69 (30.9)	

*percentages are based on within-group totals

There is no significant association between substance abuse as a coping strategy across all socio-demographic characteristics (Table 13). More so, comparable across groups, about 77.3% of the participants reported to have never engaged in smoking to ease negative emotions nor took any medication to help them feel and think better. A study conducted in the Philippines' southern part revealed that young adults have sufficient knowledge about the outbreak and were continuously practicing healthy precautionary measures and self-awareness as a coping strategy (Baloran, 2020).

Table 13.

Chi-square test results indicating relationships in coping through substance use across socio-demographic characteristics

	Substance Use (%)*					p
	Never	Some times	Most of the Time	Always	Total N=223	
Age					8.47	.75
21-22	82 (73.2)	21 (18.8)	9 (8.0)	0 (0.0)	112 (50.2)	
23-24	39 (75.0)	8 (15.4)	4 (7.7)	1 (1.9)	52 (23.3)	
25-26	30 (83.3)	3 (12.5)	1 (4.2)	0 (0.0)	34 (10.8)	
27-28	15 (68.2)	5 (22.7)	2 (9.1)	0 (0.0)	22 (9.9)	
29-30	11 (84.6)	0 (0.0)	2 (15.4)	0 (0.0)	13 (5.8)	
Gender					1.89	.60
Male	36 (69.2)	10 (19.2)	6 (11.5)	0 (0.0)	52 (23.3)	
Female	131 (76.6)	27 (15.8)	12 (7.0)	0 (0.6)	171 (76.7)	
Civil Status					0.75	.86
Single	161 (74.5)	36 (16.7)	18 (8.3)	1 (0.5)	216 (96.9)	
Married	6 (85.7)	1 (14.3)	0 (0.0)	0 (0.0)	7 (3.1)	
Employment Status					7.39	.03
Employed	102 (76.1)	20 (14.9)	11 (8.2)	1 (0.7)	134 (60.1)	
Unemployed	65 (73.0)	17 (19.1)	7 (7.9)	0 (0.0)	89 (39.9)	
Household Income					9.12	.69
Below 20,000	50 (74.6)	12 (17.9)	4 (6.0)	1 (1.5)	67 (30.0)	
20,000-29,999	29 (72.5)	7 (17.5)	4 (10.0)	0 (0.0)	40 (18.0)	
30,000-39,000	23 (79.3)	5 (17.2)	1 (3.4)	0 (0.0)	29 (13.0)	

Table 13. cont.

	Substance Use (%)*					X ²	p
	Never	Some times	Most of the Time	Always	Total		
40,000-49,999	11 (61.1)	3 (16.7)	4 (22.2)	0 (0.0)	18 (8.1)		

Table 13. cont.

	Substance Use (%)*					X ²	p
	Never	Some times	Most of the Time	Always	Total		
Above 50,000	54 (78.3)	10 (14.5)	5 (7.2)	0 (0.0)	69 (30.9)		

*percentages are based on within-group totals

Table 14.

Spearman's correlation coefficients for challenges encountered during ECQ and coping strategies

	*He	Fo	Ho	Work	Fin	CT	Safe	HC	CS	RFa	RFr
CA	0.057	0.015	-0.016	0.038	-0.017	-0.049	-0.052	-0.04	-.158*	0.065	-0.05
SS	0	-0.01	0.017	.144*	0.106	.145*	0.114	0.126	0.044	0.026	0.041
PS	0.048	0.03	-0.014	0.064	-0.027	0.035	-0.042	0.015	-.155*	0.065	0.045
Rel	0.08	0.047	0.059	0.087	0.085	0.04	0.037	0.12	0.021	0.092	0.034
Tol	0.033	0.053	-0.028	0.042	0.078	0.01	0.047	0.106	0.013	0.06	0.121
ER	0.054	0.063	0.111	0.13	0.082	0.058	0.128	0.029	0.105	0.131	.172*
O	0.064	0.041	.133*	0.126	.133*	.149*	0.125	.139*	.150*	0.075	.191**
RR	0.059	-0.06	-0.093	0.117	0.002	-0.051	-0.071	-0.02	-0.064	0.006	0.068
SU	0.051	0.004	.133*	0.089	.146*	0.057	0.123	0.065	-0.014	0.106	0.034

***Coping:** CA-cognitive reappraisal, SS-social support, PS-problem-solving, Rel-religiosity, Tol-tolerance, ER-emotional release, O-overactivity, RR-relaxation recreation, SU-substance use; **Challenges:** He-keeping myself healthy, Fo-food availability, Ho-housing conditions, Work-work conditions, Fin-financial security, CT-access to communication and technology, Safe-community safety, HC-access to health care, CS-access to community services, RFa-relationship with family, RFr-relationship with friends; **p<0.01, *p<0.05, two-tailed.

A weak, negative association was found between cognitive reappraisal coping strategy and access to community services ($r = -.158, p<.05$) and between problem-solving coping strategy and access to community services ($r = -.115, p<.05$). These two coping strategies relate to the individual's perception and resolve to address the stressor. During the pandemic, community services were deemed essential to augment hunger, loss of jobs, and lack of mobility. However, with the absence of clear guidelines, poor communication, and poor coordination among stakeholders, providing immediate assistance to the poor and vulnerable becomes an even more significant challenge (NEDA, 2020). Community services, furthermore, call for cooperation from the public. These two types of active coping strategies may have emerged at a particular period, during the ECQ, when community services are inaccessible but most needed.

Social support was found to have a weak, positive relationship with challenges about work conditions ($r = .144, p<.05$) and access to communication and technology ($r = .145, p<.05$). Help-seeking behaviors, explicitly asking for advice from a more knowledgeable other and receiving support from friends and family, characterize social support as a coping strategy. During the early stages of the ECQ, when the guidelines were stricter and fear of transmission prevented social interactions, technology served its purpose to connect

people. Challenges at work were addressed by seeking help from co-workers who can provide both emotional and professional support. As purported by Li, Ghosh, and Nachmias (2020), there is a need to engage in frequent, substantive, interactive, and authentic communication with colleagues to perceive high proximity in virtual spaces and develop a shared identity for building resilience.

Emotional release shows a weak, positive association with friends' relationships ($r = .172, p<.05$). Emotional release pertains to venting out both negative and positive, emotions, in the form of overt behaviors such as crying, laughing, and even aggressive forms. Friendships are bound by affective qualities such as trust, loyalty, mutual support, and sentiment bonds that enable self-disclosure (Morais, 1981). Furthermore, social distancing and isolation have imposed threats to relationships as the lack of face-to-face interactions may be limiting the dyadic intimacy and intensity of commitment that defines close friends.

Overactivity shows a weak, positive association between several challenge variables, namely, housing conditions ($r = .133, p<.05$), financial security ($r = .133, p<.05$), access to communication and technology ($r = .149, p<.05$), access to health care ($r = .139, p<.05$), access to community services ($r = .150, p<.05$), and the



strongest with the relationship with friends ($r = .191, p < .01$). Overactivity, as a form of distraction, involves engaging in activities to keep attention away from stressors. However, escapism and avoidance in the form of burdening oneself with work, overeating, and oversleeping may result in poor health outcomes over time. Distraction has been veered as a disengagement, a maladaptive coping strategy that operates on avoidance. However, a recent study shows how positive distraction can induce positive emotions to address chronic stress (Waugh, Shing, & Furr, 2020). Some examples include engaging in a healthy lifestyle, home gardening, and playing games. The autonomy and agency adults possess to enable them to access different activities can promote a sense of control, goal orientation, and reestablish routines. Gaining a sense of control provides a protective factor against negative developmental outcomes related to risky and unhealthy behaviors (Zhu, Lu, & Chang, 2020). Substance abuse was found to have a weak, positive association with challenges related to housing conditions ($r = .133, p < .05$), and financial security ($r = .146, p < .05$). A perceived lack of control over such challenges would likely lead to maladaptive coping strategies such as substance use.

In addition to coping, Figures 8 and 9 show the various services that facilitated coping amid the pandemic and the ECQ. The average scale revealed digital payment schemes (61.4%) and food deliveries (48.9%) as the most helpful services during the ECQ. Online shopping became popular among young adults, with 40.3% of the participants doing this service. Among the least used services are remittance (31.4%) and micro-financing services (18.4%). Further evaluation revealed other services that became useful during ECQ, such as attending online courses, training, webinars, operating convenience stores, psychosocial support from peers, general express deliveries, and entertainment subscriptions.

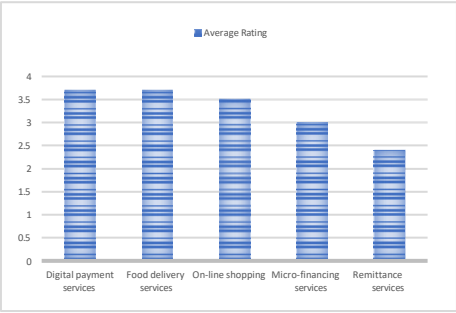


Figure 8. Average rating showing various services that helped in coping during ECQ (n=223)

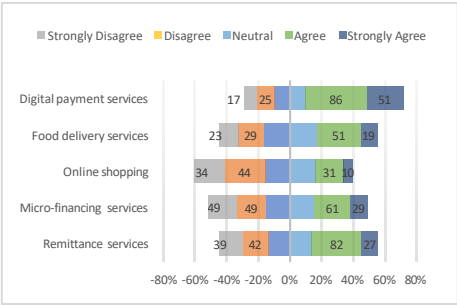


Figure 9. Various services that helped participants cope during ECQ (n=223).

3.5. Expectations Post-Enhanced Community Quarantine (ECQ)

Figure 10 shows the distribution of health-related; new normal expectations strongly diverging to the right. Results revealed that the majority of the participants highly expect online consultation (strongly agree: 28%; agree: 52%), medical supplies delivery (strongly agree: 32%; agree: 56%), increase in medicine supplies at home (strongly agree: 36%; agree: 53%), frequent handwashing and sanitizing (strongly agree: 73%; agree: 26%) and practice of physical distancing (strongly agree: 65%; agree: 31%) to be part of the new normal. Frequent handwashing and sanitizing, followed by physical distancing, showed the highest rating, indicating high compliance concerning following the standard precautionary measures. Although several articles highlight telehealth's advantage in reducing infection risk (Hollander & Carr, 2020; Perrone et al., 2020), online medical consultation was still the least expected by the participants. Skepticism and resistance to change can be attributed to external challenges such as potential costs, limited technical resources, and data privacy issues (Leochico, 2020). The further evaluation suggested other health-related expectations from the participants, including the availability of mass testing, increased medical services not limited to X-rays and MRI, work-from-home set-up, and transportation alternatives.

