

The Barangay Readiness Enhancement and Development Interventions (B-READI) Academy: A Human Ecological Approach to Community-Based Disaster Resilience



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Abstract

Even though *barangays* are on the frontlines of disaster risk management (DRM), many lack the capacity to effectively manage these risks. This study employed a mixed-methods research design to explore the potential of a community-level partnership among academia, government, and industry. A needs assessment revealed an increased vulnerability to disasters in Barangay San Pablo Norte, Sta. Cruz, Laguna, Philippines, due to climate change and rapid social-ecological changes in Laguna de Bay. Moreover, it was demonstrated that utilizing Human Ecology as an integrative body of knowledge was effective in mobilizing multi-stakeholder partnerships to empower local leaders. The results of the pre- and post-tests showed an increase in knowledge about risk communication among participants. Beyond examining the project components and their implementation, the study provided recommendations for future research to strengthen documentation and knowledge production of successful local DRM initiatives. Ultimately, the study's findings are essential in informing mechanisms to strengthen transdisciplinary and cross-sectoral partnerships for community resilience.

Keywords: human ecology, community resilience, disaster risk management, BDRRMC

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1. Introduction

Disasters refer to serious disruptions in the functioning of a community or society at various scales, resulting from hazardous events that exceed its capacity to cope using its own resources (United Nations Office for Disaster Risk Reduction [UNDRR], 2017). The Philippines ranked first among countries vulnerable to disasters (Weltrisikobericht, 2024). Major disasters, including typhoons, floods, droughts, earthquakes, tsunamis, and landslides, affect 60% of the country's land area and 74% of the population. These resulted in 70,000 deaths and USD 23 billion in economic losses in the past few decades (World Bank Group, 2021).

Many *barangays*—the smallest governance units in the country (Porio & Roque-Sarmiento, 2019)—are exposed to different disasters such as flooding (Baguio et al., 2024), drought (Agbay et al., 2023), landslides (Solano et al., 2024), and storm surges (Lagmay et al., 2015). Yet they assume a critical responsibility in ensuring community resilience, as mandated by Republic Act 10121, also known as the Philippine Disaster Risk Reduction and Management Act of 2010. The law mandates the establishment of a Barangay Disaster Risk Reduction and Management Committee (BDRRMC). This committee plays a crucial role in disaster preparedness, response, and recovery efforts at the community level. The BDRRMC is composed of various subcommittees—focused on administration and training, research and planning, operations, and warning systems. However, many *barangays* lack appropriate equipment and facilities. Many are unable to comply with the provisions of the Hyogo and Sendai frameworks due to budget constraints, technical vulnerabilities, and lack of political support (Toledo-Bruno et al., 2017). Hence, there is a need for an integrated approach to building DRM capacity.

The Barangay Readiness Enhancement and Development Interventions (B-READI) Academy was developed to enhance the disaster preparedness and response capabilities of *barangays* through capacity-building programs. B-READI is a partnership between the Department of Social Development Services, College of Human Ecology, University of the Philippines Los Baños, with the Department of the Interior and Local Government–Laguna (DILG-Laguna), the Provincial Disaster Risk Reduction and Management Office of Laguna (PDRRMO), the Office of Civil Defense (OCD) Region IV-A, Laguna University (LU), and Rappler. The project assessed the needs, capacities, plans, and programs of the BDRRMC. Second, it has co-developed interventions based on identified needs and capacities. Third, the intermediate outcomes of the intervention were assessed.

In this study, we examined B-READI as a collaborative approach undertaken to strengthen the BDRRMC of Barangay San Pablo Norte, Santa Cruz, Laguna. Specifically, this paper discussed the B-READI process as a collaborative initiative to provide capacity building for a BDRRMC. It also explained the results of the Participatory Capacity and Vulnerability Assessment (PCVA). Finally, the study examined the project's outputs and intermediate outcomes.

B-READI is anchored on Human Ecology as a discipline, field, and an approach in the study of human-environment interaction (Dangcalan et al., 2025; Eusebio, 1984; Fellizar, 1990). At UPLB, it was presented as a synthesizing science that integrates different disciplines and sectors (Saguiguit et al., 1974) to address complex problems (Dangcalan et al., 2020; Dangcalan et al., 2025). In this study, Human Ecology is premised as an integrative body of knowledge that encompasses the social, physical, and natural dimensions of human-environment interactions.

This was applied in the co-development of a capacity-building intervention to address the complexities of disasters. True to Human Ecology's eclectic and synthesizing nature, the B-READI Framework brought together diverse concepts and perspectives. It was developed by adopting, modifying, and combining the

global framework on capacity building of Harle et al. (2022) and design thinking. The resulting amalgamation is called *paghahabi* or weaving in Filipino, as it involves the reconciliation and synergy of different interests and resources of various organizations toward a common goal of designing a disaster-resilient *barangay*. The fundamental levels of capacity development are (1) individual, (2) organizational, and (3) ecosystem.

At the individual level, the framework emphasizes the enhancement of risk communication skills, improvement of knowledge in Disaster Risk Reduction and Management (DRRM), and the strengthening of interpersonal relationships among the members of the BDRRMC. These factors are critical to the skills development of the organization's members, enabling them to effectively respond to and reduce disaster-related risks.

At the organizational level, the internal structures and processes of the BDRRMC matter. Existing capacities in the BDRRMC must be collectively reviewed. The reconfiguration of BDRRMC's organizational structure may be done to ensure the development of coordinated and effective DRM programs. Finally, at the ecosystem level, the framework facilitates collaborations between the *barangay*, government agencies, academic institutions, and the media. Learning processes are co-defined and customized. Thus, building learning networks among different sectors and providing opportunities for resource sharing among organizations.

Regarding the nucleus of the framework, two guiding principles govern the entry points for change. The left side of the framework is informed by four principles: transcending technical capabilities, engaging all levels of change, mutual learning, and learner-centricity. These principles shape the framework's methodology for capacity development by ensuring that interventions transcend skill-based training. The right side of the framework, however, is concerned with creating sustainable and long-term change in DRM activities. It prioritizes three important components: effective capacity development, sustainability of interventions, and partnerships. These highlight the need to establish structured and effective capacity-building programs.

