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Lived experience of the fish cage owners engaged in milkfish farming

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Abstract

Aim: This study aimed to explore the lived experiences of fish cage owners engaged in milkfish farming in Tangub City, particularly the problems they encountered, the coping mechanisms they employed, and the additional programs they wished to receive from the Bureau of Fisheries and Aquatic Resources (BFAR).
Methodology: This phenomenological qualitative study involved twenty-one (21) fish cage owners who were directly involved in the financial and operational management of their farms. A researcher-developed and expert-validated semi-structured interview guide was used to gather data. Participants were purposively selected, and interviews continued until data saturation was reached. Thematic analysis was employed to identify recurring themes related to challenges, coping mechanisms, and program needs.
Results: The findings revealed ten major challenges: mussel infestation, adverse weather conditions, scarcity and high cost of milkfish feeds, fish theft, fish mortality, difficulty finding reliable buyers, financial challenges, unreliable caretakers, occurrence of diseases among milkfish, and low market prices. The coping mechanisms employed included techniques for preventing mussel overgrowth, use of water pumps, borrowing money to purchase fish feeds, consistent monitoring of fish cages, tenacity in managing operations, and coordination with legal authorities. The participants also identified four programs they wished to receive from BFAR: a mussel solution program, financial and fish feed assistance, a laboratory for milkfish disease management, and a milkfish buyer registration program.
Conclusion: Fish cage owners in Tangub City face environmental, financial, market, and operational challenges that affect milkfish production and profitability. Despite these challenges, they demonstrate resourcefulness and resilience through various coping mechanisms. The findings highlight the importance of sustained technical, financial, disease-management, and market-related support from BFAR to strengthen the sustainability and resilience of milkfish cage farming in the area.
Keywords: *Aquaculture, Milkfish Cage Farming, Fish Cage Owners, Coping Mechanisms, Sustainable Fisheries*

INTRODUCTION

Global fish cage farming faces major environmental, ecological, and socio-economic challenges. As pressure on capture fisheries has increased, aquaculture has expanded as an important source of aquatic food and protein. This expansion has heightened the need to manage production systems sustainably. In cage aquaculture, fishes are housed inside a man-made cage submerged in water. Fish culture is an essential activity for supplying food and protein. Thus production volume and efficiency in fish cage farming directly dictate the economic survival, food security and social stability of rural coastal households.

In addition, climate change directly threatens fish cage farmers by raising water temperatures, lowering dissolved oxygen levels, and triggering severe weather events that cause massive fish kills and financial losses. Certainly, milkfish (*Chanos chanos)* is one of the fish species that is most frequently cultivated in both domestic and foreign markets. Aquaculture experts can manage milkfish production in a regulated manner by using fish cage farming.

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The suitability of a site for milkfish cage farming depends on factors such as water quality, depth, currents, environmental conditions, and access to appropriate farm infrastructure. The challenges associated with milkfish cage farming may have significant implications for the long-term sustainability and profitability of farming.

Milkfish farming is practiced in several Southeast Asian countries, including Malaysia, the Philippines, and Indonesia. Culture methods vary according to local environmental conditions. Lee and Banno (n.d.) discuss milkfish culture and production in Southeast Asia. According to the Bureau of Fisheries and Aquatic Resources (BFAR, 2022), Asia accounted for 99.97% of global milkfish production in 2018. The roadmap reports 1,326,746.30 metric tons for Asia, 355.70 metric tons for Africa, and 51.1 metric tons for Oceania, for a global total of 1,327,153 metric tons.

Aquaculture has a long history in the Philippines, with milkfish farming being one of the earliest and most widely practiced forms of aquaculture in the country. In recent years, milkfish farming has continued to gain popularity in various regions as the industry has developed steadily over time. Lape and Dela Gente (2024) reported that in Davao Region milkfish production reached 19,398.77 metric tons (MT) in 2019, 16,527.34 metric tons (MT) in 2020, and 20,143.08 metric tons (MT) in 2021. Despite its widespread practice, milkfish production continues to face several challenges. Research on temperature management has demonstrated significant effects on the growth, development, and survival of milkfish in Philippine aquaculture systems (Lape & Dela Gente, 2024).

Orzales (2024) reported that Philippine milkfish production declined from 414,900 metric tons in 2019 to 355,400 metric tons in 2023. Milkfish accounted for 8.3 percent of the total volume of fisheries production during the year. The highest harvest during the 5 years period was in 2021 when it reached 447,000 tons. However, production dropped by 12.6 percent in 2022 to 390,100 tons with 12 regions registering lowering production. The decline was attributed to the insufficiency of fingerling supply and low quality feeds which continues up to now.

Globally, aquaculture production has surpassed capture fisheries as the leading source of aquatic animal production for human consumption, underscoring its growing importance in ensuring food security (Food and Agriculture Organization of the United Nations, 2024). Similarly, Olesen et al. (2023) emphasized the importance of aquaculture as a major component of the bioeconomy, contributing to food security and economic sustainability through technology-assisted and environmentally sustainable practices. Despite this global progress, milkfish production in the Philippines continues to experience fluctuations. According to Lagare (2024), milkfish production in the second quarter of 2024 declined to approximately 91.6% of its reference level, indicating a modest contraction in output. Furthermore, Jose and Divya (2023) identified the inconsistent availability and scarcity of high-quality milkfish fingerlings as major challenges in aquaculture. Limited access to quality fingerlings has compelled some fish farmers to rely on wild fingerlings of uncertain quality, potentially reducing production yields (Orinda et al., 2021). In addition, inadequate funding and limited government assistance continue to constrain the development of the milkfish cage farming industry (Tahiluddin & Terzi, 2021). Manlosa et al. (2023) also highlighted the challenges faced by fish cage farmers in the Philippines, including overfishing, illicit and harmful fishing practices, and inadequate law enforcement.

Although previous studies have examined milkfish production, aquaculture constraints, environmental risks, and livelihood conditions in different settings, less attention has been given to how local milkfish cage owners themselves experience, interpret, and respond to the interconnected production, environmental, financial, market, and operational challenges affecting their farms. In particular, there is limited documented evidence on the lived experiences of fish cage owners in Tangub City, including the coping mechanisms they employ and the forms of technical, financial, disease-management, and market support they perceive as necessary. Understanding these experiences is important because production statistics alone may not capture the practical constraints and adaptive responses that influence the resilience and sustainability of local milkfish cage farming. By examining the firsthand accounts of fish cage owners, this study seeks to complement existing production related evidence with a context specific understanding of how multiple challenges intersect, how owners respond to these challenges, and how they perceive the adequacy of available institutional support. This study therefore explores the lived experiences of fish cage owners in Tangub City to generate context-specific evidence that may inform fisheries extension, institutional support, and sustainable aquaculture initiatives.

This study is conceptually organized around the lived experiences of milkfish cage owners in Tangub City, particularly the challenges they encounter, the coping mechanisms they employ, and their perceived needs for institutional support. The inquiry is organized around three interconnected areas: the challenges encountered in milkfish cage farming, the coping mechanisms employed by fish cage owners, and their perceived needs for institutional support. These areas guide the exploration of how production, environmental, financial, market, and operational concerns affect their farming experiences and how they respond to these challenges. Rather than testing a predetermined theoretical framework, the study seeks to understand participants experiences within their local context, with interpretations grounded in their accounts. This approach enables the study to generate context-specific insights

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into the interconnected challenge of local milkfish farming and identify support needs that may inform fisheries extension services and sustainable aquaculture initiatives.

With these, the researchers wanted to conduct this study to obtain in-depth findings of the various problems they encountered in milkfish cage farming. The researchers' findings of the study were used also to identify the coping mechanisms employed in connection to their problems encountered toward milkfish cage farming. Furthermore, the study was conducted to also give the fish cage owners new knowledge and clear insight into milkfish farming and answer those related questions that could identify other programs they wanted to receive from Bureau of Fisheries and Aquatic Resources.

