GPH-International Journal of Social Science and Humanities Research
(Online ISSN 3050-9637| Print ISSN 2795-3222)
Volume 09 | Issue 01 | January 2026
Published by **Global Publication House**
DOI: https://doi.org/10.5281/zenodo.18311587
Available online at www.gphjournal.org
Journal homepage: https://gphjournal.org/index.php/ssh/index

CATFISH URBAN FARMING: A PROPOSED LIVELIHOOD TRAINING PROGRAM IN MABOLO, NAGA CITY

Harold Wilson Lim[1], Mark Amiel Vivas[2], Lance Villegas Salva[3], Rey Emman A. Manansala[4], Caesar D. Palma Jr.[5], Michael Penolio Villafuerte[6*], Maria Alida A. Mores[7]
[1–7] University of Nueva Caceres, School of Business and Accountancy, Philippines.

Article ID: GPH-IJSSHR-2026-2200

Abstract

This study, called "Catfish Urban Farming: A Proposed Livelihood Training Program in Mabolo, Naga City," looked into how catfish (hito) farming in the city could become a steady source of income for the people of Barangay Mabolo. Using a descriptive-quantitative method and thirty (30) participants, the research examined the current situation of small catfish farms and what affects people's interest in joining, especially the help they get from the government and NGOs. The results showed that although some residents already raise catfish, they face problems like flooding, lack of technical knowledge, poor water quality control, and limited access to organized markets, which lower their production and income. The flooding caused by Typhoon Kristine also led to fish losses and discouraged some farmers from continuing. Even with these problems, many participants said they are willing to do catfish farming if they receive proper training, financial help, equipment, and technical support. Because of this, a two- to three-day training program was suggested to teach pond setup, feeding and disease control, financial management, and cooperative building. The goal of the program is to help the community gain skills, improve farming methods, connect better with markets, and build a long-term and sustainable livelihood in Barangay Mabolo.

Keywords:

Catfish farming Philippines, Hito aquaculture, Urban aquaculture Urban fish farming, Livelihood training program, Sustainable aquaculture practices, Community-based aquaculture.

INTRODUCTION

Catfish farming, locally known "hito" farming, is becoming more popular in the Philippines as a good source of income and food. Many people can start this business even in their backyards. Southeast Asian Fisheries Development Center (SEAFDEC) conducted a study and showed that a 1,000 square meter pond with 10,000 young catfish can produce around 770 kilograms of catfish and earn about ₱22,971 in profit, which is an 80% return on investment.

* Corresponding author: *Michael Penolio Villafuerte*

According to the Philippine Statistics Authority (PSA), the production of catfish from nonshore fish farms increased from about 4,500 metric tons in 2020 to around 6,800 metric tons in 2021. With help from the government, the growing demand for fish, and the ability of catfish to live in small ponds, this industry is expected to grow more. However, there are still problems such as lack of technology, fish diseases, and limited access to markets.

In Barangay Mabolo, Naga City, most people depend on their old jobs for a living, and there are only a few economic activities. This study focuses on creating training and livelihood programs for catfish farming in the community. The goal is to help residents use their local resources to earn income and improve their lives.

Barangay Mabolo is in Naga City, which is one of the main economic centers in Camarines Sur. Its location gives local producers an advantage because they can easily sell fresh products in nearby markets. However, the community has not yet reached its full potential because of the lack of training, materials, and facilities. The proposed livelihood program aims to solve these problems by offering training in sustainable fish farming and basic business skills.

RESEARCH OBJECTIVES

This study aimed to assess the viability and potential of Catfish Urban Farming in Mabolo, Naga City. Specifically, it sought to address the following objectives:

1. To determine the status of Catfish Urban Farming in Mabolo, Naga City in terms of Farm Information, Farm Management and Biosecurity and Production and Marketing.

2. To determine the factors affecting the willingness of the community members in engaging the Catfish Urban Farming in terms of Government Support and involvement of NGO's.

3. To propose a Catfish Urban Farming Livelihood Training program in Mabolo, Naga City

SCOPE AND DELIMITATION

This study aimed to find out if Catfish Urban Farming can be a good and practical livelihood in Barangay Mabolo, Naga City. It focused on learning about the current situation of catfish farming in the area and the reasons that affect the residents' interest in joining this kind of work. It also looks into how government helps and support from non-government organizations (NGOs) can encourage people to take part.

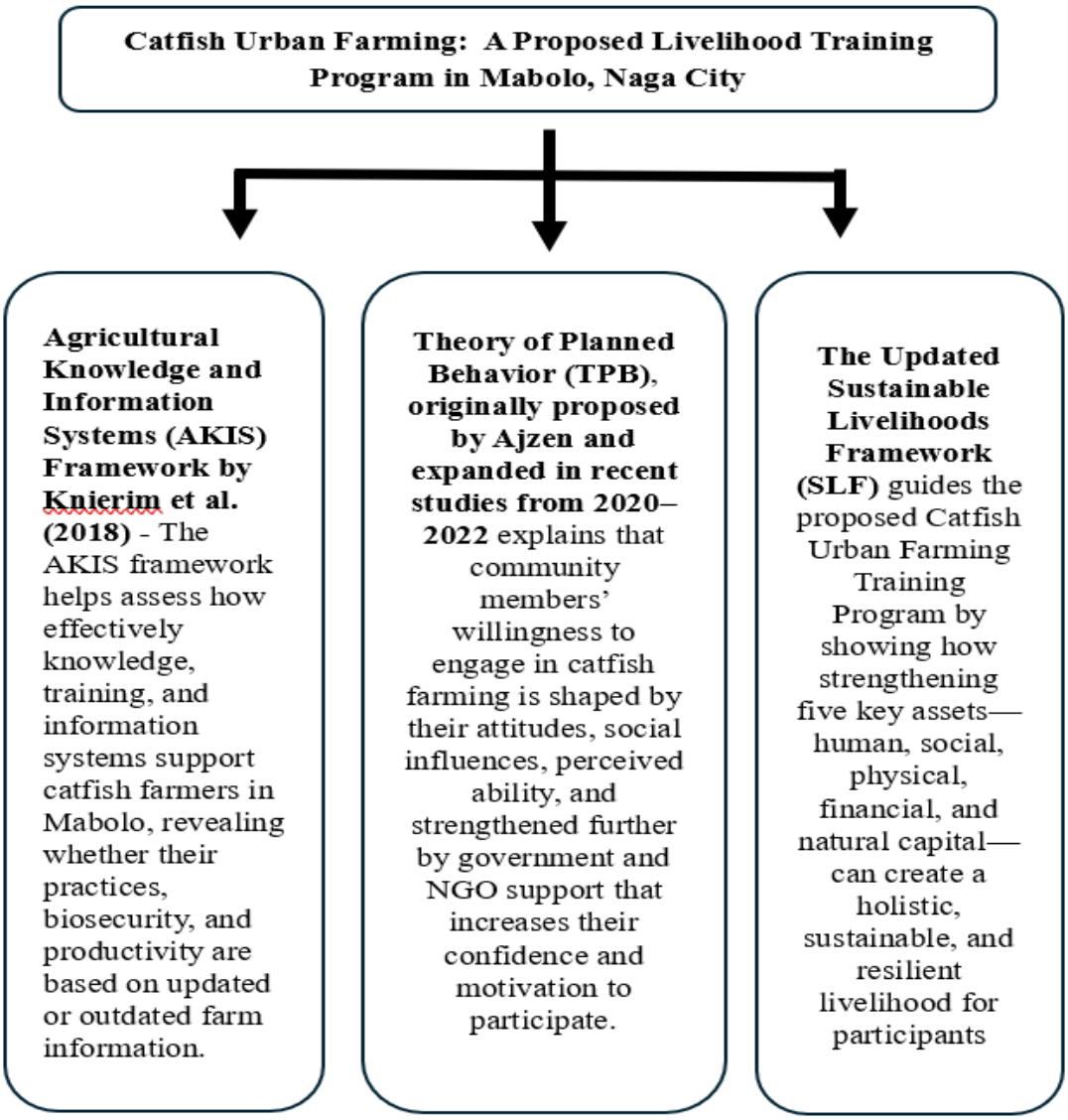
The study is limited only to the residents of Barangay Mabolo and does not include other barangays in Naga City. It will focus on small-scale or backyard catfish farming instead of large commercial fish farms. The research will not discuss the whole process of catfish production outside the community. Information will be gathered mainly through surveys, interviews, and existing data available in the barangay.

