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Research Article

Vulnerability and Coping Capacity to Disaster Risks of Selected Barangays in Mandaon, Masbate, Philippines

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ABSTRACT

This study assessed the vulnerability and coping capacity to disaster risks of selected barangays in Mandaon, Masbate, Philippines in 2013. The study made use of a descriptive survey method wherein survey-questionnaire based on the National Disaster Risk Reduction Management Framework (NDRRMF) was used in data collection. Statistical tools included frequency count, percentage, and rank order. The data on age, gender, member per household, and income were assessed using the dependency ratio, female-to-male ratio, and poverty index. The DRRM programs implemented were analyzed by comparing them to the DRRM Framework by FAO. Results revealed that selected barangays were vulnerable to disaster risks, and the people had low coping capacity based on their age with a dependency ratio of 68.2%. In the gender component, the females are less resilient with a 1:1 ratio. In terms of income, the barangays are found to be vulnerable to the fact that 50% of the total households are found to be living below the poverty line (about $1/day/person). The programs, projects, and activities implemented by the agencies and organizations of the government are under the category of prevention, mitigation, and preparedness only based on the DRRM Framework. The barangays are also vulnerable since there are no programs yet related to response, rehabilitation, and recovery that are implemented.

Keywords*: Vulnerability, Coping capacity, Disaster risk, DRRM, Mandaon*

Introduction

The world today is facing tremendous challenges and changes in its various phases. Its physical environment has been getting worse brought about by technology and human activities. The industrial revolution has

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brought about new technologies with immense power. This was the transition to new manufacturing processes in Europe and the United States, in the period from about 1760 to 1840. This has been succeeded by continued industrialization and further technological advancements in developed countries around the world, and the impact of this technology on the environment has included the misuse and damage of our natural earth. (Edinburgh Sensors, 2024)

Disasters, natural calamities, and emergencies come in many forms; such as typhoons, earthquakes, volcanic eruptions, flash floods, fire, and many others, and they may require anything from a brief absence from the homes to permanent evacuations. It is an event that shapes our future, during a disaster, it affects lives, infrastructures, livestock and produce, and we can only adapt to it. (Asio,2021). Each type of disaster requires different measures to keep people's lives and resources safe. The very first thing that a person can do for himself and his family is to protect themselves from danger. This follows with the claims of the Normative Theory that comprehensive emergency management requires people to be prepared, to respond, and to recover from being prone to disaster. Many institutions and organizations from the government, the private sector, and civil society are implementing disaster mitigation programs. In the Philippines, the program in disaster preparedness has been strengthened by the government through Republic Act No. 10121, otherwise known as the "Philippine Disaster Risk Reduction and Management Act of 2012".

The geographical location of the Municipality of Mandaon is prone to any disaster that may affect the lives and properties of the people residing in the place. Some of the common calamities that strike in the vicinity are typhoons, earthquakes, storms, drought, fire, floods, and soil erosion. The research was conducted to assess the vulnerability, coping capacity, and how people of selected localities (barangays) of Mandaon are prepared whenever disaster strikes. It features the significant impact of disaster preparedness on the different calamities that may occur in the place and gives valuable inputs on how to build the capacity to deal with the risks. Parsons et al. (2021) highlight that geographic and social factors play a critical role in shaping disaster resilience, suggesting that coping capacities vary significantly based on a community's exposure to risk Resilience is a multidimensional construct that encompasses emotional, cognitive, and social capacities that allow individuals to recover from stress and adversity. In the context of natural disasters, resilience is closely tied to effective coping strategies that can mitigate the psychological and physical impacts of disaster exposure. (Wu, et.al. 2025) Recent studies, such as Shing et al. (2016), emphasize that contextual positive coping contributes significantly to resilience following disasters.

The Local Disaster Risk Reduction Management (LDRRM) is tasked to implement and supervise the disaster preparedness programs, projects, and activities of the government in the local level.

This study focused on the vulnerability and coping capacity to disaster risks and disaster preparedness of selected barangays in the municipality of Mandaon. Specifically, the main problem sought answers to the following questions:

1. What is the vulnerability and coping capacity of selected barangays to disaster risk in terms of:
   a.) Age
   b.) Gender
   c.) income
2. What are the common disaster preparedness programs, projects, and activities implemented in the selected barangays?