Additionally, design thinking (DT) was adopted and adapted. There are five main phases of DT: (1) empathize, (2) define, (3) ideate, (4) prototype, and (5) test (Voltage Control, 2023). DT helps in developing feasible solutions to community problems (Interaction Design Foundation, 2016). To empathize means setting aside personal biases and actively engaging with community stakeholders. Particular attention should be given to their lived experiences and needs. Once community perspectives are surfaced, co-definition of the problem and capacity-building interventions ensued. The collaborative process now enters a period of ideation, where the range of possible solutions is brainstormed and explored. Prototyping follows as ideas are now translated into tangible outputs.

The final stage is testing, which involves the prototyping of interventions to address identified concerns. This collaborative approach enables the community to co-own the development process, making it more effective, relevant, and sustainable.



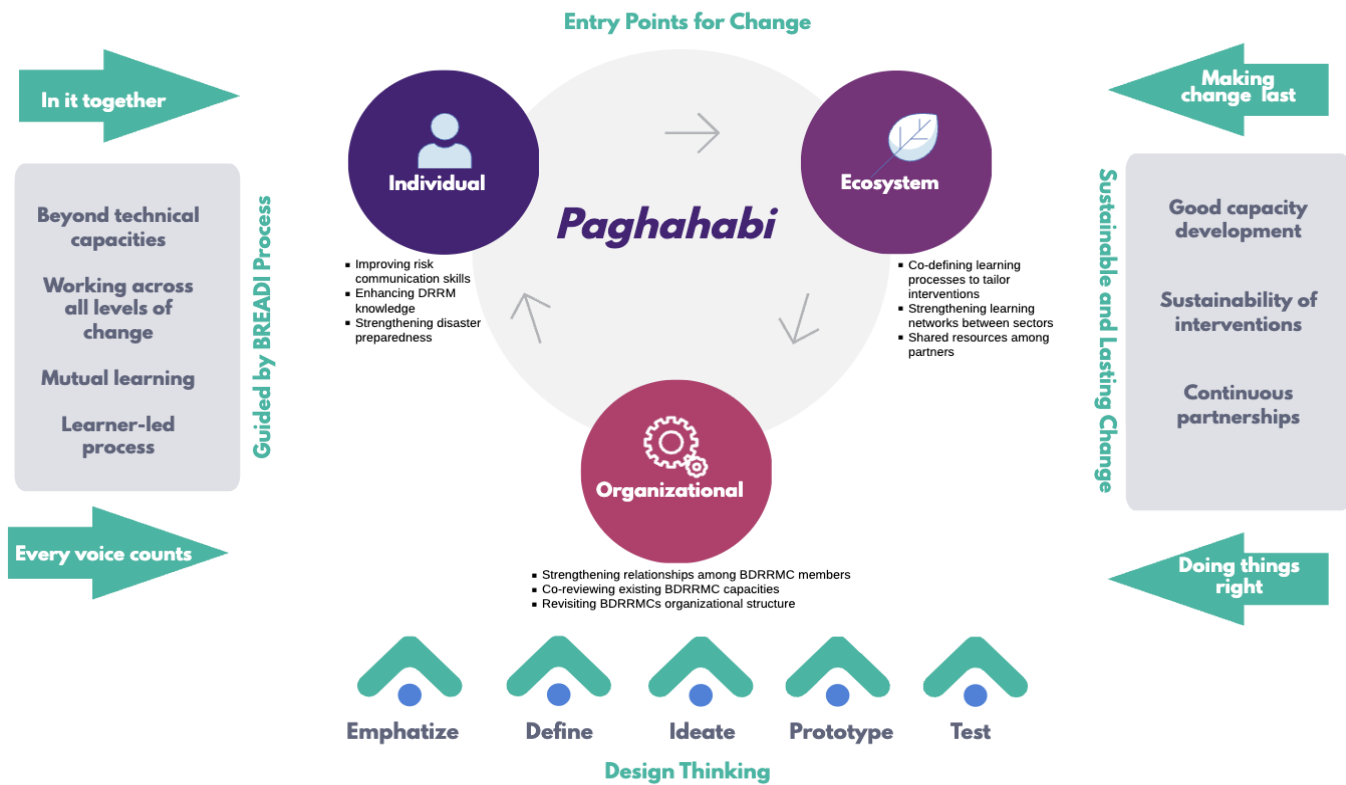


Figure 1. B-READI Process or *Paghahabi* (adopted and modified from Harle et al., 2022, and Voltage Control, 2023)

2. Methodology

2.1 Research Locale

Barangay San Pablo Norte is located in the Municipality of Santa Cruz, Laguna. According to the 2020 census, it has a population of 2,751 (Philippine Statistics Authority [PSA], 2020a; PSA, 2020b). The *barangay* is surrounded by Laguna de Bay to the north and the Santa Cruz River to the southwest. Due to its proximity to the lake and streams, many homes are built on or near the water, primarily using bamboo structures (PhilAtlas, 2020). This led to increased vulnerability during typhoons and flooding. The majority of the residents rely on fishing, farming, small-scale vending, and tricycle driving for their livelihoods. These were heavily affected by frequent flooding, storm surges, and the increasing impacts of climate change, such as El Niño (Cruz et al., 2017).

San Pablo Norte was chosen as a project site as it was one of the *barangays* with low scores in disaster preparedness based on the 2024 Seal of Good Local Governance for *Barangays* (Department of the Interior and Local Government [DILG], 2024). It received a failing mark due to the absence of a *barangay* hazard map, an outdated risk assessment, and limited disaster equipment. Despite having basic tools such as sirens, first aid kits, and rescue vehicles, the *barangay* lacked alternative power sources and personal protective equipment, highlighting critical capacity gaps.

