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## Research Article

### Involvement in Community-Based Disaster Risk Reduction and Management Among Vulnerable Populations

Julius Kris S. Tropel<sup>1</sup>, Alexander N. Morados<sup>2</sup>

<sup>1</sup>Municipal Government of Guinsiliban, 9102, Guinsiliban, Camiguin, Philippines

<sup>2</sup>Camiguin Polytechnic State College, 9100, Mambajao, Camiguin, Philippines

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#### \*Corresponding author:

E-mail:

#### ABSTRACT

The extent of involvement among vulnerable populations in community-based disaster risk reduction and management (CBDRRM) across demographic and sectoral groups is examined in this research. A total number of 305 respondents participated, majority with females composed of 66.56% and senior citizens aged 60 years and above with 56.72%. Most respondents resided in upland areas with 66.56% of the total, in which 54.42% of the respondents had attained secondary-level education. There are four sectoral groups considered in the study, among was the highest representation of the senior citizens with 56.07%, followed by 27.54% of women, persons with disabilities with 13.11%, and youth with 3.28%. The study evolves with risk awareness, community participation, local disaster governance, and preparedness and recovery in which resulted to moderate levels of involvement of respondents. Showing their greater awareness towards natural hazards and disaster plans yet limited training participation and household level preparedness. A relatively higher confidence showed in the local government planning but stretches low participation of the vulnerable groups in decision-making under the governance indicator. Significant differences have been highlighted statistically in involvement by sex, age, educational attainment, and sectoral group, but not by ecozone. The outcome of Post hoc tests shows that respondents with younger age and those with higher educational attainment had greater involvement compared to senior citizens and those with elementary-level education. And with the sectoral group, youth and women showed higher engagement compared to senior citizens and Person-With-Disability. Overall, the study underscores the need to strengthen program to inclusive disaster risk governance, enhance training opportunities, and prioritize household preparedness, particularly among senior citizens and less-educated groups, to foster equitable resilience in vulnerable communities.

**Keywords:** *Community Involvement, Disaster Preparedness, Inclusive Governance, Guinsiliban, Vulnerable Population*

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## **Introduction**

Disastrous events create a serious disruption in the community that affects the lives of the people. With its increasing frequency in a period of time, vulnerable population are exposed to hazards without preparedness measures taken on their part. These individuals may not understand their situation during the untoward incident which may lead to significant loss of lives and damaged to properties.

With the geographical location of the Philippines, it is considered as one of the disaster-prone countries in the world situating along the Pacific Ring of Fire and Pacific typhoon belt. Where it resulted to rank the Philippines with top high exposure in the world risk index in 2023. Experiencing an average of about 20 cyclones to enter Philippine area of responsibility each year (De Veluz et al., 2025).

The Municipality of Guinsiliban is not exempted to this situation. Several destructive natural disasters have been experienced in the municipality to highlight its susceptibility. In December 2021, the municipality experienced Super Typhoon Odette that destroyed 87 houses in Guinsiliban and a total of 1,520 across the province (News, 2021). Heavy rains, flash floods, and mudslides that caused families to evacuate during Typhoon Nanang in November 2001 (Gallardo, 2012). And in July 2012, a forced evacuation in implemented over 500 families including those from Guinsiliban due to a flashflood (Office of Civil Defense Region 10, 2012; JICA). These recurring vulnerability of the municipality demonstrate the need to strengthen disaster preparedness and develop more resilient programs.

Despite these repeated disasters, many vulnerable individuals remain unprepared due to limited resources, inaccessible early warnings, and insufficient inclusive disaster planning, leaving them at higher risk of injury, displacement, and slow recovery (Chang et al., 2023). The neglected needs of the elderly, persons with disabilities, and marginalized groups

compounded by psychological barriers such as fear and denial, weak community support, and inadequate infrastructure further emphasize the importance of inclusive, community-based preparedness strategies (Rahman et al., 2022).

In Guinsiliban, the upland areas, which includes mountainous and forested areas, is prone to landslides, flooding, and tree uprooting during strong storms, contributing to soil erosion and environmental hazards. In contrast, the coastal areas are vulnerable to storm surges during typhoons, causing damage to houses, roads, and fishing areas. Recognizing these hazards according to ecozones allows the community to plan more effective measures to protect residents and the environment.

