

# INTEGRATING FLOOD CONTROL AWARENESS, SUSTAINABLE CONSTRUCTION, AND DISASTER PREPAREDNESS FOR COMMUNITY CLIMATE RESILIENCE

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Received 29 March 2026 Received in revised form 14 April 2026 Accepted 17 April 2026  
 Available Online 20 April 2026

## ABSTRACT

Climate change has increased the frequency and intensity of flooding and other extreme weather events, particularly affecting vulnerable and low-lying communities. Despite the presence of the flood control infrastructures and disaster risk reduction programs, many communities still lack adequate awareness, understanding, and preparedness regarding flood control, sustainable construction, and disaster preparedness among residents of Sitio Sampalukan. The research also seeks to understand how community-based educational initiatives can improve residents' participation in climate resilience efforts. This study employs a qualitative research design using Focus Group Discussion (FGD) as the primary method of data collection. The respondents consist of ten (10) community members from Sitio Sampalukan who are involved in or targeted by the climate resilience seminar and community action program. Through guided discussions using open-ended questions, participants shared their knowledge, perceptions, and experiences related to climate change, flood control systems, and disaster preparedness practices. The data gathered from the discussions were analyzed using thematic analysis, where responses were grouped into common themes to identify patterns in community awareness, concerns, and suggested actions related to climate resilience. The findings of this study aim to provide insights into the community's current level of awareness and preparedness and identify areas where further education and engagement are needed. The results also supported the development of community-based strategies such as educational materials, flood preparedness plans, and future climate resilience initiatives. Ultimately, this research contributes to strengthening community resilience and encouraging proactive participation in disaster risk reduction and climate action within Sitio Sampalukan.

**Keywords:** Climate Change, Community Climate Resilience, Disaster Preparedness, Community Awareness

## 1. INTRODUCTION

Climate change has intensified the occurrence of flooding, extreme weather events, and other climate-related disasters that significantly affect vulnerable communities. Many local communities, particularly those located in low-lying and flood-prone areas, continue to experience increased risks to their safety, property, and livelihoods due to these environmental challenges. Studies on flood hazard mapping in the Philippines further confirm that geographical and environmental conditions significantly influence the level of flood risk among municipalities [1]. Despite the presence of flood control infrastructures and disaster risk reduction initiatives, there remains a lack of sufficient awareness, understanding, and preparedness among residents on how to effectively respond to these hazards. This gap between existing disaster management efforts and community knowledge highlights the need for programs that focus on increasing public awareness and participation in climate resilience initiatives. Adaptation and adaptive capacity within communities are essential

components in addressing climate-related risks and vulnerabilities, particularly in local contexts where social and environmental factors intersect [2].

Several studies highlight the importance of integrating climate adaptation, disaster preparedness, and sustainable construction to strengthen community resilience against climate-related disasters. According to Adger, Arnell, and Tompkins, the increasing frequency of disasters such as floods, droughts, and heatwaves threatens sustainable development worldwide [3]. This emphasizes the need to combine climate change adaptation and disaster risk reduction to improve resilience. Global initiatives such as the Sendai Framework for Disaster Risk Reduction and the Paris Agreement encourage organized, coordinated planning, and community involvement to reduce disaster risks while supporting sustainable development.

Flood control is an important strategy in improving climate resilience, especially in urban areas where there are fewer green areas like trees.

Ward et al. explain that integrating floor mitigation systems into urban planning can help protect infrastructure and reduce economic losses caused by flooding [4]. Structural solutions such as levees and retention basins, together with non-structural approaches like zoning policies, sustainable land use, and early warning help planners assess flood risks and develop better strategies. Effective flood risk management also requires coordinated governance mechanisms and the integration of risk assessment tools to support long-term mitigation planning [5].

Community education and awareness also play a key role in disaster resilience. Based on Krishnan et al., it shows that many communities still have limited knowledge about resilient building practices [6]. Their study found that barriers such as high construction costs, lack of technical knowledge, and limited government support often prevent the adoption of safer building methods. However, the research also shows that communities are willing to learn; they are exposed to practical examples and training programs. Integrating resilient construction education into community programs, school curricula, and builder training can increase public awareness and encourage safer construction routines and practices.