2.2 Research Design, Data Collection, and Data Analysis

Qualitative research aims to provide a deep understanding of the meaning behind a phenomenon (Pyo et al., 2023). The inductive nature common in this approach helps unravel meanings, develop new theories,

understand processes, and surface lived experiences. Quantitative research is normally deductive and seeks to test theories or hypotheses. Its goal is to produce measurable evidence (Creswell & Plano-Clark, 2011). Meanwhile, the mixed-methods research used in this study involves a process of strategically combining rigorous quantitative and qualitative methods—leveraging the strengths of each approach to overcome their individual limitations (Creswell & Plano-Clark, 2011).

This study employed three modes of data collection: a desk review, focus group discussions conducted as part of a Participatory Capacity and Vulnerability Analysis (PCVA), and a survey. PCVA was used to analyze risks and meaningfully engage partner communities in the design, planning, and management of DRM interventions (Oxfam, 2011; Turnbull & Turvill, 2012). It was conducted on 24 February 2025 among BDRRMC members in Barangay San Pablo Norte. The PCVA had five components: (1) historical timeline of major disasters in the *barangay*, (2) participatory community mapping, (3) Strengths, Weaknesses, Opportunities, and Challenges (SWOC) of the BDRRMC, (4) Vision, Mission, Goals, and Objectives (VMGO) enhancement, and (5) Project Development and Management. Pre and post-tests were administered on 3 March 2025 to determine the intermediate effects of the capacity-building initiatives. A planned social impact assessment (SIA) will be conducted in 2026 to determine whether the skills gained during the training are applied in actual disaster situations.

To ensure the scientific rigor of the instruments, the PCVA was patterned after the prescribed instruments by Oxfam (2011). These were modified to fit the local context and the existing community organizing tools at the UPLB College of Human Ecology. The pre- and post-tests, although preliminary in nature, were reviewed by DRM experts and stakeholders during a series of workshops at UPLB.

3. Results and Discussion

In this section, we highlighted the (1) B-READI process, (2) the results of PCVA, and (3) project outputs and intermediate outcomes. For the first part, we narrated the process of developing and implementing the project. The second part showed the intersecting disaster risks experienced by Brgy. San Pablo Norte and the co-identification of the proposed intervention. Finally, the third part examined the initial effects of the project, its main outputs, and explored mechanisms for replicating this initiative in other sites across the country.

3.1 RO1. The Barangay Readiness Enhancement and Development Interventions (B-READI) Process

3.1.1 Partnership Building and Expectation Setting

The B-READI process (see Figure 2) commenced with the establishment and development of strong partnerships among key stakeholders. The UPLB Department of Social Development Services, through its SDS 172: Techniques in Community Organizing class, collaborated with a team comprising DILG-Laguna, PDRRMO Laguna, OCD IV-A, Laguna University (LU), and Rappler. The team initially faced challenges in ensuring the full participation of all stakeholders, given the large number of project partners, conflicting schedules, and limited resources. Identifying leverage points was also difficult due to the scale of resources and capacity limitations of the BDRRMC, such as the lack of access to emergency equipment, difficulty in aligning local disaster response and initiatives with national government initiatives, and lack of material and financial support, among others (Toledo-Bruno et al., 2017).



Commitment setting became crucial in leveling off expectations, ensuring each partner had a specific and realistic contribution throughout the B-READI process. Navigating various organizational interests and perspectives required patience, active listening, and a meta-perspective to weave them together into a coherent project design. Co-designing the project was, therefore, paramount not only in facilitating co-ownership among stakeholders but also in encouraging them to engage in a reflexive process to understand how the project aligns with their interests and goals. Ultimately, the process ensured the effective implementation of the project, avoided redundancies, and enhanced cooperation among all partners.

3.1.2 Participatory Capacity and Vulnerability Analysis (PCVA)

A Participatory Capacity and Vulnerability Analysis (PCVA) was conducted to align with the project's participatory design. This involved BDRRMC members in co-determining inherent vulnerabilities in the *barangay* and assessing available resources and capacities. PCVA was modified to include the (1) historical timeline of past disasters, (2) participatory community mapping to identify vulnerable areas, and (3) a SWOC analysis to assess the BDRRMC's organizational capacities. Furthermore, the BDRRMC's VMGO was reviewed. Participants were able to revisit their VMGO by reflecting on their experiences and perceived community needs. These activities helped them in developing their disaster preparedness plans. It imparted a greater sense of responsibility and rendered the approach more relevant and empowering to all participants.

3.1.3 Capacity Building

BDRRMC members articulated several capacity-building efforts that they needed through the PCVA. The core group, composed of DSDS CHE UPLB, Laguna University, DILG Laguna, PDRRMO Laguna, and OCD IV-A, convened to determine which of these initiatives they could effectively respond to, considering their available time, skills, and financial resources. *Paghababi*, or weaving together various perspectives and resources considered, was initiated through iterative discussions. Risk communication was identified as a pressing concern that the team could adequately address.

The team then co-developed a training program based on the ADIDS approach, which stands for activity and discussion, inputs, deepening, and synthesis. Human Ecology's breadth and transdisciplinary approach were beneficial as they could draw from various disciplines and perspectives. During the activity, a simulation was created in which a warning from the weather bureau and media was displayed on screen, emphasizing that torrential rains would batter the *barangay*. Various scenarios were re-enacted, including the presence of pregnant women and vulnerable groups, as well as residents refusing to evacuate. The role-playing exercise highlighted existing practices among BDRRMC members during disasters. It also highlighted the value of the humanities in co-creating Human Ecological knowledge. During the discussion, PDRRMO, OCD IV-A, and DILG Laguna noted the good practices done by the BDRRMC and recommended points for improvement.

This was followed by a scientific input, during which behavioral nudges for communicating risks were discussed by DSDS CHE UPLB. It provided participants with the opportunity to understand the science behind risk communication—to effectively persuade residents in vulnerable areas to evacuate. At the same time, scientists were compelled to acknowledge the existing knowledge derived from the experiences of BDRRMC members, rather than merely simplifying complex scientific terms. In the discussion part, Human Ecology became a dialogical space where the scientific, community, and policy perspectives came into conversation with each other. Such an approach helped offset inherent limitations in each perspective and facilitated a more holistic understanding of risk communication in the local context. Rather than summarizing what had been done, a large white canvas was placed in front, where participants wrote about how they would implement the lessons they had learned from the training in their own community. This activity helped internalize the lessons

from the capacity-building process more deeply. During this time, pre- and post-tests were administered to determine the project's immediate effects.