Review of Related Literature and Studies

Milkfish farming is a profitable and expanding industry that has the potential to provide a comfortable living for anyone with the necessary skills and resources (Braganza, 2023). Certainly, the use of fish cages is one of the key aquacultural practices for increasing milkfish productivity (Huang et al., 2022). In milkfish farming, fish cages serve as containers for milkfish cultivation that are placed offshore and are made of bamboo or wooden boards (Jagdish, 2020). In fish cages, nets are an essential component because they preserve the breeding area, safeguard the cultured milkfish, and keep them from escaping.

Milkfish cage farmers continue to attempt to survive their fish cage farming business. Certainly, milkfish cage farming has several problems despite being widely used. According to Sara (2022), it takes a lot of commitment and work to maintain a profitable milkfish cage farming operation for the reason that one of the concerns about milkfish cage farming is the rapid growth of risks that can threaten the sustainability of this aquacultural industry (Jagdish, 2020). Many obstacles must be overcome to establish productive and sustainable milkfish cage cultivation (Schadeberg et al., 2021). Of equal importance, Araujo et al. (2022) stated that milkfish farmers require techniques to evaluate their welfare that are also practical for milkfish cage farming if they hope to grow their fish cage business. To guarantee a good harvest, milkfish farming must involve processes to strengthen the milkfish's immune system (Sara, 2022).

Milkfish cage farmers endure discomfort and stress in a variety of circumstances (Hanke et al., 2020). At present, there is a growing recognition that the presence of coping mechanisms is well-recognized in milkfish cage farming (Martos-Sitcha et al., 2020). A consistent individual response to a challenge that is sustained over time and/or across context is characterized as a coping mechanism, and this definition applies to milkfish cage farming as well. Coping mechanisms are methods that people commonly used to deal with difficult emotions or circumstances. These are techniques that assist individuals in managing stressful situations and unpleasant feelings (Van Tongeren, 2020). Certainly, the welfare and productivity of farmed milkfish may be enhanced by understanding coping mechanisms (Ambong & Gonzales, 2019). The speed at which milkfish farmers adjust to new fish cage farm situations may also be influenced by the milkfish farmers' coping strategies (Algorani, 2023).

Shalli et al. (2024) reported that milkfish pond farming contributes to the socioeconomic conditions and livelihoods of coastal and livelihoods of coastal communities in Tanzania. Although their study focused on pond farming rather than cage farming, it provides relevant insights into the contribution of milkfish aquaculture to local livelihoods. To overcome the problems, the utilization of cutting-edge such as receiving and improving programs is crucial. Additionally, investment in research can further strengthen milkfish cage farming resiliency. Despite the problems encountered, there are promising prospects for its development (Salayo et al., 2021).

These various facts have made it possible for researchers to study milkfish cage farming. Milkfish cage farming represents a promising and sustainable aquaculture practice with numerous benefits. However, fish cage owners engaged in milkfish farming face a range of problems that require careful consideration and proactive solutions. With a commitment to best practices, ongoing research, and collaboration within the industry, fish cage owners can navigate the problems and contribute to the continued growth and success of milkfish cage farming.

Statement of the Problem

Milkfish cage farming provides food, income, and livelihood opportunities for communities engaged in aquaculture. However, fish cage owners may encounter interconnected environmental, production, financial, operational, fish-health, and market-related challenges that can affect the productivity, profitability, and sustainability of milkfish farming. In Tangub City, these challenges may be reflected in fish mortality, environmental conditions, feed-related constraints, disease occurrence, difficulties in securing buyers, financial limitations, and other operational concerns experienced by fish cage owners.

While production data can indicate the extent of milkfish production and losses, quantitative production figures alone may not fully explain how fish cage owners experience these challenges, how they respond to them, and what

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forms of institutional support they perceive as necessary. Understanding the lived experiences of fish cage owners is therefore important for identifying context-specific coping mechanisms and support needs that may inform fisheries extension, aquaculture management, and programs intended to strengthen the sustainability and resilience of milkfish cage farming.

Accordingly, this study examined the lived experiences of fish cage owners engaged in milkfish farming in Tangub City, with particular attention to the challenges they encountered, the coping mechanisms they employed, and the programs or forms of support they wished to receive from the Bureau of Fisheries and Aquatic Resources (BFAR).

Research Objectives

General Objective

The study aimed to explore the lived experiences of fish cage owners engaged in milkfish farming in Tangub City, particularly their challenges, coping mechanisms, and perceived needs for institutional support.

Specific Objectives

Specifically, the study aimed:

1. To identify and describe the challenges experienced by fish cage owners in milkfish cage farming in Tangub City;
2. To explore the coping mechanisms employed by fish cage owners in responding to the challenges of milkfish cage farming; and
3. To identify the programs or forms of support that fish cage owners perceive as necessary from the Bureau of Fisheries and Aquatic Resources (BFAR).

Research Questions

The study sought to answer the following questions:

1. What challenges do fish cage owners experience in milkfish cage farming in Tangub City?
2. What coping mechanisms do fish cage owners employ in responding to the challenges of milkfish cage farming?
3. What programs or forms of support do fish cage owners perceive as necessary from the Bureau of Fisheries and Aquatic Resources (BFAR)?

METHODOLOGY

Research Design

This study employed a qualitative phenomenological research design to explore the lived experiences of fish cage owners engaged in milkfish farming in Tangub City. A phenomenological approach was considered appropriate because the study focused on the participants' firsthand experiences of the challenges associated with milkfish cage farming, the coping mechanisms they employed in responding to these challenges, and their perceived needs for institutional support. Data were gathered through in-depth, semi-structured interviews with fish cage owners who had direct experience in the financial and operational management of milkfish cage farming.

Study Area and Participants

The study was conducted in Tangub City, Philippines. The city consists of 55 barangays, including 15 coastal barangays. Of these coastal barangays, seven—Aquino, Bocator, Lorenzo Tan, Maloro, Maquilao, Panalsalan, and Pangabuan—were identified as having continuing milkfish cage-farming operations. These barangays had a total of 187 fish cages.

Purposive sampling was employed to select participants who had direct and relevant experience with the phenomenon under investigation. The participants were fish cage owners who were directly involved in the financial and operational management of their milkfish cage-farming activities. A total of twenty-one (21) fish cage owners participated in the study. Data collection continued until the researchers determined that sufficient information had been obtained to address the research questions and that no substantially new themes were emerging from the participants' accounts.

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Research Instrument

Data were collected using a researcher-developed semi-structured interview guide designed to elicit participants' experiences regarding the challenges they encountered in milkfish cage farming, the coping mechanisms they employed, and the programs or forms of support they wished to receive from the Bureau of Fisheries and Aquatic Resources (BFAR).

To establish the relevance and clarity of the interview guide, the instrument was reviewed by four validators. Three validators had three to five years of field experience related to milkfish cage farming, while one validator held a master's degree. The researchers incorporated the validators' comments and recommendations in revising the interview guide before its use in data collection.

Data Collection Procedure

Before data collection, the researchers secured the necessary permission to conduct the study from the appropriate authorities and obtained the required approval from their instructor and research adviser. Eligible fish cage owners were identified based on the study's participant-selection criteria. The researchers explained the purpose and procedures of the study to the participants and obtained informed consent before conducting the interviews.

Individual face-to-face interviews were conducted with the participating fish cage owners, primarily in their respective residences or other appropriate locations. Each interview lasted approximately 30 minutes to one hour. The semi-structured format allowed the researchers to ask the prepared questions while also providing participants with opportunities to describe their experiences and provide additional information relevant to the study.

Data Analysis

The interview data were analyzed thematically to identify, organize, and interpret recurring patterns across participants' accounts. The researchers first familiarized themselves with the interview data through repeated reading of the collected material. Relevant statements and segments of the participants' accounts were then identified and coded. Related codes were grouped into categories and examined for recurring patterns. Candidate themes were subsequently reviewed, refined, and organized according to their relevance to the research questions concerning challenges, coping mechanisms, and perceived support needs. The resulting themes were interpreted in relation to the participants' lived experiences of milkfish cage farming.