This study will be conducted from July 2025 to December 2025 only which includes data gathering, analyzing the result, creating a training program and preparation of final report.

THEORETICAL FRAMEWORK

This study uses an integrated theoretical foundation that combines technical, behavioral, and livelihood-oriented perspectives to thoroughly understand the viability and potential of Catfish Urban Farming in Mabolo, Naga City.

Figure 1. *Theoretical Framework*



The Agricultural Knowledge and Information Systems (AKIS) Framework by Knierim et al. (2018) helps explain how the success of farming depends on how well farmers and other people involved share, use, and create knowledge. In this study, it's used to understand catfish farming in the area. The framework looks at how access to information, training, support from agricultural experts, and communication affect how farmers manage their farms, follow safety rules, and improve productivity. By applying AKIS, the study can find out what's working well and what's not in how information is shared, how useful and available technical advice is, and

how much farmers know about production and the market. This helps show whether catfish farmers in Mabolo are using modern methods or still depending on old or limited knowledge

The second main theory used in this study is the updated Theory of Planned Behavior (TPB), first introduced by Ajzen and later improved in studies from 2020–2022 to include support from outside organizations. This theory explains why people choose to do or not do something based on three main factors: their attitude, social pressure, and how much control they think they have over their actions. In this study, TPB helps explain why people in the community might want—or not want—to take part in catfish farming. Their decision depends on how they feel about fish farming (like whether they think it's profitable or risky), what others around them think (such as encouragement from neighbors or community approval), and whether they believe they have the skills, time, and resources to do it. The newer version of TPB also shows that help from institutions—like local government offices or NGOs—can make people feel more capable by offering training, materials, money, and technical advice. This means that government and NGO support directly affects how motivated and prepared people are to join catfish farming, making TPB a useful tool for studying what influences their willingness to participate.

The third main theory used in this study is the Updated Sustainable Livelihoods Framework (SLF), based on the work of Scoones (2015) and later updates from 2020–2023. This framework helps explain how people and communities build and maintain their sources of income and well-being. It says that a successful livelihood depends on five key assets: human capital (skills and knowledge), social capital (connections and relationships), physical capital (tools and facilities), financial capital (money, credit, and other resources), and natural capital (environmental resources). In this study, the SLF is used to design a Catfish Urban Farming Livelihood Training Program. The program aims to improve human capital by teaching better farming skills, strengthen social capital by encouraging teamwork, develop physical capital by helping participants use tools and equipment properly, increase financial capital through income opportunities and access to small loans, and protect natural capital by promoting responsible water use and environmental care. Using the SLF ensures that the training program focuses not just on farming skills but also on building a stronger, more sustainable, and resilient livelihood for the community.

These three theories—AKIS, TPB, and SLF—work together to create a strong and complete foundation for the study. AKIS looks at the current situation of catfish farming, TPB explains why people in the community choose to join or not join catfish farming, and SLF shows how to build a sustainable livelihood program. By combining these ideas, the study doesn't just describe what's happening in farming but also understands people's motivations and provides a clear plan for improving livelihoods. This mix of theories makes the study well-rounded, practical, and very useful for developing urban fish farming and community projects in Mabolo, Naga City.

CONCEPTUAL FRAMEWORK

The conceptual framework shows how the main ideas and variables in the study are related. It serves as a guide to understand the flow of the research by presenting what the study focuses on and how each part connects to the others. This framework helps make the study clearer and easier to understand by providing a visual or written explanation of the research focus and direction.

Figure 2. *Conceptual Framework*

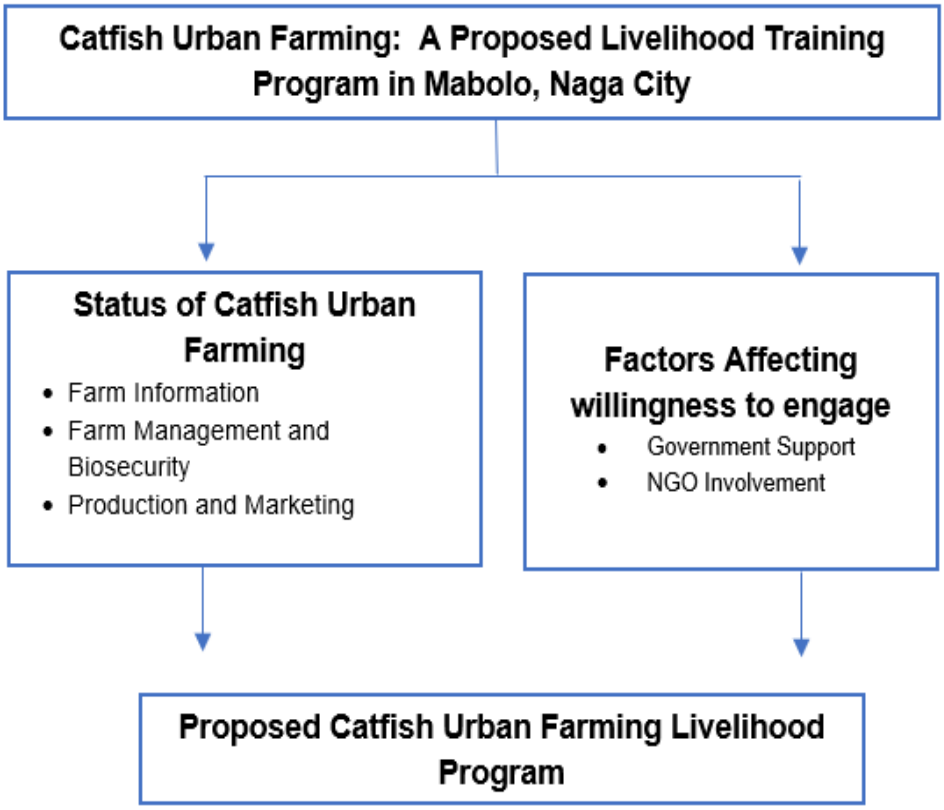


Figure 2 shows the conceptual framework for the study titled "Catfish Urban Farming: A Proposed Livelihood Training Program in Mabolo, Naga City."

It explains how the study connects different parts to create a livelihood program. The framework starts with checking the current situation of catfish urban farming, which includes four main areas: socioeconomic factors, farm information, farm management and safety, and production and marketing. These parts help the researchers understand the present condition and needs of possible farmers in the community.

The next part of the study looks at the factors that affect the residents' willingness to join catfish urban farming. These factors include government support and the help of non-government organizations (NGOs), which play an important role in encouraging people to participate and in making the program last longer.

By studying both the current situation and the factors that influence participation, the research aims to create a proposed Catfish Urban Farming Livelihood Program. This program will serve as a plan to help the community build livelihood opportunities, increase local food production, and support economic growth in Barangay Mabolo, Naga City.