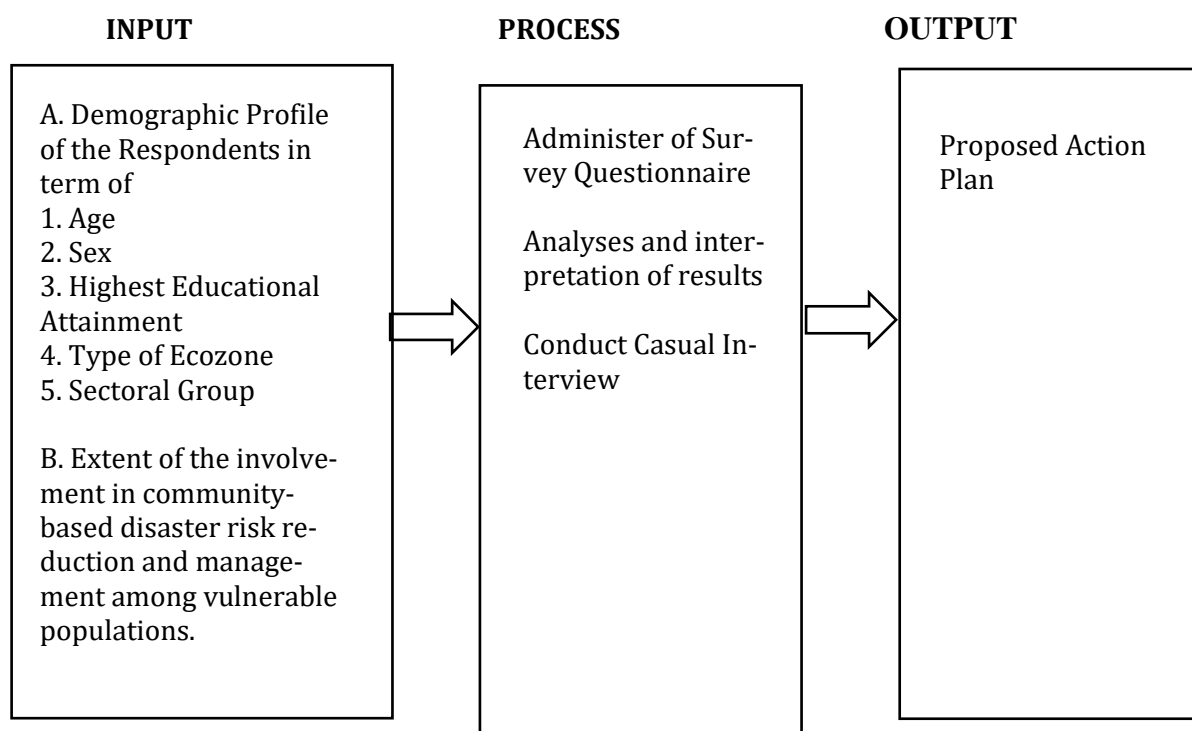
With the aforementioned facts, the researcher intended to evaluate the strategies of the Guinsiliban Disaster Risk Reduction and Management in involving vulnerable populations in the implementation of programs and activities, which led to active participation during actual emergencies. The results of this study helped the local government identify gaps in the strategies and improve community participation.

## **Methods**

This study is anchored in the Community Participation Theory, which emphasizes the importance of active community involvement in disaster risk reduction and management (DRRM). This theory asserts that the meaningful engagement of individuals, particularly from vulnerable sectors, enhances preparedness, response, and recovery efforts in times of disaster.

It recognizes that communities are not just passive recipients of assistance but are capable contributors to building local resilience.

To operationalize this theory, the study uses the Input-Process-Output (IPO) Model developed by McGrath (1964). The IPO model provides a structured way of understanding how inputs are transformed into outcomes through a series of processes.



**Figure 1**  
*Conceptual Paradigm of the study*

The input includes the demographic profile of the respondents along with their prior experience and awareness related to disaster preparedness. The process consists of the administration of survey questionnaires and the conduct of Focus Group Discussions (FGDs), followed by thematic analysis of the qualitative data gathered.

The output of the study is the development of a proposed action plan aimed at strengthening the participation of vulnerable populations in community-based disaster risk reduction and management.