Ethical Considerations

Ethical principles were observed throughout the conduct of the study. Participation was voluntary, and informed consent was obtained from all participants before the interviews. The researchers explained the purpose and procedures of the study and respected the participants' right to participate voluntarily. Measures were taken to protect participants' privacy and the confidentiality of information they provided. Personal information was treated confidentially and was not disclosed unnecessarily in reporting the findings.

The researchers also sought to avoid harm, deception, and misrepresentation of participants' experiences. Research information was handled honestly and transparently, and the researchers were mindful of potential conflicts of interest and their responsibility to report the findings accurately. The study did not involve experimental manipulation of the aquatic environment or fish stocks; its data-collection procedures were limited to interviews with fish cage owners.

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RESULTS AND DISCUSSIONS

This section presents the analysis and interpretation of the data gathered from the participants. The findings are organized into emergent themes, each accompanied by a corresponding interpretation and discussion of its implications. The thematic presentation follows the sequence outlined in the study's statement of the problem to ensure coherence and alignment with the research objectives.

Table 1

Problems Encountered by Fish Cage Owners in Milkfish Farming

Theme	Number of Participants	Percentage
Mussel infestation	13	61.90%
Weather conditions	11	52.38%
Scarcity/ cost of feeds	6	28.57%
Fish theft	2	9.52%
Fish mortality	11	52.38%
Finding reliable buyers	5	23.81%
Financial challenges	4	19.05%
Unreliable caretakers	2	9.52%
Disease occurrence	3	14.29%
Low milkfish prices	3	14.29%

Note. N = 21. Percentages are calculated using 21 participants as the denominator. Participants could describe more than one challenge; therefore, percentages do not sum to 100%.

Based on the gathered data, ten (10) themes emerged that pertain to the fish cage owners' problems with milkfish farming in Tangub City namely, mussel infestation, weather conditions, scarcity and high cost of feeds, fish theft, fish mortality, finding reliable buyers, financial challenges, unreliable caretakers, disease occurrence, and low milkfish prices.

1.1 Mussel Infestation

A theme emerged from the participants' responses. They discovered that there were fast-growing species in their fish cages that could quickly colonize nets and cages, which posed a threat to their milkfish production. The information linked to their responses to the species that they encountered in their operation is provided below.

Participant 4: *"The next problem is the mussels. As mussels grow, they can cause the net to close, preventing water and essential nutrients from entering".*

Participant 5: *"Also, there are plenty of mussels growing".*

Participants 6, 11, 17, and 19: *"It is the mussels that are plenty.".*

Participant 7: *"Of course, you cannot exclude these mussels because they are the major problem, indeed."*

Participant 8: *"Indeed, when it comes to mussels, they pose a significant problem because if you see them, they have already formed into mounds"*

Participant 9: *"Moreover, it trips because of these mussels".*

Participant 12: *"Mussels have multiplied greatly, leading to oxygen depletion inside and reducing space for the milkfish."*

Participant 13, 16, and 18: *"It is the mussels because they covered the nets"*

Based on the participants' accounts, mussel growth was perceived to obstruct cage nets and restrict water movement. Some participants associated this condition with concerns about oxygen availability and space for milkfish. These are participants' observations; the study did not measure water flow or dissolved oxygen to verify the reported effects.

According to Westlands Water District (2026), mussels pose a direct threat to westland farmers. Preventive action is the most effective and lowest-cost protection for irrigation reliability and farm productivity. Furthermore, Hernandez et al. (2022) stated that mussels can quickly colonize nets and cages, which reduces water flow, increases drag and overall impairs aquaculture operations' efficiency.

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1.2 Weather Conditions

Another theme occurred in the participants' responses. They stated that weather conditions pose challenges to maintaining optimal conditions for milkfish. The information from their replies is provided below.

Participants 2 and 3: *"When the weather gets bad".*

Participants 4, 7, 8, 18, and 21: *"There are times that the water in the sea is not moving. The water flow is just steady."*

Participant 6: *"Also when it is windy".*

Participant 14 and 16: *"It depends on the weather, especially during high tide, we struggle with that."*

Participant 17: *"The fluctuation of water".*

Eleven participants described weather-related conditions, including strong winds and reduced water movement, as challenges affecting their fish-cage operations.

Boyd, 2020 stated that, weather and climate are major factors affecting all types of agriculture, including aquaculture. Water temperature exerts major limitations in aquaculture production. At the same time, fish cage farmers have identified one of their challenges as being natural disasters brought on by the shallow placement of the cages in the gulfs and the clogging of the cage nets (Orinda et al., 2021).

1.3 Scarcity of Milkfish Feeds

Another theme occurred in the participants' responses. As stated, the scarcity and high cost of milkfish feed often force fish cage owners into debt to ensure adequate feeding for their operations. The information from their replies is provided below

Participants 5 and 9: *"The main problem lies in feeding, particularly when there is nothing to feed."*

Participant 10: *"One of our problems is also with the feeds. We end up having debt".*

Participants 11 and 12: *"Next are the feeds. Fish is offered at a very cheap price, but the sack of feeds is extremely expensive".*

Participant 15: *"Feeding the fish is hard because my 19,000 milkfish fry need around 30 sacks of feed each week."*

Six participants identified feed scarcity and high feed costs as operational challenges. Their accounts indicated that difficulty financing feed sometimes led them to borrow money to maintain feeding practices.

As described by George and Sugumar (2026), aquafeeds cost are one of the biggest pressure points shaping aquaculture profitability. In addition, eFeedLink Newsdesk (2026) states, that commercial pellets and extruded feeds account for the vast majority production budget, squeezing profit margins when farm gate prices fluctuate.

1.4 Milkfish Theft

Another theme occurred in the participants' responses. They discovered that these incidents could lead to substantial losses and negatively impact the profitability and sustainability of their operations. Information about their replies to the incident is provided below.

Participant 11: *"There were many thieves incidents. Thieves would come and steal milkfish."*

Participant 15: *"Another problem is thieves especially if there is no one guard the fish cage."*

Grounded in the utterances mentioned above, out of 21 fish cage owners two (2) participants similarly said that theft is one of the problems met in fish cage operations. It was revealed that incidents occurred where caretakers, upon leaving the site unattended, led to the theft of fish by thieves.

As explained by Yang et al. (2020), fish cages and other aquaculture facilities are particularly vulnerable to theft due to their isolated locations and inadequate security measures. Furthermore, Madibana et al. (2020) reported incidents of theft taking advantage of unattended sites to steal fish feeds, equipment, and farmed fish.

1.5 Fish Mortality

Another theme emerged from the participants' responses. They stated certain issues of numerous deaths and substantial losses of milkfish and fingerlings within the fish cages that create a significant problem within milkfish production. The information linked to their responses is provided below.

Participant 1: *"Sometimes the fingerlings die".*

Participants 2, 3, 9, 10, 12, and 21: *"When the fish die, it becomes a big problem".*

Participant 6: *"When the fish died, they declared it as fish killing".*

Participant 13 and 15: *"Our milkfish died because there was no oxygen*

Participant 16: *"We experienced fish dying and losing almost half of our fingerlings."*

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Eleven participants reported fish mortality, including mortality involving milkfish and fingerlings. Some participants associated fish deaths with inadequate oxygen conditions; however, the study did not include direct water-quality measurements to establish oxygen depletion as the cause of mortality.

According to Chang et al. (2021), fish may become stressed, suffocated, or even die when oxygen levels fall below critical thresholds because of things like high temperatures, algal blooms, or excessive biomass. Thus, due to their sensitivity to environmental factors, such as oxygen levels, milkfish are likely to die more often in low-oxygen settings (De Silva & Soto, 2020).