In correlation to another study on flood-resilient housing design emphasizes the importance of improving building strategies to respond and mitigate climate change. As per Harrington, Athavankar and Hsu, housing in flood-prone areas often has structural weaknesses that increase vulnerability during disasters [7]. The study recommends combining traditional knowledge with modern design approaches and promoting community participation and supportive policies. Overall, these studies show that flood control awareness, sustainable construction, and disaster preparedness must work together to strengthen community climate resilience and reduce the impacts of climate-related disasters.

### Significance of the Study

**To the residents of Brgy. Sitio Sampalukan.** This study will help residents understand climate change, flood control, and disaster preparedness. It may also encourage them to participate in community programs that aim to improve safety and resilience during floods and other climate-related disasters.

**To local government units.** The findings of this study can provide information about the community's level of awareness and preparedness. This may help them design better educational programs, disaster preparedness plans, and flood

management strategies, particularly as local government units play a critical role in disaster risk management and community resilience in the Philippines [8].

**To planners and architects.** This study can provide insights on the importance of sustainable construction and flood-resilient design in vulnerable communities, which may guide future planning and building practices.

**To community leaders and organizations.** The study may serve as a basis for creating community-based initiatives, seminars, and educational materials that promote climate resilience and disaster risk reduction.

**To researchers.** This study may serve as a reference for future studies related to climate change awareness, flood control, disaster preparedness, and community resilience.

## 2. METHODS

### Research Design

This study utilized a mixed-method research design, specifically combining both quantitative and qualitative approaches to comprehensively evaluate the effectiveness of the AGAP-BUHAY Climate Resilience Seminar and Community Action Program in Sitio Sampalukan, Molino 3, Bacoor City, Cavite.

The quantitative component employed a descriptive-comparative design, using pre-seminar and post-seminar survey questionnaires to measure changes in the participants' knowledge and awareness regarding flood control, sustainable construction, and disaster preparedness. The collected data were analyzed using descriptive statistical tools such as frequency counts, percentages, and mean scores, along with comparative analysis to determine any improvement in understanding after the seminar.

On the other hand, the qualitative component used a Focus Group Discussion (FGD) and participant observations to gather in-depth insights into the participants' experiences, perceptions, and level of engagement throughout the program. Responses from open-ended questions and discussions were analyzed through thematic analysis, where recurring ideas and patterns were identified, coded, and grouped into relevant themes. The combination of these methods was appropriate as it allowed the researchers to measure both the extent of knowledge improvement (quantitative) and the quality of participant experiences and perceptions (qualitative), providing a holistic evaluation of the program's effectiveness in promoting climate resilience and disaster preparedness.