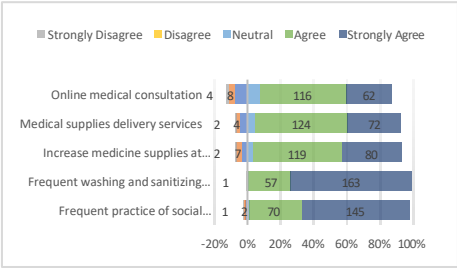


Figure 10. Health-related new normal expectations post-ECQ (n=223)

Food and nutrition-related new normal expectations are shown in Figure 11. Similarly, the distribution is strongly diverging to the right, depicting high expectations from the participants to do the listed practices when the quarantine is lifted. Increased consumption of fruits and vegetables (strongly agree: 53%; agree: 39%), healthy and well-balanced meals (strongly agree: 51%; agree: 38%), and increased awareness of the importance of nutritional recommendations (strongly agree: 51%; agree: 41%) were among the top answers. A recent study that focused on eating habits and lifestyle change among the Italian population confirmed that almost half of the participants (48.6%) perceived weight gain during the lockdown period (Di Renzo et al., 2020). In another study conducted by Deschasaux-Tanguy et al. (2020), the lockdown period was characterized by unhealthy dietary practices that may increase the risk of contracting COVID-19 due to compromised immunity. The lowest scores belong to home gardening for food production (strongly agree: 42%; agree: 41%) and availing food and grocery delivery services (strongly agree: 39%; agree: 49%). Thus, it may be attributed to the gradual easing of lockdown restrictions (as stated in the most recent Republic of the Philippines Inter-Agency Task Force Resolution No. 56, series of 2020), wherein most transactions have recently been allowed to operate, including market and grocery buying. Furthermore, other responses about food and nutrition-related expectations post-ECQ include increased awareness of home gardening, less consumption of processed food, increased consumption of nutritious food, regular eating patterns, mindfulness in choosing what to eat, availability of new food products in the market, accessibility of more online health tips, and online diet consultations.

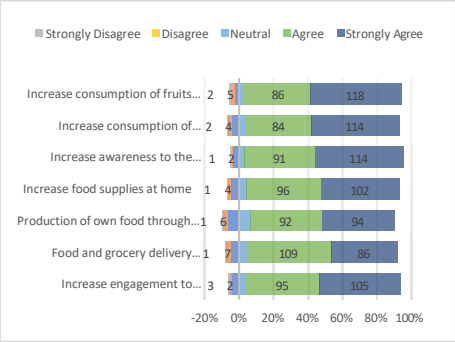


Figure 11. Food and nutrition-related new normal expectations on post-ECQ (n=223)

4. Conclusion

In this study, challenges and various coping strategies among 21 to 30-year-old Filipino adults during the ECQ were described. Although 34.9% reported preparedness, 38.7% were neither prepared nor unprepared. Participants felt secure with their food supply, internet connection, and the information they acquired from credible sources. While there

seems to be limited access to food, healthcare, and community services brought about by the ECQ restrictions and fear of COVID-19 transmission, findings suggest that individuals will continue to innovate given the resources within reach. Home-cooked meals were often prepared, while rice, bread, fruits, and vegetables comprise their usual diet. More than half of the participants take vitamin and mineral supplements, which may be attributed to a protective, health-seeking behavior emerging during a pandemic. Stocking up on food, obtaining credible information, preparing food at home, consuming fruits and vegetables in addition to the usual staple food, and taking supplements exemplify taking individual responsibility to ensure health and well-being. More so, cognitive reappraisals and problem-solving strategies also highlight the importance of personal action over one's situation. Coping strategies such as relaxation-recreation, problem-solving, religiosity, and cognitive reappraisal were among the frequently used.

In a crisis such as a pandemic, it must be realized that health consequences are the results of both individual and collective efforts to improve the well-being of the community. It also follows that post-ECQ, participants expect that more will resolve to adhere to healthy lifestyles, which also meant following nutrition recommendations, continued physical distancing, handwashing, and sanitizing. This study illustrated how 21-to 30-year-old Filipino adults could cope during the community quarantine's heightened enforcement in the Philippines. While the Department of Health mandates health and safety protocols, differences exist in each local government unit (LGU). These disparities, including a wide range of socio-demographic profiles, make it difficult to generalize at this point. Data collection was also limited to a one-time, online survey, mostly dependent on recall and self-reports. A larger sample size may be considered for theorizing, generalizability, and predicting outcomes to further research and practice. A cross-sequential study design may also be used to determine how individuals are coping, given the easing restrictions. This study's findings may be used to encourage individuals, especially young adults, to take a proactive stance in overcoming stress during the pandemic and take accountability in following the mandated health protocols.

Declaration of Conflict of Interest

The researchers declare that there is no conflict of interest involved whatsoever in this study.

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Children of the Flood: The Effect of Flood on the Psychological Resilience of Children



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Abstract

The Philippines' geographical location is along the typhoon belt. It is visited by an average of 20 typhoons yearly, leaving devastation trails. Despite this yearly occurrence, Filipinos, including children, remain resilient as they encounter such adversities. There have been some studies about Filipino resiliency and coping strategies amidst disasters; however, the literature on the resiliency of Filipino children during the disaster and its psychological effect remains underexplored. Using a phenomenological framework, this study explored the psychological resilience of children affected by floods. The findings of this study reveal that the psychological effects of the annual flood on the children relate to the following: emotion (sympathy and fear), behavior (securing their belongings, preparing food, staying in high places, cleaning, searching for lost things, and listening to weather forecast), and cognition (anxiousness, attentiveness, preparedness, sense of responsibility for others, and awareness of the importance of trees). This study also determined the main factors affecting the children's coping strategy: dependency on their parents, being accustomed to flood, their family, and their faith. The most outstanding and significant factor that significantly influences the children's coping strategy to become psychologically resilient is the culture of *bayanihan* in their community.

Keywords

resilience, annual flood, *bayanihan*, children

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children's psychological resilience when experiencing natural disasters becomes the impetus of this study.

1. Introduction

The Philippines is a group of over 7,000 Southeast Asian islands. The Philippines is susceptible to tropical storms and suffers from various natural calamities because of its location along the geographical Ring of Fire and its proximity to the vast Pacific (Ang & Diaz, 2014). Over the years, the Philippines has been a hotbed of natural disasters such as tropical storms, tsunamis, earthquakes, and volcanic eruptions. Located along the typhoon belt in the Pacific, the Philippines is visited by an average of 20 typhoons every year and is left with trails of devastation that prove the Philippines' very vulnerable position in disaster vulnerability (PAGASA). According to the World Risk Report (2019), the Philippines ranked ninth as one of the world's most disastrous countries. Despite these natural disasters, Filipinos remain resilient as they encounter such adversities. Several studies have examined Filipinos' resiliency and coping strategies amidst disasters (Acosta & Macandog, 2016; Ang & Diaz, 2014); however, the literature on Filipino children's resiliency during a disaster and its psychological effect remain underexplored. Thinking along these lines, a study of

In the Philippines, Palawan, known for its beautiful island, rich marine resources, and virgin forests, is usually believed by most people to be the safest area for disasters (Lewis, 2014). However, Palawan is not exempted from natural disasters. Historical storm tracks and tsunami maps from the National Geophysical Data Center in 2018 reveal that Palawan has experienced tropical storms and is at risk to nearby tsunami sources. In 2017, as reported by Rappler News, Mangsee Island, Palawan's southern tip, suffered from casualties and property damages due to severe tropical storm Vinta, leaving at least 34 people dead and at least 59 others missing ("34 Dead in Palawan", 2017).

Punang is a village in the municipality of Sofronio Española, in the province of Palawan. It is located near the national road in the southern part of Palawan. Punang's topography is surrounded by mountains on the west and facing the Sulu Sea on the east, but its center is a vast plain. Thus, the topographical location of Punang is ideal for farming and provides the opportunity for fishing. Before 2018 ended, tropical storm Usman brought heavy rains to Punang that caused severe flooding. According to the National Disaster Risk Reduction and Management Council (NDRRMC, 2019), typhoon Usman claimed 75 lives, with 16 still reported missing and 12 injured. Regional offices also said that 45,348 families composed of more than 191,000 individuals were affected in CALABARZON regions



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(Cavite, Laguna, Batangas, Rizal, Quezon) and MIMAROPA (Mindoro, Marinduque, Romblon, Palawan). In terms of damage to infrastructure and agriculture, NDRRMC reported a total of P4.25 billion, with almost P949 million in farm losses and P3.3 billion in roads, bridges, public buildings, and private structures. Floods are among the most destructive calamities. They may result in millions of pesos of damage to roads and bridges, buildings, and other economic infrastructure, crops and livestock loss, and productivity loss in the industry. There is also an incalculable loss of human lives directly attributable to floods and the hardship and emotional impact on those affected. Like any form of natural hazard, floods do not only inflict loss of lives and costly property damage but also psychological harm.

The conceptualization and study of resilience have evolved in various disciplines concerned with adapting and recovering complex systems when faced with significant threats. Resilience is the ability to overcome challenges like trauma, tragedy, personal crisis, and direct old life problems and still bounce back stronger, wiser, and more personally powerful (Henderson, 2007). One of the traits that foreign people mostly admire from Filipinos is smiling despite life's challenges. The best example is the Filipino spirit of resilience after Typhoon Yolanda. Santos (2013) states that the super typhoon Yolanda left over 6,000 people dead, more than 28,000 injured, and nearly one million families displaced along its track. Despite the many destroyed properties and lives, the story of overcoming Yolanda's effects still shows resilience - the positive example of Filipinos recovering quickly from difficulties.

Furthermore, the values of fortitude and strength of the Filipinos have been passed down from one generation to another. It will not be a surprise if young Filipinos can endure and overcome such difficult situations. Children are dependent on their parents until they can live on their own. Hence, their parents play an essential role in building their resilience. Unfortunately, no matter how resilient Filipinos are, setbacks are always present, such as natural disasters. Natural disasters are inevitable phenomena between human beings and a dynamic environment. Subsequently, negligence on the possible psychological effect of natural disasters on children usually happens in Filipino culture. De Guzman (2018) stated that talking about mental health creates a stigma among Filipinos. She said that it could be why it is the Philippines with the highest rate of depressed people in Southeast Asia. She also cited the high number of cases among the youth. The 2015 World Health Organization school-based survey reported that 11.6% of 13 to 17-year-olds considered suicide, and 16.8% attempted it (as cited in Tomacruz, 2018).