RELATED LITERATURE

The aquaculture of catfish, commonly known locally as "hito," has been increasingly significant within the Philippines as a strategy for diversifying freshwater fish production. According to the Bureau of Fisheries and Aquatic Resources (BFAR, 2023), there were about 2,792 catfish farms in the Philippines as of December 2023, covering around 670 hectares of land. About 87% of these farms focus on raising catfish until they are ready to be sold. BFAR and other government programs are supporting catfish farming because it helps improve food supply and provides more job opportunities. Catfish are also easy to raise since they grow fast and can live well in freshwater areas.

Philippine Information Agency (PIA). (2025, April 22) says that the Bureau of Fisheries and Aquatic Resources (BFAR) is encouraging catfish or "hito" farming in areas affected by African Swine Fever (ASF) as a new source of income for farmers. The program includes turning old pigpens into catfish ponds, giving training, providing fingerlings, and helping farmers find markets, including possible halal buyers.

To support this effort, the region held its first "Hito Industry Forum" on March 17, 2025, in Bula, Camarines Sur. The event aimed to make catfish farming more productive and profitable and to officially create the "Bicol Catfish Producers Fisherfolk Association." In Camarines Sur, a PHP 30 million freshwater hatchery is being built in Barangay San Roque, Bombon, to raise catfish and other fish species. The province also gave free catfish fingerlings and fish nets to 50 households in Pili to help them start catfish farming in areas without natural bodies of water. In addition, seminars and training sessions on tilapia and catfish farming, such as the one held on April 22, 2025, in Calabanga, are being conducted to help farmers improve their skills.

BFAR Region 5. (2025, March 28) on their published article "Strengthening the Hito Industry: Bicol hito farmers undergo technical training" reports three-day training held from March 25 to 27, 2025, in Tabaco City, Albay. It involved around 30 farmers and local government representatives who learned about breeding and raising African catfish.

According to the 2023 City Newsletter An Naga Ngonian, forty-two (42) small fishers from Barangay Mabolo have already joined a training program on backyard catfish production. The activity was organized with the help of the Bureau of Fisheries and Aquatic Resources (BFAR), which also gave free fingerlings to the participants.

The city government has also supported fish farming in other places by releasing 500 catfish fingerlings into a backyard pond in Pagdacion Poro and distributing 5,000 tilapia fingerlings into the Bicol River. These projects aim to help families whose income has been

affected by the decline of fish in natural water sources. Because of these efforts, more residents now view aquaculture as a good source of income.

Lirag, M. T. B. & Estrella, A. (2017) on “Adaptation Measures of Farmers in Response to Climate Change in Bicol Region, Philippines”, International Journal on Advanced Science, Engineering and Information Technology, 7(6), 2308 2315, while not specific to hito farming, this study provides context on how Bicol Region farmers are adapting to climate change — useful when discussing aquaculture resilience (including importance of species like hito that are claimed to "adapt to climate change").

Banaay, Legaspi & et al. (2024) on their study “The supply, demand and value chain of catfish in the two northern cities of Nueva Ecija, Philippines.” (ABAcademies journal) examines supply–demand dynamics and value chain issues for catfish in a land locked province of the Philippines, providing insights into commercialization, marketing, and farmer willingness.

Southeast Asian Fisheries Development Center Aquaculture Department (SEAFDEC AQD) on their studies “Crude protein in hito feed improves profitability.” Iloilo, Philippines (2000) found that feeding pond cultured Asian catfish (“hito”) a formulated diet containing 34 % crude protein significantly improved profitability

Khondokar H. Kabir, Mohammed Nasir Uddin, Saifur Rahman, Dietrich Darr & Zaman Siddiqi Drubo — 2022 on Opportunities and determinants for rural youth engagement in catfish farming: empirical evidence from north-central Bangladesh.

This peer-reviewed paper used household and youth surveys in the Mymensingh district (a major inland aquaculture area) to measure how rural youth perceive catfish farming as an opportunity and which socioeconomic, institutional and perception factors predict their engagement. The authors apply multivariate analysis to link individual attributes (age, education, prior farming experience), household endowments (land, capital), and local enabling services (extension, access to fingerlings and credit) with the probability that a young person would enter catfish farming. Key findings: despite clear market demand and technical feasibility, uptake among rural youth remained limited because of (1) poor access to quality fingerlings and feed, (2) lack of start-up capital and credit, and (3) weak extension/mentorship; conversely, higher education, previous pond experience and membership in youth or farmer group.

Food and Agriculture Organization (FAO) / value-chain analysis — (FAO report on catfish aquaculture value chain, Nigeria, date varies). The catfish aquaculture value chain in Nigeria: analysis and design report.This FAO/technical report gives an in-depth value-chain perspective: it maps production bottlenecks (fingerling supply, feed quality), post-harvest losses, market segmentation, and the role of service providers (hatcheries, feed mills, middlemen). Although the report is a broad value-chain assessment rather than a household willingness survey, it is highly relevant to barangay decision making because it quantifies the structural constraints that dampen local willingness (e.g., when local producers know they’ll face unreliable market channels or low prices, willingness to invest falls). The FAO analysis repeatedly shows that community-level interventions (shared hatchery services, cooperative marketing, and links to processors/buyers) shift the business case from marginal to viable and thereby increase the

likelihood that an entire barangay will endorse starting catfish enterprises. For barangays, the takeaway is to view willingness not only as attitude but as the result of concrete chain-level enablers (inputs, market linkages, collective action). ups substantially increased willingness to engage. For a barangay, the paper's most actionable lessons are that communal solutions (cooperative buying of inputs, barangay-level fingerling hubs, youth training plus linking to credit) significantly raise local willingness to start catfish enterprises.

Suleiman D. Bello, Salin K.R., John K. M. Kuwornu — 2021 on Willingness to adopt aquaculture as an alternative livelihood option – a case study of the fishers and livestock farmers of Adamawa State, Nigeria. (International Journal of Value Chain Management) surveyed 324 households (multi-stage cluster sampling) in Adamawa State to estimate how many fishers and livestock farmers were willing to adopt aquaculture and which factors influenced that choice. Using a binary logit model, the study reports surprisingly high stated willingness — roughly 67% of artisanal fishers and 90% of livestock farmers — but it also identifies barriers that would block actual uptake: lack of quality inputs (feed, seed), limited extension and training, credit constraints, and concerns about market access. The paper emphasizes that stated willingness can be converted into real uptake only when supply-side constraints are addressed (training plus seed/ feed provision) and when local institutions (cooperatives, extension) actively support transition. For barangay planners, the study underscores that survey measures of willingness should be paired with a concrete action plan (seed supply, training calendar, and small-credit schemes) to turn interest into operational farms.

T. Manyise et al. 2024. Farmer perspectives on desired catfish attributes in Nigeria Region (Science Direct / Aquaculture/ Nutrition journal entry) Though this is not a direct "willingness" survey, the 2024 study that asked catfish farmers which biological and market attributes they most value (growth rate, disease resistance, feed efficiency, fillet quality) matters because perceived product attributes shape farmers' motivation to start or scale up production. The paper uses farmer interviews and preference elicitation methods to show that where farmers expect better-performing catfish strains (and can access them), their interest in adopting or expanding catfish farming rises sharply again tying supply-side biotech and seed improvements to higher community willingness. Practically, this means barangays that can secure access to improved fingerlings or demonstrate good growth/returns in pilot ponds will find more household buy-in than barangays relying on low-yield, low-survival seed.

