
Research Article

Disaster Preparedness and Response Among Emergency Responders

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ABSTRACT

The Philippines is ranked as the number one most disaster-prone country in the world, based on the 2025 World Risk Index (World Population Review, 2025). This means it faces the highest risk from natural disasters like typhoons, earthquakes, and floods. The country's location in the Pacific combined with communities living near the shore, increases exposure to storm surges and coastal hazards. On top of that, many areas still lack strong buildings, good roads, and enough emergency resources, which makes it harder to recover after disasters. This study examined the extent of disaster preparedness and response practices among 58 community-based emergency responders in the Municipality of Sagay, Camiguin. It utilized quantitative-descriptive survey design with validated survey questionnaire as the main instrument in gathering data supplemented with casual interviews. Frequency counts, percentages, mean, standard deviation, t-test and Analysis of Variance were utilized to analyze and interpret the data gathered. Results revealed that the respondents were affiliated as Barangay Health Workers, Civil Volunteer Organizations, and other groups such as Sangguniang Kabataan, Barangay Nutrition Scholars, and Community Development Workers. Respondents varied in years of service, with the majority having more than six years of experience, while most had attended two or fewer disaster risk reduction (DRR) trainings. Findings revealed a high extent of DRR practices. The response efficacy appeared as the strongest aspect, followed by severity and self-efficacy, while vulnerability registered the lowest. Statistical analysis using T-test and ANOVA indicated significant differences in preparedness when grouped according to organizational affiliation, particularly between Civil Volunteer Organizations (CSOs) and other affiliations. There were no significant differences observed when grouped according to years of service or number of trainings attended. The most pressing challenges identified were lack of equipment and supplies and community non-compliance during evacuation. These results highlight the need for targeted support and resource provision to strengthen community-based disaster preparedness.

Keywords: *Barangay Health Workers, Disaster Risk Reduction, Preparedness, Responders, Response-Efficacy*

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Introduction

Because of its location and the fact that it is prone to natural disasters like typhoons, earthquakes, landslides, storm surges, floods, and volcanic eruptions, the Philippines is thought to be one of the most disaster-prone countries in the world. Climate change is causing more and more disasters to happen, which makes it harder for communities and local governments to get ready for and deal with them. Even though Republic Act 10121 and other national laws say that local disaster risk reduction systems must be set up, many places still don't have enough resources, coordination, or infrastructure.

Emergency responders such as fire fighters, paramedics, police officers, and disaster risk reduction personnel, play an important role in disaster management. The success of their work depends on the proper trainings, accessibility and availability of resources, and operational coordination. On the other hand, challenges such as limited manpower, logistical constraints, and communication failures can affect response performance, particularly in local settings.

Typhoon Odette (Rai) in 2021 underlined both the strengths and limitations of disaster response at the local level. In the Municipality of Sagay, Camiguin, pre-emptive/force evacuation and coordinated efforts which resulted to zero casualties despite of significant damages. Issues such as unwillingness to evacuate, resource limitations, and operational difficulties were observed. These conditions indicate the need to assess the preparedness and response capacity of emergency responders at the barangay level.

Despite existing studies on disaster impacts, there is limited localized research focusing on the preparedness and actual experiences of barangay emergency responders. There is also insufficient data on how factors such as organizational affiliation, years of service, and training exposure influence preparedness levels. This gap limits the ability of local government units to implement targeted and effective interventions.

This research focuses on the disaster preparedness and response of barangay emergency responders in the Municipality of Sagay. The results may offer baseline information for

the enhancement of disaster risk reduction measures at the local level and building community resilience. The research offers valuable information on the emergency responders' disaster preparedness in the Sagay Municipality. It helps local government units improve planning and resource allocation by identifying key challenges such as lack of equipment, limited training, and communication issues. The findings also support responders and barangay organizations in enhancing their skills, coordination, and overall readiness. This highlights the need for stronger community participation and awareness to improve disaster response. Lastly, it contributes to the field of disaster risk reduction and management and serves as a basis for future research.

Methods

This study used a **quantitative descriptive-correlational research design** to assess disaster preparedness and response among emergency responders.

