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VALUE CHAIN ANALYSIS OF ISLAND MACKEREL (*Rastrelliger faughni*) IN SELECTED COASTAL MUNICIPALITIES IN LAGONOY GULF, PHILIPPINES

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Abstract

Background: Fisheries play a crucial role in food security and livelihoods in coastal communities. However, inefficient value chains hinder optimal economic returns for small-scale fishers. Analyzing the value chain of island mackerel (*Rastrelliger faughni*) in the Lagonoy Gulf helps to identify bottlenecks and areas for improvement.
Purpose: This study aimed to assess the value chain of island mackerel in selected coastal municipalities around the Lagonoy Gulf, Philippines, to understand its structure, dynamics, and socioeconomic implications.
Design/methodology/approach: This study employed a case study approach using primary data (surveys, interviews, focus groups with fishers, traders, and local officials) and secondary data. It involved a total of 114 respondents, including 100 fisherfolks representing the target population, 10 participants in focused group discussions (FGDs), and four key informant interviews (KIIs) with fishery experts selected from the local government and barangay officials, including a municipal agriculturist, an agriculture technologist in the fisheries sector, and a Department of Agriculture officer. The value chain analysis framework was used to map the actors, flows, and margins.
Findings/Results: The study revealed key actors, such as fishers, consolidators, retailers, and processors. Price disparity and limited infrastructure were identified as major constraints. The value chain analysis showed that fishermen earned the highest average net profit, earning 95.30% during the peak season and 59.65% during the lean season. Retailers earned 15.19% during peak and 9.11% in lean seasons, whereas processors' profit margins varied by product, with seasoned dried buraws reaching up to 57.91% in the peak season and 63.02% in the lean season. Retailer processors showed strong profitability, with margins of 82.84% (peak) and 77.33% (lean). Recommendations include strengthening fisher cooperatives, improving cold-storage access, and enhancing market linkages.
Conclusion: The value chain of island mackerel in the Gulf of Lagonoy has the potential for economic improvement. However, inefficiencies and limited support hinder performance. A more coordinated approach among stakeholders can significantly enhance the outcomes.
Originality/value (state-of-the-art): This study provides a comprehensive local-scale value chain analysis of island mackerels in the Philippines. This study provides practical insights for fishery development, particularly in coastal community contexts.

Keywords: island mackerel, value chain, fisheries, coastal municipalities, Lagonoy Gulf

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INTRODUCTION

The global fisheries sector faces challenges (e.g., habitat degradation, overfishing, and climate change impacts), which are particularly evident in Southeast Asia, where the Philippines plays a major role in fisheries. In 2019, the Philippines ranked 10th in capture fishery production and 11th in aquaculture production, contributing approximately 1.2%–1.3% of the country's GDP (Southeast Asian Fisheries Development Center, 2022). Declining fish supplies and variable capture rates are major environmental and economic issues in many coastal communities, including those in the Philippines (Cabral et al., 2023).

Fishing is one of the main sources of income for a country. In 2019, there were approximately 1.99 million fishermen and 0.35 million fish farmers. The average annual consumption of fish and fishery products was 34.27 kilograms per Filipino. This consumption consisted of 23.36 kg of fresh fish, 2.85 kg of dried fish, 4.97 kg of processed fish, and 3.10 kg of crustaceans and mollusks. In 2022, total fishery output increased by 2.2 percent, reaching 4,339.89 thousand metric tons, up from 4,248.26 thousand metric tons in the previous year (PSA, 2022). Additionally, Camarines Sur remains a key player in the buraw fishing industry, with an average catch of 4,073.50 kg from 2019 to 2022 (National Fisheries Research and Development Institute-Bureau of Fisheries and Aquatic Resources (NFRDI-BFAR), 2023). Specifically, the Lagonoy Gulf spans around 3,070 square kilometers with a reef area of 166 square kilometers, supporting the livelihoods of coastal communities. Coastal communities along the gulf rely heavily on their abundant marine resources for their livelihoods. However, Olaño et al. (2018) found that the region faces challenges, such as declining fish supplies and overfishing, particularly in the Lagonoy municipality. Efforts are underway to promote sustainable fisheries management, including the implementation of the fishing activity limitations outlined in RA 8550. Sections 9 and 18 of RA 8550 have led to reduced catch volumes in the Lagonoy Gulf, aiming to prevent overexploitation and safeguard marine resources through sustainable fisheries management, which may impose restrictions on fishing activity, limiting the catch and profit margin of all actors in the chain (Delfino, 2020). Moreover, the fish value chain involves various participants such as fishermen, processors, traders, retailers, distributors, and governmental organizations. Disparities and external factors influence the interactions among these players, contributing to the value chain dynamics that affect the supply and profit margins of each actor. For instance, fishermen face challenges, such as low negotiating power and dependence on intermediaries (Belton & Little, 2014). Understanding these dynamics is critical for stakeholders to make educated decisions and develop measures to reduce the risks associated with supply change (Dobrzykowski et al., 2014).

