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| RESEARCH ARTICLE

## Assessing the Effectiveness of Agriculture Intervention Programs on the Socio-Economic Status of Fisherfolk in Bauko, Mountain Province

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| ABSTRACT

This research explored the effectiveness of Agriculture Intervention Programs from different government agencies to interested residents of Bauko, Mt. Province. This study employed an Explanatory Sequential Mixed-method to determine the perceived effectiveness of the agricultural intervention programs to 230 fisherfolk. Such respondents were filtered by stratified sampling from 539 constituents from the 18 barangays of the municipality of Bauko, Mt. Province. Data was collected through a survey instrument, then analyzed for frequency, percentage, and mode. Then, ten respondents were selected by criterion sampling for further data gathering through interviews. After which, the data collected was subjected to thematic analysis. From the interviews conducted, it was found that the perceived impact of the intervention programs on the socio-economic status of the fisherfolk is positive, as shared by the respondents. It provided them additional income, served as an extra source of food, and fostered better social interactions within their community. The findings highlight the need for the Integrated and Sustainable Development for Aquaculture and other agencies to expand their assistance beyond fingerling distribution to sustain fisherfolk productivity and thereby stabilizing socio-economic status.

| KEYWORDS

Fisherfolk, effectiveness, socio-economic status, agricultural programs, agencies, explanatory sequential, ISDA, PVO, tilapia, fish farming.

| ARTICLE INFORMATION

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### 1. Introduction

Fishing is one of humanity's oldest means of livelihood, sustaining millions worldwide. Globally, around 500 million people in developing nations depend directly or indirectly on fisheries and aquaculture for income and survival (FAO, 2020; Mills et al., 2024). Small-scale fisheries alone contribute at least 40% of the global catch, yet fisherfolk remain among the most financially vulnerable sectors (Stanford Center for Ocean Solutions, 2024; WorldFish, 2024; Pomeroy et al., 2012). With the advancement of technology in the industry, the majority of fisherfolk were continuously engaged in traditional practices that exposed them to ongoing livelihood challenges (Pramanik, 1993).

Fishing is a significant source of income for many impoverished individuals in the Philippines. Meanwhile, the poverty incidence among fisherfolk was 27.4% in 2023, one of the worst across all basic sectors. The Indigenous Peoples have a poverty rate of 32.4% and slightly higher than the farmers' figure at 27.0 (Philippine Statistics Authority [PSA], Philippine Daily Inquirer via GMA News, Manila Standard Aug-Sept coverage; PSA data reported by PNA; PSA data as cited in GMA News 2023). Both national programs, namely the Agricultural and Fisheries

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Mechanization (AFMech) Law (RA 10601, 2013). The Provincial Agricultural and Fisheries Extension System (PAFES) is trying to modernize the sector, but the execution is still not balanced. Agriculture typically gets more attention than fisheries (DA, 2020; DA official portal, n.d.; Republic Act No. 10601, 2013). The geographical location of Bauko, Mt. Province, caused fisherfolk in the area to face difficulties and challenges in tilapia production. Located at 1,270.3 meters above sea level, it depends on rivers, lakes, and tanks that are struggling to survive economically but are also wrestling with limited technology, unpredictable harvests, and poor access to profitable markets. The fisherfolk receive minimal support in the province's official roadmap (the CPAFEP), which lists only a single priority for the sector (PSA, 2022). Still, the local fisherfolk have adapted creatively, the rice-fish culture, like in the barangay of Bila, Banao, and Guinzadan. This rice-fish culture integrates traditional farming practices to create a new and alternative source of income, showing a promising venture that tilapia has already emerged in Mountain Province as the top municipality fish product, registering 0.41 metric tons in early 2021 (PSA, 2021).

The local fisherfolk's own initiatives are now being formally supported by the government. The Provincial Veterinary Office (PVO) provided the support in compliance with the 1991 Local Government Code, which expands the traditional focus from livestock to include fisheries and aquaculture. The PVO is a local government agency that is responsible for delivering direct services. It provides technical training, expert advice, and program implementations to the fisherfolk and farmers. One support that reached Bauko is the Regular Fishery Program. This program has a P100,000 fund yearly for dispersing fingerlings, feeds and feeds subsidies and monitoring projects. Another is the Integrated Sustainable Development for Aquaculture and Fisheries (ISDA) program. The ISDA program funded by the Governor's office is designed to empower local communities, strengthen the food supply, and protect vital water environments. The program demonstrates a strong and growing commitment from the government, as evidenced by a significant increase in its budget, rising from an initial of P500,000 in 2023 to P700,000 by 2025. This expanded funding will lead to larger development projects. As well as it creates more livelihood opportunities for residents and increase its environmental protection efforts. Moreover, the PVO helps by providing needed technical training. It focuses on the prevention of disease and making sure that there are proper assistance and supervision.