The study was conducted in the Municipality of Sagay, Camiguin, which consists of nine (9) barangays: Alangilan, Bacnit, Balite, Bonbon, Bugang, Cuña, Manuyog, Mayana, and Poblacion. The municipality has a mix of coastal and upland areas, making it vulnerable to hazards such as storm surges and landslides. Its socio-economic condition and exposure to disasters make it suitable for this study.

The respondents were 58 emergency responders in total from the nine barangays under the Committee on Disaster Preparedness and Response. The study employed **purposive sampling** with total enumeration. Each barangay had approximately 6 to 7 respondents. The list of respondents was obtained from barangay secretaries.

The study used a structured questionnaire adapted and modified from Salita, Tiongco, and Kawano (2020). The instrument consisted of three parts: (1) Demographic profile (organizational affiliation, years of service, and trainings attended); (2) Disaster preparedness indicators measured through an **Inclusive Resilience Scale** (severity, vulnerability, response efficacy, and self-efficacy); and (3) Challenges encountered by responders. This study, the Inclusive Resilience Scale was treated as a structured Likert-based

measurement tool designed to capture perceived disaster preparedness dimensions in a localized emergency response setting.

The instrument underwent expert validation from personnel of DILG, PDRRMO, and MDRRMO. Reliability testing through pilot testing (n=35) yielded a **Cronbach's alpha of 0.816**, indicating good internal consistency and acceptable reliability for further analysis.

The study was secured from the Municipal Mayor and Punong Barangays. The researcher personally distributed and retrieved the questionnaires. A brief orientation was conducted prior to data collection. Casual interviews were also conducted to support survey responses. All data were collected, organized, and prepared for analysis.

The following statistical tools were used: (a) **Frequency and percentage** for respondent profile; (b) **Weighted mean and standard deviation** for the level of preparedness; (c) **t-test and Analysis of Variance (ANOVA)** to determine significant differences; and (d) **Ranking method** to identify challenges

A four-point Likert scale was used to interpret preparedness levels, ranging from strongly disagree (1) to strongly agree (4). Regarding the processing methods of gathered information using Ms. Excel, data was tallied and tabulated. Presentation of results followed the

study objectives. Confidentiality was maintained after collecting data and destruction of collected data after the study was done. Secure storage and destruction of data after the study guaranteed anonymity. Compliance to all participant's rights was adhered to. Local and institutional protocols were followed as well.

As per the Data Privacy Act of 2012 (Republic Act No. 10173), confidentiality of the data was a top priority. To promote transparency, an independent observer was present during the data collection to ensure that all procedural guidelines were followed.

Results and Discussions

In order to answer and understand the purpose of the question thoroughly, the analysis results and the important findings are indicated as the highlights of this assignment.

Demographic profile of the Respondents

Table 1 presents the demographic profile of the 58 respondents, categorized by organizational affiliation, years of service, and trainings attended. These variables serve as the basis for understanding the factors influencing disaster preparedness among emergency responders and how these relate to their effectiveness in disaster response.

Table 3
Demographic Profile of the Respondents of the Study

| Variables | Counts | Percentage |
|-------------------------------------|-----------|---------------|
| Organizational Affiliation | | |
| CVO | 20 | 34.48 |
| BHW | 25 | 43.10 |
| Others (SK, BNS, CDW) | 13 | 22.41 |
| Total | 58 | 100.00 |
| Years in Service | | |
| CVO | 20 | 34.48 |
| BHW | 25 | 43.10 |
| Others (SK, BNS, CDW) | 13 | 22.41 |
| Total | 58 | 100.00 |
| Number of Trainings attended | | |
| 2 or less | 38 | 65.52 |
| 3 and more | 20 | 34.48 |
| Total | 58 | 100.00 |

Age and Sex Distribution

Table 1 shows the significant majority of the respondents, with a total of 25 (43.10%) are Barangay Health Workers (BHW), 20 (34.48%) are members of Civil Volunteer Organizations (CVOs), and 13 (22.41%) belong to other groups such as SK, BNS, and CDW. This shows that BHWs is the largest group of emergency responders, emphasizing their important role in disaster preparedness due to their direct involvement in community health and first aid. The presence of CVOs also shows the importance of volunteer support, while other groups shows the participation of different sectors in disaster response. The said findings suggest that disaster preparedness at the barangay level is a shared responsibility among various organizations, with each group contributing to community safety and resilience.

