

Fire Preparedness and Incident Challenges: A Qualitative Study of Barangay Responses in Plaridel and Guiguinto, Bulacan

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ABSTRACT

This study assessed the gap between barangay fire preparedness measures and the actual response encountered during fire incidents in Bulacan. It aimed to determine how barangays organize and implement fire safety measures, identify the main causes of fire, examine the effects experienced when fire safety protocols are tested, and evaluate how preparedness helps address operational difficulties. The study employed a qualitative research design using semi structured interviews with barangay personnel from Barangay Sto. Niño in the Municipality of Plaridel and Barangay Sta. Cruz in the Municipality of Guiguinto, Bulacan. The study was anchored on Fire Dynamics by the National Institute of Standards and Technology, McClelland's Theory of Competencies at Work by Esen Şen, and the Climate Change Vulnerability Risk Model by Sining C. Cuevas.

Findings revealed that barangays establish their fire preparedness programs through scheduled activities, which they coordinate with the Bureau of Fire Protection together with ongoing training activities including regular trainings, drills, and seminars. The implementation of these measures resulted in improved staff skills and better operational coordination which enabled improved emergency response to incidents. Recurring fire causes were primarily electrical wiring issues and grassfires, indicating persistent household and environmental vulnerabilities. When protocols were tested during actual fire incidents, barangays experienced coordination challenges, limited communication systems, and insufficient equipment. Despite these constraints, trained personnel demonstrated improved response behavior and clearer role execution. The study concludes that while basic preparedness systems exist in the barangays, operational challenges remain due to limited resources and communication systems. Improvements in equipment distribution and communication systems are needed to strengthen barangay fire resilience.

Keywords: Fire safety measures, Bureau of Fire Protection, Grassfires, Bulacan, Barangay

INTRODUCTION

Fire is a persistent hazard in the communities. The Philippines is a third world country, having dense residential settlements, clumps of unorganized electrical wirings, and tropical climate that increase the probability of fire related incidents. Despite the presence of the Bureau of Fire Protection and the training they conduct annually for barangays, fire incidents are still present disrupting the livelihood of residents.

In Bulacan, the occurrence of fire is commonly linked to unsupervised cooking, dry grassy surroundings and unprofessionally installed or illegal wirings. While there are guidelines and policies for fire safety, conflicts arise on the planned safety preparedness and the actual implementation of response during real fire emergencies. This poses serious questions about the capability, leadership, coordination and resource sufficiency.

Preparedness requires planning, proper training, as well as having the right equipment, awareness and engagement from the community. Response is specified as the action before, during, and after a fire is aided and restored to safety. A weak preparedness system may result in ineffective response. However, being well prepared results in a timely and coordinated response.

REVIEW OF RELATED LITERATURE

Previous research has looked into patterns of fire occurrences using quantitative models. A study from Pampanga about fire incidents found patterns that may help guide prevention strategies. Findings show that during specific months, fire disasters peak in densely populated areas, recommending preparedness must be data driven and localized (Balahadia & Trillanes, 2020). A similar analysis in Manila revealed that fire protocols are often tested during real emergencies, exposing weaknesses in operations (Disaster Prevention and Management, 2018).

Forecasting studies using multiple linear regression have predicted ongoing fire occurrences in the Philippines, stressing the need for strategic preparedness at the community level (Tuengr, 2020). However, using a quantitative approach, numbers cannot answer the experiences, the process of decision making, and the operational limits within the barangay.

Qualitative research provides a better understanding on how preparedness systems work. According to Kvale and Brinkmann (2015), interviews allow the participants to freely express their answer with their own words, providing a response that cannot be explained by numbers alone. A qualitative approach is implemented when dealing with competencies of the leaders, barangay coordination, and the capacity of an organization.

Administrative capacity is one of a factor that is highlighted for institutional studies as it is considered a causal factor for response effectiveness. A research done in Ibadan Nigeria found that lack of training, insufficient equipment, and inadequate coordination diminish the response effectiveness (Institutional Capacity Study, 2022). Struggles in the Philippines are similar to these elements.

Establishing a solid foundation based on theories strengthens the analysis of response and preparedness. Fire dynamics theory helps with the operational decisions since it explains how the fire starts, spreads, and evolves overtime. Understanding the behavior of fire helps with preventive measures and response efficiency (National Institute of Standards and Technology, 2025). According to McClelland's Theory of Competencies, the ability to lead, proficiency in technicalities, and behaviors are all necessary in an organization to function effectively. In barangays, having a competent leader makes all the difference when it comes to decision making in times of crisis. Climate Change Vulnerability Risk model provides a theoretical grasp on the relationship of hazards, vulnerability, and exposure. Temperature variation due to climate change impacts the likelihood of fire to occur, especially in dry areas (Cuevas, 2011).