Building on the local efforts, the national government is stepping in to give the fisherfolk a powerful boost. The programs like BFAR-SAAD play an important role because of the important tilapia fingerlings they provide, which are needed for successful fish production, support the rice fish practices in rice paddies, and use cemented tanks in Bauko and neighboring places. Additionally, national agencies are funding training initiatives to teach fisherfolk valuable skills in processing and adding value to their catch, which means they can sell their products for more money and improve their income. Considering all these factors, the grassroots creativity, local government support, and robust national programs have been important. It signifies that the fishery is now finally establishing themselves as a serious, stable component of the province's overall agricultural landscape. Where it provides reliable livelihood opportunities and helps ensure food security for these upland communities, despite the clear progress and the introduction of innovative projects and government aid. There is a need to recognize that the fisherfolk in Bauko are still facing major economic problems. It indicates that these challenges are primarily revealed in low income, poor access to viable markets, and a limited acquisition of modern skills (DA-SAAD, 2025). This shows that while there are programs ongoing, their full economic benefit hasn't realized by the local fishing communities. Which also indicates deficit. In the research of Briones et. Al. (2017) it confirmed that fisheries can reduce poverty. Additionally, it is not widely known how standard programs affect high-altitude, landlocked environments (Israel, 2019). The effectiveness of the IMTA system in Guimaras helped the financial and social well-being of stakeholders (Salayo et al., 2022), giving the necessity of explicitly examining the local impacts of current aid programs on the lives of mountain fishermen.

The Participatory Action Research of Tolentino et al. (2015) that was conducted in Misamis Oriental resulted that when fisherfolk are directly involved in designing their own projects, it naturally develops greater confidence and the ability to work together to protect their resources. Other study in Bulacan conducted by Manlosa, (2023) confirmed that strong community bonds make small-scale fish farmers tougher and more resilient in the face of challenges. The main issue often observed in major livelihood initiatives is the over-focus on boosting production but frequently overlooking the vital business skills, such as financial management and effective marketing of the

product (D. Joyce, 2022). This oversight often prevents farmers and fisherfolk from realizing their full profit potential. We will achieve this by systematically investigating the current economic status of Bauko's fisherfolk, assessing the tangible assistance they have received from the local ISDA and PVO programs, pinpointing the specific operational obstacles they encounter, and evaluating the programs' real-world impact. The ultimate goal is to generate concrete data that can be used to formulate more practical, effective, and inclusive fisheries development strategies for the future.

## **2. Methods**

### **2.1 Study Design, Population, and Setting**

This study employed explanatory sequential mixed- method design to determine the impact of the agricultural intervention programs. It utilizes both quantitative and qualitative data. This design is suited for evaluation and social science researches as asserted by Palinkas, L. A., & Soydan, H. (2020). It addresses the qualitative questions of "how and why" which were developed based on the quantitative data.

For the socio-demographic data of fisherfolk, quantitative method was employed. A total of 230 fisherfolk were guided to accomplish the socio-demographic questionnaires. The respondents of the study were selected from a larger population of 539 fisherfolk in the Municipality of Bauko, Mountain Province using stratified sampling. A 2021 study conducted by Pascual-Fernández et al. showed that stratified sampling is a good method to determine the differences in the socio-economic status of fisherfolk.

From the 230 fisherfolk respondents, ten (10) were selected using criterion sampling. The qualitative approach used probing questions. It was used to explore the challenges, opportunities and impacts of the intervention programs. According to Creswell and Creswell (2022), respondents chosen should meet specific criteria. This was done to address the research questions of the study. The following are the criteria: (a) a fisherfolk who have been into inland fishing for a minimum of 5 years; (b) have a minimum harvest of 50 kilograms of tilapia per cycle; (c) a beneficiary of the intervention programs and (d) have been provided with fingerlings, fertilizers, and other benefits/assistance from the Integrated and Sustainable Development for Aquaculture (ISDA), Provincial Veterinary Office (PVO) in Mountain Province.