Methods

Research Design

The study made use of the descriptive survey methods of research as it involves the description recording, analysis, and interpretation of the present phenomena or situation as shown by the prevailing condition. Documentary analysis was used to gather data about the number of households, population, gender, etc. Qualitative research was also employed particularly on the vulnerability and

coping capacity of the barangays to disaster risks. The data was manually computed by the proponents with the assistance of the accredited statistician.

Participants

The study covered 12 barangays of which six (6) are identified coastal barangays and another six (6) are inland barangays. The 10 sample individual residents per barangay were selected through convenient sampling. Purposive sampling was applied to the barangay captains, heads of offices, and schools in selected coastal and inland barangays of Mandaon. There was a 100% retrieval of survey questionnaires from the respondents.

Instrument

The study used the descriptive survey method of research, mainly a survey questionnaire. It is composed of five (5) sets of questions, and these were lifted from NDRRMF (2010).

Statistical/Analytical Tool

Frequency count, percentage, rank order, dependency ratio, male-to-female ratio and poverty index were used in treating the data. The formula used for computing the dependency ratio is:

$$\frac{\text{Population 0-14 + population 64+}}{\text{Population 15-63}} \times 100$$

Likewise, the DRRM programs of the government were analyzed by comparing the programs to the DRRM Framework of FAO as presented in Figure 1.

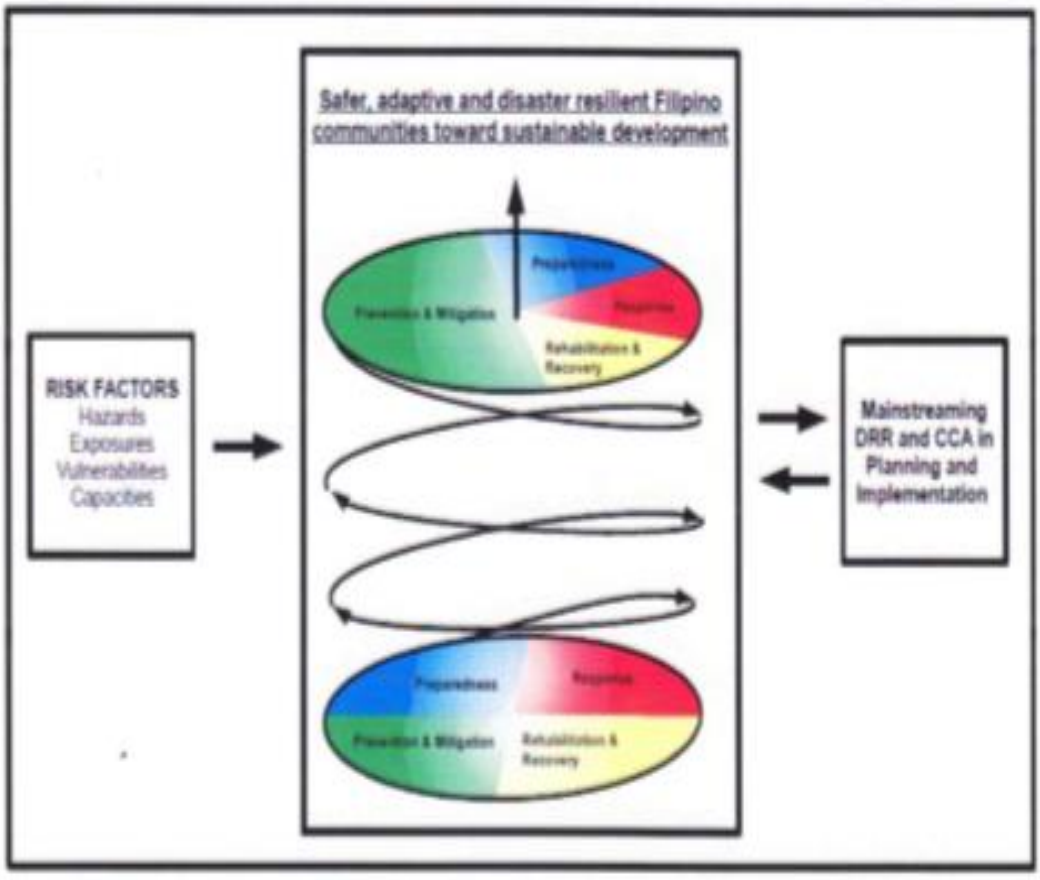

Figure 1. DRRM Framework

Results and Discussions

Vulnerability and Coping Capacity

Age profile. Table 1 shows the age information of the households in different selected barangays in Mandaon.