These statements substantiated the Filipinos' resiliency as evidently present, especially in times of difficulties and crisis. It is difficult for adult Filipinos to start over after everything they own turns into scrap. However, most of the time, they manage to continue their lives as if nothing happened. How about the children who are still developing to become adults? What are the things that should be known from them after the calamity? What can be the possible effects of a catastrophe on them? How should it be properly addressed if there is an alarming effect on their psychological resilience? Will the children manage the aftermath of such a disaster if it happens repeatedly? Considering these questions, the researchers' query about the

children's psychological resiliency as they encounter such adversities becomes the driving force for this study.

2. Methods

A phenomenological-qualitative research method was employed to answer the queries raised in this study. The children's lived experiences and resiliency in the annual flood were subjected to thematic analysis through which the underlying themes and ideas were identified.

The 14 participants were selected through purposive sampling and were identified by the barangay officials and the teachers of Brgy. Punang Elementary School, based on the following criteria: (a) must be between seven to 12 years old; (b) must have been residing in Brgy. Punang, Sofronio Española, Palawan for at least five years; and (c) experienced an annual flood. The age requirement employed in this study was based on Piaget's theory of cognitive development. According to Piaget, seven to 12 years of age makes up the concrete-operational stage. During this period, children develop the ability to think logically and have more adult-like thought patterns.

This study aimed to study children's resiliency and coping mechanisms in the face of calamities. In collecting the data needed in this study, the researchers used the indigenous methods cited by Yacat (2013), such as (a) *pagmamasid* (observing), (b) *pakikipagpalagayang-loob* (building rapport), (c) *patanong-tanong* (asking questions), and (d) *pakikipagkuwentuhan* (having a conversation). *Pagmamasid* was first used to observe the participants' outward disposition during the visit. Then, *pakikipagpalagayang loob* was used to build rapport and a trusting relationship with the participants. *Patanong-tanong* was also used to start a conversation and to gather initial information about them. Lastly, *pakikipagkuwentuhan*, with the vignette method's aid, was used to gain in-depth and detailed information about the participants' lived experiences from the flood.

Focus Group Discussions (FGDs) were also used to collect information from the participants. The discussion focused on the participants' lived experiences and coping strategies in the annual flood. The researchers' guide questions were based on the research objectives and were given to the participants using the Filipino language. Questions during FGD were made simple according to the children's age so that they could respond accurately. Considering the participants' age, the researchers used the vignette method to prepare a video about the flood to prompt the participants' attention. The video aimed to stimulate their memories of their experiences during a flood.

The information gathered from the recorded interview was transcribed and underwent meticulous scrutiny. Data were then coded, and emerging themes and sub-themes from the extracted responses were identified, categorized, and continued until data saturation was reached. Data saturation means that additional interviews are no longer adding to existing thematic categories or creating new categories. This study applied thematic analysis to have a coherent and reliable interpretation of the data. Thematic analysis has been poorly branded yet widely used in qualitative research (Braun & Clarke, 2006) and has been rarely appreciated in the same way as grounded theory,



ethnography, or phenomenology. Braun and Clarke (2006) argued that thematic analysis should be a foundational method for qualitative research, as it provides core skills for conducting many other forms of qualitative analysis. Many authors have maintained that because the thematic analysis is a process used by many qualitative methods, it is not a different method, but rather something to assist researchers in the analysis (Boyatzis, 1998; Holloway & Todres, 2003; Ryan & Bernard, 2000). The thematic analysis helped the researchers to give distinction among the qualitative data by organizing them into groups. It also enabled the researchers to create appropriate themes for each group which was derived from the result of thorough analysis.

Ethical consideration is vital in any research study to ensure that participants know their rights and understand the research's nature and scope. Protocols were strictly observed in this study. The anonymity of participants was ensured in all parts of the study. Informed assent and consent were obtained from the participants and their parents, respectively. Confidentiality of information gathered was guaranteed in all research procedures. The researchers assured the participants that they could disclose important information to the researchers without worry.

3. Result and Discussion

3.1. Profile of Participants

The researchers purposively selected a total of 14 participants. The participants were children aged seven to 12 years old and were living in the flood-prone area of Brgy. Punang, Sofronio Española, Palawan. Table 1 presents the necessary information about the participants. To protect the identity of the participants, they are given aliases.

Table 1. Profile of Participants

Number	Alias	Sex	Age	Educational Level
1	Porpot	Male	8	Grade 3
2	Dodong	Male	12	Grade 7
3	Muray	Female	9	Grade 5
4	Isabela	Female	8	Grade 2
5	Katong	Male	8	Grade 3
6	Bebang	Female	12	Grade 7
7	Toto	Male	7	Grade 2
8	Monmon	Male	11	Grade 6
9	Nene	Female	10	Grade 5
10	Bongbong	Male	10	Grade 6
11	Inday	Female	9	Grade 4
12	Isang	Female	9	Grade 4
13	Kaykay	Female	10	Grade 5
14	Dada	Female	10	Grade 5

3.2. Problems Encountered From the Flood

Destruction is inevitable when calamity hits. An average of 20 typhoons have made landfall in the Philippines every year and caused floods, which have left severe destruction of houses and livelihoods and injuries and deaths of people in the country since 1990 (Acosta et al., 2016). Floods are the most common natural disaster occurring worldwide. The children of Brgy. Punang are not exempted from the consequences of such adversity. Even though floods happen yearly in their place, the past floods only caused minimal damage, and no casualty was recorded. However, the flood caused by the tropical storm Usman in 2019 brought numerous destructions to the children's community. The children in the said village witnessed floods ravaging their livelihood, properties, and livestock.

Floodwaters pose immediate dangers to human health. The children of Brgy. Punang experienced the possible danger created by the flood. Such threats are venomous animals, strong water current, and health problems like skin irritation. Inday, Bebang, and Isang narrated these dangers.

Tsaka maraming mga ahas. Kung minsan natatapanan ko iyong mga scorpion. Minsan nasusugatan din kami. [There are many snakes. Sometimes I step on the scorpion and sometimes we get wounded.] (Inday)

Minsan po kasi malakas po 'yung agos. [There are times that the current of the water is so strong.] (Bebang)

Tapos may mga ipis na nakadikit sa lupa, mga ahas... kasi naga-ano siya ng kati-kati. Iyon lang po. [There are cockroaches and snakes at the bottom of the water... sometimes those irritate my skin.] (Isang)

The above responses show that floods can impose a serious threat to someone's life if not considered. Ivers and Ryan (2006) explained in their study that the risk of infectious diseases after flood-related natural disasters was often specific to the event itself. In the case of the children of Brgy. Punang, the dangers that they stated above were the significant risks for them during a flood. The Center for Disease Control in 2018 reported that "outbreaks of communicable diseases after floods are unusual but ingesting or exposing an open wound to the floodwater increased the risk of diarrheal diseases or infection" (as cited in "5 Dangers to Be Aware of After a Flood Strikes", 2018).

Flooding has been shown to cause epidemics of water and vector-borne diseases (Kondo et al. 2002). Waterborne outbreaks of diarrheal illness after floods are thought to result primarily from water contamination, which occurs due to the disruption of purification and sewage disposal systems. Likewise, skin and eye infections often occur as a result of direct contact with polluted water. These include wound infections, dermatitis, and conjunctivitis. In one study conducted in Thailand, it was found that eczema is the most common skin disease during floods (Vachiramon et al., 2008). Also, leptospirosis is a common zoonotic infection in the world, according to WHO. This condition's primary sources are infected rodents and other wild animals that excrete leptospira in their urine (Vijayachari et al., 2008). Once excreted, bacteria can live long in freshwater, damp soil, vegetation, and mud.

Moreover, contact with contaminated water bodies is a potential cause of acquiring this disease. The dirty water creates a potential source of infection for those walking barefoot. Children who are attracted by puddles of rainwater are therefore at risk.

Facing disaster causes distress to everybody, not only psychologically but also physically. During heavy rainfall with accompanying floods, Muray and Dodong experienced cold weather conditions that gave them discomfort. The Philippine houses, especially in the countryside, are not designed for cold weather. The World Health Organization (WHO), as cited in the Philippine Council for Health Research and Development (<http://pchr.dost.gov.ph>), warned that the risk of suffering from hypothermia could be a grave threat to children if they

were trapped in floodwater for lengthy periods. According to WHO, Hypothermia is a medical emergency that occurs when the body loses heat faster to produce heat, causing a dangerously low body temperature. Children and older people are more at risk of hypothermia during floods.

When a flood happens, evacuation is necessary, especially if the place is already unsafe. Bebang and Monmon told the researchers that they did not like to leave their houses during the flood. All of the homes in Brgy. Punang are built to withstand a flood. The houses in their community are all elevated from the ground. During the flood, some children are not allowed to leave their homes, but others are obliged to evacuate and stay with their relatives. Their houses are fully submerged in water, and to avoid possible danger, they must evacuate. When persons are forced to evacuate from their place of origin, it gives them discomfort and sadness because of their sense of place. Sense of place is a multidimensional concept consisting of place dependence, place identity, and place attachment aspects (Anacio et al., 2016). In the study conducted by Munro et al. (2017), people who were displaced from their homes were significantly more likely to have higher scores on each scale for depression, anxiety, and post-traumatic stress disorder than people who were not displaced.

Preparing for a flood and dealing with its aftermath are difficult for children. The children narrated the hardships they experienced in handling the consequences of the flood. They did the chores assigned to them by their parents. They also had to deal with muddy roads in going to school. The recent flood caused damage and brought difficulties to the children. The hardships encountered by the children of Brgy. Punang might affect their development if the severity of the flood damage was higher than what they had experienced. Healthy children who experience too much stress will likely lag far behind their age-mates in physical growth and motor development (Shaffer & Kipp, 2014).

A disaster such as a flood comes in life's most unexpected moments. As for the children of Brgy. Punang sometimes happens during their class days and sometimes during important occasions. Two participants expressed disappointment over lost opportunities like attending school and celebrating the New Year on January 1, 2019.

