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Participatory Groups in Urban Flooding: The Case of Mandaue City, Cebu, Philippines

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ABSTRACT

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Flooding affects people globally. Flooding leads to the loss of infrastructure, livelihood, essential belongings, and even lives. This study described the participatory groups created in the community for flooding and how men, women, and the LGBTQ community involved themselves in the participatory groups. This study is part of the Research Project "Exploring gendered knowledge and inclusiveness in community resilience for flooding disaster: Case studies in Can Tho City (Vietnam) and Metro Cebu (Philippines) funded by the Asia-Pacific Network for Global Climate Research, Kobe, Japan. A descriptive, exploratory,

qualitative research endeavor was used in this study to look into the floods that affected the communities of Village Looc and Village Paknaan in Mandaue City, Cebu, Philippines. Twenty informants, comprising males, females, and LGBTQ community members from each village, participated in Focus Group Discussions (FGDs). All informants had resided in their respective villages for over a decade and possessed direct experience with local flooding events. Data collection involved in-depth interviews during the FGDs, followed by systematic data collation and analysis. The study revealed several key themes regarding community responses to flooding, and the study found that sexual orientation and gender identity expression do not impede one's ability to contribute effectively during crises. These findings underscore the importance of inclusive and well-structured emergency management strategies in mitigating the impact of disasters.

INTRODUCTION

The Philippines is an island country in Southeast Asia in the western Pacific Ocean. More than 7,000 islands and islets make up this archipelago, located about 500 miles off the coast of Vietnam. It has a population of 105 million and it is one of the most at-risk countries in the world, with a frequent exposure to climate-related and geophysical hazards (Zuñiga, 2023). The country experiences a wide range of natural catastrophes, such as super typhoons, earthquakes, floods, volcanic eruptions, landslides, and fires, due to its location on the Pacific Ring of Fire and the Pacific Typhoon Belt (Corpuz, 2023).

The country's islands are organized into three major groups: Luzon, Visayas, and Mindanao. The country's capital, Manila, is located on the major island of Luzon in the north. The Visayas are a group of islands in the center of the archipelago. Mindanao is the southernmost island group. The Visayas Region is divided into three non-administrative sub-regions: Central, Eastern, and Western Visayas. The region also has seven islands: Cebu, Bohol, Leyte, Masbate, Negros, Panay, and Samar (Valdeavilla, 2018). Cebu is a province located in the Visayan area of the central Philippines. The province comprises mainland Cebu Island and its surrounding 167 islands and islets. Cebu City, the province's capital, is the country's oldest city. It consists of the Cebu Metropolitan Area and its four adjacent cities: Danao, Lapu-Lapu, Mandaue, and Talisay, as well as other local government entities (Department of Foreign Affairs, 2021).

Cebu is among the most progressive provinces in the Philippines. Its development and commercial activities have a significant impact on the environment. Globally, several catastrophic hydro meteorological hazards occurred in 2017, among which were the monsoon floods in South Asia, which

were particularly disastrous (Kamal et al., 2018). With storms getting stronger and floods and landslides becoming part of the weather forecast, governments have already acknowledged climate change's impact on people's and their communities' lives (Aldrich & Meyer, 2015).

In Ramalho's (2019) study, flood management in Metro Cebu has been at the heart of disaster risk management (DRM) and broader urban development discussions. It is serving as justification for the demolition and displacement of informal settler communities in areas classed as 'danger zones.' It is one of the primary considerations for its goals and strategies for disaster risk reduction (Priscoli & Stakhiv, 2015). Floods affect more people globally than any other natural hazard (McCallum et al., 2016). Understanding and addressing each risk component and their interactions is essential for effective flood disaster risk reduction (DRR). Local institutions can serve an essential role in delivering first-hand rescue and support to communities, hence minimizing the effects and vulnerability to natural disasters such as floods (Shah et al., 2018).

According to Singh et al., (2018) flood and flood-related problems have become more rampant worldwide, leading to loss of life, infrastructure damage, and epidemics every year. Floods are the most common natural disaster in the world, and as a result of population migration and climate change, as its frequency is expected to rise in the future. Floodwaters pose an immediate hazard to human health, but it can also have long-term effects due to displacement and deteriorating living conditions (Paterson et al., 2018).