### **2.2 Study Variables, Instrument, and Data Collection**

This study followed a three-phase approach. It includes a pre-implementation phase, an implementation phase, and a post-implementation phase. Documents to secure ethical and other administrative preparations were done during the pre-implementation phase. The study was approved by the Mayor's and Barangay's Office in Bauko, Mountain Province. During the implementation phase, data were collected from the fisherfolk through survey questionnaires and audio recordings. The audio recordings were transcribed from the local dialect to a written form. The transcribed information's were translated in English for analysis.

### **2.3 Data Analysis**

To assess the data on the socio-economic profile of the fisherfolk respondents, the numerical data from the survey questionnaires were analyzed. It was summarized, then the frequencies and percentages were calculated which provided a general overview of the fisherfolk respondents (Salkind, 2020).

Thematic analysis was used to evaluate the information's gathered from the interview of the ten (10) fisherfolk. This was consistent with the insights of Braun & Clarke (2021), who emphasized that it is a systematic process of identifying meaningful patterns across a dataset. The audio recordings were played several times to transcribe the exact words uttered by each fisherfolk during the interview. Transcribed words and phrases were translated in English. Each response was given different codes then it will be grouped into themes (Braun & Clarke, 2021). The themes formed were used to discuss the findings of the research problems. Combining the both quantitative and qualitative results were used to formulate the comprehensive conclusion of the study (Creswell & Creswell, 2022).

**2.4 Ethical Considerations**

The researchers conducted the study following the ethical standards of research. They secured approval from the Office of the Mayor and the Barangay in Bauko, Mountain Province. Before starting data collection, informed consent was obtained from the officials in charge; verbal and written assent were obtained from each fisherfolk respondent. The researchers assured all respondents of confidentiality and voluntary participation. They were ensured that respondents of the study shall receive accurate information regarding the study's purpose, procedures, and data privacy policies. The respondents who were qualified for the interview were given consent form. They were only interviewed if they agreed to participate and be a part of the study. The researchers maintained strict confidentiality and handled all data following ethical guidelines. This was done to ensure the integrity of the study and trust of the participants.

**3. Results**

**3.1 Socio-Economic Profile of Respondents**

The following table presents the socio-economic characteristics of the 230 fisherfolk respondents in the said province. Where it gives the summary of their primary occupations, monthly household income, and educational attainment with their respective frequency and percentage distribution on each category.

**Table 1: Socio-Economic Profile of the Fisherfolk Respondents**

Socio-Economic Variable	Category	Frequency (f)	Percentage (%)
<b>Occupation</b>	Fishing only	22	9.6
	Fishing and Farming	162	70.4
	Fishing and Other jobs	46	20.0
<b>Monthly Household Income in Fishing</b>	₱10,957.00 and below	101	43.9
	₱10,957.00 – ₱21,914.00	112	48.7
	₱21,915.00 – ₱43,828.00	17	7.4
<b>Educational Background</b>	No formal education	9	3.9
	Elementary level	20	8.7
	Elementary graduate	8	3.5
	High School level	67	29.1
	High School graduate	64	27.8
	Vocational/Technical	6	2.6
	College level	44	19.1
	College graduate	11	4.8
Postgraduate studies	1	0.4	
<b>Total Respondents</b>		<b>230</b>	<b>100</b>

### 3.2 Benefits/Assistance Received from Integrated and Sustainable Development for Aquaculture and Provincial Veterinary Office

The following figure summarizes the benefits/assistance received by the ten respondents during the interview.

