An Assessment of the Behavioral Responses of the Residents of Barangay Sta. Lucia Wakas Masantol Pampanga Towards Natural Disasters: A Basis for Disaster Risk Management

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Abstract- Natural disasters are severe, unexpected occurrences brought on by environmental elements such as storms, floods, droughts, fires, heatwaves, and Earthquakes. Natural catastrophes are now happening more frequently and with a larger range and impact. Area may be causing flooding, severe damage to crops, homes, and buildings. Also, the daily life of people is affected. Due to its geographic location, the Philippines is prone to tropical cyclones, frequently bringing about heavy rains, severe flooding, and high winds that cause significant human casualties. The built environment and human-related characteristics, such as the decision to adopt a preventive behavioral strategy, can interact to either increase or lessen the effects of a particular disaster's occurrence. In this study, residents of a high susceptibility risk area in Masantol, Pampanga were asked about their expected behavioral strategies, and factors that might affect their behaviors were evaluated. The intensity Natural disaster preparedness and the kind of residence are important factors in selecting a particular behavioral strategy. These findings' ramifications were examined, along with potential improvements to preparedness.

I. INTRODUCTION

Natural disasters are ecosystem processes that can result in the loss of stability of the social-economic system and serious imbalances between the supply and demand of social resources. They include floods, hurricanes, tornadoes, tsunamis, landslides, wildfires, volcanic eruptions, earthquakes, and extreme temperatures. These events are caused by nature and significantly negatively impact the environment and human life. In many of these situations, being prepared might never be enough. Still, it can lessen the probability of the damage that it can cause too many, that well in fact, what can we even really have against mother nature, nor what could go against it or to even prevent it? Some of these situations can be detected early, but some are not.

As said in the study of Vincenzo Bollettino, et. al., (2018, p. 1) a strong coping mechanism was established due to the long history of experience of the Philippines government when it comes to disaster but there are only little data that can reference the local level of disaster resilience and preparedness like in the study of Danilo Jr. Rogayan (2020), it was revealed that in the community of Zambales, most of its people were moderately aware of the occurring various disaster in their barrios such as a tsunami or storm surge, but they were aware of a typhoon. It can be said that some places were not fully aware of what one natural disaster could cause in their community. People's awareness can make a gateway for improved disaster resilience and preparation in places. The more aware people are, the more people will think about how to improve their lives by having their common experiences yearly in their community.

In the Province of Pampanga however, the municipality of Masantol to be exact are commonly experiencing Floods and Typhoon, that According to the Municipal Disaster Risk Reduction and Management Office (MDRRMO) of the said municipality, The town has a population of 57,990 determined by the (philatlas 2020) and more than half

of the barangays were reported to be under flood on July 22, 2021. According to MDDRM Officer Paul Magat, 18 of the 26 communities, particularly those close to the Pampanga River, were experiencing flooding of up to 1.5 feet and a maximum of 4.5 feet. The barangays San Isidro Matua and Sta. Sta. Lucia Matua, Sta. Lucia Wakas, Sta. Lucia Paguiaba San Nicolas, Sto. Lucia, Alauli, Balibago, Bagang, Sagrada, Nigui, and Sapang Kawayan. Nio, Bebe, Anac, San Agustin, Sua, Palimpe, and Bebe Matua. The town of Masantol has been placed under a state of disaster and climate emergency due to massive flooding brought on by Habagat-induced rains on September 1, 2022 and thousands of people are still being affected by floodwaters. Barangay Sta. Lucia Wakas has a population 1,932 as determined by the (philatlas 2020) Census This represented 3.33% of the total population of Masantol. which is finally among those who experience flooding the most regularly, has residents who struggle in their daily lives whenever there is a flood because their livelihoods and students going to school are affected. Thec ontaminated water brought on by the flood, which makes people sick in the area, also impacts the locals' health.

This research aimed to address the knowledge gap on local disaster resilience and preparedness by providing a comprehensive overview of household measures of resilience and levels of disaster preparedness. This is the first local household study on disaster resilience and preparedness measures carried out in the Municipality of Masantol, Barangay Sta. Lucia Wakas in the Province of Pampanga. It comes at a time of critical importance as efforts are being made to ensure disaster management is based on evidence, especially at the local level and amid national discussions on centralizing disaster resilience efforts under a single national agency.