The Butuanon River Watershed is one of the geographically essential rivers in Cebu Province (Larino & Castanares, 2019). It is located within the jurisdiction of the city of Cebu, encompassing the political boundaries of seven barangays (villages) with a total area of 35.363 km2. The elevation of the watershed ranges from 40 meters to 750 meters above mean sea level. The river catchment has been significantly altered by urbanization in the past decades. Catchment land cover has a significant impact on the conversion of rainfall into runoff. It gives information on soil infiltration and the catchment's ability to store and release rainwater (Maglana et al., 2020).

Hence, this paper describes the participatory groups created in the community for flooding and how men, women, and the LGBTQ involve themselves in the participatory groups before, during, and after the flood. Flood-warning systems should be viewed as delivering (a) flood forecasts, (b) warnings to people in danger, and (c) in-between procedures for disseminating warning signals to those who require the information to respond (Penning et al., 2007). Adopting a 'whole systems' perspective allows for assessing and comparing structural and non-structural approaches, allowing resources to be focused most effectively.

OBJECTIVE OF THE STUDY

The primary goal of this study is to explore the lived experiences of community members, specifically determining the involvement of men, women, and the LGBTQ+ community before, during, and after flooding events. It sought to understand their roles, challenges, and contributions to disaster preparedness, response, and recovery efforts.

METHODOLOGY

This study is a descriptive, exploratory, qualitative research design that was conducted in Village Looc and Village Paknaan, Mandaue City, Cebu, Philippines. Village Looc is a coastal area community, while Village Paknaan is located beside the Butuanon River Watershed. The Province of Cebu is rich in natural resources – the watersheds, the mangrove areas, the marine sanctuaries, and pristine beaches. However, it is exposed to hydrometeorological and geological hazards such as typhoons, storm surges, floods, landslides, and earthquakes. Floods affect all Cebu island municipalities due to the steep mountain range through the center of the island falling to the lower-lying coastal areas. Climate change is causing an increase in sea level, a rise in low-lying coastal zones, less rainfall, and increased temperatures and intensity of storms and typhoons on the Cebu Islands (Prag & Estallo, 2019).

Twenty (20) informants were interviewed using focus group discussion. The focus group discussion allows the participants to express a range of opinions and ideas on what they have experienced and observed during the flooding. Each village is represented by males, females, and members of the LGBTQ community. The majority of these informants lived in the villages for more than a decade, and they had first-hand experience once the flood arose in the community. After gathering the data, the researcher collated and analyzed the data collected from the conversation and the questions the study's informants asked during the FGD. The study employed Colaizzi's method in analyzing the qualitative data to determine the emerging themes, ensuring a rigorous and systematic approach to capturing the participants' lived experiences.

Ethical considerations are paramount during this study, especially during the focus group discussions. The researchers applied the principle of objectivity, social responsibility, and non-discrimination. In applying objectivity, the researcher maintained a formed and sustained response in conducting the research interview and was not unduly influenced by their desires, emotions, or

affiliations. The researchers ensured the impact of this undertaking and the study's results will benefit various stakeholders. After getting all the consent needed, each participant was oriented adequately about the researchers' identities and the study's purpose. The researchers shared all the anticipated benefits of the study and the importance of the participant's role. It also discussed that the participant can withdraw from the research study. Another aspect of the ethical norm is to ensure data privacy and confidentiality, ensuring that any data obtained is solely for the purpose of this study.

Disclosure of quality enhancement strategies is applied to get substantial results and participation through a collaborative effort. This is to get thorough, narrative, and comprehensive responses. Also, this is to gain mutual trust between the researchers and the participants and ensure that all data are treated with extreme confidentiality. The researcher's commitment to the study is emphasized through exhaustive discussion of the subject matter, formulation of objective responses, and methodological procedure during engagements.