1.6 Finding Reliable Buyers

Another theme occurred in the participants' responses. They find it challenging to ensure that buyers are trustworthy and reliable during the post-harvest phase of their operations. The information from their replies is provided below.

Participants 4, 20, and 21: *"So, the problem is when you are the owner you are the one looking for a buyer and you have to make sure they are legit."*

Participant 8: *"Next is during the time of selling, if you are not wise in finding a buyer, of course, you would not be able to sell."*

Participant 16: *"Next is after the harvest, the buyer. That is also a problem for us."*

Following the utterances mentioned above, out of 21 fish cage owners five participants reported that one of the challenges during the selling process was finding reliable buyers. These obstacles faced by fish cage owners in the post-harvest phase of their operations emphasize the need for improved buyer reliability.

The income and profitability of fish farmers, as well as their trust and confidence in the market, can suffer due to untrustworthy purchasers, while long-term relationships and the growth of the aquaculture industry rely on dependable buyers and secure payment options. Thus, having a stable first sale market helps small-scale farmers secure steady demand for their products, encouraging investment in better farming practices and higher-quality production (Negroni, 2025).

1.7 Financial Challenges

Based on the participants' responses, limited capital, inadequate profits, and the ongoing need for funding to sustain operations are significant problems for fish cage owners. The information in their replies is provided below.

Participants 1 and 4: *"Finances are also a problem".*

Participant 3: *"The problem becomes bigger when there is no money left, especially when the profit from the first harvest is just enough to cover the initial expenses."*

Participant 14: *"And if you are lacking of capital."*

Derived from the utterances mentioned above, out of 21 fish cage owners four participants reported about the financial burden and the necessity of having enough capital for successful milkfish farming operations. Participants described sufficient capital as important for purchasing inputs, financing subsequent production cycles, and maintaining operations.

As mentioned by Cabatay (2023), fish farmers face major financial challenges driven by the high cost of feed which consumes up to 70% of total production expenses with limited access to formal credit, high interest rates, and unexpected losses from weather. Moreover, farmers may find it more difficult to invest in resources if they lack the necessary funds, which could lead to suboptimal production results and financial instability (Salazar et al., 2025).

1.8 Unreliable Caretakers

Another theme occurred in the participants' responses. They find issues with caretakers' performance and in taking care of the fish cage as one of the challenges they met during their operation, as it affects the management and success of the production. Information about their replies to issues with their caretakers is provided below.

Participant 4: *"Another thing is the caretaker you hire can become a problem as well especially if he will not look the fish cages from time-to-time."*

Participant 10: *"One of the problems I encountered was because my caretaker did not watch the fish cage properly."*

Built upon the utterances mentioned above, out of the 21 fish cage owners, there were two (2) participants who said that hiring and managing caretakers for fish cage operations was one of the challenges they met during their fish cage operation.

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According to Tahiluddin and Terzi (2021), the vital role that caretakers play in maintaining the architecture of fish cages stresses that caretakers' negligence can result in structural damage and equipment failure, raising the possibility of fish escapes and disruptions to operations. Thus, tracking feed consumption, growth rates, and expenses is vital. Unreliable staff frequently neglect paperwork, leaving the farm owner blind to whether the business is actually turning a profit (Bautista, 2025).

1.9 Diseases Occurrence

Another theme occurred in the participants' responses. They found out that there are diseases among milkfish that show potential health issues within the fish population. This was one of the problems they encountered in their milkfish operation. The information from their replies is provided below.

Participants 2 and 16: *"It is like when the gills of the milkfish have spotted, which looks quite different from those of a healthy milkfish".*

Participant 14: *"The people from fisheries have not said what kind of illness it is, but their term for it is korikong."*

Three participants reported observable health-related abnormalities among milkfish, including unusual gill appearance and conditions locally referred to as "korikong." Because no laboratory diagnostic testing was conducted as part of the study, these participant reports cannot be used to establish the specific disease or pathogen involved.

Gonzalez (2023) stated that milkfish health and production can be impacted by common diseases such as fungal outbreaks, parasite infestations, and bacterial infections. Additionally, Jose and Divya (2023) stated that disease outbreaks in fish are caused by poor water quality, imbalanced nutrition, physical harm, and other stressors that compromise their immune systems.

1.10 Low Milkfish Prices

Another theme emerged in the participants' responses. It was concluded that despite the efforts and investments made in production, the low market value of milkfish undermines the economic viability of aquaculture operations, affecting profitability and creating financial strain. The information linked to their replies is provided below.

Participant 4: *"The milkfish becomes very cheap".*

Participant 12: *"The feeds are even more expensive compared to the price of milkfish".*

Participant 16: *"It is tough. Especially the market value of milkfish is not that expensive".*

Three participants identified low milkfish selling prices as a challenge, particularly in relation to the cost of inputs such as feed. Their accounts indicate concern regarding the financial sustainability of individual farming operations.

Jose and Divya (2023) mentioned that due to a lack of training and conversion supported by the government, fishermen frequently experience unfair or exploitative contracts or prices with business partners due to their low level of knowledge and skills. Furthermore, Macusi et al. (2024) noted that declining farmgate prices for milkfish, coupled with rising production cost, have placed fish farmers under considerable financial pressure. These challenges may stem from chronic oversupply, high commercial feed costs that account for up to 70% of production expenses, and climate related pressures.

Table 2

Coping Mechanisms Employed by Fish Cage Owners in Responding to Farming Challenges

Theme	Number of Participants	Percentage
Mussel Management	9	42.86%
Use of Water Pumps	4	19.05%
Borrowing Money	2	9.52%
Consistent Monitoring	5	23.81%
Tenacity/ Resilience	6	28.57%
Coordination With Legal Authorities	2	9.52%

Note. N = 21. Percentages are calculated using 21 participants as the denominator. Participants could report more than one coping mechanism; therefore, percentages do not sum to 100%.

Based on the results, there were six (6) themes that emerged as to the coping mechanisms of the fish cage owners namely, mussel management, use of water pumps, borrowing money, consistent monitoring, tenacity/ resilience, and coordination with legal authorities.

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2.1 Mussel Management

Another theme emerged from the participants' responses. The fish cage owners are determined to use different techniques in preventing the overgrowth of mussels since this could help them handle a problem in their milkfish cage farming business. The information on their replies is provided below.

Participants 5, 6, 7, 8, and 9: *"For mussels, we bury them in the ground."*

Participant 13: *"We keep a constant check on it, and whenever a new batch of mussels has grown thickly attached to the net, we submerge them in the mud."*

Participants 17 and 19: *"We hire someone to dig up the mussels."*

Participant 18: *"Mussels attached to the net we removed them by simply shaking them until they detach from the net."*

The participants' accounts indicate that, of the 21 fish cage owners, there were nine (9) participants who described several methods of managing mussel growth on cage nets, including manual removal and submerging removed mussels in mud. These practices reflects the participants local response to mussel infestation; however, their effectiveness was not independently evaluated in this study.

According to Inoue et al. (2021), some species of mussels are well-known to people all over the world due to their abundance in coastal regions, especially close to places where people live. On the other hand Thorpe (2026) states that existing strategies for mussel control are first screen filtration because it is effective in catching mussels shells and mature mussels. Next, manual removal but may require extended downtime to complete.

2.2 Use of Water Pump

Based on the participants' replies, using a water pump is beneficial in moving the seawater direction from one point to another so that the milkfish still get oxygen. The information on their replies is provided below.

Participant 2: *"What we do then is start up the water pump because if they run out of oxygen, they jump out of the cage".*

Participant 4: *"Just like when the water in the sea is not moving, we use either a pump boat or a water pump."*

Participant 8: *"We use the water pump it is easier to use since it is much simpler to operate'.*

Participant 21: *"If we are talking about when the seawater is calm, we just use a water pump, it is much easier for us. There are times when we borrow with other owners about taking turns in using the pump, and they agree if we take care of it".*

Four of the 21 participants reported using water pumps to circulate or move seawater around their fish cages. They perceived this practice as helpful in maintaining water movement and supporting fish survival. However, the study did not independently measure dissolved oxygen levels or evaluate the effectiveness of the pumps.