Years in Service

Table 1 also shows the distribution of emergency responders based on their years of service. The majority (32 or 55.17%) have more than 6 years of service, followed by 17 (29.31%) with 1–3 years, 5 (8.62%) with 4–6 years, and 4 (6.90%) with less than 1 year out of 58 respondents.

This indicates that most respondents are experienced, suggesting they have gained sufficient knowledge and familiarity with disaster response procedures over time. Meanwhile, those with fewer years of service represent a smaller group who may still be developing their skills through training and experience. The findings imply that longer years of service may contribute to better preparedness, as supported by studies (Dayanghirang, 2025) which

show that individuals with more experience tend to have higher levels of disaster readiness.

Training Attended

Majority (38 or 65.52%) have attended two or fewer DRRM trainings, while 20 (34.48%) have attended three or more, out of 58 respondents. This shows that most respondents have limited training exposure, while only a smaller group has more advanced or frequent training. Even responders have basic knowledge of DRRM, increasing the number and frequency of trainings may further improve their preparedness and response capabilities. According to the study of Liu et al. (2025), showing that individuals who undergo more disaster training tend to have higher levels of preparedness and better performance during emergencies.

Extent of Disaster Preparedness among Emergency Responders in terms of Severity, Vulnerability, Response Efficacy and Self-Efficacy

Table 2 shows the insights of the respondents on the extent of disaster preparedness among emergency responders with a total average weighted mean of 3.41 indicates that the emergency responders perceive their overall disaster preparedness to be at a “high extent”, showing strong awareness, readiness, and confidence in managing disaster situations. The standard deviation value of 0.65 recommends that while most respondents share similar observations of preparedness, there is a moderate variation in responses, indicating slight differences in individual experiences, training, or exposure to disaster management activities.

Table 2

Extent on the Disaster Preparedness among Emergency Responders when Group According to Organizational Affiliation, Number of Years as Responder and Number of Trainings Attended (n = 58)

| Indicator | Mean | SD | Qualitative Description |
|-----------------------------------------------------------|------|------|-------------------------|
| A. Response Efficacy | | | |
| Coordination among responders improves disaster outcomes. | 3.95 | 0.22 | Strongly Agree |
| Early warning systems help save lives. | 3.91 | 0.28 | Strongly Agree |
| Community drills and simulations enhance readiness. | 3.91 | 0.28 | Strongly Agree |
| Following DRRM protocols can reduce disaster impact. | 3.83 | 0.60 | Strongly Agree |
| Our barangay response plan is effective. | 3.76 | 0.47 | Strongly Agree |

| | | | |
|------------------------------------------------------------------------------------------|-------------|------|-----------------------|
| Area Mean | 3.87 | 0.40 | Strongly Agree |
| B. Severity | | | |
| Disasters can cause serious harm to my community. | 3.90 | 0.31 | Strongly Agree |
| Disaster events are life-threatening. | 3.79 | 0.49 | Strongly Agree |
| It is difficult to recover immediately from the effects of a disaster. | 3.48 | 0.60 | Strongly Agree |
| Disasters have long-term impacts on health and livelihood. | 3.38 | 0.62 | Strongly Agree |
| Disasters can disrupt essential services and daily routines. | 3.28 | 0.72 | Strongly Agree |
| Area Mean | 3.57 | 0.61 | Strongly Agree |
| C. Self-Efficacy | | | |
| I am confident in my ability to respond during emergencies. | 3.57 | 0.50 | Strongly Agree |
| I know how to perform my assigned tasks during a disaster. | 3.55 | 0.50 | Strongly Agree |
| I can lead or assist others effectively during emergency situations. | 3.53 | 0.50 | Strongly Agree |
| I feel prepared to make decisions under pressure during disaster response. | 3.48 | 0.60 | Strongly Agree |
| I am capable of adapting to unexpected situations during disaster operations | 3.33 | 0.73 | Strongly Agree |
| Area Mean | 3.49 | 0.58 | Strongly Agree |
| D. Vulnerability | | | |
| My barangay is highly exposed to natural hazards. | 3.03 | 0.92 | Moderate Agree |
| Our location increases our vulnerability to typhoons, floods, storm surge or landslides. | 2.79 | 1.09 | Moderate Agree |
| Many residents in our area are not well-prepared for disasters. | 2.76 | 0.96 | Moderate Agree |
| I am personally at risk during disaster events. | 2.74 | 1.04 | Moderate Agree |
| Our community lacks sufficient protection against disasters. | 2.22 | 0.99 | Less Agree |
| Area Mean | 2.71 | 1.03 | Moderate Agree |
| | | | Strongly Agree |
| Total Average Weighted Mean | 3.41 | | Strongly Agree |
| Standard Deviation | 0.65 | | |