The researcher used a quantitative method, specifically a descriptive design. A survey questionnaire is employed to obtain the data for the study and to complement the data with participants' perspectives, casual interviews are also conducted. The study is conducted in the Municipality of Guinsiliban, one of the five municipalities in the Province of Camiguin. A small, rural municipality located along the island's southeastern coast, characterized by mountainous landscapes, slopes, and coastal lowlands. Its seven barangays are home to a population of 6,827 people, whose

farmers and fisherfolk form the backbone of local livelihoods.

To categorize the target respondents of this study, the researcher requests for the identified lists of vulnerable populations from the Municipal Social Welfare and Development Office in the municipality. In ensuring comprehensive representation of the vulnerable sectors namely persons with disabilities (PWDs), senior citizens, women, and youth, stratified random sampling technique is used.

Within each stratum, respondents are selected through random sampling to minimize selection bias. The required sample size was calculated using the Rao soft Sample Size Calculator to ensure sufficient statistical power and reliability. Participation in the study was entirely voluntary, with all data treated as strictly confidential. Informed consent was obtained from all respondents prior to data collection.

The researcher utilized a survey questionnaire modified from the Sendai Framework in four key areas of Disaster Risk Reduction (UNDRR, 2015). The instrument was structured into two (2) parts. In Part 1 on the

questionnaire includes the demographic profile of the respondents in terms of age, sex, highest educational attainment, type of ecozone and sectoral group. Part 2 determine the extent of the involvement in community-based disaster risk reduction and management among vulnerable populations.

To ensure the validity of the researcher-modified questionnaire, it was reviewed by five expert validators from the Department of the Interior and Local Government (DILG) and various Provincial and Municipal Disaster Risk Reduction and Management Offices (DRRMOs) in the Province of Camiguin. The validators critically assessed the instrument and provided recommendations to enhance its clarity, relevance, and comprehensiveness.

To establish reliability, a pilot test is conducted in the Municipality of Sagay, a locality with characteristics comparable to Guinsiliban. Surveyed a total of 35 respondents from different sectors, in which 20 respondents from Senior Citizen, 1 from Youth, 9 from Women, and 5 from Persons with Disabilities (PWD) sectors.

Then, tally the data from the pilot test and Cronbach's Alpha is used to analyze the collected data which yielded a coefficient of 0.93, indicating that the reliability and consistency of the questionnaire is excellent.

The researcher submitted letter of intent to the local authorities to seek for approval to

conduct study on disaster risk reduction and management. In administering the survey, it is clearly explained to respondents the objectives of the research and any concerns are encouraged to ensure that the respondents will understand the survey questionnaire.

Once all responses are collected, the researcher analyzed the data using appropriate statistical tools and provided interpretations to answer the research questions of the study.

For the quantity responses of the respondents, a four (4) point Likert scale will be adopted with corresponding arbitrary values, statistical limit, qualitative description, and quantitative interpretation.

If the arbitrary value is one, it is then interpreted as Community participation involvement is strongly disagreed with statistical limit of 1.00 to 1.75 and described as no extent. If the arbitrary value is two, it is then interpreted as Community participation involvement is disagreed with statistical limit of 1.76 to 2.50 and described as less extent. If the arbitrary value is three, it is then interpreted as Community participation involvement is agreed with statistical limit of 2.51 to 3.25 and described as moderate extent. And if the arbitrary value is four, it is then interpreted as Community participation involvement is strongly agreed with statistical limit of 3.26 to 4.00 and described as high extent.

**Table 1**

*Scoring Guideline on the Extent of Involvement in Community-based Disaster Risk reduction and Management among Vulnerable Population*

<b>Arbitrary value</b>	<b>Statistical Limits</b>	<b>Qualitative Description</b>	<b>Qualitative Interpretation</b>
4	3.26-4.00	High Extent	Community participation involvement is strongly agreed
3	2.51-3.25	Moderate Extent	Community participation involvement is agreed
2	1.76-2.50	Less Extent	Community participation involvement is disagreed
1	1.00-1.75	No Extent	Community participation involvement is strongly disagreed

The researcher utilized appropriate statistical tools to analyze the data collected in the study, ensuring that the methods aligned with the research questions and the type of data gathered.

Problem 1. Frequency counts and percentages were used to describe the demographic profile of the respondents, including age, sex, highest educational attainment, type of eco-zone, and sectoral group.

Problem 2. The Weighted Mean (WM) was employed to determine the extent of involvement of vulnerable populations in community-based disaster risk reduction and management. The Area Mean was computed to determine the level of involvement for each major dimension, while the Total Area Weighted Mean (TAWM) was used to describe the overall extent of involvement.