3.1.4 Sustainability Plan

A sustainability plan was designed to ensure that disaster preparedness efforts would be adaptable and continuously implemented in the long run. First, the team co-designed a set of exercises that could be replicated in future training sessions in other BDRRMCs nationwide. Second, these were collated in the B-READI module, allowing for the step-by-step process of implementing similar initiatives to be recorded and replicated later. Third, the B-READI manual, community maps, and PCVA outputs were turned over to the barangay. Fifth, the project solidified partnerships between institutions such as DILG Laguna, PDRRMO Laguna, LU, OCD IV-A, and Rappler. Hence, providing a platform or coalition of partners that the *barangay* could tap into in the future, should the need arise.

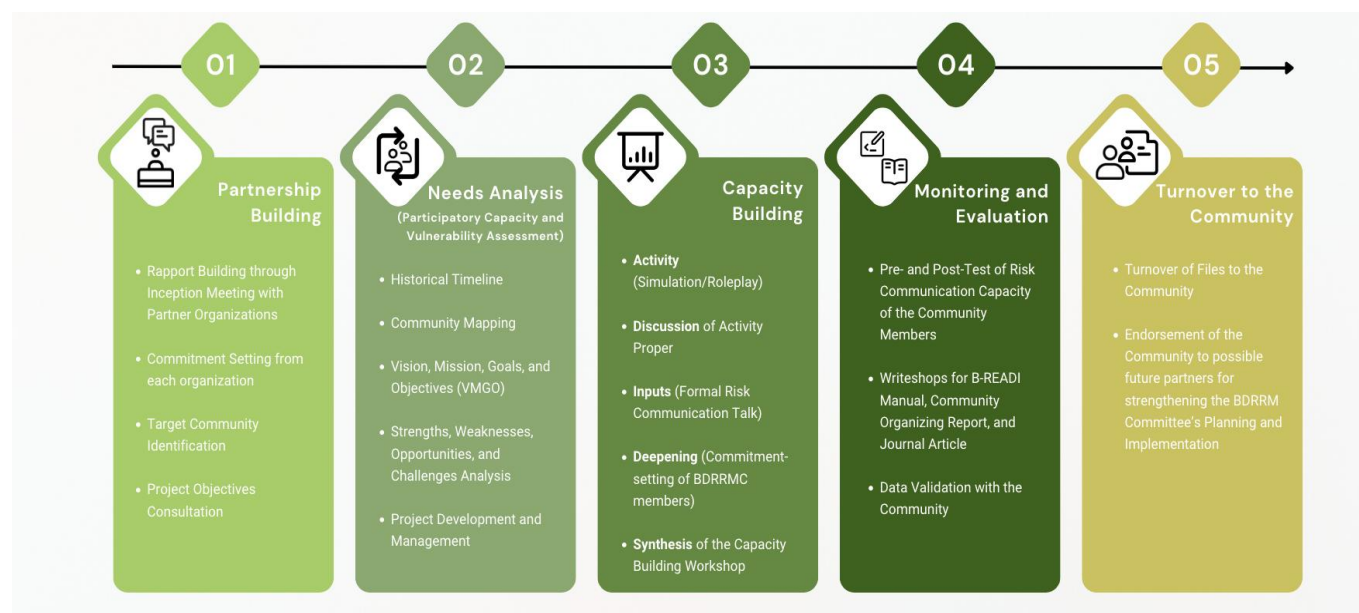


Figure 2. Capacity building process

3.2 RO2. Results of Participatory Capacity and Vulnerability Assessment

3.2.1 Historical Timeline

Barangay San Pablo Norte in Santa Cruz, Laguna, has faced significant disasters, including typhoons and floods (see Figure 3). These impacted health, livelihoods, property, and agriculture in the *barangay*. Typhoons Ondoy and Santi were considered among the worst disasters. Participants recalled the severity of the rains and flooding that swamped the coastal communities of Laguna de Bay, affecting thousands of residents. Reports from the Laguna Provincial Disaster Coordinating Council (PDCC) in 2009 indicated that 125,319 families, or approximately 613,519 individuals, were affected by flooding. In Santa Cruz, the number of individuals and families affected was approximately 64,180 (ReliefWeb, 2009).



After Typhoon Ondoy, Santi followed. It was the fourth tropical cyclone to make landfall across Southern Luzon. According to the National Disaster Coordinating Council, 60% or 183,243 of Santi's victims resided in Laguna (Dedace, 2009). Considered a catastrophic disaster, the typhoon had a profound impact on both social and economic aspects, damaging public assets (Global Facility for Disaster Reduction and Recovery [GFDRR], 2009). Due to the severity of their impacts, the National Disaster Coordinating Council decided to concentrate its rehabilitation efforts on the flooded towns of Laguna.

Residents described annual floods that threatened communities since 2014, especially in Sitios 1 and 4. Damages from annual typhoons in Santa Cruz have destroyed housing, stranded vehicles, caused price hikes in transportation, disrupted fishing, and led to crop losses. Severe Tropical Typhoon Kristine (2024) recently triggered widespread flooding. Accompanied by Super Typhoon "Leon" shortly after, they both affected a total of 1,067,784 individuals, 247,822 families, and 584 *barangays* in the province of Laguna as reported by DOST-PAGASA (2025). In Santa Cruz, 12,984 families, 83,620 individuals, and a total of 23 *barangays* were affected (Department of Science and Technology-Philippine Atmospheric Geophysical and Astronomical Services Administration [DOST-PAGASA], 2025). In Laguna, delayed transportation and production, along with suspended fishing activities, caused strains on the food supply and increased market prices. Additionally, rice crop losses were valued at PHP 20.08 million (Trinidad, 2024). The severe impacts of flooding and heavy rains on livelihoods led to the declaration of a state of calamity in Santa Cruz, as post-disaster impacts continued with heightened risks of diseases such as eczema, fungal infections, and dengue (Gomez, 2024).