II. METHODOLICAL FRAMEWORK

This chapter presents the data gathering, research design, research setting, and research instrument to be used in the construction and validation of the questionnaires, gathering procedure, and the statistical treatment of data.

FIGURE 1: METHODOLOGICAL FRAMEWORK
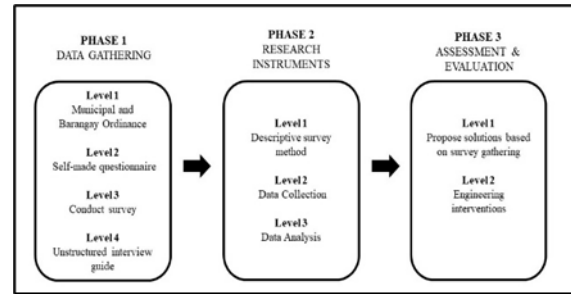
A. Data Gathering

The researchers used a self-made questionnaire and an unstructured interview guide to gather the data needed for this study. A questionnaire is defined as a "tool" for collecting and recording information about a particular issue of interest. It mainly comprises a list of questions but should also include clear instructions and space for answers or administrative details.

B. Research Instrument

This study used the descriptive-survey method in gathering data and information to determine the effect of the respondents' profile, factors influencing the residents' traits during Natural Disasters struck, determination of the total risk perception of the residents, measurement of the level of preparedness of the residents and the proposed solution of the respondents in relation to their preparedness and level of risk perception.

C. Assessment and Evaluation

It may provide civil engineering solutions for the assessment and evaluation of this research that could help with the development of the area of Barangay Sta. Lucia Wakas to enhance their status when disasters hit. All the interventions made throughout this research were communicated to the local government unit so they were aware of the circumstances in this area and can take appropriate action.

III. RESULTS, FINDINGS, AND DISCUSSIONS

This chapter demonstrates the data analysis and interpretation. The data obtained were presented in tabular and textual order depending on the problem description for clarity of presentation.

A. Frequency Distribution of the Respondents' Age

Table 1		
Frequency Distribution of the Respondents' Age		
Age	Frequency	Percentage
Below 19	38	11.52%
20 - 29	81	24.55%
30 - 39	93	28.18%
40 – 49	69	20.91%
50 Above	49	14.85%
Total	330	100.00%

In this study, three hundred thirty (330) people between the ages of 19 and 50 responded to the survey. Ages 30-39 received the highest percentage of responses (28.18%), followed by 20-29 (24.55%). The lowest percentage of responders (14.8%) belonged to the 50+ age group. According to the study, the greater proportion of responses from respondents aged 30 to 39 may imply greater survey participation. In comparison, the lesser proportion of respondents aged 50 and older may indicate lower participation. The fact that most respondents were either married or single suggests that older married people or younger adults may be strongly represented. The majority of respondents had completed high school, while a tiny minority had completed college, suggesting that the sample's highly educated population was underrepresented.

B. Frequency Distribution of the Respondents' Civil Status.

Table 2		
Frequency Distribution of the Respondents' Civil Status		
Status	Frequency	Percentage
Single	152	46.06%
Married	137	41.52%
Separated	31	9.39%
Widower	10	3.03%
Total	330	100.00%

The data presented in Table 2 reveal that the majority of the respondents were either single or married. This suggests that the sample may be biased towards younger adults who have not yet married or older adults who have already married. The percentage of respondents in the separated category was relatively low, indicating that the study may have a limited representation of individuals who are currently separated. The widower category had the lowest frequency, indicating that the study may have a limited representation of older adults who have lost their spouse.

C. Distribution of the Respondents' Highest Educational Attainment Status.

Table 3		
Frequency Distribution of the Respondents' Highest Educational Attainment		
Education	Frequency	Percentage
Undergraduate – Elementary	16	4.85%
Elementary Graduate	39	11.82%
Undergraduate - High School	43	13.03%
High School Graduate	159	48.18%
Undergraduate – College	38	11.52%
College Graduate	35	10.61%
Total	330	100.00%

The data presented in Table 3 indicate that the majority of the respondents had completed high school, while a relatively small percentage had attained a college degree. This suggests that the study may have a limited representation of highly educated individuals. The low percentage of respondents in the undergraduate - elementary category may suggest that the study has limited representation of individuals who did not complete elementary school.