The Standard Deviation (SD) was also calculated to measure the variability of respondents' responses. The results were interpreted using a four-point Likert scale.

Problem 3. To determine whether there are significant differences in the extent of involvement in community-based disaster risk

reduction and management across respondents' demographic profiles, appropriate inferential statistical tools were applied at a 0.05 level of significance. A t-test was used for variables with two groups, specifically sex and type of eco-zone, while Analysis of Variance (ANOVA) was utilized for variables with three or more groups, including age, highest educational attainment, and sectoral group. When ANOVA results were significant, a post hoc test using Tukey's Honestly Significant Difference (HSD) was conducted to identify specific group differences

This study followed all necessary ethical standards to protect the rights and well-being of all respondents. Before participating, respondents were clearly informed about the purpose of the study, its objectives, and what their participation would involve, so they fully understood their role.

The respondents are assured that all responses were for research purposes only and will be treated with confidentiality to safeguard the rights, privacy, and wellbeing of all respondents.

**Table 2**  
*Profile of the respondents (N=305)*

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Sex</b>		
Male	102	33.44
Female	203	66.56
<b>Total</b>	<b>305</b>	<b>100.00</b>
<b>Age Group</b>		
18 to 29	52	17.05
30 to 59	80	26.23
60 years old and above	173	56.72
<b>Total</b>	<b>305</b>	<b>100.00</b>
<b>Type of Ecozone</b>		
Coastal	102	33.44
Upland	203	66.56
<b>Total</b>	<b>305</b>	<b>100.00</b>
<b>Educational Attainment</b>		
Elem Level	12	3.93
Elem Graduate	20	6.56
HS Level	78	25.57
HS Grad	88	28.85
College Level	65	21.31
College Graduate	42	13.77

<b>Total</b>	<b>305</b>	<b>100.00</b>
<b>Sectoral Group</b>		
Youth	10	3.28
Women	84	27.54
PWD	40	13.11
Senior Citizen	171	56.07
<b>Total</b>	<b>305</b>	<b>100.00</b>

Table 2 shows the demographic profile of the 305 respondents in terms of sex, age group, type of ecozone, highest educational attainment, and sectoral group.

*Sex*

The table shows that 203 (66.56%) or more than half of the respondents were females, whereas only 102 (33.44%) were males, out of a total of 305 respondents. This indicates that female respondents outnumbered male respondents, resulting in a stronger representation of female perspectives in the study on involvement in community-based disaster risk reduction and management among vulnerable populations.

This distribution may be attributed to the more active participation of females in community-based and disaster-related activities. Recent studies have emphasized that women often play key roles in disaster preparedness, risk awareness, and community organization, which increases their engagement in CBDRM initiatives and their likelihood of participating in related surveys (Bradshaw et al., 2020).

*Age Group*

The table shows that 173 (56.72%) of the respondents were 60 years old and above, indicating that more than half of the participants belonged to the senior citizen age group. While the age bracket 30 to 59 years old contributed 80 (26.23%) individuals and age bracket 18 to 29 years comprised 52 (17.05%) of the total 305 respondents.

The result implies that in the research on involvement in community-based disaster risk reduction and management among vulnerable populations the largest age group comprised of older adults.

Relating to the study of Un-ob and Thongchuay (2025), it emphasizes that older

adults have substantial role in the community with their experiences but at the same time needs to be supported due to their weakness in nature as their sector represents the majority of the vulnerable population in the municipality.

*Type of Ecozone*

In the total of 305 respondents, 203 of which were from the upland area and 102 were from the coastal areas of the municipality. This indicates that the majority of participants in the study on involvement in community-based disaster risk reduction and management among vulnerable populations were residents of upland ecozones.

Research by Nappo et al., (2021), highlights that upland communities tend to have more established local networks and organized community initiatives, which contribute to greater participation in disaster risk reduction programs. This supports the higher representation of respondents from upland areas in the study, reflecting the active involvement of these communities in resilience and preparedness activities.

*Educational Attainment*

The table shows that the majority of respondents had high school-level education, with 88 (28.85%) being high school graduates and 78 (25.57%) having reached high school level, making up 166 (54.42%) of the 305 respondents. Respondents with college-level education comprised 65 (21.31%), while college graduates were 42 (13.77%). Those with only elementary education, including elementary level and graduates, accounted for 32 (10.49%). These results indicate that most participants in the study on involvement in community-based disaster risk reduction and

management among vulnerable populations had attained secondary education.