Apart from typhoons and floods, the COVID-19 pandemic imposed significant constraints on livelihoods and led to widespread illnesses. As the surge in infections and patients afflicted with COVID-19 increased, the pandemic revealed limitations in healthcare systems, including the shortage of medical personnel to handle the growing demand for emergency services and meet the needs for medical care. On a positive note, Laguna ranked first in 2022 as the leading province in COVID-19 vaccinations in Region IV-A, with a total of 2,121,345 vaccinations, or 82.19% of the population vaccinated (Presidential Communications Office [PCO], 2020).

Throughout the years, *bayanihan* efforts and early warning systems have helped residents in Santa Cruz strengthen their resilience across multiple sectors, enabling them to manage crises, reduce exposure to disasters, and prevent unnecessary losses and deaths.

Moving forward, participants suggested building a water breaker, dredging Laguna Lake, and planting trees. They anticipated these projects to help control water flow, assist in irrigation systems, and avert casualties and losses from catastrophic disasters.

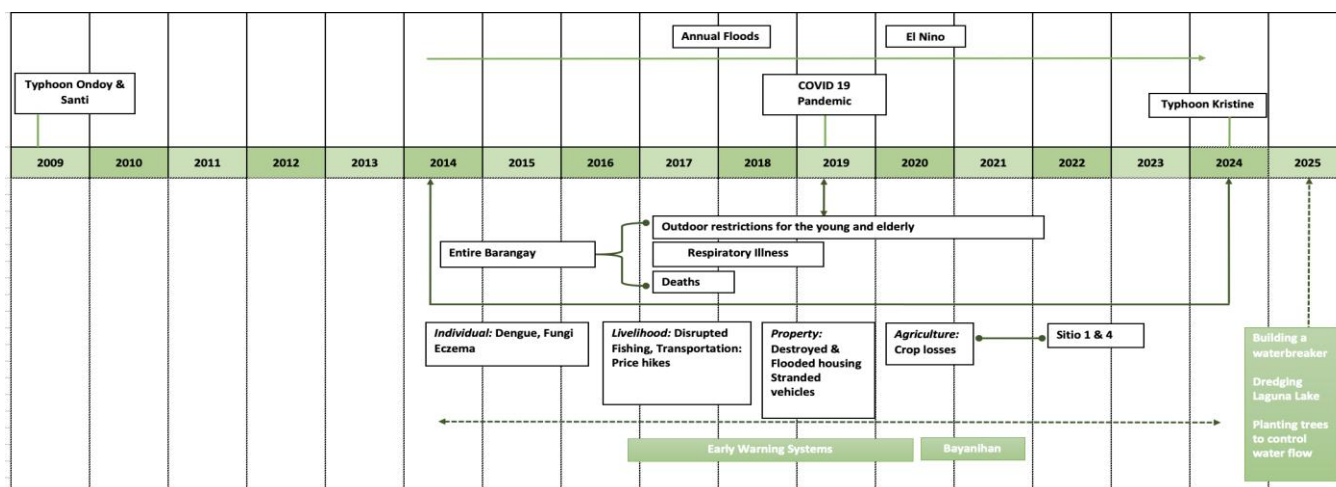


Figure 3. Historical timeline of Barangay San Pablo Norte, Santa Cruz, Laguna

3.2.2 Participatory Mapping

Figure 4 presents the results of the participatory mapping in Barangay San Pablo Norte. It displayed the seven (7) *sitios* in the *barangay*, along with labels of the major sources of livelihood and common hazards in each area. Local livelihood sources consisted of *sari-sari* stores, other businesses, tricycle operations, farming, and fishing. Common types of hazards included drought, accumulation of algae or moss, and flooding, which they attributed to climate change. In addition, vulnerability assessment was conducted to determine each *sitio*'s susceptibility to specific hazards, ranking them on a vulnerability scale from 1 (highest vulnerability) to 7 (lowest vulnerability).

In terms of natural hazards, participants noted that climate change has contributed to the intensification of floods and droughts in Santa Cruz. Typhoons were occurring more frequently, which had an adverse effect on low-elevation areas, such as Barangay San Pablo Norte (Cataluña et al., 2021). These intersected with poor drainage systems, which left the barangay submerged in lake water (Hedreyda, 2024). Sitio Syete (7) and Sitio Sais (6) ranked the highest in terms of vulnerability to frequent and recurring floods. These had adverse effects on fishing and farming. Moderately affected areas included Sitio Uno (1), Sitio Dos (2), and Sitio Tres (3). During *habagat*, the formation of moss or '*lumot*' was also considered a hazard. They usually form between July and December. Participants said that the accumulation of moisture from rainfall and floods contributed to moss growth. Frequent flooding in Sitio Syete (7) and along the *barangay*'s coastline made it highly vulnerable to algae formation. Hence, roads in these areas often require regular cleaning.

The dry season was also perceived as becoming more intense. Extreme heat constrained agricultural productivity by adversely affecting water supply and soil productivity. El Niño was expected to persist from April to May (ReliefWeb, 2024). Extreme heat exacerbated food and water insecurities (Rola et al., 2017). Sitio Uno (1) and Sitio Dos (2) were the most severely affected by El Niño, putting the residents who relied on farming and fishing at risk. Diversifying options in aquaculture was recommended to mitigate the effects of the dry spell. This included the use of heat-resistant species such as *tilapia*, *bangus* (milkfish), catfish, and mudfish (Agoot, 2023).