Table 2 shows the overall extent of disaster preparedness has a total average weighted mean of 3.41, interpreted as **Strongly Agree**, indicating that emergency responders are generally well-prepared for disaster situations. This means they possess adequate knowledge, skills, confidence, and awareness, and they consistently follow DRRM protocols and practices.

Among the indicators, **Response Efficacy** has the highest mean (3.87), followed by **Severity** (3.57) and **Self-Efficacy** (3.49), all interpreted as Strongly Agree. This shows that respondents believe in the effectiveness of response measures, understand the seriousness of disasters, and are confident in their abilities. On the other hand, **Vulnerability** has the

lowest mean (2.71), interpreted as Moderate Agree.

Notably, the lowest item (M = 2.22, Disagree) indicates that respondents do not believe their community lacks protection, suggesting that some protective measures are in place. However, this also points to a possible gap between individual preparedness and community-level resilience, highlighting the need to further strengthen infrastructure and disaster mitigation systems.

Response Efficacy

Emergency responders strongly believe in the effectiveness of disaster response measures, with an area mean of 3.87 (Strongly Agree). They highly agree that coordination

improves disaster outcomes, early warning systems save lives, and drills enhance preparedness. They also trust DRRM protocols and believe their barangay response plans are effective. This shows strong confidence in organized and coordinated disaster response efforts. Regular IEC campaigns and drills conducted by the MDRRMO further strengthen their preparedness and awareness. According to the study of Chen et al. (2021), supports that the strong response efficacy leads to better preparedness and proactive actions.

Severity

Respondents have a high awareness of the seriousness of disasters (area mean = 3.57, Strongly Agree). They recognize that impacts of disasters can cause serious harm, threaten lives, and have long-term impacts on health and livelihood. They also understand that recovery is difficult and that the effect of disasters disrupt daily life and essential services. This strong awareness is likely influenced by their actual experiences with typhoons, storm surge and flooding in the municipality of Sagay. As Ng (2025) stated that higher perception of severity encourages better disaster preparedness.

Self-Efficacy

The results show that the respondents are confident in their abilities (area mean = 3.49, Strongly Agree). They also believe they can respond effectively, perform their tasks, assist

others, and make decisions under pressure. Even though adaptability scored slightly lower, it is still strongly agreed upon. This indicates that respondents feel capable and ready during emergencies, mainly due to their personal experiences, trainings, and participation in drills. According to Al Thobaity et al. (2021) that high self-efficacy improves disaster response performance.

Vulnerability

Respondents moderately agree on the vulnerability of their barangay (area mean = 2.71). They recognize exposure to hazards and some level of personal and community risk. Respondents also disagree that their community lacks protection (M = 2.22), suggesting that they believe there are existing safety measures in place. This indicates a balance between awareness of risks and confidence in current preparedness efforts. Still, gaps in infrastructure, equipment, and funding remain, especially in hazard-prone areas. Study of Kumar et al. (2023) cited that stronger infrastructure, early warning systems, and community-based programs are essential in reducing vulnerability and enhancing community resilience to disasters.

Significant difference in the extent of disaster preparedness among emergency responders when grouped according to organizational affiliation, number of years as responders and number of trainings attended.

Table 3.