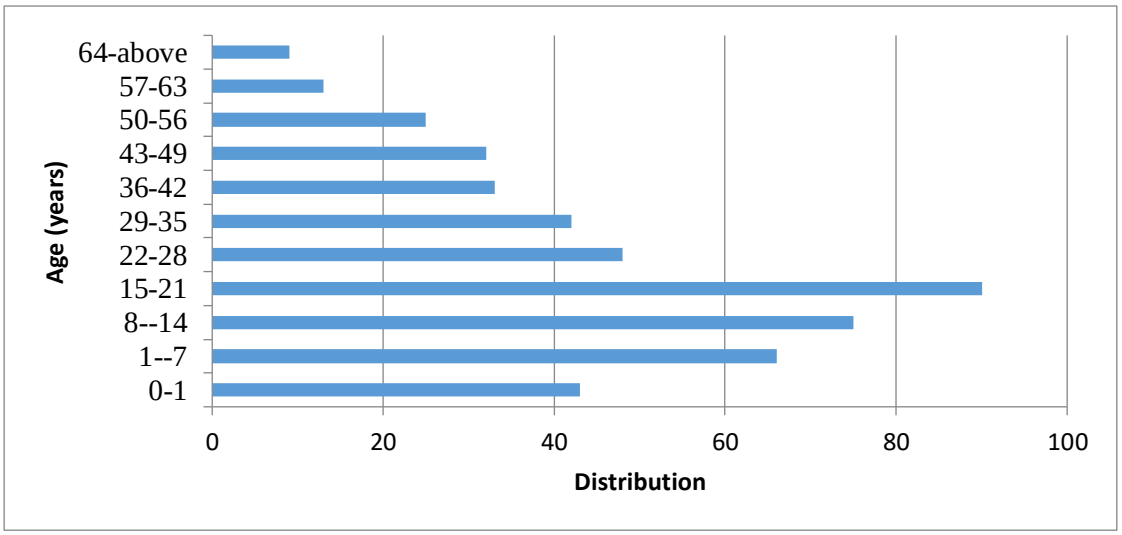

Figure 2. Age distribution of participants.

In terms of age profile, the dependency ratio of 68.2 % results revealed that the barangays are vulnerable. Based on the data gathered 38.66% of the total population is under the age bracket 0-14 years old, and 1.89% comprise the 64-years-old bracket. According to African Development (2009), a higher dependency ratio is an indication that children are vulnerable because they cannot work for themselves and they are dependent on their parents. Furthermore, based on the report of the European Commission, a rising child dependency ratio is a concern of every household because of their age and dependency. They are even more vulnerable to disaster than adults. Finally, several variations of the age dependency ratio exist, such as the adult dependency ratio, which takes prolonged working lives into account by removing the upper threshold and hence defining dependency as the proportion of inactive persons (aged 0-14 years) compared to active persons (aged 15 years and over) in the population (Bussolo, Koettl and Sinnott, 2015).

Households with higher dependency ratios, point out that in terms of coping capacity, they are facing greater challenges to cope and recover from disaster. In terms of DRRM, the findings imply that programs, projects, and activities for the youth and school children should be taught at home first and foremost. The school should also include activities such as a discussion of the hazard map area of the place, observational walks across the community, mural painting activities, and community drills that were done in Japan (Yasushige M. 2010). Children, particularly infants and toddlers, are at greater risk of malnutrition during disasters. According to a study in The Lancet, malnutrition can have long-term effects on child development, and crises often disrupt supply chains for essential nutrients (Leroy et al., 2015). Research has shown that children exposed to disasters face significant psychological stress, which can impact their mental health and developmental outcomes. (Gustafsson et al., 2016).

In the light of the findings, it should be noted that respondents are limited to 10 individuals only in as far as the individual resident is concerned. It is suggested therefore that future researchers may consider more respondents to have more reliable and conclusive results. Finally, community people should be involved in the decision-making regarding DRRM programs, projects, and activities.

Gender profile. Figure 2 gives the profile in terms of gender.