With these frameworks in hand, this research examines how barangays in Bulacan implement fire safety measures and how effective those measures are in actual situations.

Research Objectives

This study offers empirical information on fire safety at the local level. Planners, firefighters, and barangay authorities are informed. It adds to the body of qualitative research on local government preparedness for disasters. Additionally, it encourages the creation of evidence-based policies and the possible use of automated fire detection technology. This research aims to:

1. Describe the barangay-level preparedness measures that are currently in place.
2. Determine the structural and operational difficulties that arise during a fire.
 - 2.1. Examine the connection between response efficacy and preparatory measures.
3. Make recommendations based on evidence to increase local fire resistance.

METHODS

Research Design

Qualitative methods is used to conduct the study. The researchers selected qualitative design because the research aims to explore experience, perception, and understand fire preparedness and incident response procedures. The

study investigated how actual preparedness systems operate in real-world situations instead of assessing specific numerical data points.

The research method of qualitative study investigates and analyzes non-numerical data to understand social processes and how people perceive things (Bhandari, 2025). The research employed a descriptive qualitative method that included elements from case study research design. Selected barangays in Bulacan served as bounded cases.

The design allowed in depth exploration of:

1. Organizational structure and planning mechanisms.
2. Resource allocation and equipment availability.
3. Training practices and drills.
4. External agencies should be coordinated.
5. The experience and response during the actual fire incidents

Participants and Sampling

The population included barangays in Bulacan which experienced fire risk because of their high residential density and their existing electrical dangers and their past fire incidents.

To determine the study participants, researchers used a non-probability purposive sampling method. These criteria were used by the researchers in selecting barangays for their study:

- Documented fire incidents within the past five years.
- Organized disaster risk reduction and management committees of barangays exist.
- Readiness and willingness of officials to participate.

Within each selected barangay, participants included:

1. Barangay captain.
2. Members who are responsible for safety in the Barangay Council.
3. Community of Respondents and Barangay tanods.
4. Members of the committee on Disaster Risk Reduction.

The researchers has a total of 2 participants because their participation would create enough data for researchers to analyze while maintaining control of their research work. The researchers kept conducting interviews until they reached the stage where all data had been collected, and reached saturation point because interviews stopped producing fresh themes for identification. The inclusion criteria needed participants to show direct participation in both fire preparedness planning and fire response operations. The study considered only people who had relevant positions to participate in the research.

Instruments and Procedures

The researchers used a semi structured interview guide as the main research tool. Researchers in qualitative studies commonly use semi structured interviews because this method maintains consistent results while allowing for flexible interview procedures according to Adeoye Olatunde and Olenik 2021. The research guide contained open ended questions that matched the study's research goals.

The interview process focused on main areas of research which included:

1. The evaluation of fire readiness through assessment of organizational fire preparedness systems.
2. The examination of budget distribution for fire safety measures.
3. Training and drills conducted.
4. Equipment and resource availability.
5. Common fire causes observed.
6. Experience during recent fire incidents.
7. Coordination with the Bureau of Fire Protection.
8. Challenges encountered.
9. Lessons learned and recommended improvements.

The researchers used open-ended questions, which allow participants to describe their actual experiences. The researchers used follow-up probing questions to obtain specific information which led the participants to think about their answers.

The research team collected data through multiple steps.

Phase 1: Coordination and Approval

The researchers coordinated to obtain permission from barangay officials to conduct their research work.

The researchers held meetings to present their study purposes and to determine the times for their research interviews.

Phase 2: Conduct of Interviews

The researchers conducted their interviews at barangay offices through direct face-to-face contact with participants. The duration of interview sessions lasted between 4 minutes and 15 minutes.

Phase 3: Review of Document

The researchers reviewed barangay records about fire incidents and preparedness plans and committee reports to support their interview data.

Phase 4: Transcription

The researchers used audio recordings to create written transcripts which they verified for accuracy by checking the transcripts against the original audio recordings.

Data Analysis

The researchers applied thematic analysis to conduct their data assessment. Thematic analysis provides researchers with a structured approach to identify patterns in their qualitative data and report their findings.

These steps are used for the analysis:

1. Researchers read transcripts multiple times to gain overall understanding which they used as their foundation for research work.
2. The researchers applied initial coding to their text by using descriptive codes which showed the essential concepts of their text.
3. The process of searching for themes involved creating broader categories through the combination of related codes.
4. The researchers checked themes against transcripts to verify their coherence and consistency.
5. The researchers established theme definitions which included participant quotes as evidence for their theme descriptions.