Summary of the Analysis of Variance on the extent of disaster preparedness among emergency responders when grouped according to organizational affiliation and number of years as responder.

| <i>Variable</i> | <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>Decision</i> |
|-------------------------------------|----------------------------|-----------|-----------|-----------|----------|----------------|-------------------|
| Organizational affiliation | | | | | | | |
| | Between Groups | 0.63 9 | 2 | 0.31 9 | 4.28 | 0.019 | Reject Ho |
| | Within Groups | 4.10 5 | 55 | 0.07 5 | | | |
| Number of years as responder | | | | | | | |
| | Between Groups | 0.10 5 | 3 | 0.03 5 | 0.41 | 0.748 | Fail to Reject Ho |
| | Within Groups | 4.63 9 | 54 | 0.08 6 | | | |

The P-value of 0.019 for organizational affiliation is lower than the 0.05 level of significance. Thus, the null hypothesis is rejected. This means that there is a significant difference in the extent of disaster preparedness among emergency responders when grouped according to organizational affiliation. In simple terms, responders from different groups (such as CVOs, BHWs, and others) have varying levels of preparedness. This suggests that differences in roles, training, and responsibilities across organizations influence their level of readiness. According to Lin et al. (2024) that responders from structured organizations with clear roles and training tend to have higher preparedness, as structured disaster management programs significantly improve response readiness and competencies.

On the other hand, the P-value of 0.748 for years of service is higher than 0.05; thus, the null hypothesis is not rejected. This indicates that there is no significant difference in disaster preparedness when responders are grouped according to their years of service. This means that both new and experienced responders have similar levels of preparedness. The result implies that preparedness is not based on length of service alone but is more influenced by training, standardized procedures, and organizational support. Permana et al. (2022) cited that training and education are stronger factors in disaster preparedness than years of experience, as education can equip individuals to anticipate risks and take preventive action even without direct exposure.

Post Hoc Analysis Using Tukey’s Honestly Significant Difference (HSD)

| | Comparison | Mean Difference | T-value | P-value |
|-----|-----------------------|------------------------|----------------|----------------|
| CVO | Others (SK, BNS, CDW) | 0.28 | 2.87 | 0.016 |

Table 4

T-test on the Significant Difference in the Extent of Disaster Preparedness among Emergency Responders When Grouped according to the Number of Trainings Attended.

| t-value | d.f. | P-value | Decision |
|----------------|-------------|----------------|-------------------|
| 0.101 | 56 | 0.92 | Fail to reject Ho |

The P-value of 0.92 is higher than the 0.05 level of significance. Thus, the null hypothesis is not rejected. This means that there is no significant difference in disaster preparedness among emergency responders based on the number of DRR trainings attended. Responders who attended fewer trainings and those who attended more trainings have similar levels of preparedness.

This suggests that the number of trainings alone does not determine disaster preparedness. Other factors such as the quality of training, hands-on experience, regular drills, personal motivation, and actual exposure to disasters may have a greater impact. Studies also show that the effectiveness of training depends more on its quality and practical application rather than the number of sessions attended (Toto et al., 2023).

Group Means for organizational affiliation

| Organizational Affiliation | N | Average |
|-----------------------------------|-----------|----------------|
| CVO | 20 | 3.54 |
| BHW | 25 | 3.39 |
| Others (SK, BNS, CDW) | 13 | 3.26 |
| TAWM | 58 | 3.41 |

Organizational Affiliation

The ANOVA result shows that a P-value of 0.016, which is less than 0.05. Therefore, the null hypothesis is rejected. This means there is a significant difference in disaster preparedness among emergency responders based on organizational affiliation. To break it down, different groups such as CVO, BHW, and others have different levels of preparedness. CVOs have the highest preparedness, followed by BHWs and other groups. This suggests that organizational roles, training, and exposure to actual disaster response influence preparedness. Studies support that members of structured organizations tend to have higher preparedness due to regular training and clear roles (Rodriguez et al., 2023; Delos Reyes et al., 2022).

Organizational Affiliation

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organizational roles, training, and exposure to actual disaster response influence preparedness. Studies support that members of structured organizations tend to have higher preparedness due to regular training and clear roles (Rodriguez et al., 2023; Delos Reyes et al., 2022).