Hindi makapasok... dalawang araw. [We cannot go to school... for two days.] (Murray)

No'ng January 1, iyong hindi ko talaga makakalimutan New Year 'yun tapos nagbaha. Hindi na kami naka-celebrate sa mga pinsan ko. [One thing that I could never forget on the flood that happened on January 1, we were not able to celebrate New Year with my cousins.] (Kaykay)

Murray was disappointed that classes were disrupted because of the flood. In line with this, research conducted in Muzarabani District, Zimbabwe, indicated that floods caused the loss of learning hours, loss of qualified personnel, an outbreak of waterborne diseases, high absenteeism, and low syllabus coverage resulting in children's poor academic performance (Mudavanhu, 2014). In the study conducted by Akello (2014), the flood not only closes schools but also destroys infrastructure and makes roads unacceptable for

students. In addition, families may lose their livelihood and cannot send their children to school.

Because Filipinos are accustomed to celebrating special occasions like New Year with their families, failure to observe this kind of event because of bad weather conditions is considered a problem, especially if planned ahead of time. Kaykay viewed it as one of her unpleasant experiences caused by the flood.

3.3. Psychological Effect

When someone is exposed to a severe threat, fear is a normal response. Like other disasters, severe storms and flooding can result in not only damage to property but also emotional distress. As flood usually happens in Brgy. Punang, the severe flood they experienced in 2019, made them fear the risks and the grave threats that flood could inflict on them.

Natatakot po, gano'n po. Tapos... tapos pag-ano... 'pag nangyari po sa amin na ano... masyadong nakakatakot kasi po 'pag nalubog 'yong bahay namin wala na kaming mapupuntahan. [We are afraid. Because if we experience severe damage, if our houses will be submerged to water, it will be so scary because we have nowhere to go.] (Kaykay)

Nakakabahan po ako kasi po baka may maaksidente. Mamaya ako 'yong maaksidente... 'yong January 1 kinakabahan po ako ay baka po may malunod. 'Yong bakod po lubog na po 'yan. [I am nervous because someone might have a fatal accident, and it might happen to me as well. On January 1, I was nervous because I thought that someone could be drowned. That fence over there, it was fully submerged in water.] (Bongbong)

Takot po. Baka po kasi... meron pong madisgrasya sa pagkiddat po... sa mga pagkaputol po ng kahoy. [I am afraid. Because someone might be struck by lightning or someone could be injured from the falling trees.] (Bebang)

Their fear came from what they had experienced and from what they had witnessed. No casualty concerning the flood was recorded from the community. However, the damage it caused to the people was severe. The fear of the children for themselves and their community whenever there is a flood is part of the flood's effect on their emotional aspect. This fear is deemed normal because the children were facing a grave danger. Several studies have shown various symptoms from exposure to natural disasters such as flooding. According to Mason, Andres, and Upton (2010), individuals may experience depression, anxiety, and post-traumatic stress disorder symptoms. This result corroborates Chae et al. (2005) findings that the residents in the disaster-exposed group experienced higher levels of stress, anxiety, depression, and post-traumatic disorder compared with those in the non-disaster group.

As the children experienced the annual flood occurrence, they could grasp the difficulties it brings. When asked how they felt when they heard the word flood, they answered that they knew how difficult it was to deal with its effects. Although all the children who participated in this study



experienced the same flood every year, some residents' struggles were greater than others. The children witnessed with their own eyes the destructive force of the flood. Hence, the children learned how to empathize at a young age. They knew the feeling of struggling from a disaster.

Behavioral Effect

The most prominent behavior manifested by the participants before the flood happens is securing their valuable things. They help their parents put their important stuff in high places to avoid being wet and lost. They learn to secure items at a young age before a disaster happens. The people of Brgy. Punang prepare for the annual flood by elevating their houses from the ground and having a place inside their homes that is high enough to secure their valuables. Surge is expected in their community at any time of the year, especially with heavy rainfall. The children's behavior towards anticipating flood is securing their valuables because they also see their parents doing it. When a flood occurs, it becomes part of their yearly routine to put their things in high places before they can be damaged.

Food is one of the basic needs of every human. In times of flood, food and water are essential for survival. A disaster like a flood can cause food and drinking water scarcity. To avoid this, the children help prepare their basic needs, such as food and water, beforehand to ensure they have something to restore their energy during and after the flood.

Naghahanda ng mga pagkain at saka humahanda ng mga kagamitan... [flashlight pati mga pagkain, mga tubig. [I prepared food and some other stuff like flashlights and water.]] (Nene)

The participant named above always prepares ready-to-eat food and water to drink before a flood occurs. During the flood, she and her family could not leave their house, and after the flood, she had to assist her parents in cleaning the mess and fixing the damage brought by it. They need to have something to eat and drink to deal with the hardships of the flood.

The children know that staying in high places in times of flood is a must. It is one of the safety precautions to avoid danger. Their houses are designed to prepare for floods, as mentioned earlier. During the flood, the children stay at the highest place in their homes while helping their parents to arrange their belongings. Others exhibit a sense of calmness. Children know that panic will not help during the flood. Instead, they help their parents when things still need to be put in high places. They also find activities inside their room while waiting for the water to subside. Their room is designed high enough to prevent the floodwater from entering. Their calmness during the flood is exemplary.

Scattered garbage, muddy roads, fallen trees, and ruined belongings are the common scenarios the children face after the flood. When asked what they always do after the flood, the children answered 'cleaning.' Given the disorder and the untidiness brought by the flood to their community every year, the children learn the value of cleaning and helping their parents do the job efficiently. Instead of being idle, the children participate in their community's collective effort to clean their surroundings after the flood. Cleaning the garbage and organizing things are children's typical responses after the water subsides. As explained previously, they assist their parents in doing the chores even if some are hard for them.

The recent flood caused so many losses to the people of Brgy. Punang. Some can be retrieved, and some are lost forever. As they experience floods yearly, two participants always search for their lost belongings like slippers and other things that can still be used after the flood.

Hinahanap po 'yung mga ibang nawawalang tsinelas... 'yong mga tsinelas lang po namin. [I was searching for our lost slippers from the flood.]] (Katong)

Tumutulong maghanap ng mga gamit na nawawala. [I helped my parents to find our lost things from the flood.]] (Dodong)

Katong and Dodong searched for those things that could be retrieved. Their things that are usually put outside the house, like slippers, laundry bowl, and water pails are often lost after the flood. They search for them, hoping they can still be found.

The weather forecast is significant. It will give everyone information and warning for bad weather in advance. After the devastating flood that hit the community of Brgy. Punang, Inday starts listening to the weather forecasts to prepare for the upcoming flood.

Kapag nalinis na lahat ang mga gamit na gingtaas naming, iyong nakalagay sa taas ng bahay ginababa na namin. Tapos ginabuksan namin ang radyo kung may kasunod pa na baha. [When we finished cleaning our house, we put down and organize those things that we put in high places. After that, we open the radio so that we will know if there will be the next flood.]] (Inday)

Children nowadays are not accustomed to listening to the news on the radio. Many children do not also like to watch news and weather forecasts; however, the children of Brgy. Punang, like Inday, has learned the value of being updated with weather conditions. She knows it will help her prepare for the upcoming flood.

Cognitive Effect

As the children encountered and witnessed the grave danger of flood to their community, they were anxious about the worst thing that could happen. They were worried about their safety and the people around them. They were also concerned about the strong current reaching their home and the fatal lightning that could strike anyone. These could be attributed to what they went through on January 1, 2019. According to the Center for Disease Control and Prevention (CDCP), children may develop symptoms of anxiety, depression, and post-traumatic stress disorder after a disaster. The children understand less about the situation, feel less able to control events, have less experience dealing with a stressful situation, and may not communicate their feelings, such as fear or anxiety (CDCP, 2019).

A flood can cause unimaginable damage to a particular community affected by it. Flood is a great problem, especially if it happens yearly, just like in Barangay Punang. Nevertheless, despite the children's yearly experience of a flood, they do not fall into despair but gain a strong sense of awareness and increased vigilance to danger by being attentive to what they should do. During and after the flood, the children are cautious about how much the flood

has damaged their surroundings. They observe the falling trees and the electrical wires that can cause severe harm. Children learned about being attentive to danger during and after the flood. Having a sense of safety in flood times is one of the admirable traits that can be noticed among the children.

Problems that keep repeating will probably burn out anyone but not the participants in this study. Growing up with flood as part of their yearly life teaches them how to prepare for it when it happens. They know they must be ready and mindful of their belongings before and during the flood. They also know that they must be alert and prepared for the consequences of floods. They also give importance to the value of teamwork in facing disaster.

They always ensure they are ready to face it with their family and community before a flood happens. Luthar, Cicchetti, and Becker (2000) stated that the two essential factors of child resilience were serious threats to adaptation or development and achieving a positive and good outcome. The study by Hassan, Singh, and Sekar (2018) stated that children showed high levels of intrusion and avoidance in the aftermath of floods. Both boys and girls who experienced the flood disaster in September 2014, which wreaked havoc in the Jammu and Kashmir region of India, showed moderate to severe psychological impact on the domains of the Children Revised Impact of Events Scale (CRIES). In contrast to the previous study's finding, severe flood threats to the present study's participants helped them achieve a positive outlook in combating it and employing preparedness. Due to the annual and devastating floods of January 1, 2019, their sense of readiness is quite remarkable. The participants in this study did not experience any loss of loved ones, unlike Jammu and Kashmir's children in India (Hassan, Singh, & Sekar, 2018).

The children who experience the annual flood live in different village areas. Some are near the Punang River, others near the shore, and the rest far from water bodies. According to the village officials, the flood always starts from the river. Dada, who lives near the river, feels responsible for others by warning her neighbors when she sees the river's water is already rising. Filipinos have a collective culture wherein they view one another as part of one community. Dada knows she is part of their community, and they are responsible for one another during the flood. She lives near the Punang River, and she always warns neighbors to also prepare for the flood.

Trees are a significant part of nature. They supply oxygen for breathing and water for drinking. One of the children out of 14 participants emphasizes the importance of trees in preventing a flood. However, the leading cause of flood in Punang is its location and not the lack of trees, as the barangay officials stated. Even if that is the case, Bongbong realizes the vital role of trees in preventing disasters like floods.