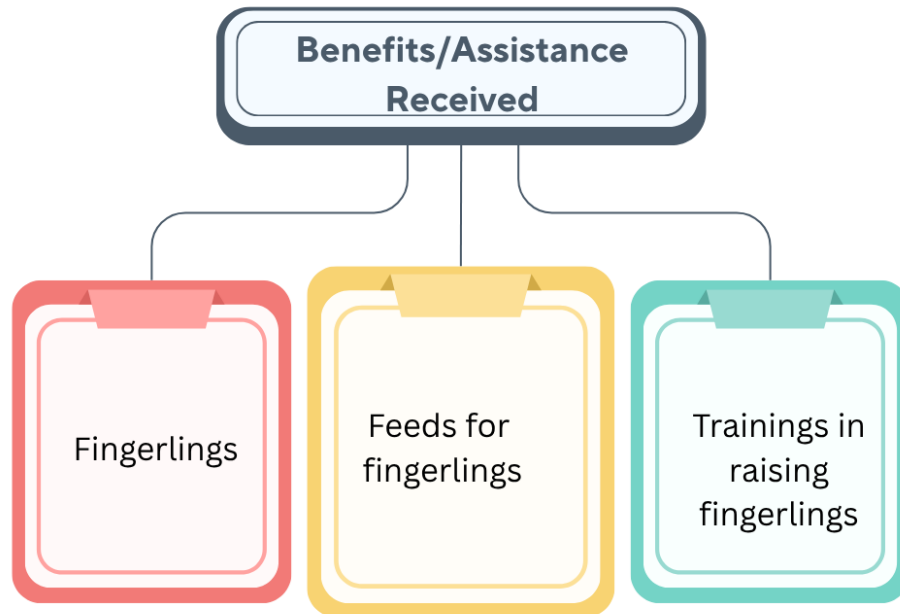


Figure 1: Benefits/Assistance Received by Fisherfolks

### 3.3 Challenges Encountered by the Fisherfolks

Figure 2 presents the challenges that the fisherfolk respondents encountered during the implementation of the program.

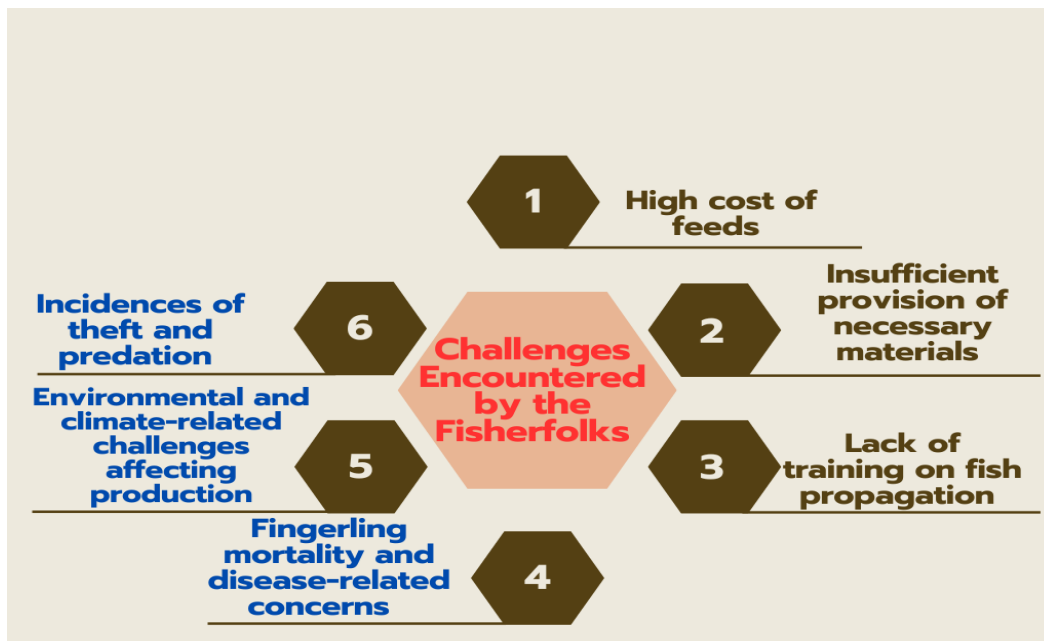
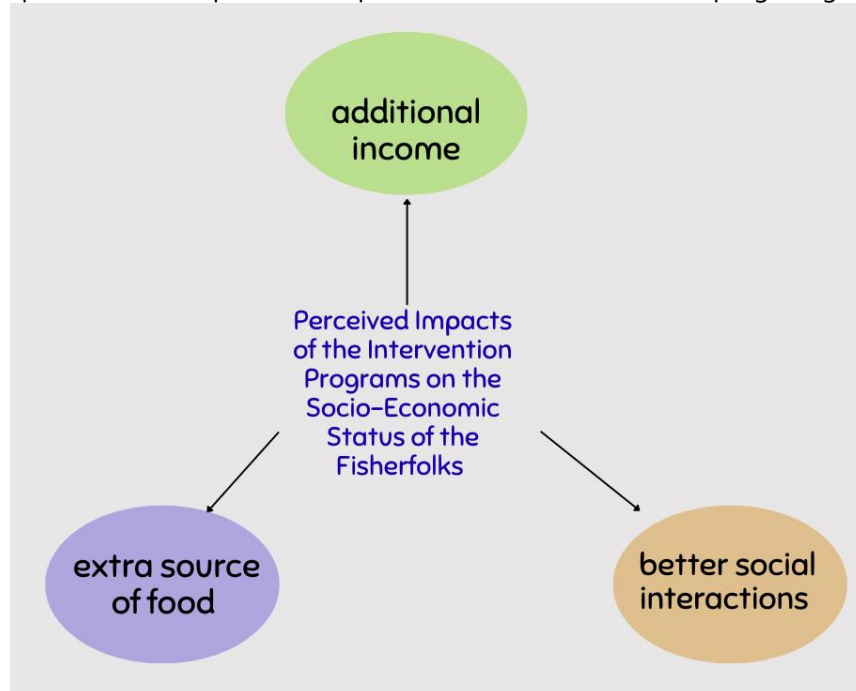