On the other hand, Sitio Singko (5), Sitio Sais (6), and Sitio Syete (7) experienced favorable conditions for crop harvesting due to subsiding water levels resulting from the El Niño phenomenon. A weak to moderate El Niño favored the growth of certain drought-resistant crops, such as cassava, sweet potatoes (National Disaster Risk Reduction and Management Council [NDRRMC], 2023; Ludher & Teng, 2023), corn, and mung beans, which have low water demands (Dumlao, 2024). To avoid losses, the Department of Agriculture also informed farmers to plant these alternative crops as they could thrive despite the extreme heat. Due to the lack of farmlands, the main source of income in Sitio Tres (3) was mostly *Sari-Sari* Stores. As a residential area, it ranked the lowest in vulnerability, followed by Sitio Kwatro (4) and Sitio Singko (5). Since these three sitios are located in higher elevation areas, they were less vulnerable to recurring flood problems.

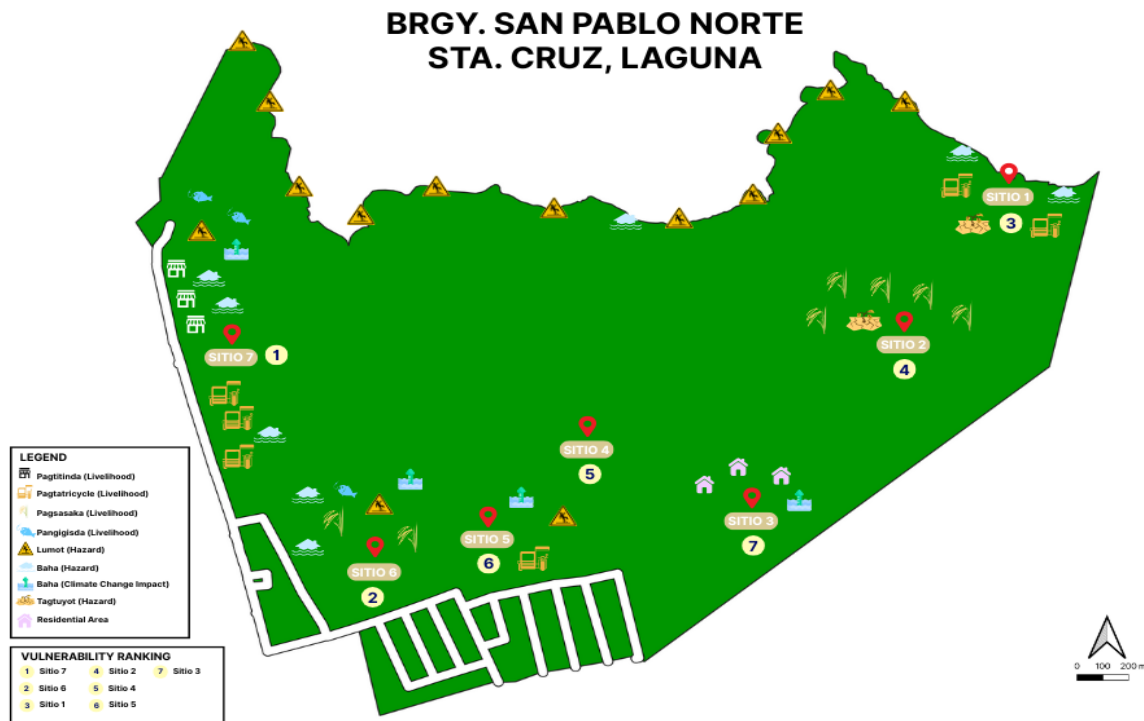


Figure 4. Results of the participatory mapping

3.2.3 Thematic Analysis of Vision, Mission, Goals, Objectives (VMGO)

The BRDRRMCs VMGO was examined as recurring concepts, essential values, and strategic directions for the organization. The vision highlighted strengths such as collaboration, official support, and the ability to turn aspirations into reality. Meanwhile, its weaknesses included unfulfilled needs, which manifested into tangible problems such as inefficient waste disposal. Apart from highlighting qualities like cleanliness, order, and peace, the mission placed a strong emphasis on leadership. However, it did not factor behavioral change among residents into its mission. This is reflected in the lack of discipline among visitors and non-residents, as well as the lack of initiative among community members, who often rely on the *barangay* for cleaning.

Third, in terms of goals, some capacity-building interventions were being undertaken to fulfill the *barangay's* aspirations of ensuring a disaster-resilient community. However, BDRRMC members noted that many residents were unresponsive and uncooperative, and these trainings were inadequate to deal with the growing risks faced by the *barangay*. For objectives, BDRRMC members had very specific answers, such as the

presence of funded programs and their implementation. They highlighted weaknesses such as difficulties in encouraging citizen participation, budget insufficiency, and a lack of willingness among people as challenges.

Interestingly, the answers during the workshop magnified the fact that the BDRRMC's VMGO was not fully understood by stakeholders. It was observed that many *barangays* often copied the BDRRM Plan, which contained these VMGOs, resulting in a poor understanding of what they stood for. The study revealed the need for national government agencies, civil society organizations, and the academe to closely collaborate with *barangays* to ensure that BDRRM plans are not just done for compliance, but that stakeholders truly understand their purpose, which could translate into improved DRM initiatives.

3.2.4 Thematic Analysis of Strengths, Weaknesses, Objectives, and Challenges (SWOC)

Table 1 presents the thematic analysis of Strengths, Weaknesses, Opportunities, and Challenges (SWOC). By organizing various insights into four areas, the analysis highlighted internal capabilities, areas for improvement, potential growth opportunities, and existing challenges. Based on the SWOC analysis, the strengths were sufficient resources for climate change and hazard mitigation, availability of medical kits, response vehicles, sirens, and active BDRRMC members. Additionally, it also mentioned the presence of the Federation of Civil Society Organizations (FCSO), frequent drills and training, waste segregation, regular clean-up drives, and the use of a Memorandum of Agreement (MOA) with Silangan Elementary School as an evacuation center. The weaknesses included an insufficient number of rescue vehicles, the loss of health facilities (specifically those for birthing), and a lack of medical supplies and necessities.