D. Descriptive Statistics of the Level of Risk Perception of Residents

Table 4

Descriptive Statistics of the Level of Risk Perception of Residents

Items	Mean	Standard Deviation	Verbal Description
In 5-10 years to have, how vulnerable would it be for your barangay in any disasters that are given as follows:			
Earthquake	2.28	0.78	Low Risk
Floods	3.55	0.68	High Risk
Typhoons	3.30	0.84	High Risk
Probability	3.08	0.94	Moderate Risk
In any time given, how vulnerable would it be for your barangay in any disasters that are given as follows:			
Earthquake	2.31	0.77	Low Risk
Floods	3.59	0.66	High Risk
Typhoons	3.38	0.83	High Risk
Threat	3.12	0.94	Moderate Risk
The cut off of supply for your barangay in any disasters that are given as follows:			
Earthquake	2.61	0.74	Moderate Risk
Floods	3.01	0.74	Moderate Risk
Typhoons	2.99	0.90	Moderate Risk
Supply	2.89	0.82	Moderate Risk
Given that these cases of disasters made your barangay to evacuate you. How risky it would it be for the people to be in any evacuation center in any disasters that are given as follows:			
Earthquake	2.63	0.82	Moderate Risk
Floods	3.11	0.78	Moderate Risk
Typhoons	3.12	0.85	Moderate Risk
Response Efficacy	2.97	0.85	Moderate Risk

Table 4 suggest that residents perceive their barangay to be at high risk of floods and typhoons, while the risk of earthquakes is perceived to be low. The cutoff of supply and risk of being in an evacuation center during disasters were perceived to be in the moderate-risk category. The study may be useful in informing disaster risk reduction strategies in the barangay. However, caution must be taken in interpreting the results as the study only presents the perceptions of the residents and does not account for other factors that may affect the actual risk levels during disasters.

E. Descriptive Statistics of the Level of Risk Perception of Residents

Table 5

Descriptive Statistics of the Level of Preparedness of Residents

Items	Mean	Standard Deviation	Verbal Description
1. How prepared are you and your household for natural disasters?			
Earthquake	2.89	0.90	Slightly Prepared
Floods	2.45	1.01	Prepared
Typhoons	2.57	1.07	Slightly Prepared
2. What level of preparedness do you have your area for disaster management for the following disasters?			
Earthquake	3.01	0.78	Slightly Prepared
Floods	2.61	0.94	Slightly Prepared
Typhoons	2.70	0.92	Slightly Prepared
3. What are the preparedness or preventions that your barangay does in response to natural disaster? Do you think that these preparations are enough for any upcoming natural disaster that might come?			
Do you know your disaster management regulations and guideline? In relation to this, was it being practiced from previous natural disaster that had happened in your barangay?	2.89	0.87	Slightly Prepared
Do you know your evacuation plan in your barangay?	2.54	1.06	Slightly Prepared
What is the barangay's response AFTER the disaster strike?	2.87	0.78	Slightly Prepared

The results of the survey indicate that the residents and barangay are slightly prepared for natural disasters, with some preparedness measures already in place but still need further improvement. The findings of this study can be used to develop and implement effective disaster management plans and strategies to enhance the preparedness of residents for natural disasters.

F. Frequency Distribution of the Problems Encountered by the Residents Towards Natural Disasters

Table 6

Frequency Distribution of the Problems Encountered by the Residents Towards Natural Disasters

Problems Encountered	Frequency	Percentage
Flooding	275	83.33%
Drainage Problem due to Garbage	27	8.18%
Water Contamination	7	2.12%
Uneven Roads/Pavements	10	3.03%
None	11	3.33%
Total	330	100.00%

The data presented in Table 6 provide valuable insights into the problems encountered by the residents towards natural disasters. The high percentage of flooding highlights the need for better flood prevention and management measures. The drainage problem due to garbage is also a concern, as it may contribute to the occurrence of flooding and other

water-related problems. The low percentage of water contamination suggests that the residents may have access to safe drinking water, but further investigation is necessary to confirm this. Overall, the data can be used to inform policy and planning decisions aimed at reducing the impact of natural disasters on the residents.