SEAFDEC / AQD (Philippines) (SEAFDEC technical bulletin / "Growing catfish in the Philippines") SEAFDEC's aquaculture department and related Philippine extension publications describe both technical protocols for freshwater catfish culture and local adoption constraints in the Philippines (fingerling scarcity, limited hatchery capacity, and extension gaps). These Philippine-context documents combine field interviews with extension outcomes, showing that barangays where the municipal/ provincial government or NGOs facilitated hatchery access, provided hands-on training, and created micro-credit linkages had substantially higher community readiness and faster uptake of catfish enterprises. For Philippine barangays specifically, SEAFDEC's experience points to practical entry steps: start a barangay pilot pond with group management (cooperative), secure a stable fingerling source (or barangay hatchery),

run a 2–3 day hands-on training for interested families, and set up a simple group marketing agreement these actions consistently convert "willingness" into actual businesses.

Didi B. Baticados (2015). Reaching the poor through aquaculture: The case of technology adoption in rural communities at west central Philippines.

This study surveyed two rural communities (one marine in Guimaras, one inland freshwater in Capiz) using community-based participatory extension of aquaculture technologies. It found that aquaculture is an acceptable technology for both adopters and non-adopters. Key barriers included institutional issues, technology constraints (e.g., feed/fry supply), and environmental/climate challenges. This work is relevant to a barangay contemplating catfish business because it emphasises that willingness is influenced not only by attitude but by tangible enablers (seed supply, access to training, local institutions)

Leomarich F. Casinillo, Cristita A. Clava & Milagros C. Bales (published in Canadian Journal of Family and Youth). Modeling the Adoption of Aquaculture Technologies among the Members of 4-H Club Youth (Philippines). The study focused on youth members of the 4-H Club in Southern Leyte, Philippines, looking at what predicts adoption of aquaculture technologies. It found that only about 10.17% of youth members had adopted aquaculture technologies; perceptions of complexity, economic viability and environmental safety were neutral. This suggests that while interest may exist, actual willingness or readiness to start aquaculture ventures (like catfish farming) may be low unless these factors are addressed.

Tsutom Miyata (2022). Economic performance and roles of local communities in the adoption of multi-species aquaculture. This work, presented in a workshop in the Philippines, explores how community roles affect adoption of integrated/multi-species aquaculture systems. It emphasises that local community engagement and firm linkages to markets/inputs matter for uptake. While not catfish-specific, the findings are relevant: for a barangay considering a catfish business, community structures (groups/cooperatives), market linkages, and input/seed supply access shape willingness and ability to start.

METHODOLOGY

This outlines the research methodology used in the study to know the status of Catfish farming in Barangay Mabolo, Naga City and the factors that affect their willingness to participate in the proposed training and development program of the barangay. A descriptive research design was chosen because it allows for obtaining first-hand data regarding current status and practices in the area. The chapter details the research design, the sampling procedures, data collection instruments, and the analytical techniques used to address the research questions.

Research Design

This study used a descriptive-quantitative research design to find out what factors affect the willingness of the people in Barangay Mabolo, Naga City to join catfish (hito) urban farming. The descriptive method was used to describe the current level of awareness and interest in catfish farming among the residents. The quantitative method, on the other hand, helped gather and analyze numerical data from survey questionnaires.

This research design was chosen to clearly measure how government help and the support of non-government organizations (NGOs) affect the community's interest in joining catfish farming. By studying the survey results using simple statistical tools, the research was able to see patterns, strengths, and connections between these factors. The findings then served as the basis for creating a livelihood training program for the community.

Respondents/Participants of the Study

The respondents of this study were thirty (30) residents of Barangay Mabolo, Naga City. They were either already involved in or interested in joining livelihood or fish farming programs. These people were chosen because they have experiences, knowledge, or interests related to Catfish Urban Farming, which is the main focus of the study. The selection was done using purposive sampling, which means the participants were carefully chosen based on specific qualities that fit the goals of the research.

This method was used to make sure that only those who could give useful information about the possibility and potential of catfish farming were included. By focusing on people who are already involved or interested in fish farming, the study was able to get a clearer picture of the community's readiness, interest, and ability to take part in this kind of livelihood. This approach also helped the researchers gather more detailed and relevant information, which can be used in planning and improving future urban farming projects in Barangay Mabolo.

Data Gathering Tools

The researchers used a structured questionnaire to gather information from the residents of Barangay Mabolo, Naga City about their interest and willingness to join Catfish Urban Farming. The questionnaire had different parts that focused on factors that could affect community participation, such as government help and the support of non-government organizations (NGOs).

Each question was rated using a five-point scale, where "1" means Not Interested at All and "5" means Very Much Interested. This scale helped the respondents show how much they agreed or were interested in each statement, and it also allowed the researchers to collect data that could be analyzed using numbers.

The questionnaire was written in both English and Filipino so that everyone could understand it easily. Overall, this tool helped the researchers learn about the community's opinions, identify available support, and see how successful a catfish urban farming training program could be in Barangay Mabolo.

Data Gathering Procedure

The researchers followed an organized process in collecting data from the residents of Barangay Mabolo, Naga City. Before starting the survey, they asked for advice and approval from their research advisers to make sure the questionnaire was clear, correct, and related to the goals of the study.

After the questionnaire was approved, it was personally given to thirty (30) chosen residents of Barangay Mabolo using purposive sampling. The researchers explained the purpose of the study and gave simple instructions on how to answer the form. The respondents were told that joining the survey was voluntary and that their answers would be kept private. They were given enough time to finish the questionnaire, and the researchers personally collected the completed forms to make sure all answers were complete and correct.

After collecting all the questionnaires, the researchers reviewed the answers, recorded the data, and arranged them for analysis. The information gathered was studied using simple statistical tools like mean and percentage to find patterns, levels of awareness, and the willingness of the residents to take part in Catfish Urban Farming. The results were then used as the basis for creating a livelihood training program that fits the needs and interests of the people in Barangay Mabolo, Naga City.

Data Analysis Techniques

For this study on Catfish Urban Farming in Barangay Mabolo, Naga City, the data were analyzed using descriptive analysis. Since the questionnaire used a five-point Likert scale, the answers were studied using weighted means to find out the general level of interest and agreement of the respondents for each statement.

The mean or weighted mean helped interpret the overall responses for each factor, such as government support and NGO involvement, to see how much these factors affect the community's willingness to join catfish farming. Ranking was also used to identify which factors had the strongest influence on encouraging participation.

By using these descriptive methods, the researchers were able to summarize and understand the data, identify patterns, and draw clear conclusions about what affects community participation and the potential of Catfish Urban Farming as a livelihood program in Barangay Mabolo, Naga City.

Ethical Considerations

This study was conducted in the study followed proper ethical standards to protect and respect all participants. Before collecting data, the purpose and goals of the research were clearly explained to the respondents. Participation was voluntary, and everyone was informed that they could stop answering at any time without any negative effects. Consent was obtained before they answered the questionnaire.

The privacy and confidentiality of all participants were strictly protected. No personal information was collected, and all data was used only for academic purposes. The answers were treated with respect and presented as a group to make sure no individual could be identified.

The study also made sure that no one was forced, misled, or harmed in any way. The questionnaire was written in a respectful and fair manner, focusing only on topics related to catfish farming and community participation.

Artificial Intelligence (AI) tools were used only to help with grammar checking, formatting, summarizing, and organizing ideas in the research paper. All data analysis, interpretation, and conclusions were done by the researchers themselves to maintain honesty and originality in the study.