Number of Years as Responder

The ANOVA result shows a P-value of 0.748, which is higher than 0.05; thus, the null hypothesis is not rejected. This means there is no significant difference in disaster preparedness based on years of service. Whether responders are new or experienced, their preparedness levels are similar. This suggests that length of service alone does not determine preparedness. Instead, factors like training, drills, experience, and organizational support are more important. As cited by Nguyen et al (2023) and Singh et al. (2022) that continuous training and practical experience are stronger factors than years of service in improving disaster.

Challenges encountered among Emergency Responders in the Performance of their Duties

Table 5.

Challenges encountered among emergency responders

| Indicator | Total Score | Rank |
|-------------------------------------------------|-------------|------|
| Lack of equipment and supplies. | 221 | 1 |
| Community non-compliance during evacuation. | 243 | 2 |
| Limited access to training. | 247 | 3 |
| Inadequate budget support. | 263 | 4 |
| Communication barriers during response. | 305 | 5 |
| Physical risks during response operations. | 333 | 6 |
| Poor coordination among agencies. | 338 | 7 |
| Emotional stress and fatigue. | 367 | 8 |
| Delayed early warning dissemination. | 407 | 9 |
| Lack of recognition or support from leadership. | 469 | 10 |

Table 5 identified several key challenges encountered by emergency responders. The top and major challenge is the **lack of equipment and supplies**, which limits their ability to respond effectively during disasters. Respondents also reported shortages of tools like chainsaws and incomplete first aid kits, showing the need for better resource and equipment allocation. The second challenge is **community non-compliance during evacuation**

which means that many residents refuse to evacuate due to fear, distrust, or concern for their property, making disaster response more difficult and increasing risks.

Another challenge is **limited access to trainings**, where respondents reported insufficient and irregular training opportunities. This affects their confidence and skills, especially when practical, hands-on training is lacking. **Inadequate budget support** is also a

major concern, as limited funds restrict the purchase of equipment, training, and other preparedness needs. Respondents noted that the current budget is not enough to fully support disaster operations.

Responders also experience **communication barriers**, such as poor signal and limited communication devices, which delay coordination and information sharing during emergencies. Other challenges include **physical risks during operations, poor coordination among agencies, emotional stress and fatigue, delayed early warning dissemination, and lack of recognition from leadership**. These factors affect both the effectiveness and well-being of responders.

These findings show that disaster preparedness is affected by limited resources, communication issues, organizational support, and community behavior. According to the Protection Motivation Theory, responders' actions are influenced by their perception of risk, confidence, and ability to respond, which aligns with the challenges identified in the study.

Conclusion

The study concludes that most respondents are Barangay Health Workers with more than six years of service but have attended limited DRRM trainings. Despite this, emergency responders demonstrated a high level of disaster preparedness, with strong response efficacy, awareness of disaster severity, and self-efficacy, while vulnerability was the lowest. The results also revealed a significant difference in preparedness based on organizational affiliation, particularly among Civil Volunteer Organizations, while no significant differences were found in terms of years of service and number of trainings attended. This indicates that preparedness is more influenced by organizational roles rather than experience or training alone.

From a governance perspective, these findings highlight the importance of institutional design within local disaster risk governance systems. The variation in preparedness across organizations suggests uneven integration within the Local Disaster Risk Reduction and Management Council (LDRRMC). While responders are generally engaged, the current structure does not fully maximize inclusive participation. In line with existing legal frameworks, including the Philippine DRRM Act (RA 10121), there is room to strengthen the formal

integration of marginalized or frontline groups, including Civil Volunteer Organizations and potentially persons with disabilities (PWDs), into decision-making and planning processes. The actual implementation appears constrained by limited representation mechanisms, unclear role delineation, and resource dependency at the barangay level.

The most pressing challenge identified was the lack of equipment and supplies, followed by community non-compliance during evacuation and limited access to training. Other concerns include communication issues, insufficient budget allocation, emotional stress, and lack of support from leadership.

The study defines that while responders are generally prepared, improvements are still needed in resources, training, communication, and community cooperation to further strengthen disaster preparedness and response.

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