The researchers applied manual coding to their data analysis. Applied employed tabular code organization to the study which is used to monitor code occurrences together with code connections, established their themes according to the research questions and theoretical frameworks, and gained credibility through three different methods which included both interview assessments and document examination. The researchers conducted member checking by presenting their findings to specific participants who confirmed their understanding. Achieved transferability through its comprehensive description of all contextual elements. Maintained an audit trail that documented their coding choices to establish dependability. Confirmability was enhanced by reflexive journaling to reduce researcher bias.

Ethical Considerations

Participants received informed consent forms which explained the study purpose and study procedures and study risks and study benefits. The study allowed indicates that participation is voluntary. The researchers maintained participant confidentiality by keeping their anonymity. The audio recordings were kept in a secure storage location. The data collected from the study were used only for research purposes. The participants did not report any conflicts of interest.

RESULTS AND DISCUSSION

Topic analysis produced five major themes:

1. systems for preparedness which have been organized but have limited resources.
2. common fire causes who are related to electrical and humanity.
3. Lacks of Operations Throughout Serious Fire Events.
4. Skill and Management as Aspects Influencing Response Effectiveness.
5. Environmental and climate conditions raise the probability of fire.

Theme 1: Preparedness Systems without Structure but Low Assets

A majority of barangays stated that they had established committees for disaster risk reduction. There was preparation of materials. There were also annual events and occasional fire drills.

Participants have mentioned they were facing limited funds for equipment. In some instances, fire extinguishers are expired. Also in barangay levels, fire engines were limited. It was typical to rely on the Bureau of Fire Protection. This reflects institutional capacity issues identified in international research, where limited resources weaken response effectiveness (Institutional Capacity Study, 2022). fortunately, there is a structure assembled on paper, its ability to operate is still limited.

Theme 2: Recurrent Physical and Electrical Fire Causes

The primary causes cited by participants were improper usage of explosives, octopus wirings, unattended cooking, and illegal electrical connections. These results conform with documented incidents in fires caused that have been highlighted by the data. The rate of these causes indicates that prevention strategies and training were weak. Despite training programs, there are still differences in compliance.

Theme 3: Gaps in Operations During Active Fire Accidents

During actual incidents, challenges came up:

1. Delayed recognition.
2. Congestion in the roadways affects the response time.

3. Lack of water supply.

4. Panic residents.

These protocols for preparation are tested under pressure. When barangay officials created an active part in evacuation preparation and cooperation improved. Confusion ignited where leaders were unsure. These findings correspond with spatial research demonstrating that actual incidents show planned problems. (Disaster Prevention and Management, 2018).

Theme 4: Organization and Expertise Influence Quality Response

In barangays having proactive and experienced officials, coordination is better. There were also fewer questions because roles were allocated appropriately. Communication and rapid decision-making were affected by competency. McClelland's Theory of skills, which emphasizes specific roles. This validates capacities as factors affecting efficiency in organizations.

Theme 5: Environmental and Climate Factors Raising the Risk of Fire

Participants noticed that there were additional fires during the summer months. Grass fires close to houses presented additional hazards. The Climate Change Exposure Risk calculation, which links environmental variables and hazard level, appears in the findings (Cuevas, 2011).

DISCUSSION

Despite the barangay's impact, preparedness is demonstrated. Their effectiveness has been limited by technological limitations and tools. Fire dynamics are still not fully comprehended by responders. Training usually concentrates more on operational practice than firing behavior.

Three variables that serves to the distance between preparedness and response:

1. Lacks of funding.
2. Inconsistent training.
3. Environmental stressors.

Enhancing readiness seeking for improving competencies, increasing equipment, improving community awareness, and bringing localized risk assessment into reality.

CONCLUSION AND RECOMMENDATIONS

This qualitative research showed how the different barangays in Bulacan demonstrated an organized but resource limited fire preparedness system. The common causes of fire remains electrical, climate, and human related. Gaps in operations are experienced during active incidents due to shortages in equipment, issued with coordination, and climate factors. Competency in leadership greatly influences the effectiveness of barangay response. Climate conditions contribute to barangay environmental vulnerability. The study utilized qualitative experience and evidence further supporting the need to align the operational preparedness and planning to real-life local fire encounters.

Recommendations

1. Increase the current budget allocation for barangay fire fighting and safety equipment.
2. Conduct regular competency based training that is aligned with the fire dynamics principles.

3. Strengthen the existing barangay coordination and protocols with the Bureau of Fire Protection.
4. Implement community based electrical safety seminars.
5. Explore the feasibility of utilizing an automated fire detection and response system in high risk zones.
6. Develop localized risk maps using incident history.

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