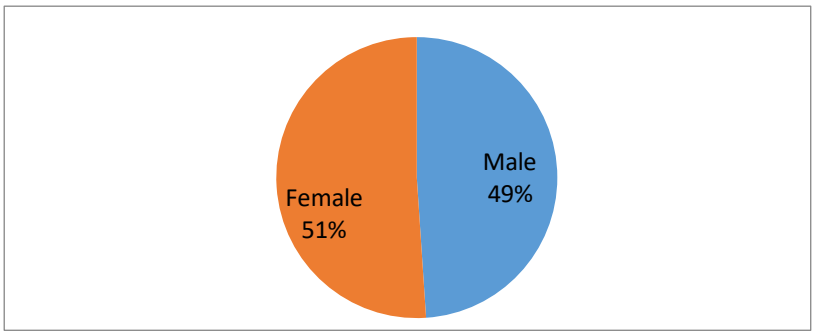

Figure 2. Gender Distribution of the Respondents

As to gender, female to male ratio is found to be 1.04. These findings suggest that there are more females than males in the identified barangays thus they are vulnerable. World Health Organization (WHO) said that equal sex ratio has a vital role as it affects the social and economic relationships within the locality. Mastrorillo et. al. (2016) stressed that during disasters, access to reproductive health services can be severely disrupted. Furthermore, it was suggested that women tend to be relatively poorer and do not have the necessary resources to respond to and recover from disasters. Moreover, women are susceptible to many environmental hazards especially when pregnant, since the reproductive system is particularly sensitive to adverse environmental conditions (MIT, 2012). According to some findings, women are often economically disadvantaged, with fewer resources to prepare for or recover from disasters. (UNDRR, 2015). Lastly, the study of Aldrich and Meyer (2015), cited that women may have less access to critical information about disaster preparedness and response, particularly in rural areas, and be less likely to receive timely information about evacuations or available resources.

Income. Table 1C presents the monthly income of the different household respondents.