Park (2025) discussed that pumps act as mechanical heart of fish farming by driving continuous water movement, aeration, and filtration. In cage aquaculture, the water pump is considered a technique that inputs sufficient water movement, supplying the cage with oxygen, and clearing trash out of the cage (Nagothu, 2021).

2.3 Borrowing Money

Borrowing money to buy fish feeds is another coping mechanism that the fish cage owners employ. This coping mechanism helps the fish cage owners to survive their aquaculture business. The information on their replies is provided below.

Participant 1: *"Sometimes, we end up borrowing money to buy feeds, and it just depends on an agreement on when will we pay, usually after the harvest or something like that."*

Participant 5: *"What we typically do when it comes to insufficient feeding is to borrow money because we need to buy the fish feed."*

Derived from the utterances mentioned above, of the 21 fish cage owners, there were two (2) participants similarly said that the need to borrow money to buy fish feeds is one of their coping mechanisms to handle the problems they encountered in the milkfish cage business. In simple terms, the fish cage owners are talking about borrowing things they need, like money or fish feed, when they don't have enough of their own.

As Yusoph (2021) stated that borrowing money serves as an immediate survival and risk management strategy for fisherfolks facing low and unpredictable incomes, seasonal off-seasons, and unexpected family emergencies. Moreover, Owusu (2025) states that, borrowing money isa common yet double-edged coping strategy for fisherfolk

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facing low income, lean fishing seasons, high fuel costs, and emergencies. It recommends interest free loans to support fisherfolk who are already engaged in small businesses.

2.4 Consistent Monitoring

Another theme emerged from the participants responses. They highlighted that monitoring the fish cage consistently is a big help to reduce the chance of failure in their aquaculture operation. The information on their replies is provided below.

Participant 1: *"Continuous and thorough care is essential. Through care, you can monitor your fish cage effectively."*

Participant 3: *"It needs to be monitored until it is completed. It should not be neglected to avoid any failures."*

Participant 13: *"Before going to sleep, I make sure to thoroughly check all the nets."*

Participant 15 and 16: *"From time to time, I check all sides to see if there are any tears or damages so I can repair them immediately."*

Derived from the utterances mentioned above, of the 21 fish cage owners, there were five (5) participants similarly said that consistent monitoring of the fish cages is one of their coping mechanisms to overcome the problems they encountered in milkfish cage farming. The participants' emphasis on regular monitoring indicates the importance they place on early detection of operational problems. In an aquaculture context, routine monitoring can also be relevant to responsible cage management, although the present study did not measure whether participants' monitoring practices directly reduced environmental impacts.

As mentioned by Macaulay et al. (2021), fish cages have the potential to pollute the surrounding water and endanger other aquatic life by increasing the concentration of fish excrement and uneaten feed. Thus, to reduce its negative effects on the environment, fish cage farming must also be done sustainably and responsibly (Shen et al., 2022).

2.5 Tenacity/ Resilience

Being tenacious is another theme that arose based on the participants' replies. Being tenacious as a coping mechanism helps the fish cage owners to last long and helps them find ways and solutions to survive their aquaculture business. The information on their replies is provided below.

Participant 3: *"Keep searching for ways and keep repeating them until you find a solution." (P 3, Line # 136-138, Transcript #3)*

Participant 9: *"Keep striving because if we did not strive to find appropriate solutions, maybe right our operation failed."*

Participant 11: *"Exactly like what I said earlier, just endure. Because that is the reality, there are no easy jobs, it comes with enduring as well."*

Participant 12: *"Well, it is really about endurance because this is the nature of our business. We have invested a lot of capital, so we endure until we harvest, rather than abandoning it halfway through."*

Participant 14: *"It just takes patience. A business like this requires a lot of patience."*

Participant 16: *"Being patient is key. You should always be firm in your goals. If you feel weak, you really will not be able to move forward, might as well quit."*

The participants' accounts indicate that, out of 21 fish cage owners six participants reported that being tenacious is one of their coping mechanisms in handling the problems they encountered in milkfish cage farming. Tenacity is the firmness of mind and will in the face of danger or extreme difficulty. Participants described perseverance and continued problem-solving as ways of coping with the challenges associated with milkfish cage farming.

According to Oglend (2020), milkfish farming can be a difficult and unpredictable aquaculture activity. Risks associated with milkfish cage farming include disease outbreaks, volatile market prices, unfavorable weather, and bureaucratic obstacles (Ryzhkov, 2023).

2.6 Coordination with Legal Authorities

Another theme emerged from the participants' responses. The fish cage owners find it beneficial to coordinate with legal authorities especially when encountering problems that involve appropriate measures. The information on their replies is provided below.

Participant 20: *"We went to see the captain, and he just said we will get paid; I do not know when."*

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Participant 21: *"Regarding our buyer, we reported it."*

It showed in the utterances mentioned above, that of the 21 fish cage owners, there were two (2) participants described reporting buyer rated concerns to local authorities. Their accounts suggest that reporting was one response to perceived difficulties in buyer transactions. The study did not establish whether these reports resulted in dispute resolution, payment recovery, or improved profitability.

According to Coalition for Fisheries Transparency (2024), regions like Philippines, platform such as the Karagatan Patrol allow local fisherfolk and fish farmers to coordinate directly with law enforcement and LGU's to report illegal commercial intrusions or poaching in municipal. It was added by Ledesma (2023) that the utilization of coordinating with legal authorities helps to have profound knowledge and advice that can optimize the profitability and sustainability of milkfish cage farming ventures.

Table 3

Desired BFAR Programs of Fish Cage Owners

Theme	Number of Participants	Percentage
Mussel solution program	8	38.10%
Financial and feed assistance	6	28.57%
Laboratory/ disease- management support	3	14.29%
Buyer registration	2	9.52%

Note. N = 21. Percentages are calculated using 21 participants as the denominator. Counts reflect participants whose accounts included each requested support area; not every participant necessarily identified a BFAR program.

Based on the results, there were four (4) themes that emerged as to the other programs concerning milkfish farming that the fish cage owners would like to receive from the Bureau of Fisheries and Aquatic Resources namely, mussels solution program, financial and feed assistance, laboratory/ disease- management support, and buyers registration.

3.1 Mussels Solution Program

Solution for mussels is the first theme that arose based on the participants' replies. They find it relevant that having a solution to mussels will solve the problems that these mussels provide. The information on their replies is provided below.

> ***Participants 4 and 5:*** *"If I may suggest, they could create a program on what solutions they can implement for the mussels."*
> ***Participants 6, 7, 12, 18, and 19:*** *"We want them to find a solution for this mussels issue."*
> ***Participant 8:*** *"And perhaps those mussels could be included in discussions during their workshops or seminars on how to deal with them effectively."*

The participants' accounts indicate that eight of the 21 fish cage owners wanted BFAR to provide a program or guidance addressing mussel infestation. These participants recommended developing initiatives or conducting further research to identify practical management options. Because this theme was mentioned by eight participants, the finding should not be generalized to every fish cage owner in the sample.

According to Lebata-Ramos (2023), in the Philippines, the production of mussels alone was worth PhP1.552 billion. The prevalence of mussels makes it essential to develop quick, techniques for identifying them quickly to safeguard the milkfish housed in fish cages. Further, Guendouzi (2021) stated that effective ways of eliminating mussels in fish cages should be developed since it was a major problem facing the fish cage owners in their production.

3.2 Financial and Feeds Assistance

Another theme emerged from the participants' responses. The fish cage owners find it helpful to receive financial and fish feeds assistance that would support their aquaculture business. The information on their replies is provided below.