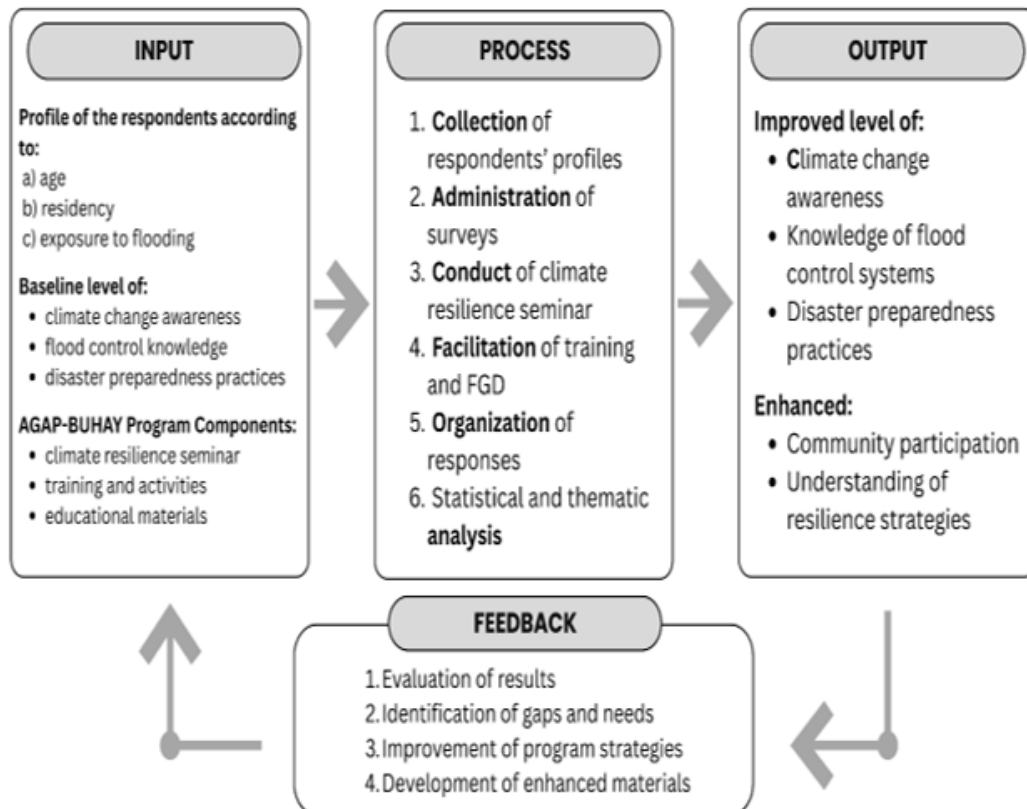
### Conceptual Framework

The conceptual framework of this study is grounded in the systems theory approach, specifically employing the Input-Process-Output (IPO) model. This model serves as a functional blueprint, detailing how raw data and program interventions are transformed into meaningful social

outcomes through a structured series of actions and continuous refinement.

### The Components of the Framework

As illustrated in Figure 1, the framework is divided into four distinct yet interconnected phases:



**Figure 1. Cyclical Input-Process-Output (IPO) Model of the AGAP-BUHAY Climate Resilience Program**

**Input:** This stage identifies the foundational variables of the study. It encompasses the demographic profile of the respondents (age, residency, and flood exposure) and their baseline levels of climate awareness and disaster preparedness. Furthermore, it incorporates the core components of the AGAP-BUHAY Program, such as seminars and educational materials, which act as the primary catalysts for change.

**Process:** This phase describes the methodological workflow. It begins with the collection of data and the administration of surveys, followed by the active implementation of the program through training and Focus Group Discussions (FGD). The process concludes with a

rigorous statistical and thematic analysis to interpret the effectiveness of the interventions.

**Output:** The output represents the intended results of the program. The goal is a measurable improvement in the community's knowledge of flood control and disaster practices, alongside enhanced participation and a deeper understanding of long-term resilience strategies.

**Feedback:** Unique to the cyclical model, the feedback loop ensures sustainability. By evaluating results and identifying gaps, the program can undergo continuous improvement, allowing for the development of enhanced materials that flow back into the input phase for future iterations.

## Participants and Sampling Technique

The participants of this study consisted of two groups:

### 1. Community Members

The primary respondents were 10 community members of Sitio Sampalukan who were involved in or targeted by the AGAP-BUHAY Climate Resilience Seminar and Community Action Program. These participants represented a portion of the local population and provided insights into community awareness, needs, and experiences related to climate action and flood prevention.

### 2. Student Implementers

The study included approximately 10 bona fide BS Architecture students who are conducting the Community Extension Service (CES). These students were responsible for the implementation and evaluation of the program and will provide perspectives on project execution, community engagement, and outcomes.

This study used a purposive sampling technique, as participants are intentionally selected based on specific criteria relevant to the objectives of the research.

The selected community members must meet the following inclusion criteria:

- Residents of Sitio Sampalukan
- Aged 18 years and above
- Willing to participate in the study
- Have been exposed to or engaged in the seminar and program activities

Purposive sampling is appropriate for this study because it ensures that only participants who have direct experience and involvement in the program are included, allowing the researchers to gather relevant and meaningful data regarding the effectiveness of the seminar and community action initiatives.