Table 1. General Theme: SWOC

Specific Themes	In Vivo Statements	Interpretation
Strengths	<i>"May sapat na kagamitan upang tugunan ang kalamidad [Enough equipment to respond to disasters]: medical kit, response vehicles, may sirena [siren]."</i> <i>"Cooperative at [and] active BDRRMC members."</i> <i>"Pagkakaroon ng [Existence of] Federation of Civil Society Organizations (FCSO)."</i> <i>"Pagkakaroon ng iba't ibang pagsasanay [Provision of different training]: drills and training."</i> <i>"Waste segregation."</i> <i>"Clean-up drive every Saturday."</i>	It shows the <i>barangay's</i> strong disaster preparedness, environmental initiatives, and community engagement efforts. With adequate emergency equipment, active BDRRMC members, regular training, and organized clean-up drives, the community demonstrates proactive risk reduction and sustainability practices. In addition, collaborations with institutions like Silangan Elementary School further enhance disaster response and resilience.



Specific Themes	In Vivo Statements	Interpretation
	<i>"Pagkakaroon ng MOA sa Silangan Elementary School bilang evacuation center. [Existence of MOA with Silangan Elementary School as evacuation center.]"</i>	
Weaknesses	<i>"Kakulangan ng [Shortage of] rescue vehicles."</i> <i>"Kawalan ng health facilities gaya ng birthing. [Lack of health facilities, such as birthing.]"</i> <i>"Hindi sapat na gamot at kagamitan. [Not enough medicines and equipment.]"</i>	It highlights gaps in emergency response and healthcare services, including insufficient rescue vehicles, a lack of birthing facilities, and inadequate medical supplies.
Opportunities	<i>"Tulong mula sa [Help from] MDRRMO, PDRRMO, PCG, PNP, BFP, WILGO (fire volunteers), FCYMAA, Red Cross."</i> <i>"Pagsunod sa mga polisiya ng Barangay. [Compliance with community policies.]"</i>	It exhibits strong external support and policy adherence as key opportunities for the <i>barangay</i> .
Challenges	<i>"Uncooperative residents during evacuation."</i> <i>"Climate change."</i> <i>"Geographical location of the barangay."</i>	It highlights key challenges in disaster preparedness, including the lack of cooperation of residents during evacuations, the impacts of climate change, and the <i>barangay's</i> geographical vulnerabilities.

Meanwhile, there were opportunities such as external support from different organizations, such as the Municipal Disaster Risk Reduction and Management Office (MDRRMO), PDRRMO Laguna, Philippine Coast Guard (PCG), Philippine National Police (PNP), Bureau of Fire Protection (BFP), WILGO (fire volunteers), Filipino-Chinese Young Men Athletic Association (FCYMAA), and the Philippine Red Cross. Efforts to strengthen the compliance of community members with *barangay* policies were also seen as an opportunity. Lastly, challenges existed, such as uncooperative residents during evacuation, climate change, and the vulnerable geographical location of the *barangay*.

3.2.5 Role of Partners

Figure 5 illustrates the roles and commitments of the project partners in the B-READI process. Each stakeholder played a crucial role in the project's implementation. During the facilitation of workshops: FGD and PCVA, the UPLB SDS 172 class coordinated closely with LU, DILG Laguna, OCD IV-A, and PDRRMO Laguna. They served as facilitators during the PCVA and capacity-building workshops. It was DILG Laguna that identified the site and led the coordination with other agencies and the *barangay*. LU offered logistical support during fieldwork. The PDRRMO Laguna covered meals during fieldwork and meetings and provided technical assistance. OCD IV-A ensured the alignment of activities to existing projects and policies. DSDS CHE UPLB led in writing the module. Other stakeholders actively participated in meetings and provided inputs in drafting the modules.

The B-READI framework or *paghahabi* served as a guide in navigating the complexities of community-based disaster resilience. The three-tiered approach of the framework (individual, organizational, and ecosystem) was integrated into the project's methodology. For example, individual-level capacity building was employed in the pre- and post-tests that monitored the improvement in DRM awareness among BDRRMC members. At the organizational level, the BDRRMC's structure and practices were assessed using interactive tools like PCVA, VMGO, and SWOC analysis.

Multi-sectoral collaboration was emphasized at the ecosystem level, where networks were established through partnerships. Academic institutions, government agencies, and the media co-learned together in the project. This iterative process highlighted the importance of the Design Thinking's five phases (Emphasize, Define, Ideate, Prototype, and Test), which shaped the B-READI project.

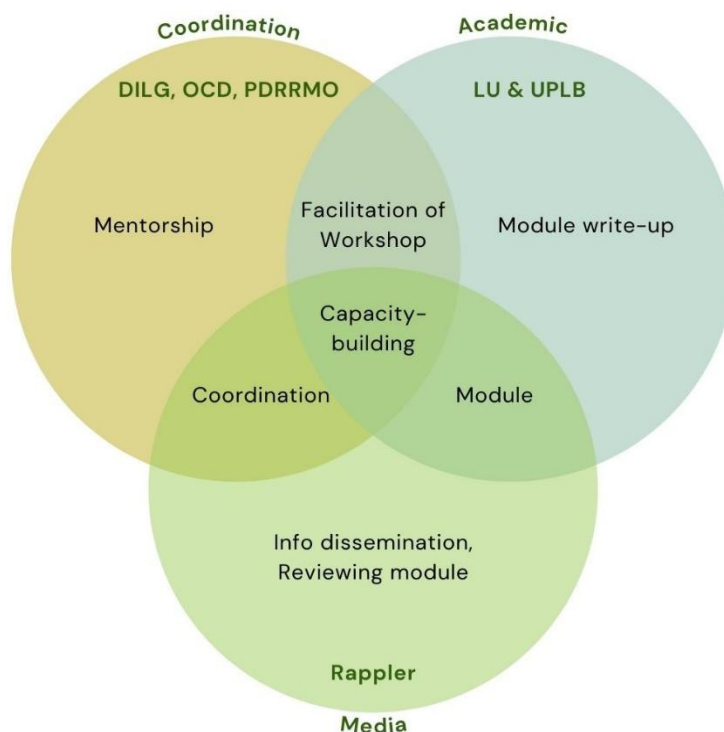


Figure 5. Role of each partner in the B-READI process

3.3 RO3. Intermediate Outcomes and Project Outputs

Pre- and Post-Tests were conducted to measure the knowledge of BDRRMC members on risk communication. Descriptive statistics, such as the mean and standard deviation, were used to analyze the data collected from 22 attendees. The percentage of total correct answers was indicated in the mean, while the standard deviation was measured by the dispersion of data relative to its mean. While limited to capturing the immediate effects of the project, this could be useful in developing a more comprehensive social impact assessment in the future.