According to Hoffmann and Blecha (2020), the impact of high educational attainment reduces the disaster vulnerability of an individual. Their review found that formal education increases awareness of disaster risks and the ability to anticipate, cope with, and respond to natural hazards by improving access to information and social resources, which supports the observed pattern of higher representation among respondents with secondary and tertiary education levels.

### Sectoral Group

The table shows that the majority of respondents were senior citizens, with 171 (56.07%) of the 305 respondents, followed by women with 84 (27.54%), persons with disabilities (PWDs) with 40 (13.11%), and youth

with 10 (3.28%). This indicates that senior citizens comprised the largest sectoral group in the study on involvement in community-based disaster risk reduction and management among vulnerable populations.

According to Jia et al. (2020), senior citizens and women are often highly involved in community-based disaster preparedness and resilience programs because of their social roles, experience, and participation in community networks. Their active engagement contributes to disaster risk reduction initiatives and explains the higher representation of senior citizens and women in this study. This sectoral distribution reflects the level of involvement and accessibility of vulnerable populations in community-based disaster risk reduction activities.

**Table 3**

*Extent of the involvement in community-based disaster risk reduction and management among the vulnerable population*

Indicators	Weighted Mean (WM)	SD	Description
<b>Preparedness and Recovery</b>			
I feel more disaster-prepared today than I was before.	3.45	0.66	High Extent
Our community builds stronger and safer structures after disasters.	3.21	0.75	Moderate Extent
After disasters, our community helps vulnerable individuals recover quickly.	2.96	0.87	Moderate Extent
I have participated in emergency drills or disaster simulations.	2.89	0.95	Moderate Extent
My household is prepared for possible disasters.	2.7	1.04	Moderate Extent
<b>Area Mean</b>	<b>3.04</b>		
<b>Local Disaster Governance</b>			
Local government has clear disaster preparedness and response plans.	3.30	0.74	High Extent
Local officials are responsive and active in disaster risk reduction programs and activities.	3.2	0.77	Moderate Extent

I receive timely and accurate information from authorities during disasters.	2.96	0.86	Moderate Extent
Community leaders ensure that all members, especially the vulnerable, are included in disaster planning.	2.88	0.82	Moderate Extent
Vulnerable sectors are consulted in creating disaster-related programs.	2.84	0.8	Moderate Extent
<b>Area Mean</b>	<b>3.03</b>		
<b>Understanding Disaster Risk</b>			
I am aware of the natural hazards that may affect my community.	3.13	0.76	Moderate Extent
I believe that knowing disaster risks helps reduce their impact.	3.04	0.84	Moderate Extent
I understand how disasters affect vulnerable populations like children, elderly, or persons with disabilities.	3.03	0.85	Moderate Extent
I know the evacuation routes and designated safe areas in our locality.	3.00	0.93	Moderate Extent
I have received training on disaster risks in my area.	2.59	1.15	Moderate Extent
<b>Area Mean</b>	<b>2.96</b>		
<b>Community Participation in Disaster Risk Reduction and Management</b>			
I feel encouraged to take part in disaster-related programs or trainings.	2.94	0.85	Moderate Extent
I am informed or invited when disaster risk reduction activities are conducted in my barangay.	2.9	0.86	Moderate Extent
I participate in community activities related to disaster preparedness and response.	2.9	0.82	Moderate Extent
I have access to community resources that help reduce disaster risks.	2.87	0.79	Moderate Extent
Vulnerable groups like mine are included in disaster risk planning and decision-making.	2.73	0.88	Moderate Extent
<b>Area Mean</b>	<b>2.87</b>		
<b>Total Area Weighted Mean</b>	<b>2.97</b>		
<b>Standard Deviation (SD)</b>		<b>0.88</b>	

Table 3 shows the extent of the respondents' involvement in community-based disaster risk reduction and management among

vulnerable populations. Overall, the involvement was moderate with a total area weighted mean of 2.97 (SD = 0.88). This suggests that

although initial engagement has been established, there is still a clear need to strengthen and sustain community participation to achieve more effective DRRM implementation.