## Data Analysis

Both quantitative and qualitative techniques were used to evaluate and interpret the collected data. The effectiveness of the community seminar and activities in raising the awareness, understanding, and readiness of the residents of Sitio Sampalukan in Molino 3, Bacoor City, Cavite about climate action and flood prevention may be accurately determined using these methods.

Pre-seminar and post-seminar survey questionnaires measuring residents' knowledge and awareness of flood control infrastructure and climate change before and after the program were used to gather quantitative data. To determine the degree of understanding of the people living in Sitio Sampalukan, these collected data were examined using descriptive statistical techniques including frequency counts, percentages, and mean scores. On the other hand, comparative analysis is used to assess whether participants' knowledge has improved between before and after the seminar. Using Microsoft Excel, the researchers easily organized the data, generated tables, and presented results through charts and graphs.

Thus, quantitative data, through participants feedback forms, open-ended survey responses, and observations during the activities and disaster drill were gathered and analyzed through thematic analysis, where answers were grouped into recurring ideas or themes, such as improved awareness of climate change and understanding of flood control systems. The researchers categorized the gathered responses and assign labels or codes to similar responses. With the small numbers of the participants, the researchers manually coded the gathered responses from the residents of Sitio Sampalukan, to allow the researchers to flexibly group similar ideas, adjust codes, and refine themes as new insights emerge during the analysis process.

Quantitative analysis measures the increase in knowledge and awareness among the residents of Sitio Sampalukan, while qualitative analysis captured the residents' perception, experiences, and level of engagement before, during, and after the program. Combining both these approaches provided a comprehensive understanding of how effective the seminar and activities were in strengthening community resilience, promoting disaster preparedness, and encouraging participation in climate action initiatives aligned with SDG 13: Climate Action.

## Ethical Considerations

Ethical principles were strictly observed throughout the research process. Prior to participation, respondents were informed of the study's purpose, procedures, and expected outcomes. Informed consent was obtained, and participants were assured that their involvement was voluntary and that they could withdraw at any time without consequence.

To ensure confidentiality and anonymity, participants were not required to disclose their names. Any identifying information provided was excluded from the final report. Data were reported in aggregate form, and individual responses were anonymized.

The principle of non-maleficence was upheld by ensuring that survey questions did not intrude into sensitive personal matters or pose any professional risk to participants. All data collected were used solely for academic purposes and stored securely. After the completion of the study, data were scheduled for proper disposal.

By adhering to these ethical standards, the study ensured the protection of participants' rights, dignity, and professional integrity while maintaining the credibility and trustworthiness of the research.

### 3. RESULTS

The evaluation of the AGAP-BUHAY Climate Resilience Program indicates a significant baseline of awareness coupled with a strong positive response to the intervention. According to survey findings, residents of Sitio Sampalukan typically exhibit a high level of awareness and readiness regarding flooding, disaster risk reduction, and climate change [2, 5]. The majority of respondents indicated that they understood the idea of climate change and how it affects flooding, indicating that the community already has a basic understanding of environmental issues [7].

While some respondents indicated a lack of understanding, the majority of locals are aware of the typical causes of floods in their area. This implies that although there is a general understanding, localized knowledge is still evolving, especially regarding particular infrastructure variables that contribute to community flooding [8]. Strengthening community-based flood mitigation techniques requires filling in these gaps, much like how educational readiness relies on structured institutional support [9].

#### I. Thematic Analysis of Participant Feedback

The Focus Group Discussion (FGD) provided qualitative evidence to support the quantitative survey scores. When asked to identify the most impactful parts of the program, participants highlighted a shift from abstract fear to organized action.