Figure 2: Challenges Encountered by the Fisherfolks

**3.4 Perceived Impacts of the Intervention Programs on the Socio-Economic Status of the Fisherfolks**

Figure 3 shows the impact that the respondents experienced on the intervention program given for them..



**Figure 3:** Perceived Impacts of the Intervention Programs on the Socio-Economic Status of the Fisherfolks

**4. Discussion**

**4.1 Socio-Economic Profile of Respondents**

The study results confirm that fisherfolk have multiple livelihood as shown in Table 1. Out of the 230 respondents, 22 (9.6%) were identified as plain fishermen, 162 (70.4%) combined fishing with farming as their main livelihood sources, and 46 (20%) reported fishing along with other income-generating activities such as salaried jobs, small businesses, or manual labor. Most fisherfolk have different sources of income to be able to sustain their families’ needs. In a 2022 study conducted by Allison et al., livelihood diversification is commonly reported as a strategy to stabilize household income and increase resilience. A research conducted in the Philippines and Southeast Asia found out that fishermen combine fishing with farming, small scale businesses or seasonal labor jobs to add up to their low fishing incomes (White et al., 2024; Aguinaldo et al., 2023).

The fisherfolk have low income even if the government has provided benefits and assistance. There were 101 fisherfolk (43.9%) that earn ₱10,957.00 and below, 112 (48.7%) fisherfolk earn between ₱10,957.00 and ₱21,914.00, while only 17 (7.4%) fisherfolk earn between ₱21,915.00 and ₱43,828.00. Several researches confirm that local fisherfolk in the Philippines remain among the poorest (Philippine Statistics Authority [PSA], as cited in Baco, 2025; Degorio et al., 2023).

Fisherfolk have different educational background. There were nine (3.9%) fisherfolk who have no formal education, 20 (8.7%) fisherfolk who reached elementary level, and 8 (3.5%) fisherfolk completed elementary education. On the other hand, 67 (29.1%) reached high school level, and 64 (27.8%) graduated from high school. Also, 6 (2.6%) completed vocational or technical courses, 44 (19.1%) reached the college level, 11 (4.8%) graduated in college, and only 1 (0.4%) pursued postgraduate studies (Table 1). Although several fisherfolk attained secondary and tertiary education but most of them have limited educational attainment. Low educational background hinders the fisherfolk to adopt to technology and more advanced economic activities (IJFMR impact assessment, 2025; Aguinaldo et al., 2023).

#### **4.2 Assistance Received from ISDA (Integrated and Sustainable Development for Aquaculture) and PVO (Provincial Veterinary Office)**

The benefits/assistance provided by ISDA and PVO were limited, consisting almost exclusively of fingerlings (juvenile fish ready for stocking). The data from the fisherfolk clearly showed this limitation, as one respondent simply said of receiving "*Fingerlings only*," a sentiment verified by many others. For instance, Respondent No. 3 confirmed receiving "*500 fingerlings, 2000 fingerlings, and also 2000 fingerlings from OMAG*," while Respondents No. 4, 5, and 6 mentioned receiving just "*Fingerlings of tilapia and catfish*" or "*Fingerlings of tilapia*." The most critical complaint was, "*Fingerlings only without feed*." This limited assistance threatens to generate large initial program costs while delivering insignificant long-term gains, which fail to achieve self-sufficiency. The juvenile fish are highly susceptible to stunted growth and mortality in the absence of essential inputs, such as formulated feeds, which make up 40–60% of production costs. This makes a profitable harvest likely to fail. To lower failure rates and less dependence to continuous assistance, the Food and Agriculture Organization (FAO) emphasized repeatedly that a comprehensive combination of high-quality stock, essential feed, and technical knowledge is crucial for effective fish farming. This is continuously supported by research, which shows that the primary obstacles stopping subsistence farmers from becoming successful company owners are limited technical know-how and insufficient access to high-quality feed (WorldFish; MDPI). In excluding these crucial components, the profitable opportunity turns into a risky endeavor for the beneficiaries.