> ***Participant 1:*** *"That is right, if the government has an appropriate program, especially for those of us engaged in aquaculture, it would be a big help, especially with feeding."*
> ***Participants 2 and 3:*** *"If they could just give us even a small amount, it would mean a lot to us."*
> ***Participant 10:*** *"If there is financial assistance available for us, I would gladly accept it."*

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Participant 11: *"If they provide financial assistance. That is exactly what I want, but my goal with that is for my people".*

Participant 13: *"If they have a program, I hope they prioritize us owners, we want to receive help and financial, especially during calamities."*

Drawn by the utterances mentioned above, of the 21 fish cage owners, there were six (6) participants accounts indicate a perceived need for financial and feed assistance, particularly during calamities and periods of financial difficulty. Any proposes assistance program should be designed in consultation with local fish cage owners and informed by an assessment of their needs.

As Valcobero (2019) stated that BFAR is promoting mariculture as a substitute source of income and a sustainable way of life for fishermen by utilizing aquaculture methods like fish cage farming and marine ranching. To focus on beneficiaries' needs and project selection considerations, each region in the fisheries should perform a program that is good for a planning tool, especially in areas where milkfish farming is a significant industry (Holeh et al., 2020).

3.3 Laboratory/ Disease- Management Support

Another theme emerged from the participants' responses. The fish cage owners wish to have an appropriate laboratory in their area since they find it helpful especially since that occurrence of diseases is also now present in milkfish. The information in their replies is provided below.

Participant 2: *"It would be great if there were readily accessible laboratories like those for pigs, right? In Cagayan, they have facilities to test pork for diseases and determine what needs to be done. It would be great if we had something similar for fish."*

Participant 14: *"They should have a laboratory that can identify diseases so they would know what bacteria are causing the problem. Then they can immediately provide treatment based on their findings."*

Participant 16: *"A laboratory would indeed help them find solutions to problems."*

Following the utterances mentioned above, out of 21 fish cage owners three participants expressed a need for accessible laboratory services to help identify possible causes of fish health problems. They believed that diagnostic services could support more informed management decisions. Because laboratory testing was not part of this study, the specific causes of the reported fish health problems could not be confirmed.

Li et al. (2022) emphasized that automatic diagnosis of fish diseases is an important task in aquaculture, and plays a key role in defecting fish conditions, understanding disease signs, and improving fish welfare and health. Similarly, Delamare-Debouteville et al. (2024) highlighted the importance of managing the health of farmed fish, as disease outbreaks can reduce productivity and profitability in fish farms. In response to these challenges, investments in diagnostic technologies have become increasingly important for monitoring and managing the health of aquatic animals.

3.4 Buyer Registration

Another theme emerged from the participants' responses. The fish cage owners find it fair that BFAR should also implement the registration for milkfish buyers. The information in their replies is provided below.

Participant 20: *"Just like how there are registrations for owners, there should also be registrations for buyers."*

Participant 21: *"It would be great if the buyers were registered too, so it is fair on our end as well."*

The participants' accounts indicate that, of the 21 fish cage owners, there were two (2) participants who similarly emphasized the significance of establishing buyer registrations that resemble the current owner registrations. Participants perceived buyer registration as a possible mechanism for improving transparency and accountability in transactions. The effectiveness of such a mechanism, however, would require assessment beyond the scope of the present study.

According to Nasir et al. (2024), fish raised in cages is a viable and financially successful method of producing marketable fish, and it is a highly significant practice today. However, the welfare state information that is currently available on raising fish, particularly in aquaculture operations, is minimal (Lugert et al., 2020). Fishing operators are unable to maximize their efforts if they lack sufficient resources (Latva, 2024).

Conclusions

The findings indicate that fish cage owners in Tangub City experience a range of environmental, operational, financial, health-related, and market-related challenges in milkfish cage farming. The most frequently reported concerns included mussel infestation, weather conditions, fish mortality, feed-related difficulties, and challenges

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associated with buyers and farm finances. Participants also described several coping mechanisms, including mussel management, the use of water pumps, borrowing to obtain feeds, regular monitoring of cages, perseverance in addressing operational difficulties, and coordination with relevant authorities.

The participants further identified four areas of support that they would like to receive from the Bureau of Fisheries and Aquatic Resources: assistance in managing mussel infestation, financial and feed assistance, accessible laboratory support for fish-health concerns, and mechanisms for registering milkfish buyers. These findings indicate that support for local milkfish cage farming may benefit from attention to production management, fish health, financial constraints, market access, and institutional support. Because the study focused on the lived experiences of 21 fish cage owners, the findings primarily describe the participants' experiences and perceived needs and should not be generalized to all milkfish farmers without further research.

Recommendations

Based strictly on the findings, the following recommendations are proposed:

1. Fish cage owners may regularly inspect and clean their cage nets to manage mussel accumulation and maintain appropriate cage conditions.
2. Fish cage owners may incorporate weather monitoring and appropriate cage-maintenance practices into their routine management, particularly during periods of strong winds, heavy rainfall, or reduced water movement.
3. Fish cage owners may consider appropriate water-quality monitoring practices, particularly for parameters relevant to fish health and cage management, in coordination with qualified fisheries or aquaculture personnel.
4. Fish cage owners may seek appropriate financial-management assistance to help them plan for feed purchases, production cycles, and other recurring operational expenses.
5. Fish cage owners may coordinate with BFAR and other relevant fisheries agencies regarding technical assistance for mussel management, fish-health concerns, and other operational challenges identified in the study.
6. Fish cage owners may strengthen routine monitoring of cages and caretaking activities to facilitate early identification of operational problems, fish mortality, damaged nets, and other risks.
7. Fish cage owners may seek information about available BFAR programs and other legitimate institutional support mechanisms relevant to aquaculture production, financing, feed assistance, and fish-health management.
8. BFAR may consider assessing the feasibility of developing or strengthening programs addressing mussel infestation, financial and feed assistance, accessible fish-health laboratory services, and milkfish buyer registration, consistent with the needs expressed by the participants.
9. BFAR and relevant local fisheries stakeholders may consider mechanisms that improve market transparency and access to reliable buyers, subject to appropriate policy and institutional assessment.
10. Future researchers may conduct further studies on the economic viability of milkfish cage farming, fish-health and water-quality conditions, market arrangements, environmental impacts, and the effectiveness of government support programs.

REFERENCES

Algorani, E. B. (2023). *Coping mechanisms*. StatPearls - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK559031/

Ambong, R. M. A., & Gonzales, A. M., Jr. (2019). Influencing factors and stress coping mechanisms in agricultural communities of Occidental Mindoro, Philippines. *American Journal of Humanities and Social Sciences Research, 3*(3), 194–200. https://www.ajhssr.com/wp-content/uploads/2019/03/X1933194200.pdf

Araujo, G. S., Da Silva, J. W. A., Cotas, J., & Pereira, L. (2022). Fish farming techniques: Current situation and trends. *Journal of Marine Science and Engineering, 10*(11), 1598. https://doi.org/10.3390/jmse10111598

Bautista, A. G. (2025). Assessment of the challenges encountered by aquaculture business in Cabanatuan City, Nueva Ecija, Philippines. *Asian Journal of Agriculture and Rural Development, 15*(3), 428-435. *https://doi.org/10.55493/5005.v15i3.5569*

Boyd, C. (2020). *Effects of weather and climate on aquaculture. https://www.globalseafood.org/advocate/effects-of-weather-and-climate-on-aquaculture/*

Braganza, L. (2023). *Farming milkfish in the Philippines: How to grow and raise bangus. Sustainable Agriculture.* https://agraryo.com/fishery/farming-milkfish-in-the-philippines-how-to-grow-and-raise-bangus/

PRC-CPD Accredited Provider: PTR-2025-749
National Book Development Board Registration as Book Publisher (Print & Digital): 6312
Global Journal of Agriculture, Forestry and Food Systems (GLOAFFS)
P - ISSN: 3116-4412; E - ISSN: 3116-4420