Ano po, kung magsunod lang sa akin ang mga tao pagsabihanko po sila na huwag ng magputol ng mga kahoy para hindi na magbaha. [If people will listen to me, I will tell them to stop cutting the trees so that there will be no flood.] (Bongbong)

There is a loss of trees in the mountains near Bgy. Punang can be observed because of the *kaingin* (clearing the mountain area by burning trees to plant crops) of a particular ethnic group living in those places. Bongbong attributed the loss of trees to the flood to his community annually.

3.4. Factors Affecting Punang Children Coping Strategy

Dependency on Parents

Until they become adults, children are dependent on their parents (Shaffer & Kipp, 2014). In line with this, the children become more dependent on their parents during the flood. Their parents are the vital sources of their psychological resilience. They exhibit a sense of calmness during the flood because they know that their parents will take care of them, and it is noticeable in their behavior during the flood, as explained above. When asked how they coped with a flood yearly, they answered that they would be fine as long as their parents were with them. Stafford et al. (2018) stated that children's dependency on their parents and how parents respond to the disaster significantly impacted their coping strategy in dealing with the aftermath of any calamities (Stafford et al., 2018). Bowlby (1969) emphasized in his study the role of the primary caregiver in helping the child to develop healthy attachments, a sense of self, and a sense of self-efficacy. In the case of the present study's participants, their primary caregivers are their parents.

Being Accustomed to Flood

Encountering a repetitive flood situation teaches the participants how to deal with it positively every year. They feel stuck in this situation to the point that it becomes part of their mindset to prepare for it and manage the problems it causes. Experiencing the flood annually gives them insight into what to do every time it happens.

Wala na rin pong magawa eh, kay dito kami nakatira. Dito rin kami isinilang. Pagtiisan na lang kung anong meron ditong baha. Kay sanay na din kami eh. Kung anong ginagawa ng baha gano'n din, paulit-ulit lang. [We cannot do anything to stop it. We were born here, and we live here. We will endure the flood here because we are used to it. It is just like experiencing a cycle of flood every year, and it is almost the same.] (Monmon)

Kinakaya pa rin namin na kahit ano taon-taon bumabaha humahanda rin po kami... kasi naranasan na namin eh. [We are trying to be strong even if we experience a flood every year. And every time it happens, we always prepare because we are already accustomed to it.] (Dodong)

Being accustomed to floods has a significant contribution to their psychological resilience. Armstrong, Birnie-Lefcovitch, and Ungar (2005) considered that the child's developmental pathways contributed to multiple levels of influence on his/her resilience. The participants are children born in a flood-prone area. Growing up, they have seen their family and community dealing with a flood yearly. The children also adopt that behavior. They healthily cope with a flood because it is part of their reality, and they must confront it with strength and courage.



Family

Filipinos are known to be family-oriented. Two participants strive despite the flood for their parents and their family. Their loved ones give them a reason to move forward despite their challenging situations from the flood. Inday and Isang shared their story about dealing with a flood every year.

Iyong mga gamit po namin tsaka iyong pamangkin ko kay hindi po kasi kaya nila mama kasi kambal dala-dalawa. Hindi nila kayang asikasuhin ang baby... para matulungan sila Mama... kasi hindi rin nila kaya minsan. Kasi minsan marami din dapat itaas. Mga importanteng gamit. [During the flood, I help secure things and take care of my two young nieces, who are twins. Because my parents can't do it all by themselves, I do it to help my parents because sometimes, they are also having a hard time, especially when there are many important things to be secured in high places.] (Inday)

Ginaligpit na lang tapos ginalagay na lang sa mataas na lugar... para makatulong sa magulang... kasi nahihirapan na rin silang magligpit ng mga gamit. [I assist in organizing things that will be put in a high place so that I can help my parents. Because I can see that they also find it difficult and hard to organize and secure things during the flood.] (Isang)

Dealing with the aftermath of a flood is indeed hard for the children. As Beresford explained in his study, the absence of a coping resource could make an individual more vulnerable to stress (Beresford, 1994). However, Inday and Isang faced the flood with unwavering and unselfish attitudes toward their parents and families. As Filipino children who are family-oriented, the family is their source of inspiration to become resilient no matter how challenging the situation. The family gives them a reason not to give up when a flood hits their community.

Faith

The Philippines is the only Christian country in Asia (Miller, 2019). This fact about the Philippines speaks about how much Filipinos hold to their faith in times of tragedy. One of the children told the researchers that she had just prayed in the hope that the flood would stop. In times of disaster like flood, Dada's faith in God makes her believe everything will be fine.

Umaakyat po ako sa kwarto tapos nananalangin po ako na sana huminto na po 'yong baha. [I go inside my room, and I pray to hope that the flood will stop.] (Dada)

Many mental health workers consider seeking a spiritual understanding of one's place in the universe important in overall health and well-being, including disaster management intervention (Sipon et al., 2015). Given the potential effects of spiritual and religious beliefs on coping with traumatic events such as flood disasters, Sipon, and his colleagues conclude that the role of spirituality in fostering resilience in flood disaster survivors helps human adaptation to trauma.

Bayanihan

Bayanihan is known as one of Filipino culture's positive characteristics, which is also possessed by participants of the present study in coping with the annual flood. *Bayanihan* is a spirit of civic unity and cooperation among Filipinos (Bayanihan, n.d.). In the study conducted by Chang (2009), he observed a sense of unity within the community after the flood in Carlisle, Cumbria, United Kingdom. However, Chang (2009) also observed that Carlisle's people turned to their self-interests when the severity of the flood's damage increased. It contrasts with what happened to the participants of the present study. The more they experienced the graveness of flood, the more their people united to overcome it. The civic unity among them, called *bayanihan*, became concrete and was seen through their actions for one another.

The children cope together with their community. They realize the value of helping each other in times of need. Seeing the collective effort of the people around them helps the children to surpass the adversity of flood. Children learn from the example of adults. The positive interaction and the support of their community for one another significantly affect how they cope with the flood. The majority of the coping resources of the children of Brgy. Punang is themed under *bayanihan*. Enriquez (1992) presented a core concept of Filipino psychology: *kapwa* (as cited in Yacat, 2013). Enriquez defined *kapwa* as recognition of shared identity, an inner self shared with others. The children of Brgy. Punang shares the same struggles with their community; they face it together by helping one another in times of flood. Their community also showcased *kagandahang-loob* to each other, highlighted during the devastating flood on January 1, 2019. *Kagandahang-loob* (shared humanity) was also first identified by Enriquez in 1992 as a value that links the self to society or "linking socio-personal value" (as cited in Galano, 2017). These values within the context of Filipino psychology leave a significant impact as one of the coping strategies of the children of Brgy. Punang during a time of disaster like a flood. They know that they are not alone during the flood, but they face it together with the people around them.

4. Conclusion and Recommendations

The annual flood experienced by the children of Brgy. Punang makes them develop and foster a highly resilient attitude towards it. The role of their primary caregivers, who are their parents, helps in molding their psychological resilience. Furthermore, the culture of *bayanihan* plays a significant role in children's psychological resilience. The resilient attitude of their community significantly contributes to their coping strategy. The unity of the people around them in helping one another shows an excellent example of the children being part of a collective effort to recover from the aftermath of a flood. The children suffered from several problems from the flood-like destruction and loss, danger, sensitivity to cold weather, evacuation, hardships, disruption of classes, and missed opportunities for school and special events. Their support system for bouncing back from difficulties caused by a flood is strong and firm, as evidenced by this study's findings. Although the children display signs of apprehension and emotional distress towards flood, it does not significantly affect their psychological resilience. Instead, they foster the attitudes of safety, preparedness, courage, endurance, and calmness. They also exhibit compassion and care towards other victims who suffer greater challenges than them. Faith in God is also one of the children's fortress to overcome their

challenging situation. Their care for their parents and family also inspires them to endure the hardships of the flood. Overall, the children of Brgy. Punang's psychological resilience is largely influenced by their environment and the Filipino attitude of positivity despite adversity. As this study affirms, *bayanihan* can significantly boost Filipino children's psychological resilience in facing natural disasters such as floods. On an international scale, civic unity within the community during a disaster will significantly influence the children to develop a strong psychological resilience.

This study's contribution shows the importance of one's community in molding children's resilience. It also emphasizes and supports the existing literature on how parents' response to disaster affects their children's perspective in handling it. Furthermore, the Filipino culture of *bayanihan*, faith, family-orientedness, and positivity despite adversity can be evidence of effective and collective recovery after a disaster.

Considering the results presented in this study, the researchers would like to recommend the following to DRRM in partnership with DSWD. They must encourage the children living in flood-prone areas to foster a resilient attitude towards disaster. This can be done by providing children with training in disaster preparedness. They can also train the parents to exercise precautionary measures to secure their children's safety during calamity, such as a flood. Providing seminars and programs for parents on how to deal with their children during disasters positively will be a great help. Parental counseling is also deemed helpful and, therefore, recommended. Developing teachers' programs in flood-prone areas to teach children safety tips and positive responses to disasters is also highly recommended. Giving lectures, seminars, and workshops to the people living in a flood-prone area to boost their collective effort to overcome flood adversity is essential, especially to the children. Spreading awareness of the positive impact of *bayanihan* in a community will help sustain disaster survivors' resilience. The positive interaction will lift the people's morale to face struggles with courage and hope.

Furthermore, it is recommended to the local government of Palawan that evacuation centers for flood-prone areas like Brgy be established. Punang be built. The evacuation centers will be a great help to the residents, especially to the children. Children feel uncomfortable leaving their homes, but they see the necessity to evacuate for safety purposes. Providing a comfortable temporary shelter and orienting the residents, especially the children, about the importance of evacuation in times of disaster are important. It is also recommended that the flood-prone area of Bgy. Punang will be studied to identify appropriate measures that will prevent the annual occurrence of floods. This recommendation is given to prevent casualties and, most significantly, psychological distress among the vulnerable children living there.

This study can be used as a basis for Filipino children's resilience and the factors that affect it. Other studies on children who are affected by flood or any disaster may be conducted, taking into account the following cases: without parental support, suffering from extreme devastation and casualty of loved ones, and seriously injured children. These are not explored in the present study. Thus, considering the suggested cases will be a good continuation of this research. It is hoped that this research will pave the way for the

development of an effective psychological intervention for Filipino children who are survivors of disasters.

Declaration of Conflict of Interest

The researchers declare that there is no conflict of interest in this study.