The secondary benefits/assistance received are feeds for the fingerlings (formulated feeds) received by Respondent No.8, affirming, "*The first three that I received are only fingerlings without feeds but the fourth has feeds*". This shows uneven allocation of resources and a major shortcoming of the aquaculture support. Only one out of ten respondents, as demonstrated by Respondent No. 8 stated, "*The first three that I received are only fingerlings without feeds, but the fourth has feeds*". The essential supplement that was obtained blatantly shows a serious problem of inequality and a breakdown in the implementation of standardized programs.

Respondents 7, 9, and 10 point out the inclusion of technical training together with the provision of fingerlings (and occasionally feeds). This suggests that this component plays a vital role in ensuring program sustainability and strengthening fisherfolk capacity, even when material support is inconsistent. Analyzing what participants No.7, 9, and 10 received, a key takeaway was that they received technical training along with the fingerlings, and sometimes even some feed. This really proposes that the training part is very important. It seems to be a vital way to keep the program staying longer and build up the skills of the fisherfolk, even if the material support, like the feed, which is not provided consistently.

This is illustrated by Respondent No. 7, who shared, "*There are fingerling varieties like tilapia, catfish, and the most recent was carp. There are also trainings because, before the government provides assistance, they first conduct training*," and by Respondent No. 10, confirming, "*I received fingerlings and feeds and several trainings*." Training sessions on water management and disease prevention are really an investment in the fisherfolk themselves. This training also acts as a long-term asset because it builds their skills and knowledge, also helping the fisherfolk to be more resilient and self-reliant. They can achieve better harvests on their own even if outside help is no longer available (WorldFish). Respondent No.9 highlighted this perfectly, saying: "*Received both fingerlings and feeds three times. After that, however, we only received fingerlings. Training on how to take care of tilapia was also provided*." This shows that the training serves as a vital tool that helps the fisherfolk succeed even when the expected material support, specifically the feeds, is suddenly no longer available.

The Food and Agriculture Organization (FAO) supports this perspective, emphasizes that technical capacity building is an indispensable, foundational element necessary for adopting best management practices, optimizing production efficiency, and empowering beneficiaries to transition into sustainable, business-minded fish producers (MDPI). The Food and Agriculture Organization (FAO) backs up this idea, stressing that teaching technical skills is an absolutely essential foundation. Pointing out the need to adopt the best management practices, get the most

efficient production possible, and finally help the beneficiaries become sustainable, business-minded fish producers (MDPI).

The assessment of benefits/assistance in Bauko, Mountain Province, shows notable differences in the degree of assistance received by the fisherfolk. The respondents all confirmed they got support from the ISDA and PVO programs; however, it's clear that the assistance they received did not cover everything they needed. The provided support based on the assessment in Bauko, Mountain Province, shows that the support received by the fisherfolk varies among all respondents. All respondents confirmed that they get help from the ISDA and PVO programs. This shows that the assistance given to them was incomplete. The interviews conducted clearly show that assistance was limited to just the fingerlings, and additional resources like feeds or technical training were not included. Respondent No.1 was very clear, stating that the help received was "Fingerlings only without feed. This form of assistance was also declared by other respondents, like Respondent No.3, who affirmed receiving "500 fingerlings, 2000 fingerlings, and also 2000 fingerlings from OMAG," and Respondents No. 4, 5, and 6, likewise mentioned that they received "Fingerlings of tilapia and catfish" or "Fingerlings of tilapia." In addition to the limited assistance, it was found that the delivery of support was inconsistent. For instance, Respondent No.2 noted getting fingerlings from both BFAR and OMAG/PVO, but this only happened *once*. They explained that the reason for this was that their share was given to "other fisherfolk" because they were absent at the time of distribution. Highlighting how the aid was managed and delivered. This very limited kind of assistance is a problem because it doesn't offer full framework approach needed to actually boost productivity and create a long-term, sustainable fishing industry for the beneficiaries.

In 2024, the Bureau of Fisheries and Aquatic Resources (BFAR) admits that the most common form of support is the fingerling distribution, and additional feed and technical support are frequently missing. This limitation is due to the lack of budget, as the cost of expensive inputs like formulated feeds is more than the program capacity (Muallil et al., 2021). These resulting inconsistencies in the program implementation served as evidence of a few achievements, while a comprehensive package of fingerlings, feeds, and training led to the successful inland aquaculture. This systemic issue is a recognized challenge: BFAR's National Aquaculture Development and Management Plan (ADMP) for 2025-2030 specifically aims to shift from this fragmented, input-based aid to integrated support systems that rely on standardized protocols and continuous funding to ensure equitable and effective assistance.