Based on the data presented in Table 2, 81% of the attendees answered question one correctly in the pre-test, whereas 40% deviated from the mean percentage of correct answers. This deviation suggested variability in scores and performance. However, results from question one in the post-test showed that 100% of the attendees answered it correctly with no deviation from the mean. Meanwhile, other questions, such as Q2, Q4, and Q5, presented a significant increase in the post-test mean, suggesting an overall improvement in knowledge. An increase in standard deviation relative to the mean equated to an increase in variability in responses. Hence, this increase in the mean and variability of responses showed that while the training was effective in reinforcing knowledge among some community members, some attendees still struggled to follow through with the capacity-building process. This requires some innovations in training strategies that the next iteration of B-READI could employ to become more effective in facilitating learning.

Additionally, qualitative feedback served as a guide in assessing the individual experiences of the participants. Response varied when asked which parts of the workshop they enjoyed or preferred the most. Some participants shared that the information presented on risk communication was sufficient in raising awareness of hazard risks, as the knowledge was relevant to their experiences during disasters. The re-enactment of pre-emptive evacuation allowed the participants to analyze case scenarios, strategize, and formulate different responses as a team to effectively implement appropriate emergency response and evacuation procedures. Additionally, the respondents stated that the training helped them gain a deeper understanding of community perspectives. In particular, the ability to recognize diverse backgrounds, needs, and circumstances that affect the decision-making of evacuees. They hoped to translate this newly acquired knowledge to real-life situations, such as offering better support to affected individuals.

Table 2. Pre- and Post-Tests Results

Question	Pre Test (N=22)		Post Test (N=22)	
	M	SD	M	SD
1. What do you call ignoring the risks of disasters because of the loss of memory about previous flooding impacts?	0.81	0.40	1.00	0.00
2. What do you call the inaction of residents due to the uncertainty of what they should do?	0.24	0.44	0.5	0.51
3. What makes it difficult for people to cooperate during a disaster or state of calamity?	0.38	0.50	0.36	0.49
4. What is the term for the method of convincing residents to act on the right thing based on science?	0.29	0.46	0.36	0.49
5. What is the term for the method of persuading residents by following the actions of the majority?	0.19	0.40	0.32	0.48

However, the capacity-building process required further improvements. Some attendees expressed difficulty in understanding new concepts despite efforts to translate them into the local language (*Filipino*) and giving concrete examples. While specific terms such as mimetic and normative nudges are applicable and relevant to their real-life situations, introducing new terms could be confusing since they are highly technical. To ensure a better understanding of key concepts, various learning strategies could either be refined or explored. Training may use simpler terms or avoid jargon altogether. This may also involve breaking down terms using relatable, real-life examples, such as common community behaviors during emergencies or everyday decision-making. Visual aids, such as illustrated manuals, posters, and tarpaulins, can serve as helpful references in reinforcing community understanding beyond the training session. Additional participatory-based activities could be added, such as peer-led group discussions. These modifications could help reinforce concepts and foster peer learning, where participants explain ideas to one another in their own terms. Hence, enhancing collective understanding.

To ensure the project's sustainability, these lessons were documented in the B-READI Academy Manual. The manual serves as a practical guide for barangay leaders, residents, and stakeholders, enabling them to effectively share and understand information before, during, and after disasters. The manual contains relevant information on how B-READI can be facilitated using different social technologies. It elaborated various steps and methodologies related to needs assessment, project development and management, capacity building, and monitoring and evaluation. Overall, the manual is essential to the mission of the B-READI Academy as it translates technical disaster risk concepts into transformative and participatory DRM initiatives at the grassroots level.

4. Conclusion

The study shows that *barangays* are at the forefront of DRM initiatives. They can serve as leverage points in pursuing community resilience, as capacity-building interventions could be easily translated into meaningful actions. However, it was noted that many *barangays* lack the capacity to adequately respond to disasters. In Barangay San Pablo Norte, Santa Cruz, Laguna, the results of the PCVA showed heightened risks due to changing social-ecological dynamics of the lake and climate change.

As such, BREADI was developed utilizing a Human Ecological approach to address complex disaster risks at the local level. Human Ecology was defined as an *integrative body of knowledge that deals with the interaction of humans with their total environment*. Moreover, *paghahabi* as a unifying principle in the B-READI framework was an amalgamation of various frameworks to navigate inter-organizational dynamics in multi-sectoral partnerships. The paper discussed how the project, implemented in San Pablo Norte, involved the formation of broad-based partnerships, assessment of local needs, capacity building, and sustainability planning towards lasting change. Finally, the intermediate effects of the project were demonstrated. There was an increase in knowledge on risk communication among BDRRMC members. However, greater attention should be given to improving training design so that it is more engaging, grounded, and effective for local BDRRMCs.

While the paper examined the perspectives of project implementors, it did not capture inter-subjective interpretations that would have aided in holistically determining its effectiveness. The concept of *Paghahabi* introduced in this study is still in its nascent stage. Further iteration or studies are needed to determine its scientific merit. Furthermore, the reliance on a single case is inadequate to determine the potential of B-READI to be scaled up.

Therefore, it is recommended that a Social Impact Assessment be conducted using more rigorous evaluation tools and inferential statistics to determine the project's impacts. Future studies may also focus on expounding and developing *Paghahabi* as an approach to Human Ecological thinking and doing. B-READI can be implemented in other *barangays* through UPLB's courses and, if possible, among Philippine Human Ecology Consortium (PHEC) member institutions

To close, by positioning B-READI as a Human Ecological model of transdisciplinary or multi-stakeholder collaboration, the paper contributed to academic discourse on community resilience and academe-industry-government collaborations.



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