Out of 20 indicators, the highest ranked were “I felt more disaster-prepared today than I was before” (Rank 1, WM = 3.45, High Extent), response plans”, (Rank 2, WM = 3.30, High Extent), “Our community built stronger and safer structures after disasters” and (Rank 3, WM = 3.21 Moderate Extent) “Local government had clear disaster preparedness. These findings indicated that personal preparedness, governance, and community recovery were effective (Bali, 2022).

The casual interview revealed that respondents perceive the community as more prepared for disasters compared to the past. This is the outcome of proactive approach taken by the government such as information drive to the community, disaster trainings that involved the vulnerable populations, and active MDRRM programs to reach the gaps between the government and community. In which, the local government has been recognize as Gawad KALASAG Awardee for the three consecutive years, a highest award in the field of Disaster Risk Reduction and Management and Humanitarian Assistance in the Philippines. Moreover, with the help of technology to provide real-time weather updates and relevant news, the community is more knowledgeable with the situation.

Among the indicators, “I had received training on disaster risks in my area” ranks in 20 as the lowest. This shows that a limited access to formal disaster training may affect the preparedness and ability to respond effectively of some vulnerable individuals. In the casual interview revealed that participation of vulnerable population is hindered due to the accessibility of the trainings especially to the population in upland areas. This situation is a challenge to local government since then, for many vulnerable populations is positioned to far areas but government programs reaching out the gaps to deliver disaster-related trainings closer to vulnerable populations.

## **Preparedness and Recovery**

In preparedness and recovery, the result area mean of 3.04 shows the moderate involvement of respondents. The top indicator was “feeling more disaster-prepared today than before”, is the output of the cooperation between the community and government in building a resilient environment. Local government disaster programs lead to the trust of the community though not all vulnerable populations are addressed directly but concerns were taken appropriately.

The lowest-ranked indicator was household preparedness for possible disasters (WM = 2.70, SD = 1.04, Moderate Extent, Rank 5. The study of Wang, Han, Liu, & Yu, in 2021 highlighted the resources support needed to improve preparedness behavior at the household level even awareness was moderate.

The casual interview shows that in household disaster preparedness some of the families were already taking preparedness measures while others still unprepared due to limitation of their location and environmental weaknesses. This situation challenges the local government to consider programs that will scope all constituents regardless of their location.

## **Local Disaster Governance**

In local disaster governance, an area mean of 3.03 and moderate involvement of respondents. Among the five indicators, the highest-ranked was that the local government had clear disaster preparedness and response plans (3.30, SD = 0.74, High Extent, Rank 1), followed by local officials being responsive and active in disaster risk reduction programs (3.20, SD = 0.77, Moderate Extent, Rank 2), receiving timely and accurate information from authorities during disasters (2.96, SD = 0.86, Moderate Extent, Rank 3), and community leaders ensuring that all members, especially the vulnerable, were included in disaster planning (2.88, SD = 0.82, Moderate Extent, Rank 4).

The lowest-ranked indicator was that vulnerable sectors were consulted in creating disaster-related programs with 2.84, SD = 0.80, Moderate Extent.

The inclusion of diverse community in disaster planning enhances the quality of decision and effectiveness of the policy to be created but somehow becomes challenging due to social barriers (Agyemang, 2025).

The casual interview results showed suggests ongoing improvement community engagement. Highlighting the gaps in accessibility and reach which cause some of the vulnerable population could not participate in barangay consultations, assemblies, and IEC activities.

### **Understanding Disaster Risk**

In understanding the risk, the result area mean of 2.96 shows the moderate involvement of respondents in disaster risk awareness.

The top indicator was “awareness of the natural hazards that may affect their community”, with the access to advance technology situational updates becomes easy and partnered with information, education, and campaign brought by the local government cascading of the relevant disaster information has been deliver to the community efficiently. With this programs, vulnerable populations become more aware of the risk that may affects the community and will lead them to take steps for preparedness measures. In connection to the study of Marulanda, de la Llera, & Cardona, in 2022, that understanding disaster vulnerability is essential for disaster preparedness and risk reduction.

The lowest-ranked in the indicator was receiving training on disaster risks in their area with 2.59, SD = 1.15, and Moderate Extent. Few respondents have received training but explained that some of their family members attended to the same training and feel more prepared. The casual interview results showed non-participation was often due to distance from the venue and unavailability of the respondent due to livelihood. Sometimes they let another family member to attend. This is an additional challenge for the local government indicating that there is a need for more inclusive disaster preparedness efforts. Research showed that formal disaster preparedness training significantly enhances knowledge and preparedness actions among vulnerable

populations, especially families with older adults (Fatmah, 2022).