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Establishing a Conservation-Friendly Livelihood: The Case of Lato Farming in Rizal, Magsaysay, Palawan, Philippines



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Abstract

This study describes certain aspects of the *lato* (*Caulerpa lentillifera*) production by Barangay Rizal in Magsaysay, Palawan, as a livelihood with conservation goals. Most *lato* growers have elementary and secondary education, and this livelihood had a good income. The *lato* farmers aspired to have a stable market and stable market price throughout the year for their produce and find ways to mitigate the adverse effects of excessive rain draining into their *lato* farms. The existing associations of *lato* farmers were functional, served their members' needs, and were instrumental in achieving common goals. Through sustained support of this community initiative, the Local Government Unit can sustain these associations through various support programs and linkages to various organizations and groups to improve their livelihood. Furthermore, the associations' vigilant protection of their environment is recommended to sustain their livelihood and provide a possible replication model in other suitable *lato* farming areas.

Keywords

lato, conservation, livelihood, sustainability, farmers, Palawan

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1. Introduction

Since ancient times, humans have consumed marine algae (Young et al. (2006), as cited in Banu, 2011). People worldwide, especially those in Asia, consider seaweed to be an excellent delicacy and have been using it in their diets for centuries. One of the most favored species of edible seaweed is *Caulerpa lentillifera* due to its green-grass color and soft and succulent texture (Ratana-Arpon & Chirapart, 2006). Tabangar lato is a variety of the *Caulerpa lentillifera*. There are other varieties like *lomo-lomo* or *keseg-keseg*. But *Tabangar* is preferred for its commercial value – longer shelf life, rich taste, and attractive overall appearance. Known locally as *lato*, *ar-arosep*, or *arosep* (Figure 1), it is usually eaten as a salad with a mixture of fresh tomatoes and onions, combined with a blend of vinegar, fish sauce, fish paste (locally called bagoong), as dressing.



Figure 1. *Caulerpa lentillifera* (Source: R. del Rosario/PSU)

C. lentillifera, which is known to be rich in iodine, has a high content of minerals like phosphorous, calcium, magnesium, potassium, and copper (Jimenez-Escrig, 2000; Ratana-Arpon & Chirapart, 2006; Wild Singapore, 2016). Cabial et al. (2015) found a similarity in the composition of seaweed lipid extracts to commercially available fish oil. Although further studies still need to be conducted, initial results implied omega-3 fatty acids in *Caulerpa lentillifera*. Yap et al. (2019) reported further on the antioxidant and antibacterial properties of *lato*, while Sharma and Rhyu (2014) reported anti-diabetic effects.



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Of *Caulerpa* varieties, commercial production exists only for *C. lentillifera* (Paul, Symon, & de Nys, 2009). Commercial cultivation is gaining recognition due to domestic and international demand (Rabia, 2016). In the Philippines, much of the production centers around Cebu. However, because of its attractiveness as a source of livelihood for coastal households, production has spread throughout coastal areas in the country. Hence, production generally comes from family farms on small islands (Salayao et al., 1991). Despite its popularity and relative ease in its production, commercial-scale production is still insufficient, and its productivity does not meet local demand (Gerundio et al., 2020). This study is conducted to fill the dearth of research on *lato* production in the Philippines, especially outside Cebu's production center. It is also to share the experience of *lato* farming as a livelihood.

This paper describes *lato* farming experience as a livelihood source with Barangay Rizal residents' conservation goal in Magsaysay, Palawan. Specifically, it describes the community's efforts concerning the support they received from the United Nations Development Programme- Small Grants Program Cycle 5 (UNDP-SGP5) project "Empowering Women and Men for Biodiversity Conservation in Magsaysay, Palawan". In this case, the researchers described the *lato* farmers' profiles, their aspirations, especially towards their *lato* farming livelihood, their conservation goal, and their experience in helping one another through their associations/organizations and producing and marketing their produce. This study aims to share knowledge with other communities, inspire people of other communities with similar livelihoods, and be a model for possible replication in other suitable areas for *lato* farming.

2. Methodology

This research is qualitative. The researchers used the following methods of gathering data: (1) Baseline Survey, (2) Focus Group Discussion or FGD, (3) Key Informant Interview or KII, and (4) Observation. Data analysis was discussed in each of the methodologies used.

2.1. Baseline Survey or Household Interview

For the interview, 51 *lato* farmers of Rizal, Magsaysay, out of 103, were selected using normal random sampling. A prepared questionnaire was used for a paper and pen interview in April 2016, focusing on the demographic profile and *lato*-farming baseline information. Informed consent was obtained from the participants to address the ethical concerns of the study. Data gathered were cleaned, interview notes were transcribed and encoded using Excel, organized according to categories, and presented in tables and figures.

2.2. Focus Group Discussion (FGD)

During a seminar-workshop on biodiversity (April 2016) and introduction to biodiversity-friendly livelihoods (August 2016), focus group discussions were held. In the said FGD, the participants were grouped according to their livelihoods – cashew production, *lato* production or farming, salt-making, and cashew product processing. In the FGD for *lato* farming (with eight participants), using guide questions, they discussed the positive side of their livelihood, the problems encountered, and their proposed solutions to the problems mentioned. In the April workshop, the participants

were guided in the discussion by Threats, Opportunities, Weaknesses, and Strengths (TOWS) Analysis. The August discussion validated the April focused group discussion on the threats to the livelihood and the proposed solutions. The data gathered from the first and second FGDs were sifted, organized, and reduced into themes. Only the data with the group's consensus (presented by the group as an output in their TOWS Analysis) and confirmed during the second FGD were used in the study.

2.3. Key Informant Interview (KII)

This was done in December 2016 during a Participatory Learning and Action where resource and livelihood activity mapping were conducted. Seven officers of four different *lato* growing or farming associations were interviewed. It focused on the role of their associations in their livelihood. Another KII was conducted on February 22, 2018, to validate the previous KII findings with the same set of interviewees, except for one who was not present during the first KII and another who was present in the first KII but absent during the second. The validated data were organized and presented in narrative form in this study. This method ensured the study of multiple and rich data sources in addition to validation.

2.4. Observation

The visits (three times with 25 participants) to the *lato* demonstration areas provided an excellent way to observe the families working in the *lato* farms, including how *lato* was planted, cared for, and harvested. It also allowed the researchers to witness why *lato* farming was considered a family-based livelihood, i.e., couples help each other manage their area.

3. Discussion of Findings

As part of the UNDP-SGP5 project "Empowering Women and Men for Biodiversity Conservation in Magsaysay, Palawan", residents of Barangay Rizal in Magsaysay, Palawan worked to establish biodiversity-friendly livelihoods, of which *lato* farming was one. To this end, the barangay local government identified a demonstration site for *Caulerpa lentillifera* production and formally declared this recognition through Barangay Rizal Resolution No. 20, Series of 2016 (October 2016).

3.1. Profile of the *Lato* Farmers

The average household of the *late farmer* has three to four members, the household head of which is aged from 41 to 50 years and is either elementary (37.25%) or high school (33.33%) educated (Figure 2).

In these households, *lato* farming is the primary source of income of the participants, who, on average, earn anywhere from less than P3000 to P5000 per month, mostly from *lato* production (Figure 3). About 30% of the farmers earned Php 5,000+ to Php 9,000, and about 10% earned Php 9,000+ to Php 11,000 and less than 10% earned Php 31,000+ monthly.

During the study, income from *lato* production had become variable because of lower production brought about by the unstable environment resulting from the weather's unpredictability. For instance, when water becomes more brackish during heavy rainfall, the *lato* dies. However,



compared to other livelihood activities in Magsaysay, *lato* farming was still a favored enterprise and considered an excellent livelihood source.

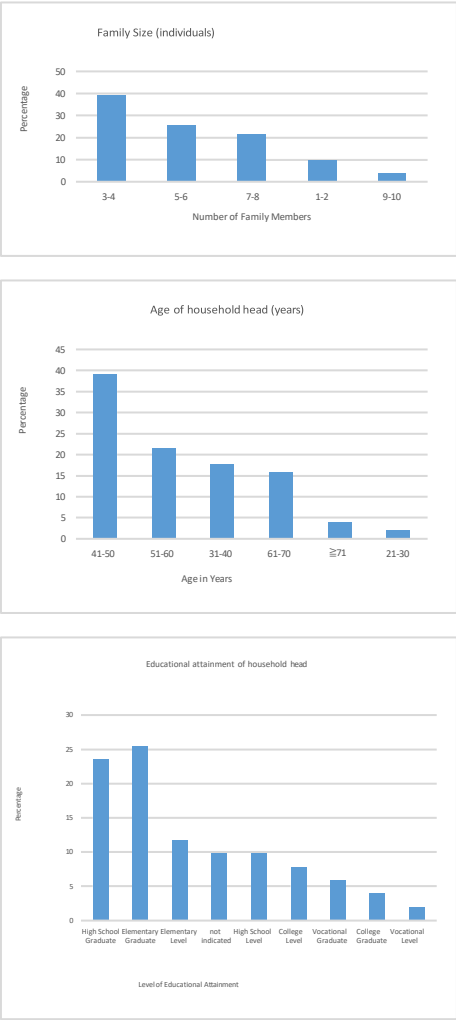


Figure 2. Some socio-demographic characteristics of the households of *lato* farmers

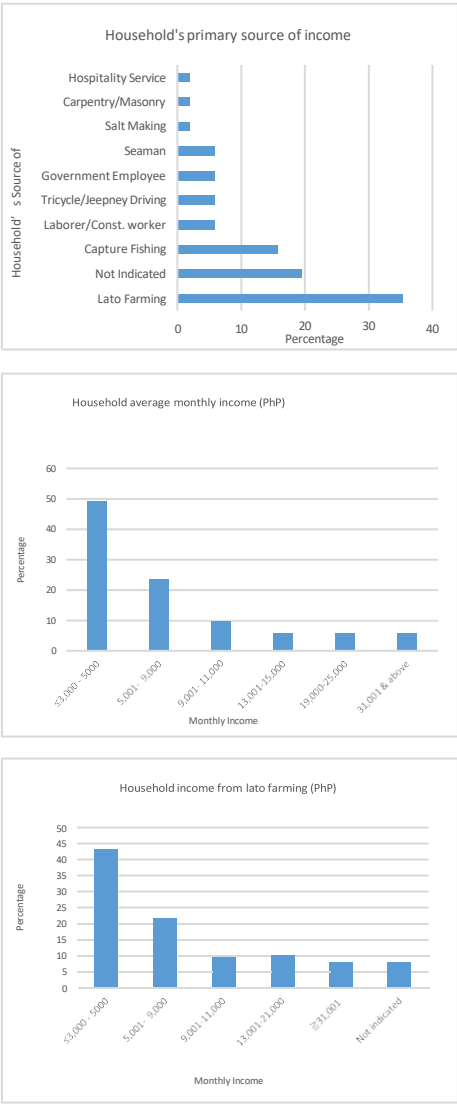


Figure 3. Income characteristics of *lato* farmers' households

3.2. Associations Related to *Lato* Growing

Four *lato* growers associations were noted in the area, namely: (1) One Town One Product (OTOP) *Lato* Growers Association; (2) *Lato* Growers Malampaya; (3) Barangay Rizal *Lato* Farmers Association and (4) Barangay Rizal *Lato* Farmers Association (Table 1).