RESULTS AND DISCUSSION

Table 1. ***Status Catfish Farming in Brgy. Mabolo, Naga City in terms of Farm Information***

Variables	**Frequency (n)**	**Percentage (%)**
1. Type of Ponds		
Earthen	2	40%
Plastic	3	60%
Total	5	100%
2. Water Source		
Tap Water	2	40%
Rainwater	1	20%
Deep Well	1	20%
River	1	20%
Total	5	100%
3. Feed Type		
Commercial	4	80%
Local	1	20%
Total	5	100%
4. Feeding Frequency (daily)		
Once a day	4	80%
Thrice daily	1	20%
Total	5	**100%**

Table 1 shows the farm information of five catfish farmers in Brgy. Mabolo, Naga City, including pond type, water source, feed used, and feeding frequency. For pond type, 2 farmers (40%) use earthen ponds while 3 farmers (60%) use plastic ponds. For water source, 2 farmers (40%) use tap water, and 1 farmer each (20% each) uses rainwater, deep well water, and river water. In terms of feed, 4 farmers (80%) use commercial feeds and only 1 farmer (20%) uses local feeds. For feeding frequency, 4 farmers (80%) feed their fish once a day, while 1 farmer (20%) feeds twice a day.

The data shows that plastic ponds are more commonly used, likely because they are easier to set up and manage in small spaces. Tap water is the most used water source, which suggests that it is the easiest and most reliable for the farmers. Almost all farmers use commercial feeds, showing their preference for feeds that are convenient and promote faster fish growth. Most farmers feed their fish only once a day, which may reflect their usual routine or the belief that once-a-day feeding is enough.

From the results, we can infer that farmers prefer materials and resources that are simple, practical, and readily available. The large number using plastic ponds and commercial feeds suggests that farmers want less maintenance and better growth results. The variety of water sources indicates that access to water differs among farmers, so they use whatever source is closest or most dependable. Feeding once a day also hints that farmers may have limited time or resources, or they think that their current feeding method already works well.

These findings that farmers use plastic or lined ponds when land is small, rely on available water sources (tap, rain, well, river), use commercial feed, and feed once a day match what some scientific studies say about pond aquaculture and fish growth under varied resource conditions. For example, a recent review of pond-based aquaculture in resource-limited rural communities shows that ponds of different water supply types (levee ponds, watershed ponds, small or large) are widely used depending on land and resource availability. Also, a study on pond water quality from small-scale fish farms in arid or semi-arid zones — found that water source and management practices significantly affect fish yield and disease occurrence. Moreover, research about feeding frequency for catfish shows that feeding regime strongly influences growth and production performance. Altogether, these studies support the idea that in community-level farms where resources vary, the choices of pond type, water source, feed type, and feeding schedule such as what your data shows are key factors that influence how well the fish grow and how productive the farm becomes.

To improve catfish farming in Brgy. Mabolo, farmers should receive training on proper pond management and water quality to ensure healthy fish. They may also benefit from learning how to combine commercial and locally available feeds to reduce costs while still providing good nutrition. Trying to feed fish twice a day, when possible, can help increase growth rate and production. Finally, forming a farmers' group can help them share ideas, solve problems together, and improve their farming practices as a community.

Table 1.1 ***Status Catfish Farming in Brgy. Mabolo, Naga City in terms of Farm Management and Bio Security***

Variables	**Frequency (n)**	**Percentage (%)**
1. Water Quality Monitoring		
Regular	3	60%
Occasional	1	20%
No	1	20%
Total	5	100%
2. Use of Probiotics/ Water Treatment		
No	4	80%
Yes	1	20%
Total	5	100%
3. Waste Disposal Method		
Proper	5	100%
total	5	100%

4. Protective Gear Use		
Always	1	20%
Never	4	80%
Total	5	100%
5. Disease Incidence (6months)		
Yes	2	40%
No	3	60%
total		100%
6. Cause of Disease		
None	3	60%
Change in water temperature	1	20%
Fungus	1	20%
Total	5	100%

The results show that catfish farmers in Brgy. Mabolo generally practices basic farm management and biosecurity measures, though with varying consistency. A majority regularly monitor water quality (60%), while 20% do so only occasionally and another 20% do not monitor at all. Most farmers (80%) do not use probiotics or water treatment, yet all adhere to proper waste disposal practices. Protective gear use is low, with only 20% always using gear and 80% never doing so. Disease incidence within the past six months affected 40% of farms, with common issues including disease linked to water temperature changes (20%) and fungal infections (20%). Overall, the table highlights partial compliance with recommended aquaculture practices and areas needing improvement.

The distribution of responses suggests that despite good waste management compliance, other essential biosecurity components are inconsistently practiced. The high percentage of farmers who do not use probiotics or water treatment (80%) may indicate limited awareness or accessibility of preventive technologies that help stabilize pond microbiology and reduce pathogen loads. Similarly, the low use of protective gear exposes farmers and fish stocks to contamination risks. The presence of disease in 40% of farms reflects vulnerabilities likely influenced by the lack of regular monitoring and inadequate protective measures. The emergence of issues tied to water temperature and fungal infections underscores the sensitivity of catfish farming to environmental fluctuations and hygiene lapses.

Based on the patterns observed, it can be inferred that the community's catfish farming sector maintains only a minimal level of biosecurity, which could compromise long-term production sustainability. The inconsistent water monitoring suggests that some farmers may not fully grasp the relationship between water quality and fish health. Likewise, the absence of probiotics and protective gear use points to limited adoption of modern aquaculture practices, possibly due to cost, lack of training, or low perceived importance. Disease occurrence in nearly half the farms further signals that current management measures are insufficient in preventing outbreaks. These weaknesses could lead to reduced yields, increased mortality, and higher operational costs over time if not addressed.

The findings align with studies in small-scale aquaculture that highlight gaps in farmers' knowledge and adoption of biosecurity practices as key contributors to disease outbreaks. Research on Southeast Asian aquaculture has shown that limited awareness of water quality management often leads to increased susceptibility to fungal infections and temperature-related stress, similar to the issues identified in Brgy. Mabolo. Studies also report that proper waste disposal tends to be the easiest practice for farmers to adopt, while more technical interventions—such as probiotic use and PPE adherence—are less commonly practiced due to cost constraints and the need for training. Thus, the patterns observed in the table reflect broader regional challenges in enhancing farm management and disease prevention in smallholder aquaculture systems.

To strengthen farm management and biosecurity, it is recommended that targeted training programs be implemented to educate farmers on the importance of regular water quality monitoring, probiotic use, and consistent protective gear application. Local government or agricultural agencies may support farmers by providing subsidized probiotics, water-testing kits, and PPE to improve adoption rates. Establishing a community-based monitoring system could also help farmers detect early signs of water quality fluctuations and disease risks. Additionally, routine extension visits and demonstrations on disease-prevention strategies such as maintaining stable water temperatures and improving sanitation can reduce the incidence of fungal and stress-related diseases. By enhancing knowledge, accessibility, and support, catfish farmers in Brgy. Mabolo can improve productivity and minimize losses.

Table 1.2 ***Status Catfish Farming in Brgy. Mabolo, Naga City in terms of Production and Marketing***

Variables	**Frequency (n)**	**Percentage (%)**
1. Main buyers		
Private Individuals	5	100%
Total	5	100%
2. Challenges		
Flooding	4	80%
Lack of Knowledge	1	20%
Total	5	100%
3. Profitability		
Moderate	2	40%
Low	3	60%
Total	5	100%

The data show that production and marketing of catfish in Brgy. Mabolo are primarily directed toward private individuals, who constitute 100% of the farmers' main buyers. Farmers also face significant production challenges, with 80% citing flooding as their major issue and 20% reporting lack of knowledge. In terms of profitability, most farmers (60%) consider their income low, while the remaining 40% describe it as moderate. Overall, the findings highlight that

farmers rely on a limited market segment, encounter environmental and knowledge-related challenges, and experience modest profitability levels.