#### Theme 1: Prioritization of Tangible Preparedness

The primary takeaway for the majority of residents was the physical organization of survival tools. The "Go Bag" was seen as a vital survival

requirement. Participants expressed this with a focus on immediate readiness, emphasizing that mental peace comes from physical preparation:

“Pag may sakuna, napakaimportante na maihanda ang mga gamit. Ang paghahanda ng Go bag, upang laging handa sa mga sakunang paparating. Paghahanda sa Go Bag, upang laging handa ang aking mga kailangan dalhin kapag may sakuna. Napaka-useful nito dahil hindi na kami magkukumahog sa paghahanap ng gamit kapag tumataas na ang tubig, lalo na ang mga gamot at mahahalagang papel na madalas nababasa o nawawala sa gulo.” (When there is a disaster, it is very important to prepare one's belongings. Preparing the Go Bag so that I am always ready for incoming disasters. Preparing the Go Bag is so that my needs are always ready to be carried during a disaster. This is very useful because we won't be scrambling to find things when the water rises, especially medicines and important papers that often get wet or lost in the chaos.)

#### Theme 2: Environmental Stewardship as Mitigation

Residents also identified the link between community discipline and flood prevention. One resident provided an extensive explanation of this connection ( in the native language Filipino):

“Kalinisan ng kapaligiran at kaayusan ng komunidad. Para sa akin, ito ang pinakamahalaga dahil ang baha naman ay hindi lang dahil sa ulan kundi dahil sa baradong mga kanal at basura. Kung matututo tayong maglinis at maging maayos sa ating basura, malaki ang maitutulong nito para hindi na lumala ang pagbaha rito sa ating lugar sa Sitio Sampalukan. Ang kaayusan ng komunidad ay kaayusan din ng ating buhay.” (Cleanliness of the environment and orderliness of the community. For me, this is the most important because flooding isn't just because of rain but because of clogged canals and trash. If we learn to clean and be orderly with our trash, it will be a big help so the flooding here in Sitio Sampalukan won't worsen. The orderliness of the community is also the orderliness of our lives.)

### 4. DISCUSSION

The residents' readiness to take part in disaster preparedness initiatives is a significant finding, as it shows a favorable outlook on community involvement and teamwork [6]. The survey verifies that the locals' understanding of flood control was successfully enhanced by the seminar, illustrating how community-based educational initiatives may effectively shift social attitudes and preparedness levels [3,4].

### I. Behavioral Intentions and Family Safety

A major point of discussion is the translation of knowledge into household-level behavioral change. The residents' focus on family safety indicates that they view climate resilience not as a government-only responsibility, but as a personal one. This is encapsulated in their plans for daily application (in the native language Filipino):

“Dapat palaging handa sa lahat at mga paghahanda ng mga kagamitan sa paglikas. Para sa pagiging handa o paghahanda ng aking pamilya para sa paparating na mga sakuna. Kapag may sakuna kailanganang maihanda ang mga kailangang damit, gamot, at mga importanteng dokumento. Balak ko ring ituro sa aking mga anak ang kahalagahan ng pagiging handa para kahit wala ako sa bahay, alam nila ang dapat gagawin.” (Should always be ready for everything and prepared with evacuation equipment. For the readiness or preparation of my family for the coming disasters. When there is a disaster, it is necessary to prepare required clothes, medicine, and important documents. I also plan to teach my children the importance of being ready so that even if I am not home, they know what to do.)

This focus on family safety mirrors the internal processes of resilience often seen in individuals undergoing complex personal challenges, where preparation becomes a tool for empowerment [10].

### II. Gaps in Technical Literacy

Despite high practical awareness, a knowledge gap remains regarding long-term structural solutions and flood-resistant architecture [6],[7]. One participant summarized this survival-centric mindset (in the native language Filipino):

“Palaging maging handa sa anumang mga sakunang paparating. Ang mahalaga para sa amin ay ang mabilis na paglikas at ang masiguradong walang maiiwang pamilya. Hindi man namin kontrolado ang laki ng baha o ang paggawa ng mga kalsada at kanal, kontrolado naman namin ang aming sariling paghahanda sa loob ng aming bahay.” (Always be ready for any incoming disasters. What is important for us is the fast evacuation and ensuring no family member is left behind. We may not control the size of the flood or the construction of roads and canals, but we do control our own preparation inside our home.) This highlights a critical area for future growth: moving the community from a state of "survival" (reacting to floods) to "mitigation" (preventing flood impact through systemic

participation). Strengthening urban resilience requires integrating disaster risk reduction with long-term adaptation strategies at both the community and institutional levels [11,12].