RESULTS AND DISCUSSION

The Purok System: Volunteerism and adaptation of social media as an avenue in disseminating information

The spirit of volunteerism was established during every flood in the area. The informants reported that the village had organized a "*purok system*." The study by Matthies (2017) discussed that the "*purok system"* in the Philippines is promoted as voluntary self-organization at the sub-village level, strengthening community resilience to natural hazards. Each *"purok"* has a volunteer lookout and point person to be informed on the status of the flood, and these *"purok"* leaders will be the ones to cascade the information to the community. Using gadgets and the Internet was evident and very helpful in disseminating information to every "*purok*" leader by recording a video on the current level status of the flood and sending it through group chat. Radio communication was also used as an alternative to providing information from one purok to another. Research informants narrated:

> *Our village is composed of different "purok," and each "purok" has its leader. The "purok" leader is the representative of the "purok' and the one who will attend if there are meetings that need to be attended in the barangay. Also, the 'purok leader will be the one to disseminate information to its members about the details being discussed during the meeting. Also, regarding flooding and other calamities, the "purok*

leaders" will inform us to prepare our things for evacuation based on the assessment regarding the video sent by the other purok leaders.

An organized "purok system" helps a specific community in cascading information. It provides an opportunity to participate and engage in activities in the barangay and essential information related to floods and other calamities. With the presence of the "*purok leaders,"* the information will be relayed immediately to its members because there is already an assigned point person. According to the study of Bernados et al. (2020), in the disaster and risk management strategy, *purok* leaders were responsible for the safety of their members, and everybody was accounted for during the evacuation process. Lectures and training on flood readiness and disaster preparation were conducted at the *purok* level. Thus, mandatory evacuation was implemented to ensure everyone's safety.

Emergency Preparedness: **A program implemented by the officials to its constituents**

Emergencies, particularly floods, can cause panic in everyone. According to the study of Zhang et al. (2018), emergencies usually produce a complex disaster chain, including floods, landslides, fires, earthquakes, and social panic, eventually leading to disastrous consequences. In the case of the villages in Mandaue City, a well-planned program was implemented in order for their constituents to avoid panic. Five (5) parameters are identified in the programs: disaster, peace and order, environment, health, and infrastructure. Each parameter is represented by a volunteer in every "Turok." Every time there are seminars and training related to the identified parameters, a representative will attend the said activity. Then, the representative will re-echo to the members of the "purok" as to what he learned during the seminar or training. Research informants narrated:

In our village, the officials implemented programs. They identified five (5) parameters: disaster, peace and order, environment, health, and infrastructure. There are identified volunteers in every parameter who will attend if seminars and training are provided. After they attend the seminar or training, they will cascade the information to the members in the "purok" so that they will learn and get updates and information about emergency preparedness.

Programs like seminars and trainings will help constituents engage in the activities provided in the village. These activities will help everyone be aware of what to do in case an emergency occurs in the community. In this case, people

in the village will no longer panic in emergencies since they already know how to deal with it. If everyone knows how to deal with emergencies, the mortality rate will be avoided or reduced. According to Shaw et al. (2011), education is pivotal and has been widely acknowledged in reducing disasters and achieving human security to achieve sustainable development. Experiences have shown that education has positive effects on disaster risk management. Anyone who undergoes training and seminars has proved that they can respond promptly and appropriately, thereby providing a warning to others and helping to protect themselves during emergencies.

***The pre-emptive measures*: Initiatives in preparation of flood occurrences**

Extreme weather conditions owing to climate change can cause fatal flood damage worldwide, and flood vulnerability assessment has become regarded as one of the preventative measures in non-structural flood mitigation strategies (Lee & Choi, 2018). In the villages of Mandaue City, "*purok leaders"* and volunteers will assess themselves first to see if they are in good condition before assisting others and securing their families before extending help to others. This will help them focus on assisting others because they will know that their family members are safe. It will be easier for the leaders and volunteers to move since they will no longer think about the condition of their family members. Prioritizing the transfer of senior citizens, persons with disabilities, and kids to the second floor or higher area is also considered so that they are already secured in case of a flood.