The dominance of private individuals as buyers suggests that farmers are dependent on small-scale, direct-to-consumer marketing rather than formal market channels such as restaurants, processors, or local markets. This dependence constrains their ability to scale production or achieve higher profits. The prevalence of flooding as the top challenge reflects the vulnerability of catfish ponds to weather disturbances and inadequate infrastructure for water control. Meanwhile, the 20% citing lack of knowledge indicates gaps in technical capacity and access to extension services. The fact that the majority report low profitability aligns with these constraints: environmental risks disrupt production, limited market access restricts income, and insufficient knowledge reduces efficiency.

From these patterns, it can be inferred that catfish farming in Brgy. Mabolo is operating below full economic potential due to both environmental and systemic barriers. Heavy reliance on private buyers may lock farmers into low-volume sales with limited pricing power, contributing to low profitability. Flooding issues imply that farmers may lack proper pond engineering or drainage systems, leading to losses during heavy rains. The presence of knowledge gaps suggests that some farmers may not be fully equipped to optimize production practices, manage risks, or diversify marketing channels. Consequently, farm income remains constrained, and growth opportunities are limited.

These results align with broader findings in small-scale aquaculture research, which show that limited market channels are a major bottleneck preventing farmers from achieving higher profitability. Studies in the Philippines and Southeast Asia have similarly reported that environmental hazards especially flooding significantly reduce fish production in rural areas, particularly when ponds lack proper embankments or drainage systems. Research also demonstrates that inadequate technical knowledge impedes farmers from adopting improved practices such as water control systems, feeding optimization, and market diversification. The pattern observed in Brgy. Mabolo mirrors these trends, highlighting common structural issues in smallholder aquaculture.

To address these challenges, it is recommended that farmers be supported through capacity-building programs focusing on improved pond engineering, flood mitigation measures, and advanced production techniques. Local government units and agricultural agencies can help by strengthening extension services, offering training on market diversification, and connecting farmers to larger institutional buyers such as restaurants, wet markets, or cooperatives. Establishing farmer groups or marketing cooperatives can improve bargaining power and expand market reach. Additionally, providing access to financial support for infrastructure improvement such as elevated pond banks and drainage canals can reduce flood-related losses. Improving both technical capability and market access can enhance profitability and sustain catfish farming operations in Brgy. Mabolo.

Table 2. ***Factors affecting the willingness of the community in terms of Government Support***

Statement	***Mean***	***Rank***	***Interpretation***
1. The BLGU Mabolo will offer free basic training on Catfish Urban Farming to all its interested constituents	3.53	5	SW
2. The BLGU Mabolo will offer financial assistance or subsidies to the interested constituents	3.87	2	SW
3. The BLGU Mabolo will formulate policies and regulations to support small-scale urban farming initiatives, one of which is licensing and permits	3.63	4	SW
4. The BLGU Mabolo will create an organized market for urban fish farmer which includes creating accessible and structured outlet for selling their products	3.73	3	SW
5. The BLGU Mabolo will support and help the initiatives of creating an Urban Fish Farming Cooperative so that all its members can access credit and financing, savings through bulk purchasing of supplies and materials, more government and non-government support, and improved quality and branding.	3.90	1	SW
Overall	***3.73***		***SW***

Legend: Note:4.21-5.00 Very Much Willing (VMW), 3.41-4.20 Somewhat Willing (SW), 2.61-3.40 Neutral (N), 1.81-2.60 Not Very Willing (NVW), 1.0-1.80 Not Willing at all (NWAA)

Table 2 shows how willing the residents of Barangay Mabolo are in different plans related to Catfish Urban Farming. These plans include free training, financial assistance, creating rules, building markets, and forming a cooperative for fish farmers. Creating of Farming Cooperative gets the higher mean with 3.90 while conducting free training scores the lowest of 3.53. The overall average is 3.73.

Based on the results, the residents are most willing in forming an Urban Fish Farming Cooperative, which has the highest mean of 3.90. This shows that they like the idea of working together as a group to gain more support and benefits. The second most preferred plan is financial assistance, with a mean of 3.87, showing that funding is very important to them. The lowest score is for free training, with a mean of 3.53, which means that while training is helpful, people prefer programs that offer real and direct support like funding and cooperatives. Overall, the results show that residents want programs that can give them practical help.

The data also shows that most residents see urban fish farming as a good way to earn extra income. However, they prefer help in organizing and funding their projects rather than just

lessons or seminars. This means they are willing to participate but need stronger support systems. They also want opportunities to sell their fish and make the project sustainable in the long run.

These findings support the government's goal of helping people earn a living and produce their own food in the city. It also shows that local governments should assist small fish farmers through training, funding, and cooperatives. Doing this can help create more jobs, provide fresh fish, and promote a cleaner environment, similar to other urban farming projects in the Philippines. This result supports other studies showing that government involvement is important in improving community-based aquaculture projects. For example, Dey et al. (2021) in their study "Sustainable Aquaculture Development in Southeast Asia" found that local government support in training and funding helps boost participation in aquaculture projects. Similarly, Giron et al. (2020) in the Philippine Journal of Fisheries highlighted that policies and cooperatives backed by local governments encourage small farmers to engage more in fish farming. These studies prove that when local governments give strong support, aquaculture activities are more likely to succeed.

It is recommended that Barangay Mabolo focus first on forming a cooperative for urban fish farmers so they can share resources and work together more effectively. The barangay government should also provide financial help and materials to those who want to start fish farming. Training should still be offered but in a more practical way, such as through pond visits or simple demonstrations. Lastly, the barangay should create clear rules and coordinate with government agencies like BFAR and DA to gain more support for these projects.

Table 2.1 Factors affecting the willingness of the community in terms of Non-Governmental Organization (NGO)

Statement	***Mean***	***Rank***	***Interpretation***
1. NGOs in the community will also provide adequate support for livelihood programs like catfish farming.	4.07	*1*	*SW*
2. NGOs will provide financial or material support (e.g., fingerlings, feeds, equipment) to the constituents interested to start catfish farming	4.03	*2.5*	*SW*
3. NGOs will collborate with the government to strengthen livelihood programs in the community.	4.03	*2.5*	*SW*
4. NGOs can conduct mentorship programs in which beginner farmer will be pair with experienced catfish farming for intensive inputs	4.00	*4.5*	*SW*
5. *The involvement of NGOs increases my confidence to participate in catfish urban farming.*	4.00	*4.5*	*SW*
Overall	***4.03***		***SW***

Legend: Note:4.21-5.00 Very Much Willing (VMW), 3.41-4.20 Somewhat Willing (SW), 2.61-3.40 Neutral (N), 1.81-2.60 Not Very Willing (NVW), 1.0-1.80 Not Willing at all (NWAA)

Table 2.1 measured how people feel about NGOs helping with catfish urban farming. Each statement was rated on a 1–5 scale and the average (overall mean) was 4.03, which falls under "Somewhat Willing (SW)". The top idea with mean of 4.07 is that NGOs will give useful livelihood programs or support. While conducting of mentorship programs and involving of NGOs increases confidence to participate in urban farming gets the lowest mean of 4.0.

A mean just over 4 means many chose "somewhat willing" rather than "very much willing." That suggests trust but also caution. People likely believe NGOs can provide tangible help (money, fingerlings, feed, equipment), but they may worry about how steady that help will be or whether it reaches everyone. The close scores across items indicate agreement about several NGO roles: funding, materials, training, and collaboration. The slightly higher score for livelihood programs (4.07) shows people value concrete, organized programs over one-off donations. Lower scores for mentorship and confidence (4.00) hint that while people welcome mentoring, they may need proof that mentors are effective or accessible.