G. Frequency Distribution of the Proposed Solutions by the Residents Towards Natural Disasters

Table 7

Frequency Distribution of the Proposed Solutions by the Residents Towards Natural Disasters		
Proposed Solutions	Frequency	Percentage
Soil or Gravel Filling ("Tambak")	185	56.06%
Drainage Cleaning	75	22.73%
Road Fixing	18	5.45%
None	52	15.76%
Total	330	100.00%

This table provides valuable information about the solutions that residents think is necessary to address the problems caused by natural disasters. The data suggests that soil or gravel filling ("tambak") and drainage cleaning are the most popular proposed solutions, which may indicate that flooding and drainage problems are significant concerns for the residents. Road fixing is also a proposed solution, but it has a lower frequency than the first two solutions. Researchers and policymakers can use this information to identify the most pressing issues related to natural disasters and the solutions the residents deem necessary to address. The proposed solutions can serve as a guide in developing disaster management plans that are more responsive to the needs of the community.

H. Frequency Distribution of the Respondents' Preference to Receive Information About Disaster Management

Table 8

Frequency Distribution of the Respondents' Preference to Receive Information About Disaster Management		
Medium	Frequency	Percentage
Newspaper	13	3.94%
Television	108	32.73%
Family and Friend	89	26.97%
Cellphones	180	54.55%
Internet/Social Media	188	56.97%
Radio	45	13.64%
Public Meetings	100	30.30%

Table 8 suggests that digital media, such as social media and cellphones, are increasingly becoming popular among the respondents for disaster management information. The findings also indicate that traditional mediums, such as newspapers and radio, are less preferred. The high preference for internet/social media and cell phones may be attributed to their convenience and ease of access. These findings may have implications for disaster management agencies and organizations to effectively communicate with the public through the preferred mediums of communication.

I. Frequency Distribution of the Respondents' Proposed Projects to Enhance Natural Disaster Management

Table 9

Frequency Distribution of the Respondents' Proposed Projects to Enhance Natural Disaster Management		
Proposed Projects	Frequency	Percentage
Road development	108	32.73%
Flood Mitigation	269	81.52%
Draining system development	267	80.91%
Rescue team	93	28.18%
Evacuation plan	174	52.73%
Evacuation center	92	27.88%

Table 9 shows that flood mitigation, the development of the draining system, and an evacuation plan are the top three proposed projects to enhance natural disaster management in the community.

IV. RECOMMENDATIONS

A study conducted by JCA Construction & Management Corporation and other foreign agencies has predicted that Barangay Sta. Lucia Wakas in Masantol, Pampanga is at risk of sinking by the year 2050 without engineering intervention. The municipality recognizes the severity of the situation and is actively seeking solutions to prevent this potential disaster. One proposed solution is the construction of three-ring dikes strategically placed in heavily populated areas to serve as protective barriers against flooding and sinking.

However, the lack of sufficient municipal funding has posed challenges to the implementation of this project. Limited financial resources have hindered the construction of the dikes, presenting a significant obstacle in addressing the imminent threat faced by the barangay. The local government is currently exploring alternative funding sources and seeking assistance from external organizations to realize this crucial engineering intervention.

In addition to dike construction, the study recommends various measures to improve disaster risk management. This includes promoting collaboration between government agencies, local governments, and community organizations, conducting regular drills and exercises to gauge the efficacy of risk management plans, and educating the community on disaster preparedness.

The study also suggests piling submerged structures to ensure community safety, proposing the construction of floating houses and amphibious houses as sustainable and flood-resistant solutions, and considering the relocation of residents to a more secure location.

Efforts to secure funding, initiate dike construction, and implement these recommendations are crucial for the survival and well-being of Barangay Sta. Lucia Wakas. Continued collaboration between local authorities, concerned agencies, and the community is essential in finding viable solutions to safeguard the future of the barangay.

CONCLUSION

Based on the survey conducted and its findings, the following conclusions are considered conjectures:
Firstly, the respondents' profile can be described as follows: the majority of the respondents were 30-39 years old, single, and had attained at least a high school graduate.

Secondly, the total risk perception of the residents was found to be a moderate risk. Respondents perceived a significant risk for natural disasters, particularly typhoons, earthquakes, and floods.

Thirdly, the level of preparedness of the residents was found to be slightly prepared. Respondents lacked knowledge, resources, and training to prepare for natural disasters.

Lastly, based on the findings, proposed solution interventions were formulated. These include conducting community-based disaster preparedness training, establishing an early warning system, and providing accessible resources and tools for disaster preparedness.

Overall, the study highlights the importance of disaster preparedness and risk perception among residents. By implementing the proposed solution interventions, residents can enhance their preparedness and reduce the potential impact of natural disasters. Further research and collaboration with local government units and disaster risk reduction management offices are recommended to improve disaster response and preparedness in the community.

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