Table 1

The existing farmers' associations in Barangay Rizal, Magsaysay, Palawan

Bases	OTOP - <i>Lato</i> Growers Association	<i>Lato</i> Growers Malampaya	Brigy Rizal <i>Lato</i> Farmers Association	Brigy Rizal Growers Association
Year organized	1980s	2007	2013	2014
Organizer	MAO Cuyo	MPDO	MPDO	MPDO
DOLE Status	Not registered	Not registered	Registered	Assisted
Members (number and type)	20 <i>lato</i> growers, buyers, and sellers in the area	26 members	25 now (15 when it started)	30 members
Initial capitalization (Php)	20,000/member from former Gov. Mitta	2,000 + 100,000 from Malampaya	P80 membership fee + P10 monthly dues	Membership fees
Current President	Data not available	Data not available	Edwin Badenas	Clarina Gacasa
Benefits to Members	Training, seminar, loans	Loans	Technical assistance from DOLE	Seminars training

Note: MAO - Municipal Agricultural Officer; MPDO -Municipal Project Development Officer; OTOP - One Town-One Product

The *Lato* Growers Association was the pioneering farmer's association in the area and was established as part of the One Town-One Product (OTOP) initiative in the 1980s. It was organized by the Municipal Agricultural Officer of Cuyo, which may be why the *lato* is also known locally as *latong Cuyo*.

It was discovered that *lato* farmers were members of more than one association. Mr. Edwin Badenas, the president of the DOLE-registered Barangay Rizal *Lato* Farmers Association, decided to be part of this organization only to focus on his association's development. There were other like-minded *lato* growers.

The OTOP-*Lato* Growers Association and the *Lato* Growers Malampaya could generate income from the funds they received from the Malampaya Gas Field Project and the Department of Labor and Employment (DOLE). The fund was used to provide loans to members at a reasonable interest. These loans were for repairing the *lato* farm fences (nylon net) and buying *lato* seedlings and rafts. The loan earnings were returned to the members at the end of each year, usually in December. According to the members, the associations provided much-needed mutual support and financial assistance for farming livelihood.

In December 2016, a federation of the four associations was organized, with an election of officers. Each of these associations has provided its members with social and financial support. Some *lato* growers became members of more than one association. Members sought dual membership to be able to access more support that was available.

3.3. Aspirations of *Lato* Growers

In 2016, when this study was done, the farm gate price for Tabangar *lato* averaged seventy pesos (Php 70). However, farmers had hoped the price of a kilo could be eighty pesos for more significant earnings. The Local Government Unit (LGU) cautioned the farmers not to make *lato* farm gate prices higher than Php 70 to protect local consumers, according to MPDO Edna Saban during a KII on December 20, 2016.

Understandably, the growers aspired for the following: (1) a stable market and price for their *lato* harvest during peak and lean seasons, (2) a way for their *lato* to survive strong rainy seasons, and (3) a sustainable livelihood based on the *Tabangar* variety.

Early in 2018, during January and February, *lato* was bought at eighty pesos a kilogram, making their aspiration a reality during the lean season of 2018. By constructing a shared nursery, *lato* farming of *Tabangar* has been sustained so far because farmers can avail of seedlings for production.

3.4. Growing *Lato*

The *Tabangar* variety of *Lato* (*Caulerpa lentillifera*) is the primary type planted by the Barangay Rizal *lato* growers in Magsaysay, Palawan, because it commands a higher price and is the favored variety in Puerto Princesa City, the primary importer of *lato* from Magsaysay. It also has a shelf life of seven days using the present harvesting method and packing in banana leaves. Other varieties like *lomo lomo*, *uban uban*, and *keseg keseg* are also in the municipality. *Lomo-lomo* and *keseg-keseg* are planted in small and controlled quantities for local consumption as these are also favorites among many townfolks of Magsaysay.

Lato, mostly *Tabangar* variety, is cultured in muddy substrate in the small villages of Naga, Tenga-tenga, Igeneb, Masagana, and Malapad-lapad in Brgy. Rizal in Palawan. They are planted in 1.2 to 1.4 m deep water in 20m x 20m farm lots at least one meter away from the lowest tide. Farmers may have more than one lot, fenced using bamboo and net to avoid predators such as fish (*danggit*, *sapsap*), turtles, and crabs (*alimasag*, *dawat*). Farmers pay Php 150 to Barangay Rizal to exercise their rights to grow *lato* on their claimed farm lots.

Generally, the seedlings are planted in November and December. However, for production, farmers plant the seedlings in January and February when seedlings are scarce or are destroyed by unfavorable climatic conditions. Some variations from farm to farm depend on the growth of the seedlings and the effect of climatic and other environmental conditions on each farm lot, such as incessant and strong rains, typhoons, and floods. As mentioned earlier, *lato* is vulnerable to natural predators, as well.

Harvest is lean in January and February and peaks in March and April. It tends to decline toward June, especially with continuous rain. The seaweed is harvested every day or every other day with an average of 10-20 kg per harvest. Under favorable conditions, the average harvest per farm lot is 40-50 kg per week.



3.5. Marketing *Lato*

During the lean season, the *lato* growers market most of their produce in Magsaysay and Cuyo's local markets. There is a relatively strong and stable domestic demand for *lato* as it is a local favorite among Cuyo Island residents. According to the officers of the four associations during a KII in December 2016, Mrs. Merla Herrera, Mrs. Emelda Gadiano, Mrs. Marilou Eleazar, Mr. Edwin Badenas, and Mrs. Clarina Gacasa, an estimated 75% of produce is consumed in Cuyo Island while 25% is sold in Puerto Princesa and Iloilo. However, during the peak season, this proportion is reversed, with 25-50% being sold in Cuyo Island while the rest is sold in the markets of Puerto Princesa and to mainland municipalities. The local market cannot absorb all the production at this peak time.

The growers also expressed that marketing of the products at present still poses a problem. Thus, some *lato* organization leaders suggested integrating all associations and establishing one drop area for marketing, as well as setting one price. Likewise, it was expressed that LGU and NGO support is very much welcome. In connection with marketing, improvement of packaging is aimed for, and the members hoped there would be training for this.

Another proposal was to establish an additional outlet for *lato* in Puerto Princesa through the Palawan State University (PSU) main campus community, sold directly to consumers so it could be bought and sold at a reasonable price. As of this writing, there were no takers yet of this proposal from enterprising individual members or groups of PSU Community. At least two groups have seriously considered it.

3.6. Initiatives Under the Biodiversity Conservation Project

The participants mentioned that the project allowed them to participate in seminar-workshops on biodiversity and conservation and be introduced to biodiversity-friendly livelihoods. They were also assisted in getting organized and formally registered as a PO at DOLE on September 6, 2017.

Through Barangay Resolution No 20, Series of 2016, the Rizal *lato* area covering the coastal areas of Naga, Tenga-tenga, Igneeb, Masagana, and Malapad-lapad had been declared as a demonstration site for *lato* farming with attendant barangay support and protection for conservation. The last part of the resolution reads: "Whereas, the residents of the coastal areas of Naga, Tenga-tenga, Igneeb, Masagana, and Malapad-lapad derive their livelihoods from the production of *lato* (*Tabangar*). While making a living out of planting, harvesting, and selling *lato*, they also protect the environment and conserve biodiversity as this means sustaining their livelihoods".

They also received Php 100,000 grant (in two tranches of Php 50,000 each) based on their submitted proposals. After having received the grant, the PO was asked to submit accomplishment reports on how they made use of the fund granted.

The first tranche was used to buy materials for making *balsa* or *gaket*. The second tranche was used to build a common nursery and additional *gaket*. Creating a common nursery was very important and served the needs of the *lato* farmers. When seedlings were scarce due to

unfavorable climatic conditions, some *lato* farmers with seedlings refused to share them with others. The farmers whose seedlings/plantings were destroyed were not able to plant. The association bought seedlings with the common nursery project and planted them for propagation. Each farmer now had the chance to buy from the nursery to propagate or replant in his/her farm lot.

3.7. Profile of *Lato* Farmers

The average age of the household head (presumably the seaweed farmer) corresponded to the report of Espaldon et al. (2010) for seaweed growers in Batangas. They ranged in age from 27 to 68 years. However, they had a slightly bigger household size (five). In education, both groups had a similar proportion (about 25%) of high school graduates, but more Batangas growers reached the elementary level or graduated (50%) than in Magsaysay (~35%). They were similar in the proportion of growers who reached or graduated college.

As for the main occupation, both groups claimed seaweed farming as the main livelihood. However, the Batangas seaweed growers comprised 76% of the participants, while the Magsaysay growers comprised only 35%. Conversely, only 8% of Batangas participants said they fished, while this proportion almost doubled (>15%) among our participants. For both groups, other sources of livelihood included construction/labor, driving (tricycle or public utility jeepneys), and employment in government or private agencies.

Notably, only 28% of those who grew seaweeds in Batangas relied solely on their seaweed income. In contrast, all the Magsaysay seaweed growers relied solely on seaweed income regardless of their monthly income. A significant difference is the level of income derived from seaweed farming. The average household monthly income among Batangas seaweed growers is Php 57,544. Magsaysay *lato* growers range from less than 3000 per month to more than Php 31,000 per month, with the majority in the lower ranges up to Php 11,000 per month.

As a family-based livelihood, *lato* growing remains attractive to coastal families primarily because it provides a better income, requires less initial investment, and entails less taxing labor than growing cashews, rice, or vegetables. FAO (2018) supported these observations and further stated that what makes seaweed farming attractive to coastal communities is that the technology is relatively simple, and the crop can be harvested in about six weeks. Also, seaweed farming enables women and children to safely access seaweed plots, furthering the entire family's involvement in the enterprise. Thus women gain a significant opportunity to earn income for themselves and their families while the men work as fishermen and in other sectors.