### **Community Participation in Disaster Risk Reduction and Management**

In community participation, the respondents’ involvement in disaster risk reduction and management was moderate with an area mean of 2.87. Among the five indicators, the highest-ranked was feeling encouraged to take part in disaster-related programs or trainings (WM = 2.94, SD = 0.85, Moderate Extent, Rank 1), followed by being informed or invited when disaster risk reduction activities were conducted in their barangay (WM = 2.90, SD = 0.86, Moderate Extent, Rank 2), participating in community activities related to disaster preparedness and response (WM = 2.90, SD = 0.82, Moderate Extent, Rank 3), and having access to community resources that help reduce disaster risks (WM = 2.87, SD = 0.79, Moderate Extent, Rank 4).

The lowest-ranked indicator was inclusion of vulnerable groups in disaster risk planning and decision-making (WM = 2.73, SD = 0.88, Moderate Extent, Rank 5). Research highlights that actively involving vulnerable populations in disaster planning strengthens preparedness, ensures equity, and improves community resilience (Ngulube, Tatano, and Samaddar, 2025).

The casual interview results showed varied awareness among respondents. Some were informed and participated through meetings, while others were unaware of any activities, indicating the need for improved information dissemination in the community.

It is practiced that during the planning process of the barangay all sectors within the jurisdiction is invited.

Unfortunately, it could not cater all the members in the sectoral group. Only the officers will be accommodated to represent the sector and will be the one to disseminate the information to their members. These gaps raised during the interview exhibit the willingness of vulnerable populations to participate in the whole process. Local government will take time to review the process for improvement.

**Table 4**

*T-test on the extent of the involvement in community-based disaster risk reduction and management among vulnerable populations when group according to sex and type of eco-zone.*

Profile	t-value	d.f.	P-value	Decision
Sex	3.16	303	0.002	Reject Ho
Type of eco-zone	0.833	303	0.406	Failed to Reject Ho

The t-test results presented in Table 5 shows that the P-value for the variable sex was 0.002, which is below the 0.05 level of significance. Thus, the null hypothesis that there is no significant difference in the extent of involvement in community-based disaster risk reduction and management among vulnerable populations when grouped according to sex was rejected.

This indicates that male and female respondents differed significantly in their level of participation in disaster risk reduction activities. Research has shown that sex and gender roles influence participation in community programs, with social norms and responsibilities shaping engagement in disaster preparedness initiatives (Bradshaw & Fordham, 2025).

On the other hand, the P-value for the variable type of eco-zone was 0.406, which is above the 0.05 level of significance. Therefore, the null hypothesis was not rejected, indicating that there was no significant difference in the extent of involvement in community-based disaster risk reduction and management among respondents based on eco-zone classification.

Study suggest that geographic location alone does not necessarily determine engagement; instead, social support, community resources, and local governance have a greater influence on participation in disaster risk management programs (Cutter, Boruff, & Shirley, 2020).

**Table 5**

*Summary of the Analysis of Variance on the extent of the involvement in community-based disaster risk reduction and management among vulnerable populations when group according to age, educational attainment, and sectoral group.*

Variable	Source of Variation	SS	df	MS	F	P-value	Decision
Age	Between Groups	20.40	2	10.183	27.5	<0.001	Reject Ho
	Within Groups	111.7	302	0.37			
Highest Educational Attainment	Between Groups	24.4	5	4.87	13.5	<0.001	Reject Ho
	Within Groups	107.7	299	0.36			
Sectoral Group	Between Groups	19.4	3	6.475	17.3	<0.001	Reject Ho

Within Groups 112.6 301 0.374

**Table 5.1**  
*Means for Age Group*

<i>Age Group</i>	<i>N</i>	<i>Wtd. Mean</i>
29 yrs and below	52	3.13
30 to 50	80	3.34
60 yrs & above	170	2.76
<b>Total TAWM</b>	<b>305</b>	<b>2.97</b>

**Post Hoc (Tukey)**

<i>Comparison</i>		<i>Mean Difference</i>	<i>T-value</i>	<i>P-value</i>
60 yrs & above	29 yrs & below	0.587	7.14	<0.001
	30 to 59	0.373	3.87	<0.001