Bureau of Fisheries and Aquatic Resources (2022). *Philippine milkfish industry roadmap 2021-2040.* https://www.bfar.da.gov.ph/wp-content/uploads/2022/11/Milkfish-Industry-Roadmap-1.pdf

Cabatay, J. (2023). *Business continuity: A case study on Mr. Cabatay's fish farm business in Binangonan, Talim Island. Undergraduate Theses.* 11822. https://www.ukdr.uplb.edu.ph/etd-undergrad/11822/

Chang, C., Wang, Y., & Lee, T. (2021). Hypothermal stress-induced salinity-dependent oxidative stress and apoptosis in the livers of euryhaline milkfish, Chanos chanos. *Aquaculture*, *534*, 736280. https://doi.org/10.1016/j.aquaculture.2020.736280

Coalition for Fisheries Transparency (2024). *Promoting fisheries transparency through an inclusive approach to fisheries management: example from the Philippines.* https://fisheriestransparency.net/promoting-fisheries-transparency-through-an-inclusive-approach-to-fisheries-management-examples-from-the-philippines/

Delamare-Debouteville, J., Khor, L., & Verner-Jeffreys, D. V. (2024, July 1). *Advances in disease diagnostics drive aquaculture sustainability.* WorldFish. https://worldfishcenter.org/impact-story/advances-disease-diagnostics-drive-aquaculture-sustainability

De Silva, S., & Soto, D. (2020). Climate change and aquaculture: Potential impacts, adaptation and mitigation. *In FAO Fisheries and Aquaculture Technical Paper, 530.* http://www.fao.org/docrep/012/i0994e/i0994e04.pdf

eFeedLink Newsdesk (2026). *Philippine milkfish farm-gate prices fall to php125/kg as bangus growers struggle to cover rising cost.* https://www.efeedlink.com/articles/philippine-milkfish-farm-gate-prices-fall-to-php125kg-as-bangus-growers-struggle-to-cover-rising-costs

Food and Agriculture Organization of the United Nations. (2024). *The state of world fisheries and aquaculture 2024. https://doi.org/10.4060/cd0683en*

George, E., & Sugumar, C. (2026). *Rising aquafeed costs: Why nutrient efficiency is the new profit lever. Kemin Corporate Blog.* https://www.kemin.com/ap/en/blog/corporate/rising-aquafeed-costs

Gonzalez, R. (2023). *5,000 fish cages to take Philippine milkfish industry to next level.* Hatchery International. https://www.hatcheryinternational.com/5000-fish-cages-to-take-philippine-milkfish-industry-to-next-level/

Guendouzi, Y., Soualili D. L., Boulahdid, M., Eddalia, N., & Boudjenoun, M. (2021). Effect of physiological conditions and biochemical factors of mussels mytilus galloprovincialis in radioactivity monitoring programs along the algerian coast. *Environmental Science and Pollution Research, 28*(34), 46448-46457. https://link.springer.com/article/10.1007/s11356-020-09775-0

Hanke, I., Hassenrück, C., Ampe, B., Kunzmann, A., Gärdes, A., & Aerts, J. (2020). Chronic stress under commercial aquaculture conditions: Scale cortisol to identify and quantify potential stressors in milkfish (Chanos chanos) mariculture. *Aquaculture, 526,* 735352. https://doi.org/10.1016/j.aquaculture.2020.735352

Hernandez, M., Playan, E., Latorre, B., Montoya, F., Madurga, C., De Rivera, A., & Zapata, N. (2022). Normalized pressure: A key variable to assess zebra mussel infestation in pressurized irrigation networks. *Agricultural Water Management, 260,* 107300. https://www.sciencedirect.com/science/article/abs/pii/S0378377421005771

Holeh, G. M, Magondu E. W., Njiru, J. M., Tsuma, S., Salim, A., Muriuki, A. M., Fulanda, A., Kilonzo, J., Ochola, O., Ndirangu, S., Zamu, M. S., & Luyesi, J. (2020). Social economic survey and feasibility study to initiate cage fish farming in Kenyan coastal creeks. *Journal of Aquaculture Research & Development, 11*(11*),* 617. https://doi.org/10.35248/2155-9546.20.10.617

Huang, C. T., Afero, F., Hung, C., Chen, B., Nan, F., Chiang, W., Tang, H., & Kang, C. (2022). Economic feasibility assessment of cage aquaculture in offshore wind power generation areas in Changhua county, Taiwan. *Aquaculture, 548*, 737611. https://doi.org/10.1016/j.aquaculture.2021.737611

Inoue, K., Onitsuka, Y., & Koito, T. (2021). *Mussel biology:* From the byssus to ecology and physiology, including microplastic ingestion and deep-sea adaptations. *Fisheries Science, 87*(6), 761–771. https://doi.org/10.1007/s12562-021-01550-5

Jagdish, C. B. (2020). *Milkfish farming, Culture methods of milkfish | agri farming*. Agri Farming.https://www.agrifarming.in/milkfish-farming-culture-methods-of milkfish?fbclid=IwAR1AOlg3fdDrlrJyOTyr69sboiYZz4z2sNQhrXSWu4LZR7mov2emTjtRooM#:~:text=Site%20selection%20for%20Milkfish%20farming%201%20The%20area,like%20feeds%2C%20fertilizer%2C%20chemicals%2C%20etc.%3B%20and%20labor%20support

Jose, D. M., & Divya, P. R. (2023). A review on aquaculture important fish Chanos chanos, forsskal 1775, the milkfish. *Journal of Aquaculture in the Tropics, 41.* https://doi.org/10.32381/JAT.2022.37.1-4.1

Lagare, J. B. (2024). *Shrunken output entangles drive for 100% fish self-sufficiency.* https://www.msn.com/en-ph/news/other/shrunken-output-entangles-drive-for-100-fish-self-sufficiency/ar-AA1oPsNT?ocid=socialshare

PRC-CPD Accredited Provider: PTR-2025-749
National Book Development Board Registration as Book Publisher (Print & Digital): 6312
Global Journal of Agriculture, Forestry and Food Systems (GLOAFFS)
P - ISSN: 3116-4412; E - ISSN: 3116-4420

Lape, J., & Dela Gente, J. (2024). A time series analysis of aquaculture milkfish production volume using the Box-Jenkin SARIMA model: A case study from Davao Oriental, Philippines. *Davao Research Journal, 15*(3), 6-19. https://doi.org/10.59120/drj.v15i3.222

Latva, O. (2024). Coming to terms with fish farming and fish consciousness. *Animal Industries: Nordic Perspectives on the Exploitation of Animals, 8(*11), 153-172. *https://doi.org/10.1515/9783110787337-011*

Lebata-Ramos, M. J. H. L. (2023). Molluscan aquaculture in the Philippines: A review. *Aquaculture International, 31*(5), 2877-3001. https://doi.org/10.1007/s10499-023-01120-9

Ledesma, R. H. (2023). *Farming grouper - SEAFDEC/AQD*. SEAFDEC/AQD - Southeast Asian Fisheries Development Center | Aquaculture Department. https://www.seafdec.org.ph/grouper/

Lee, C., & Banno, J. (n.d.). *Milkfish culture and production in Southeast Asia present and future*. https://www.fao.org/4/ac282e/AC282E03.htm

Li, D., Li, X., Wang, Q., & Hao, Y. (2022). Advanced techniques for the intelligent diagnosis of fish diseases: A review. *Animals, 12(*21), 2938. https://doi.org/10.3390/ani12212938

Limi, M. A., Sara, L., Ola, T. L., Yunus, L. A., Surni, Dirgantoro, M. A., Gafaruddin, A., Fyka, S. A., Batoa, H., Aryani, E., & Yusuf, A. (2020). Technical and economical analysis of milkfish farming on the coastal area of Kendari Bay after sedimentation. *ACCL Bioflux, 13*(1), 402-413. https://bioflux.com.ro/docs/2020.403-413.pdf