3.8. Associations Related to *Lato* Farming

According to IFAD (n.d.), small family farms comprise 85% of all farms worldwide. Many of these farms are in isolated areas such as islands. The people on these farms constitute the majority of the rural poor. Smallholders form organizations to help overcome the challenges associated with this isolation and increase profitability and productivity.

Farmers organizations (FOs) are essential institutions for empowering poverty alleviation, farmers' advancement, and assisting the rural poor (Penunia, 2011). Growing evidence from Africa (Sinyolo, 2018) showed that farmers' organizations (FOs), mainly involving smallholder farmers,

enable their members to overcome challenges such as lack of finances, knowledge, and networks.

Penunia (2011) further explained that, on one side, FOs increase the likelihood that policymakers and the public hear farmers' voices. On the other side, FOs can help farmers gain skills, access inputs, form enterprises, and process and market their products more effectively to generate higher incomes. Through FOs, farmers can access information needed to produce, add value, market their commodities, and develop effective linkages with input agencies such as financial service providers and output markets.

The FOs found in the study site are successful because they could arrange major investments (Chamala & Shingi, 1998) in the organization, especially by private institutions like the Malampaya Gas Field. It can be inferred that to accomplish this, the leadership is truly representative and enlightened enough to build and nurture these FOs.

Chamala and Shingi (1998) further noted that several low-resource farmer groups working with other stakeholders like banks, agribusiness, NGOs, private consultants, and religious and philanthropic agencies would bring more resources to the development process. IFAD (n.d.) agreed that when smallholders and other resource-poor agricultural producers work together, it becomes easier to access farming inputs such as seeds, plant material, water, fertilizers, and pesticides and to aggregate produce to reach larger markets. Farmers are then able to reduce costs and improve their bargaining power. Moreover, farmers are better positioned to improve their food security and move out of poverty when they thrive.

Nguyet (2002) similarly noted that when farmers work together in groups, important new skills are developed like technical skills, group management, problem-solving, economic cooperation, bookkeeping, verbal expression, and grassroots democracy, which all help the rural society to develop more quickly economically, socially, and politically. Moreover, members obtain the benefits of scale working together. The organization helps farmers "formulate their needs for assistance, propose appropriate solutions, and request support from relevant institutions (administrations, technical services, mass organizations, other groups of farmers, etc.)."

3.9. Aspiration of *Lato* Growers

Mausch et al. (2018) argued that a better understanding of households' aspirations is key to designing successful technologies that will be widely adopted. Mojo et al. (2015) added that aspirations motivate behaviors, serve to mobilize and direct energy into actions, and are regarded as important determinants of success.

As expected, participants aspire for a stable market and price for their produce. It was not immediately apparent what they meant by stable market and price, although we can deduce that the desire is to make money/gain from their efforts. They may agree with Issing (2002) that price stability is equated with financial stability.

Finally, there is an aspiration for sustainable livelihoods. A livelihood is deemed sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities now and in the future while not undermining the natural resource base (Serrat, 2008). The participants viewed sustainability as perpetuating into the future but did not indicate the concept of not undermining the present resource base. However, the training on biodiversity-friendly livelihood has highlighted this concept with them. Moreover, the participants' thinking of sustainability calls for a move away from prescriptive to location/situation-specific approaches and activities, which stress the participants' "ownership" of their actions.

The discussion of sustainable livelihoods may include the human aspect, covering skills, knowledge, and the health and safety of the next generation of farmers and workers (BAT, 2014). Accusations of child labor can be made, mainly as the enterprise is often described as a "family affair". Along with working conditions and the farmers' discouragement of their children from entering the same enterprise, these are common challenges concerning the growers' aspirations that must be addressed.

3.10. Growing *Lato*

FAO (2018) states that *Caulerpa* is the second most commercially significant species after *Eucheuma* spp. Farming seaweeds in the Philippines generates income for more than 500,000 people from over 100,000 families living along coastlines and on the many islands. Chen et al. (2019) reported on previous studies, which suggest that the optimal salinity concentration for the growth of *C. lentillifera* was between 30‰–40‰ while the optimal temperature for growth was about 20–28 °C. In Palawan, Del Mundo et al. (2002) validated the selection of Magsaysay and Cuyo as an ideal site for *lato* production, designating it as a Class A site due to its favorable climatic conditions for year-round cultivation. This class includes Agutaya, Cagayancillo Balabac, and Calamianes Group of Islands.

The participants mentioned *lato* production is still a desirable livelihood because it does not entail complicated or expensive processes and inputs. Espaldon et al. (2010) explained that setting up is an easy process for the farmers. Materials needed are few and, for the most part, inexpensive, like bamboo, sticks, strings, and seedlings. Some farmers buy only the seedlings. Maintenance requires minimal time only. It includes replacing each stick and string every two to three times of use and the bamboo every year. There is no need for other daily inputs. Planting and harvesting are the most time-consuming activities for seaweed farming.

The reported decline in the production of *lato* in the study site is confirmed by Hill et al. (2011). They said that this decline resulted from the highly intensive nature of the farming system and subsequent disease-related issues. Therefore, the situation was not unique to the study site. They noted that from 2011, production of 5,145 metric tons, production dropped to only 1,219 mt in 2015.

Although the *lato* is widely cultivated in the Philippines, commercial-scale production is still insufficient (Chen et al., 2019), and productivity does not meet demand. It might be due to the lack of optimum cultivation conditions.



The reported growth characteristics of *lato* in Magsaysay corresponded to seasonality, growth rates during the peak seasons, and reduction in growth due to freshwater intrusion (heavy rains in the wet season) (Trono & Denila, 1987). Trono and Denila (1987) reported that low light intensity and nutrient levels were suspected of complicating factors affecting its growth. However, these factors were not covered in this study.

The rapid growth of the *lato* in the site is also not unique to the site but is inherent in the species. Rabia (2016) reported the same for *lato* grown using tray and sowing methods, which increased in weight from 476 to 888% over the initial weight recorded. She further noted that while these weight increases are quite significant, they are relatively lower than the increase in biomass reported by other researchers.

Still, the production of seaweed, especially in large volumes, could represent a “transformational change” in the global food security equation, according to the World Bank (n.d.). Because seaweeds (including *lato*) serve many uses beyond human food - animal feed and biofuels most especially could generate revenues and improve environmental quality - all responsive to the aims of environmentally friendly livelihoods.

3.11. Marketing of *Lato*

The selling price of *lato* reported by the participants in 2015 shows that prices have remained relatively unchanged for several years. Del Mundo et al. reported in 2002 that *lato* is sold fresh at PhP 70 to PhP 80 per kilogram. Regardless, the World Bank (n.d.) said prices here are significantly higher than in Africa's similar markets because of proximity to markets. On the other hand, production costs were also higher.

As described by the participants, the process of harvesting and then delivering to the market reflected the process across Indonesia's production sites (Simos, 2011). Harvesters (usually women and children) collect the “grape” clusters and return to shore to clean the harvest. It entails removing plant runners, stems, and damaged berries. The cleaned produce is then sold directly to buyers in the local markets or is sold as seedlings to other farmers/growers.

3.12. Initiatives Under the Biodiversity Conservation Project

Seaweed farming has become one of the most important livelihood sources for at least 100,000 coastal families in Southeast Asia, contributing to reducing blast and cyanide fishing and improving peace and order in seaweed farming areas (Simbahon & Ricohermoso, 2001).

Despite its importance, the Philippines' seaweed industry is still constrained by key issues from input provision to processing. The PRDP (n.d.) noted that among these issues are lack of access to good quality seedlings, lack of know-how in technical aspects of seaweed farming, including postharvest practices, lack of access to financial resources to grow a business and to facilitate upgrading, lack of postharvest facilities and logistics, the prevalence of unregistered buyers directly purchasing from the farm, absence of policy relating to water use and permits.

However, in support of the enterprise, Mendiola (2019) stressed that seaweeds are much more sustainable than other aquaculture species because they do not need feeds and do not

create waste in aquaculture. The plant only requires seawater, light, and an attachment point. Another plus is that they are nutritionally rich - promising many health benefits.

They positively affect the environment because they absorb carbon dioxide and release oxygen while cleaning water by removing unnecessary nutrients. Water, where seaweeds are cultivated, becomes a nursing ground for fish and crustaceans. Hehre and Meeuwig (2016) reported that comparisons of reef fish landings across the central Philippines reveal that the catch of siganids was positively correlated to farmed seaweed production.

The common nursery set up by the project participants reportedly had positive effects mainly related to the members/growers' access to planting material. BFAR (2008) described that the impact of even a 1/4 ha nursery is quite significant. A ¼ hectare seaweed nursery can serve one and a half (1.5) new hectares of seaweed grow-out every cropping. There will be an estimated three croppings per nursery in 12 months. Not only will this shared nursery help its members, but they can eventually help farmers in other areas or expand their plantings in Magsaysay.

The growers collaborated with LGUs, NGOs, and academe to establish a biodiversity-friendly livelihood. Farrington (1998) suggested that agricultural and rural development strategies would benefit from increased collaboration between government research, extension organizations, and nongovernmental development organizations. This collaboration can mutually reinforce the NGO's group organizing and human resource development skills, complementing the government's technical skills and facilities.

4. Conclusions

The study points to the need for sustained support for seaweed production, specifically *lato* production in Magsaysay, Palawan, as a biodiversity-friendly livelihood that addresses the call for poverty alleviation, food security, and inclusiveness. The interventions of technology providers are highly relevant and will highlight the contributions of academic and relevant government agencies like the Bureau of Fisheries and Aquatic Resources (BFAR). Specific interventions include quality seedlings/planting materials, providing credit, and establishing appropriate water use and water quality policy.

To make the enterprise more viable, the participants call for initiatives on sustaining reasonable farm gate prices and relevant interventions across the various stages of the value chain. Identifying the priority interventions can be the subject of more research. Government and development agencies can create more appropriate and sustainable policies to benefit the small-holding growers by supporting and involving legitimate farmers' organizations at all decision-making levels.

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from where they derive their livelihoods. They also manifested a commitment to conserve the said natural resources.

Declaration of Conflict of Interest

The authors declare that no conflict of interest is involved in this study.

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