From the results, it can be understood that the community sees NGOs as dependable partners in promoting catfish urban farming. The "Somewhat Interested" rating means that people are open and willing to participate if NGOs continue to show visible and consistent support. Respondents trust NGOs to provide the necessary resources such as materials, equipment, and training that will help them start and sustain their catfish farms. However, the slight difference in scores also suggests that while residents believe in the potential of NGO involvement, they still want to see concrete examples of successful projects before becoming fully confident. This shows that the community's interest is already present but needs more assurance through actual actions and results from NGO programs.

The findings of this study align with verified research emphasizing the significant role of NGOs in improving community-based livelihood and aquaculture programs in the Philippines. According to Pomeroy, de la Gente Ferrer, and Pedrajas (2017), livelihood projects in Philippine fishing communities are more successful when NGOs and local organizations ensure strong community involvement, proper training, and linkages to markets. This supports the present study's result that NGO assistance can increase community interest and participation in catfish urban farming. Similarly, the WorldFish Center (2014) reported that improving productivity in aquatic farming systems contributes to better livelihoods when supported by effective institutional partnerships such as NGOs and government agencies. Furthermore, Suh (2015) found that partnerships between farmers and NGOs in community-based organic agriculture programs helped smallholders gain resources, technical skills, and higher income opportunities. These studies confirm that NGO involvement can lead to more sustainable and productive livelihood programs. In connection with this study, NGOs in Camarines Sur can play a vital role in strengthening urban catfish farming by offering financial support, technical training, and mentorship programs that empower residents to participate actively and confidently in aquaculture initiatives.

It is recommended that NGOs strengthen their presence and involvement in the community by offering more practical programs that directly address the needs of future catfish

farmers. They should organize hands-on training sessions, provide financial or material assistance, and conduct mentorship programs where beginners can learn from experienced farmers. Collaborating closely with the local government and barangay officials can also help ensure that support programs are properly implemented and sustained. Moreover, NGOs should regularly monitor and evaluate their projects to ensure that farmers receive continuous guidance and motivation. By maintaining open communication and showcasing successful outcomes, NGOs can build trust and inspire more residents to actively engage in catfish urban farming, making it a long-term livelihood opportunity for the community.

PROPOSED TRAINING

Title of Training
"Urban Catfish Farming Capacity Building and Cooperative Formation Program"

Target Participants
Residents of Barangay Mabolo interested in starting or sustaining catfish farming

Expected Output

- By the end of the training, participants should be able to:
- Construct or improve a backyard catfish system
- Understand proper feeding, water quality, disease management
- Prepare cost-profit estimates for their farm
- Form an organized Urban Catfish Growers Cooperative / Association

Suggested Resource Speakers

Speaker	***Agency/ Organization***	***Topic***
BFAR Aquaculture Technician (Naga City Satellite Office)	BFAR Region V	Catfish production technical training & pond management
Representative from DA – Agricultural Training Institute (ATI Bicol)	DA-ATI	Feeds, nutrition & cost-effective production
Local Experienced Catfish Farmer (from Mabolo or nearby barangay)	Community Mentor	Actual farmer-to-farmer sharing & demo
LGU Naga – City Agriculture Office Livelihood Coordinator	LGU	Financial linkages, permits, local ordinances
Cooperative Development Officer (CDA / Provincial Cooperative Office)	CDA / Provincial Government	Cooperative formation and management

Training Matrix

Day 1: Introduction and Basic Technical Training

Activity	***Facilitator***
Registration & Opening Program	Barangay Officials
Opening Remarks	Punong Barangay
Rationale of the Training (Overview of Study Results)	Researcher
Session 1: Introduction to Urban Catfish Farming (Benefits, income potential, success stories)	BFAR Technician
Session 2: Pond Types and Construction (Plastic drum ponds, earthen ponds, tank setup, drainage solutions)	BFAR Technician
Hands-on Demo: Constructing a Plastic Pond or Drum Pond	BFAR + Local Farmer
Group Work: Each participant drafts pond design plan	Facilitators
Reflection & Day 1 Closing	Training Team

Day 2: Farm Management and Business Side

Activity	***Facilitator***
Recap of Day 1	Participants
Session 3: Water Quality & Biosecurity Practices (Proper water change, probiotics, aeration)	ATI / BFAR
Session 4: Feeding Management (Commercial vs Local Feeds, Feeding schedule, Feed conversion)	ATI Bicol
Q&A	Panel
Session 5: Common Catfish Diseases & Treatment	BFAR Aquaculture Specialist
Session 6: Production Costing & Income Computation	LGU City Agriculture Office
Workshop: Each participant prepares their Mini Catfish Business Plan	Facilitators

Day 3: Cooperative Building and Market Linkages

Activity	***Facilitator***
Recap of Day 2	Participants
Session 7: How to Form a Catfish Growers Cooperative / Association	Cooperative Development Officer
Organizing of Catfish Farmers' Core Group (Elect officers, membership listing)	Barangay Officials
Signing of Commitment & Cooperative Formation Resolution	All Participants
Market Linkage Session (Connecting to restaurants, online selling, market day stalls)	LGU City Agri Office
Program Closing & Awarding of Certificates	Barangay + Agencies

Training Materials and Resources Needed

1. Tarpaulin pond / plastic drums / blue lining
2. Hose and basic PVC fittings
3. Sample measuring cups for feed
4. Water quality test strips (if available)
5. Printed manuals from BFAR / ATI

Budgetary Requirements

Particulars	***Budget per pax***	***Total***
Meal for 60pax @250 pesos /pax exclusive with am snacks, lunch and pm snacks for 3days	250 x 60 pax x 3days	45,000.00
2 reams Bond papers long	210.00	420.00
1 set ink	1200.00	1,200.00
10pcs White Board Marker	30.00	300.00
1pack Special paper, 100 pcs/pack	400.00	400.00
10 pcs Token for guest	500.00	5,000.00
10 pcs Certificate frame	50.00	500.00
total		52,820.00

LIMITATIONS OF THE STUDY

This study has several limitations that should be considered when understanding the results. It involved only thirty (30) participants from Barangay Mabolo who were chosen because of their interest or involvement in livelihood activities, so the findings may not represent the whole community or other barangays in Naga City. The data came from questionnaires based on personal opinions, which might have been influenced by expectations or the desire to give positive answers, affecting the accuracy of the results about willingness and ability to engage in catfish farming. The study was also done soon after events like the flooding from Typhoon Kristine and the construction of the Almeda–Mabolo Bypass Road, which may have reduced farming spaces, resources, and confidence among fish farmers, making their responses reflect short-term problems rather than long-term plans. It did not include an actual financial test of catfish farming but relied on small farmers' reports and opinions about profitability, without detailed analysis of market changes, seasonal price shifts, or fish demand. Lastly, it only looked at the presence and perceived influence of government and NGO support, not their actual effectiveness or consistency. Because of these limits, the results should be seen as early signs of community interest and potential, and future studies should include more participants, real farming experiments, long-term monitoring, and deeper market analysis for more reliable results.

Training, coordination for the guest and budgetary requirements to implement the said program will be discussed to the Barangay for approval. All budgets must come from the barangay funds or any other funds subject to usual accounting ang auditing rules and regulations.

CONCLUSIONS

This study concludes that Catfish Urban Farming in Barangay Mabolo, Naga City holds significant potential as a community livelihood, but several critical factors must be addressed for it to become truly productive and sustainable. The assessment of current farm conditions reveals that while residents have already adopted basic aquaculture practices using accessible materials such as plastic ponds, available water sources, and commercial feeds the overall system remains simple and underdeveloped**.** Essential management components such as consistent water quality monitoring, use of probiotics, protective gear, and disease surveillance are practiced irregularly. These gaps expose farms to health risks, environmental vulnerabilities, and inconsistent growth performance. As a result, profitability remains low for most farmers, and production is easily disrupted by challenges such as flooding and limited technical knowledge.