### **4.3 Challenges Encountered by the Fisherfolks**

The implementation of the programs faced significant challenges, which were high cost of feeds, insufficient provision of necessary materials, lack of training on fish propagation, fingerling mortality and disease-related concerns, environmental and climate-related challenges affecting production and incidences of theft and predation.

*High cost of feeds* is one of the challenges faced by fisherfolk in accessing agricultural government programs because they cannot purchase enough feeds for the whole fishing cycle. As three respondents shared (R4), "We are currently lacking the necessary fish feeds", (R6) "Even if they provided fingerlings, if we cannot support their feeds, their growth would take longer, and (R9) "First, the commercial feeds were expensive. We found a way to cut costs by feeding the fish alternately with rice bran, which we get as a byproduct of rice milling." Limited resources such as high cost of commercial feeds is one of the challenges faced by fisherfolk in accessing agricultural government programs because it lowers the fisherfolks' profit, with research consistently showing that feed expenses account for over 60% of operational costs (Dey et al., 2021), making this the primary factor discouraging small-scale expansion (Muallil et al., 2021) and compromising fish health and growth (Balisco et al., 2023).

*Insufficient provision of necessary materials* leads to significant losses when their ponds overflow during typhoons, and they cannot secure their fish. As one respondent commented (R5), "Perhaps there weren't enough seminars focusing on structural needs. This is evident because when the fish grow bigger and a typhoon hits, they are able to escape their enclosures. Also, we need more training." It highlights the need for resilient structure, especially during the rainy seasons. An analysis of Typhoon Rai (Odette, 2021) impacts found that fish cages accounted for 63% of

the damages in the aquaculture sector (FAO, 2023). The main issue was not just typhoons but the structures such as the enclosures of ponds and cages resulting in water overflow and fish escapes.

*Lack of training on fish propagation* is further reflected in R6's statement: "It is difficult for them to grow, especially since it is cold here in our place, which makes it harder for them to grow." It highlights the difficulties in managing the temperature and feeding management in colder inland fishing areas. According to the fishing experts from the fisheries sector in the Philippines, changes in temperature is a top exposure hazard in milkfish and tilapia aquaculture (Macusi et al., 2025).

Another challenge encountered by the fisherfolk were *fingerlings mortality and disease-related concerns* as observed by two respondents: R7, "Yes, there are casualties that cannot be avoided, but at least when the weather is good, only about 1% is lost." and R8, "Fingerlings were dying... my husband saw that the kingfisher were the ones eating... we bought a fly catcher and caught the kingfisher". These can lead to reduced harvests and lower profits. The lack of skills and understanding in disease prevention and pond management are major constraints that lead to losses (Mayasari, as cited in Marfil et al., 2025).

*Environmental and climate-related challenges affecting production* in fishing, as mentioned by R10, "Water availability is a major issue. During the summer, many fisherfolk must stop production because their ponds dry out. Production resumes only when the rainy season returns", results in an unstable fish production. Inland fisheries and aquaculture, which rely on stable water bodies like ponds, are predicted to be "severely impacted by drought, changing water levels and flooding events" (Macusi et al., 2025). The need to stop fishing activities until the rainy season returns illustrates this negative impact of reduced water in ponds.

*Incidences of theft and predation* as shared by R1, "Before they steal but now, they stop stealing our tilapia" decrease the harvests after one production cycle. In the studies on fisheries governance in the Philippines (Suh & Pomeroy, 2020), consistently cited as a significant and serious problem of poaching and illegal harvesting of cultured stock (like tilapia), which falls under the category of theft. Predation by various species such as predatory fishes and birds is a constant management struggle in pond and cage culture, resulting in losses that directly reduce the number of fish surviving to harvestable size are challenges in the aquaculture sector (Macusi et al., 2025). This loss is a regular, non-human form of "theft" of the final product.

#### **4.4 Perceived Impacts of the Intervention Programs on the Socio-Economic Status of the Fisherfolks**

Figure 3 shows the impacts of the aquaculture assistance program on fisherfolk where it resulted to additional income of the family, better social interactions within the community and an extra food source for the family.