### 5. CONCLUSION

The evaluation of the AGAP-BUHAY Climate Resilience Program indicates that the residents of Sitio Sampalukan demonstrate a high level of awareness and preparedness regarding flooding, climate change, and disaster risk reduction. The data suggests that most respondents clearly understand the underlying causes and immediate impacts of flooding, are familiar with essential flood control measures, and possess the presence of mind to take appropriate actions before and during disaster events. This awareness extends to logistical preparedness, including the identification of evacuation areas, knowledge of emergency contacts, and a burgeoning recognition of the importance of sustainable construction. Collectively, these factors reflect a community that is relatively prepared for disaster situations.

The positive outcomes of the seminar are further evidenced by the residents' improved knowledge and an overwhelming willingness to participate in future disaster preparedness initiatives. Insights gathered from the Focus Group Discussion (FGD) support these quantitative findings, highlighting a community that deeply values practical strategies. Residents specifically emphasized the importance of preparing “go bags,” maintaining rigorous cleanliness in their immediate surroundings to prevent drainage blockage, and ensuring holistic family readiness.

However, the study also reveals critical gaps in deeper and more technical knowledge. While the residents are proficient in immediate, practical response measures, there is a lack of understanding regarding specific flood control systems, large-scale infrastructure, and the technicalities of sustainable building practices. Currently, awareness is skewed toward short-term survival rather than long-term, structural solutions. Overall, the study concludes that while Sitio Sampalukan possesses a strong foundation in disaster preparedness, continuous and more comprehensive educational initiatives are necessary to bridge the gap between basic readiness and systemic resilience against climate-related hazards.

## 6. RECOMMENDATIONS

Based on the findings of the study, the following recommendations are proposed to enhance the safety and resilience of Sitio Sampalukan:

1. Conduct Continuous Community-Based Education Programs Regular seminars and workshops should be implemented to sustain and further improve residents' awareness and preparedness. These programs must be inclusive, utilizing local dialects and accessible language to ensure that all community members, including the elderly and the youth, are reached effectively.

2. Enhance Technical Knowledge on Flood Control and Infrastructure Future educational modules should expand beyond basic evacuation. Discussions should be integrated regarding the mechanics of local drainage systems, the function of flood control structures, and the principles of sustainable building design to deepen residents' understanding of how their built environment affects their safety.

3. Promote Hands-On Training and Simulation Drills Theoretical knowledge must be supplemented with practical application. Regular evacuation drills and disaster simulations should be conducted to sharpen residents' response times and ensure that protocols for emergency communication and family reunification are second nature during actual crises.

4. Strengthen Environmental Management Practices The community should be encouraged to formalize waste management efforts. Promoting community-led "clean-and-green" programs will ensure that proper waste disposal and organized surroundings become a collective responsibility, directly reducing the risk of man-made flooding caused by clogged waterways.

5. Encourage Household-Level Preparedness Sustaining the momentum of the "Go Bag" initiative is vital. Residents should be encouraged to perform monthly checks of their emergency kits and to develop specific family disaster plans that include designated meeting points and emergency roles for each family member.

6. Foster Community Participation and Collaboration Local leaders and organizations should move toward a participatory model of governance. Actively involving residents in the actual planning and implementation of disaster risk reduction (DRR) programs fosters a sense of

collective ownership and ensures that strategies are tailored to the unique topography of the Sitio.

7. Integrate Sustainable Construction Practices Specific training on resilient and sustainable building methods should be introduced. By educating those planning to renovate or build new structures on how to minimize flood damage through elevation and water-resistant materials, the community can improve its long-term structural safety.

8. Coordinate with Local Government Units (LGUs) Collaboration with local authorities should be strengthened to ensure the community has direct access to updated municipal disaster plans, resources, and institutional support systems. This ensures that Sitio Sampalukan's local efforts are synchronized with broader city or provincial disaster frameworks.

In summary, building a disaster-ready community in Sitio Sampalukan is not merely about surviving the next flood; it is about fostering a long-term culture of awareness, technical responsibility, and collective action toward a safer and more sustainable environment.

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