**Table 5.2**  
*Means for Highest Educational Attainment*

<i>Highest Educational Attainment</i>	<i>N</i>	<i>Wtd. Mean</i>
Elem Level	12	2.39
Elem Grad	20	2.60
HS Level	78	2.71
HS Grad	88	2.98
College Level	65	3.24
College Grad	42	3.39
<b>Total TAWM</b>	<b>305</b>	<b>2.97</b>

**Post Hoc (Tukey test)**

<i>Comparison</i>		<i>Mean Dif-ference</i>	<i>T-value</i>	<i>P-value</i>
Elem Level	HS Grad	0.593	3.209	0.018
	College Level	0.856	4.54	<0.001
	College Grad	1.001	5.09	<0.001
Elem Grad	College Level	0.641	4.18	<0.001
	College Grad	0.786		
HS Level	HS Grad	0.272	2.92	0.04

	College Level	0.536	5.32	<0.001
	College Grad	0.68	5.92	<0.001
HS Grad	College Grad	0.408	3.625	0.005

**Table 5.3**  
*Means for Sectoral Group*

Sectoral Group	N	Wtd. Mean
Youth	10	3.36
Women	84	3.30
PWD	40	3.14
Senior Citizen	171	2.76
<b>Total</b>	<b>305</b>	
<b>TAWM</b>		<b>2.97</b>

**Post Hoc (Tukey)**

Comparison	Mean Dif- ference	T- value	P-value
Senior Citizen			
Youth	0.38	3.54	0.003
Women	0.54	6.64	<0.001
PWD	0.60	3.03	<0.014

Table 5 shows that age, highest educational attainment, and sectoral group had P-values less than 0.001. This indicates significant differences in the extent of involvement in community-based disaster risk reduction and management among vulnerable populations across these groups, leading to the rejection of the null hypothesis. These results are supported with study that the disaster engagement is influenced by demographic characteristics and sectoral group. Participation of older populations is less while disaster knowledge and preparedness enhancing the involvement of individuals with higher education.

In determining the significant difference of specific groups, Post hoc (Tukey) analyses are conducted. It shows that respondents with age bracket of 60 years old and above shows a lower mean involvement of 2.76 compared to younger age brackets with mean of 3.13 for 29 years old and below, and mean of 3.34 for 30 to 59 years old. On the other hand, respondents with elementary level education also

shows a lower mean involvement of 2.39 compared to respondents who graduated from college with 3.39. And also, significant mean differences among sectoral groups are determined in which the youth sector had the higher 3.36 involvement compared to women with 3.30. senior citizens with 2.76 and PWDs with 3.14.

These findings are supported by disaster literacy research, which indicates that literacy and preparedness levels vary across age and education, suggesting that educational attainment influences individuals' capacity to acquire and apply disaster knowledge (Genc, Yildiz, Kaya, & Bilgili, 2022).

An action plan is proposed to address the gaps by improving disaster knowledge, encouraging community involvement, and supporting local disaster management efforts.

The goal is to help vulnerable groups be better prepared and more resilient during disasters.

## Conclusion

Based from the findings and analyses of the study the following conclusions are derived:

1. Majority of respondents were females, senior citizens, predominantly from upland areas, and had attained secondary education.
2. The respondents demonstrated “Moderate Extent” across disaster risk awareness, community participation, local governance, and preparedness and recovery.
3. The variables of sex, age, educational attainment, and sectoral group significantly influenced involvement in community-based disaster risk reduction and management, while ecozone classification did not. Females, younger respondents, and those with higher education, as well as youth and women, demonstrated greater participation than males, senior citizens, and persons with disabilities.

## Recommendations

Based on the findings and conclusion, the following recommendations are forwarded:

1. Local Government Units (LGU) may develop quarterly, accessible, and practical disaster risk training sessions, especially targeting households and vulnerable groups, to improve the involvement and preparedness.
2. Municipal Disaster Risk Reduction and Management Office may ensure that women, senior citizens, children, and persons with disabilities are actively consulted and represented in DRRM planning and decision-making.
3. Community members are encouraged to take an active role in Disaster Risk Reduction and Management (DRRM) initiatives. By participating in trainings, preparedness drills, and barangay-led programs, residents can strengthen their own safety and contribute to the resilience of the entire community.

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