There were four respondents who agreed that the program help them gain *additional income* that helped them improve their livelihood. (R1) said that "There was an improvement," (R2) also said that "The assistance was helpful since it adds to our budget and allows us to buy livestock to raise." (R3) described it as, "A good support from the government." and (R5) positively said, "It has been a great help." These responses proved that the intervention enhanced their family's income. Similar findings were reported by Mula et al. (2024) and Enema et al. (2024), who found that livelihood interventions in aquaculture improved household productivity, income, and resilience among small-scale fishers.

Another impact on the respondents was a *better social interaction*. (R7) approved that, "It has already contributed a lot, and I am very grateful to the program that reaches us farmers," From that, it shows a strengthened community ties and appreciation for government efforts. It is evident that sharing fish within communities promote social capital and mutual support (Balisco et al., 2023). Manlosa et al. (2023) also emphasized on their research that social bonding, bridging, and linking among fish farmers help in collaboration and sustainable livelihoods. These was supported by Akbari et. Al. (2023) on institutional mechanisms.

Finally, it also provided them *extra source of food*. Where two of the respondents affirmed it. (R9) proudly said, *"It is extremely beneficial because we can sell the excess for income and have a fresh, free source of food,"* while (R10) approved by saying, *"We save money by not having to buy fish."* These showed food security and cost savings for the fisherfolk. BFAR Region 10 reports of successful bangus production and the (ADMP) 2025–2030, which emphasizes aquaculture's role in ensuring affordable, high-quality protein (Dey et al., 2021). The same result shown on the findings of Parrao et al. (2021), who found that aquaculture enhances nutrition, productivity, and household empowerment.

However, the benefits were not the same. Considering what (R6) said, *"Maybe there is a little, just a little,"* and what (R8) added, *"We also need to buy feeds,"* This indicates challenges in resource sufficiency. While (R4) shared, *"It's good even if it's not a lot; at least there's something,"* reflecting modest yet meaningful benefits.

To sum up, the program did positively influence fisherfolk livelihoods through providing the respondents additional income for the family, strengthening community relations, and improving household food security. The findings align with Dey et al. (2021), Balisco et al. (2023), and Mula et al. (2024), who emphasized that livelihood programs enhance economic resilience and food sufficiency. Continuous provision of feeds, capacity-building, and community collaboration remain essential to sustain and amplify these gains.

## 5. Conclusion

The fisherfolk in Bauko, Mountain Province, depend on multiple livelihoods in addition to fishing. This is how they support themselves to become financially stable. Having a low income makes them face economic challenges. Also, their limited educational background hinders them from availing themselves of other technical opportunities. While government interventions through the Integrated and Sustainable Development for Aquaculture (ISDA) and Provincial Veterinary Office (PVO) have been successful in providing support, they are limited only to fingerling distribution without the essential addition of feeds or technical training. This non-holistic approach, according to the participants, hinders potential long-term sustainability and productivity. Other barriers in the inland fishing industry are the high cost of commercial feeds, the occurrence of environmental hazards like typhoons and water shortages during summer.

To ensure the long-term success and viability of the fishery sector in Bauko, Mountain Province, future programs for the fisherfolk must shift to an integrated and comprehensive support. The ISDA and PVO should expand their assistance beyond fingerling distribution by including provisions for feeds, technical training, and capacity-building workshops. This comprehensive approach can help to have productive fishing operations. It can also improve the economic stability of the fisherfolk. The local government units and partner organizations should introduce other livelihood activities, such as fish post-harvest processing and preservation. With this, they can market their processed products aside from selling their freshly harvested fish. The government should also offer other trainings, such as advanced aquaculture and financial literacy. Activities such as these help the fisherfolk to gain more knowledge and skills. They can use these skills to find more livelihood opportunities as well as a secure source of income.

## Author Contributions

**J. Galsi:** Conceptualization, Data Gathering; **C. Ballo:** Writing- Introduction, Methodology, Discussion; **S. Pilala:** Writing- Results, Original Draft, Survey Instrument ; **A. Amancio:** Uploading, Writing – Introduction, Survey Instrument; **O. Ancheta** – Conceptualization, Supervision, Review

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**Ethical Approval:** The researchers obtained consent from the respondents and assured them of confidentiality, anonymity, and the voluntary nature of their involvement.

**Competing Interest:** The authors declare that they have no conflicts of interest.

**Data Availability:** The corresponding authors will make the data available upon request.

**Declaration of Artificial Intelligence Use:** The authors utilized artificial intelligence (AI) tools and methodologies, specifically ChatGPT, Gemini for language refinement, formatting, and editorial assistance. After using this tool, the authors evaluated and revised the content as necessary, taking full responsibility for the published content.

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