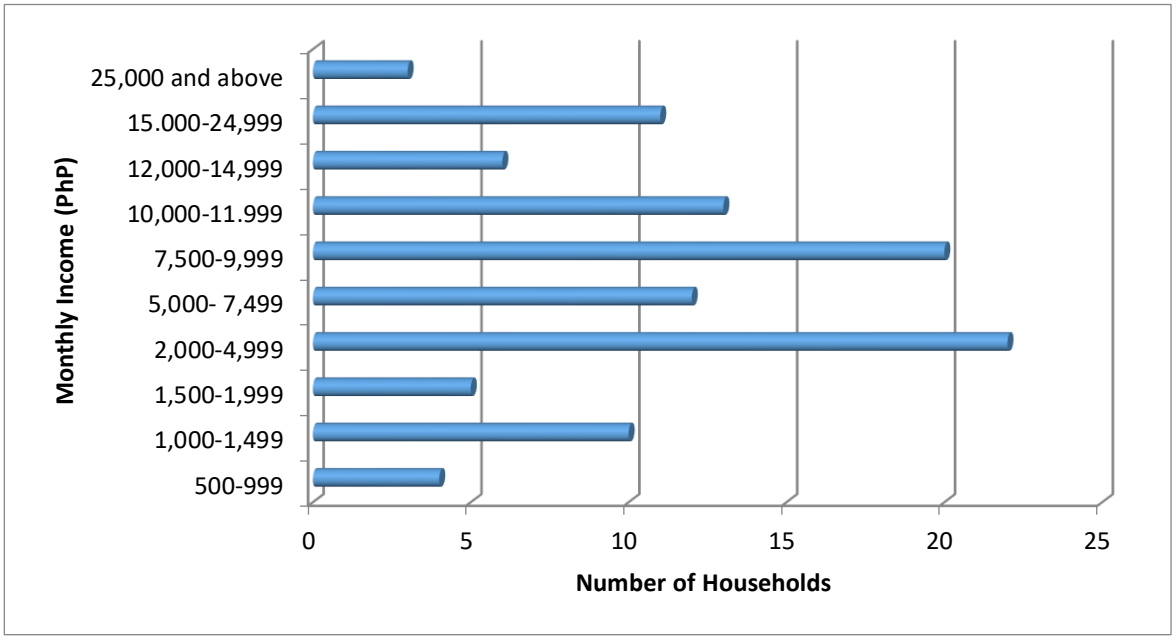

Figure 3. Number of Households with the Given Monthly Income Range

The total income is a measure of the combined monthly income of all people sharing in a particular household or place of residence (ILO, 2012). Result of this study shows that 50% of the total household-respondents have an income of less than PhP 7,500. In terms of vulnerability, using the poverty line index of "$ 1/day/ person or approximately PhP40/day/person or equivalent to PhP1, 200/month/person, considering that a Filipino family has an average household member of 6 persons/household, therefore each household should have an income above PhP7, 200/month to sustain their basic needs. Individuals with low incomes often live paycheck to paycheck, leaving little to no savings for emergencies. (Mastrorillo et al., 2016). On the other hand, World Health Organization (2012) reported that the ones often suffering disproportionately from disaster are the women. UNISDR (2009) pointed out that people have low income suffer the most likely, and others are prone to lose their lives and livelihood when drought, earthquakes, and typhoons occur. Another research finding stated that low-income individuals may have limited access to credit or loans, which can hinder their ability to invest in disaster preparedness measures, such as insurance or home improvements that mitigate risk (Schneider et al., 2015). Given the data, it was found out that barangays under study are vulnerable; they have low coping capacity because they are living below the poverty line. It is therefore suggested that the government should implement programs and projects that will augment the income of the family. In order to measure their actual income, daily expenses, it is suggested that there should be a record of their actual income.

B. Disaster Preparedness Programs, Projects, and Activities Implemented in the Barangays

Results of the study revealed that there is a minimal implementation of DRRM programs in selected barangays in the municipality of Mandaon, Out of 56 programs, 55

(equivalent to 98.21%) are under the level of the Disaster Risk Reduction Framework, which is, prevention, mitigation, and preparedness. In the absence of established programs, emergency services may be underfunded and poorly coordinated, leading to slow and ineffective responses during disasters (Aldrich & Meyer, 2015). This tells that the barangays are vulnerable to disaster risks. There is a need for the agencies concerned to implement further the programs to reach the next level (preparedness) or even higher reduction level. Thus, the implication may be stated that there is now an urgency for people to be exposed to many activities. Baker et. al. (2017) in their study noted that communities without established programs may not have access to training in disaster preparedness and response. Without ongoing activities aimed at raising awareness about disaster risks and preparedness strategies, residents may be ill-equipped to respond effectively. (Schneider et al., 2015).

The DRRM framework suggests that projects, programs, and activities should be implemented by phases such as phase 1 for prevention and mitigation, phase 2 for preparedness, phase 3 for response, and phase 4 for rehabilitation and recovery. Khan et al. (2018) noted that areas without ongoing projects aimed at strengthening infrastructure may have aging or inadequate facilities that cannot withstand disasters. This scheme will provide opportunities for the implementers to make the DRRM activities truly sustained inculcating deeply into the attitude of the people and eventually becoming part of their cultural practice.

Conclusion and Recommendations

The researchers concluded that the selected barangays under study in Mandaon, Masbate, Philippines, are vulnerable to disaster risks, and the people have low coping capacity based on their age, gender, and income. The programs, projects, and activities implemented by government agencies and organizations fall under the categories of prevention, mitigation, and preparedness.

Based from the results of this study, it is recommended that concerned agencies and organizations shall focus on the implementation of the programs, projects, and activities in the selected barangays for these places are vulnerable to disaster. There is a need to enhance their coping capacity to prepare themselves whenever a disaster strikes in their place. The implementation of programs, projects, and activities need start from the home. The identified agencies and organizations have to work together to attain their ends along DRRM implementation. The evaluation tells that there are more females than males, who are susceptible to environmental hazards especially during pregnancy, thus, having low coping capacity. . The household-respondents are living below the poverty line, they could not procure their basic family needs, financially unstable, they can hardly cope with disaster risks.

Finally, the proponents noted that age, gender and income can be considered factors in measuring vulnerability and coping capacity of an individual in a particular type of disaster that may occur in places where they live. It is evident among the barangays that programs, projects and activities are under the category of prevention, mitigation and preparedness only based on the DRRM Framework .The local government should address the necessary interventions to control and mitigate disaster risks.

Finally, future researches which focus on people vulnerability and coping capacity be undertaken to provide support and connection to the current study.

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