Lugert, V., Steinhagen, D., & Reiser, S. (2020). Lack of knowledge does not justify a lack of action: The case for animal welfare in farmed fish. *Landbauforschung, 70*(1), 31-34. https://doi.org/10.3220/lbf1592499937000

Macaulay, G., Myers, F., Barrett, L., Oppedal, F., Fore, M., & Dempster, T. (2021). Tag use to monitor fish behaviour in aquaculture: A review of benefits, problems and solutions. *Reviews in Aquaculture, 13*(3), 105-113. https://doi.org/10.1111/raq.12534

Macusi, E., Macusi, E., Bongas, H., & Cayacay, M. (2024). Typology of milkfish (Chanos chanos) farms: Their operations, socio-economic viability, and challenges. *Egyptian Journal of Aquatic Biology and Fisheries, 28(*6), 1489-1510. *https://doi.org/10.21608/ejabf.2024.396489*

Madibana, M. J., Fouche, C. H., & Mnisi, C. M. (2020). Challenges facing emerging aquaculture entrepreneurs in South Africa and possible solutions. *African Journal of Food, Agriculture, Nutrition and Development, 20(*6), 16689-16702. https://doi.org/10.18697/ajfand.94.18890

Manlosa, A. O., Albrecht, J., & Riechers, M. (2023). Social capital strengthens agency among fish farmers: Small scale aquaculture in Bulacan, Philippines. *Frontiers in Aquaculture, 2,* 1106416. https://doi.org/10.3389/faquc.2023.1106416

Martos-Sitcha, J. A., Mancera, J. M., Prunet, P., & Magnoni, L. J. (2020). Editorial: welfare and stressors in fish: Challenges facing aquaculture. *Frontiers in Physiology, 11(*162*).* https://doi.org/10.3389/fphys.2020.00162

Nagothu, S. (2021). *Intelligent control of aerator and water pump in aquaculture using fuzzy logic.* In V. Arunachalam & K. Sivasankaran (Eds.), *Microelectronic devices, circuits and systems, (pp. 160-171).* Springer. https://doi.org/10.1007/978-981-16-5048-2_13

Nasir, U. M., Mehedi, M., Sharmin, A., Zulfikar, R. M., Githinji, M. J., & Maruf, H. M. (2024). Assessing livelihood outcomes for fishing communities engaged in cooperative society. A case study in Bangladesh. *International Journal of Agriculture Extension and Social Development, 7*(9), 737-747. https://doi.org/10.33545/26180723.2024.v7.i9j.1133

Negroni, G. (2025). *The importance of the first sale fish market in a sustainable fishery/ aquaculture value chain.* https://www.bluelifehub.com/2025/05/08/the-importance-of-the-first-sale-fish-market-fsfm-in-a-sustainable-fishery-aquaculture-value-chain-part-1/#:~:text=For%20aquaculture%2C%20having%20a%20stable,farming%20practices%20and%20higher%2Dquality%20production.

Oglend, A. (2020). Challenges and opportunities with aquaculture growth. *Aquaculture Economics & Management, 24(2), 123-127.* https://doi.org/10.1080/13657305.2019.1704937

Olesen, I., Bonaldo, A., Farina, R., Gonera, A., Hughes, A., Navrud, S., Orsini, F., Parma, L., & Zornoza, R. (2023). Moving beyond agriculture and aquaculture to integrated sustainable food systems as part of a circular bioeconomy. *Frontiers in Marine Science, 10,* Article 1178014. https://doi.org/10.3389/fmars.2023.1178014

Orinda, M. A., Okuto, E., & Abwao, M. (2021). Cage fish culture in the Lake Victoria region: Adoption determinants, challenges and opportunities. *International Journal of Fisheries and Aquaculture, 13(*2), 45-55. https://doi.org/10.5897/IJFA2020.0798

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Orzales, J. (2024). *Bangus in Focus: A snapshot of the industry. https://cfa.uap.asia/cfa-briefer-bangus-in-focus-a-snapshot-of-the-industry/*

Owusu, V. (2025). *Effect of rising fuel prices on small-scale fisheries livelihoods and marine sustainability in Ghana. PLOS ONE, 20(*1), e0317260. *https://doi.org/10.1371/journal.pone.0317260*

Park, T., Shin, H., Jo, S. K., & Jung, J. Y. (2025). Applicability evaluation of the PID controlled water pump for flow-through aquaculture systems considering tidal variations. *International Journal of Electrical Power & Energy Systems, 171,* 111050. https://doi.org/10.1016/j.ijepes.2025.111050

Ryzhkov, A. (2023). *Value an aquaculture business: Expert tips & strategies*. https://finmodelslab.com/blogs/valuation/aquaculture-valuation

Salayo, N. D., Marte, C. L., Toledo, J. D., Gaitan, A. G., & Agbayani, R. F. (2021). Developing a self-sufficient Philippine milkfish industry through value chain analysis. *Ocean & Coastal Management, 201, Article 105426* https://doi.org/10.1016/j.ocecoaman.2020.105426

Salazar, C., Jaime, M., Cardenas, R., & Hernandez, F. (2025). Risk perception and production risk in seaweed aquaculture. *Aquaculture Economics & Management, 29*(*1*), 34-62. https://doi.org/10.1080/13657305.2024.2342270

Schadeberg, A., Kraan, M., & Hamon, K. G. (2021). Beyond métiers: Social factors influence fisher behaviour. *ICES Journal of Marine Science, 78*(4), 1530-1541. https://doi.org/10.1093/icesjms/fsab050

Shalli, M. S., Mmochi, A. J., Rubekie, A. P., Yona, G., Shoko, A., Limbu, S. M., Mwita, C. J., Lamtane, H. A., Hamed, S. S., Jiddawi, N. S., & Mapenzi, L. L. (2024). The contribution of milkfish (Chanos chanos) pond farming to socio-economics and coastal community livelihoods for a sustainable blue economy in Tanzania. *Aquaculture International, 32,* 4915-4931. https://doi.org/10.1007/s10499-024-01408-4

Shen, M., Xiao, N., Zhao, Z., Guo, N., Luo, Z., Sun, G., & Li, J. (2022). eDNA metabarcoding as a promising conservation tool to monitor fish diversity in Beijing water systems compared with ground cages. *Scientific Reports, 12,* Article 11113. https://doi.org/10.1038/s41598-022-15488-w

Tahiluddin, A., & Terzi, E. (2021). An overview of fisheries and aquaculture in the Philippines. *Journal of Anatolian Environmental and Animal Sciences, 6*(4), 475-486. https://doi.org/10.35229/jaes.944292

Thorpe, M. (2026). *Invasive Mussel Control for Process Water System.* https://schroederindustries.com/how-to-protect-your-process-systems-from-invasive-mussels/

Valcobero, B. J. (2019). *BFAR's fisheries livelihood assistance returns for SAAD program phase 2 | Special area for agricultural development*. https://saad.da.gov.ph/2023/05/bfars-fisheries-livelihood-assistance-returns-for-saad-program-phase-2

Van Tongeren, D. R. (2020). Face to face with death: The role of religion in coping with suffering. *The Science of Religion, Spirituality, and Existentialism,* 37-49. Academic Press. https://doi.org/10.1016/B978-0-12-817204-9.00004-4

Westlands Water District (2026). *Mussel prevention & control best management practices.* https://wwd.ca.gov/wwd-notice/mussel-prevention-control-best-management-practices-796/

Yang, X., Shu, L., Chen, J., Ferrag, M. A., Wu, J., Nurellari, E., & Huang, K. (2020). A survey on smart agriculture: Development modes, technologies, and security and privacy challenges. *IEEE/CAA Journal of Automatica Sinica, 8*(2), 273-302. https://doi.org/10.1109/JAS.2020.1003536

Yusoph, A. (2021). *Credit needs and credit utilization of marine municipal fisherfolks in Dipolog City, Zamboanga Del Norte.* https://www.ukdr.uplb.edu.ph/etd-undergrad/1