Designing a second floor or a high ceiling is also one of the considerations in constructing a house in the villages; if a flood occurs, they can quickly secure a place where they can transfer their essential things to a higher area. In addition, a seminar and house-to-house awareness are provided by the "purok leaders" to its members to ensure that everyone is aware of the things to be prepared in case of flooding. *Flood forecasting* is a pre-emptive, non-structural measure used to mitigate inundation. Most current flood forecasting techniques incorporate complex processes, such as training and optimization, before applying the technique (Lee & Kim, 2018). Research informants narrated:

> *If it is forecasted to rain, the thing we do in our "purok" provides warnings to everyone, and sometimes we do house-to-house so that the people can prepare and transfer their essential things to a higher area before the rain and flood occur. Even though that rain is not in our area, for instance, it will be in the mountain area of Cebu City, we are still affected because the flood will flow automatically in the Butuanon River, and our location is just beside the river. If the Butuanon River*

overflows, our village will be affected. First, that is why most of the houses in our area have a second floor or a high ceiling so that there will be an area where we can put our things like appliances, clothes, important documents, and the like. Even though the house is small, it is preferred to have another floor because the area is prone to flood, and people expect that if there is a flood, their things will be affected if the water level ever increases.

Evidently, the people living in the village are prepared already in case of a flood. The preparation is also based on their previous experiences in order for them to prevent situations that happened in the past from happening again. This indicates that people learn from their experiences and move forward to improve their day-to-day lives.

***Warning Device:* A system used to disseminate emergency occurrence**

The government's key responsibility in addressing emergencies is to inform its constituents about warnings and safety information to the public. According to Choy et al. (2016), warnings are usually issued by the government through a broadcast approach using communication channels such as television and radio. One of the serious natural disasters humans confront in terms of high mortality rates and long-term effects, such as flooding, which often has severely adverse social consequences (Ibarreche et al., 2020).

In the Villages of Mandaue City, the government provides emergency alarm systems to those considered flood-risk areas. The alarm system is used to warn the people in villages that there will be upcoming floods. Therefore, the alarm gives everyone an idea of how to prepare. Another practice they applied is using social media, notably Messenger, in which a group chat was created for every leader in "purok" to have prior ideas about what information they will disseminate to their "purok" members. Wister et al. (2016) found that social networks are useful instruments for spreading disaster warnings to the populace because most citizens have mobile phones with Internet and social networking applications. Research informants narrated:

In our village, the government installed an emergency alarm system so that we would be informed if the flood was coming, and if we ever heard the alarm, it gave us the idea to prepare. We also created a group chat for "Purok" leaders to get information on the flood situation and the level of the tide in the area. In my experience, the "purok" leader is the one who cascades the information regarding the current status of the flood.

The utilization of emergency alarm systems is evident and provides great help to everyone, especially to those people who are located in remote areas with limited access. This alarm system will easily reach remote areas because only the sounds from the alarm will be their basis for knowing if there are incoming floods or risks. The broadcast of information and the deployment of IoT (Internet of Things) enabled devices may aid individuals in making timely decisions in the face of a disaster (Wister et al., 2016).

***Gender Inclusiveness*: Responsiveness regardless of gender identity**

Race and gender issues profoundly impact society (Bauer et al., 2019). Gender influences resources, capacities, decision-making processes, outcomes throughout the disaster lifecycle, and the practical management of disaster risk, response, and recovery structures (Enarson et al., 2018). Determining gender identity as a member of the community in responding to floods does not apply in the village of Mandaue City. When it regards helping and responding in times of flooding and other calamities, gender does not count as long as the person is willing to extend their help in assisting and guiding other members of the community to transfer important things to a higher area and evacuate people to a safer place. In responding to people who are in need, gender orientation will not matter; men are probably the people who are expected to extend help to others because of their physical attributes. However, members in the LGBTQ+ community, especially gays, also opted to be men in order to show their strength and that they are capable of helping others, especially when it comes to lifting heavy objects. In addition, lesbians also opted to use their masculine side to help others in the same manner. Research informants narrated:

> *In our "purok," males are expected to respond because of our attributes and physical strength. After securing our family members, we immediately went to the affected areas to check and monitor those families who needed help. Since we are the people on the ground, we play a massive role in the community. We can quickly identify those houses that need assistance since we are the ones who are roaming around, and we can observe the needs of the people.*
>
> *As a member of the LGBTQ+ community, specifically gay, I will not use my feminine side, which is not necessary in considering situations, especially if there are people who need assistance. I will help only as much as I can, and I put limitations regarding the situations. Therefore, I will use my masculine side and my strength because I believe we can contribute to society if we set aside our preferences.*

> *As a lesbian, my masculine side will automatically dominate. With the situation, I can assist my family and other people using my masculine strength. Through this, I can help other people.*

Therefore, this gender inclusiveness means whatever calamities occur, regardless of your sexual orientation, as long as you have the willingness to help others, you can take part and make a difference in the community.

***Ayuda:* A humanitarian relief supply during and after the calamities**

Calamities cause significant damage to lives, properties, jobs, and the economy. According to the Philippine Disaster Report by the Citizens' Disaster Response Center, disasters frequently hit the Philippines. In addressing this concern, efficient disaster as a coping mechanism in response is a primary need that the people are looking for. Relief goods supply is also vital for those affected by the disaster to have food to eat while facing the calamities.

In the Villages of Mandaue City, relief assistance is provided to the affected areas if calamities exist. Aside from the government's relief goods, private companies also give relief goods to the affected individuals. According to the study by Platon et al. (2018), relief goods are essential in helping individuals in disasters and emergencies, particularly in meeting everyone's needs and concerns. Research informants narrated:

> *In my experience, the government provides relief goods if there is a flood. Also, I experienced other private companies donating and distributing relief goods to us. It's a big help on our part because, during times of calamities, we don't have food to eat. Also, we cannot report our work because we are fixing the damages.*

The role of non-government organizations is seen as necessary, for they are one of the major players in catering to the needs of people when the government can only provide limited assistance if disasters occur. Local communities rely on how National Government Organizations (NGOs) address disasters by planning, preventing, and responding to the disaster. The target of NGOs is the most vulnerable population that needs immediate relief assistance (United Nations, 2006).

Stakeholder participation enables the effective identification of recovery needs, dynamic flow of information, consolidation of varied perspectives, and building long-term trust and social capital between people in the community (Chandrasekhar et al., 2014). The study of Cretney (2016) emphasizes the

role of the community following disasters, as well as emergency management practitioners, putting interest in possible pathways for fostering and encouraging locally focused disaster preparedness activities.

CONCLUSIONS

The established *purok system* in the villages greatly helps disseminate information to its *purok members.* The purok system was the easiest way to make people living in the villages engage in the different activities prepared and provided by the barangay. Using radio as an alternative to communicating with other purok leaders is an advantage, especially in providing immediate messages. Gadgets and the Internet are also contributing factors that serve as evidence in sending information to the *purok leaders* so that they will have a visual idea of the current situation on the water level of the flood.

In addition, the pre-emptive measures are effective strategies implemented by the people living in the villages since they prevent the loss of essential documents and things that might be affected by the flood. Also, it reduces panic once the flood is approaching since the essential things are already secured in the higher level of the house. Lastly, in terms of gender inclusiveness during the flood response, gender orientation does not matter anymore as long as the person is willing to extend help to those who need assistance.

In conclusion, we can avoid the damage of essential things and casualties as long as there is a well-placed system, preparedness, willingness, determination, and participation in the programs implemented in the community. Also, sexual orientation and gender identity expression are not a hindrance in extending help, especially during calamities.

TRANSLATIONAL RESEARCH

The findings of the research have important implications for community resilience planning and disaster risk reduction. This study underscores the importance of inclusive disaster management policies that acknowledge and capitalize on the varied contributions of all community members by showcasing the active involvement of men, women, and LGBTQ+ individuals in flood response activities. These insights can be used by policymakers, local government entities, and disaster response groups to create gender-inclusive disaster preparedness initiatives that guarantee fair access to resources and chances for decision-making. The study's findings can also help shape training plans, policy frameworks, and capacity-building projects that improve community-based

disaster resilience.

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