The study also concludes that the community's willingness to engage in catfish farming is high**,** driven mainly by the desire for structured support systems rather than individual effort alone. Residents expressed the strongest willingness toward the formation of a cooperative and the availability of financial assistance indicating that collective action, shared resources, and institutional backing are essential motivators for participation. Their positive perception of NGO involvement further shows the community's openness to partnerships that can provide materials, mentorship, and long-term project monitoring. This means that the community is not resistant to adopting aquaculture technologies; rather, they need confidence, support mechanisms, and visible success models to fully commit.

The proposed Urban Catfish Farming Capacity Building and Cooperative Formation Program directly addresses the weaknesses identified in the current system. The training program offers a complete package technical skills, hands-on demonstrations, disease management, business planning, and cooperative organization that equips participants with the competence and structure required for sustainable catfish production. The inclusion of agencies such as BFAR, ATI, and the Cooperative Development Authority ensures scientific, technical, and financial guidance. Forming a cooperative provides farmers with collective bargaining power, reduced costs through bulk purchasing, and improved market access, which were identified as major needs based on the study's results.

Overall, the study concludes that catfish urban farming in Barangay Mabolo is feasible, promising, and highly acceptable to the community, but its success depends on strengthened institutional support, improved farm practices, and organized community participation. When these factors are aligned, catfish farming has the potential to become a steady livelihood source**,** reduce food insecurity, and enhance the socio-economic resilience of the barangay. The proposed training program serves not only as a response to existing gaps but also as a roadmap for transforming small, informal fish farms into a structured, community-driven, and income-generating urban aquaculture system.

RECOMMENDATIONS

The study recommends strengthening technical and farm management practices among catfish farmers in Barangay Mabolo by enhancing their knowledge of water quality monitoring, biosecurity, and feeding management. Regular and affordable water testing should be encouraged, supported by barangay-led monitoring every two weeks. Basic biosecurity measures must be introduced, including the use of protective gear, sanitation tools, and disease awareness training. To improve pond conditions, the use of probiotics and water treatment products should be promoted, with LGU and BFAR offering initial supplies and conducting demonstration activities. Feeding practices can also be improved by teaching cost-efficient feeding schedules, proper feed conversion techniques, and the use of alternative feeds to lessen expenses.

Addressing environmental challenges, particularly flooding, is also essential. Farmers should be guided in improving pond and site engineering by elevating pond embankments, adding drainage canals, and adopting tarpaulin-lined or modular ponds that are less prone to flood damage. Coordination with the LGU is necessary so that catfish farms are included in barangay disaster risk reduction plans and receive engineering assistance for safe placement.

Market access must be strengthened to boost income opportunities. Farmers should be connected to diverse market channels such as local restaurants, market vendors, and online selling platforms, while encouraging farm-to-table selling within the community. Organizing periodic "Catfish Harvest Days" can help attract buyers and showcase local production. Value-adding activities such as smoked, marinated, or processed catfish products may further increase profitability.

To support these efforts, government involvement should be enhanced through the establishment of a Barangay Urban Aquaculture Support Program that offers financial aid, start-up kits, and grants for new growers. Clear policies and guidelines for urban aquaculture should be formulated to simplify permits, ensure regular inspections, and standardize backyard fish farming practices. Stronger collaboration with BFAR, ATI, and the City Agriculture Office is needed to ensure continuous monitoring, technical visits, and annual training.

NGO participation is also vital. Partnerships with organizations that can provide inputs such as fingerlings, feeds, or micro-loans will help sustain production. NGOs may also facilitate mentorship programs by pairing beginners with experienced catfish growers, as well as assist in documentation, project evaluation, and monitoring for long-term impact.

The formation of an Urban Catfish Growers Cooperative or Association in Mabolo is highly recommended to unify farmers and strengthen their bargaining power. Through the cooperative, residents can be mobilized into a formal group with elected officers, clear membership rules, and internal guidelines. The cooperative can reduce costs through bulk purchasing of inputs, act as a marketing arm to negotiate better prices, secure market contracts, and establish savings or revolving funds for loans, emergencies, or farm expansion.

Implementing the proposed 3-Day Capacity Building Training Program is crucial for skill development. The training should cover essential topics such as pond construction, feeding management, water quality, disease control, costing, and market linkage. Hands-on

demonstrations should be conducted to boost confidence and practical skills, followed by progress evaluations through surveys or monitoring visits.

Finally, continuous research and monitoring must be carried out to ensure long-term sustainability. Annual assessments of farm performance should track survival rates, growth, profitability, and disease cases. Future studies may explore alternative feeds, low-cost biosecurity approaches, economic analyses, and climate-resilient pond designs to further improve catfish urban farming practices.

Overall, by enhancing technical skills, strengthening organizational support, and building partnerships among government agencies, NGOs, and community members, catfish urban farming in Barangay Mabolo can progress from small-scale backyard activities into a sustainable, profitable, and community-driven urban livelihood system.

References

Bureau of Fisheries and Aquatic Resources. (2020). *Philippine fisheries profile 2020*. Department of Agriculture–BFAR. https://www.bfar.da.gov.ph

Bureau of Fisheries and Aquatic Resources. (2023). *Catfish aquaculture development report*. Department of Agriculture, Philippines.

BFAR Region V. (2025, March 28). *Strengthening the hito industry: Bicol hito farmers undergo technical training*. Department of Agriculture, Philippines.

Chambers, R., & Conway, G. (1992). *Sustainable rural livelihoods: Practical concepts for the 21st century* (IDS Discussion Paper No. 296). Institute of Development Studies.

Dey, M. M., Alam, M. F., & Bose, M. L. (2017). Sustaining aquaculture by developing small-scale market linkages in Asia. *Aquaculture Economics & Management, 21*(3), 305–322. https://doi.org/10.1080/13657305.2017.1307012

Dey, M. M., et al. (2021). Sustainable aquaculture development in Southeast Asia. *Aquaculture Reports*.

Food and Agriculture Organization. (2019). *Small-scale aquaculture: Global status and development trends* (FAO Fisheries and Aquaculture Technical Paper No. 631). FAO.

Giron, M. P., Dela Peña, M. R., & Natividad, A. P. (2020). Strengthening local aquaculture systems through cooperative development. *Philippine Journal of Fisheries, 27*(2), 112–124.

Gupta, M. V., Bartley, D. M., & Subasinghe, R. P. (2018). *Small-scale aquaculture for rural livelihoods: Review of current practices and opportunities*. WorldFish Center.

Olagan, M. T., Fernandez, R. C., & Villanueva, R. C. (2021). Challenges and prospects of small-scale aquaculture in the Philippines. *Philippine Journal of Fisheries, 28*(2), 105–116.

Philippine Information Agency. (2025, April 22). *BFAR pushes catfish farming as alternative to hog-raising in Bicol*. https://pia.gov.ph

Phillips, R., & Pittman, R. (2009). *An introduction to community development*. Routledge.

Pomeroy, R. P., de la Gente Ferrer, A. J., & Pedrajas, J. (2017). An analysis of livelihood projects and programs for fishing communities in the Philippines. *ResearchGate*. https://www.researchgate.net/publication/317271465

Southeast Asian Fisheries Development Center–Aquaculture Department. (2000). *Crude protein in hito feed improves profitability*. SEAFDEC AQD, Iloilo, Philippines.

WorldFish Center. (2014). *Increasing productivity and improving livelihoods in aquatic farming systems*. WorldFish Digital Archive.

Yap, G. P., Dela Peña, M. R., & Natividad, A. P. (2019). Flooding vulnerability and adaptive strategies among aquaculture farmers in the Bicol Region. *Journal of Environmental Studies and Aquatic Resources, 5(1), 45–56.*