This study conducts a value chain analysis of "*buraw*" caught by fisherfolks in selected coastal municipalities along the Lagonoy Gulf coastline. It examines production, processing, distribution, and marketing to identify areas for improvement and potential opportunities to enhance the economic viability of the local fishing industry, specifically the buraw industry. Specifically, this study provides a comprehensive understanding of the value chain dynamics of the *buraw* (Rastrelliger faughni) fishery in selected municipalities along the Lagonoy Gulf. Castillo (2021) focused on the Philippine livestock industry using VCA to identify key actors, added value, and costs, reinforcing the importance of stakeholder engagement and tailored policymaking. Her emphasis on value-added activities (e.g., processing, branding, and improved logistics) strongly supports our findings and the expected results regarding enhancing the profitability and sustainability of the buraw fishery.

The study is supported by the study of Carlos (2018) on "A Value Chain Analysis of Philippine Coffee," Rodriguez (2024) on "Unveiling The Mushroom Value Chain: Opportunities And Constraints in Partido District, Camarines Sur, Philippines", and Delfino (2020) on the value chain analysis of skipjack tuna in the Lagonoy Gulf. Through this analysis, critical bottlenecks, inefficiencies, and improvement opportunities in the *buraw* industry were identified, contributing significantly to the development and viability of the fisheries industry in the Lagonoy Gulf region and Philippines as a whole.

METHODS

This study uses a mixed-method approach to analyze the Buraw value chain by combining qualitative and quantitative techniques. It involved fishermen, middlemen, and buraw processors in the Tigaon, Sagnay, San Jose, and Lagonoy municipalities. Other

possible respondents, such as a municipal agriculturist, Agriculture Technologist on Fisheries Sector, and DA officer, were considered key informants in the implementation of the study. This methodological integration ensures a more rigorous and comprehensive investigation of the Burao value chain, allowing for a more thorough exploration of its complexity, dynamics, and socioeconomic implications. The sample comprised 10 focused group discussion (FGD) participants, four key informant interview (KII) fishery experts selected from the local government and barangay officials (Municipal Agriculturist LGU and Barangay Representative, and DA Officer), and 100 fisherfolks representing the target population. The respondents were randomly identified.

The data were collected through a Focused Group Discussion (FGD) guide, survey questionnaire, and unstructured interview. A methodological technique called triangulation is used to guarantee the reliability and veracity of the acquired information. The researcher sought to confirm the findings and strengthen the study's overall credibility by cross-referencing and comparing data from various tools and techniques.

A structured guide consisting of a series of open-ended questions and prompts was used to facilitate group discussion among the participants. The FGD guide covers relevant topics related to the "buraw" fisheries value chain, allowing for an in-depth exploration of perspectives, experiences, and opinions. The interview guide was thoroughly validated by research experts to ensure its reliability, validity, and ethical integrity in gathering accurate and significant data during the study.

The structured questionnaire used in this study was adapted from the Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD). The questionnaire was designed to collect quantitative data from actors in the chain. The questions covered the relevant aspects of their involvement in the "buraw" value chain, such as fishing practices, income generation, market access, and the challenges faced. Furthermore, a special KII interview on the Municipal Agriculture Officers of each municipality, as well as the Agriculture Technologists assigned in the fisheries sector, was included in this study to further draw more reliable findings and proper recommendations.

The theoretical framework guiding this study is rooted in the value chain theory, which was developed by Porter (1985) as a means of understanding how firms can gain a competitive advantage by optimizing the various activities involved in the production and distribution of goods and services, Mutia et al.'s conceptual framework on the VCA of Maliputo presented in Figure 1, and the theory of change. This was used to examine the actors in the chain, their roles and the dynamics of their relationships. It provides a map of buraw production and marketing in the Gulf of Lagonoy.

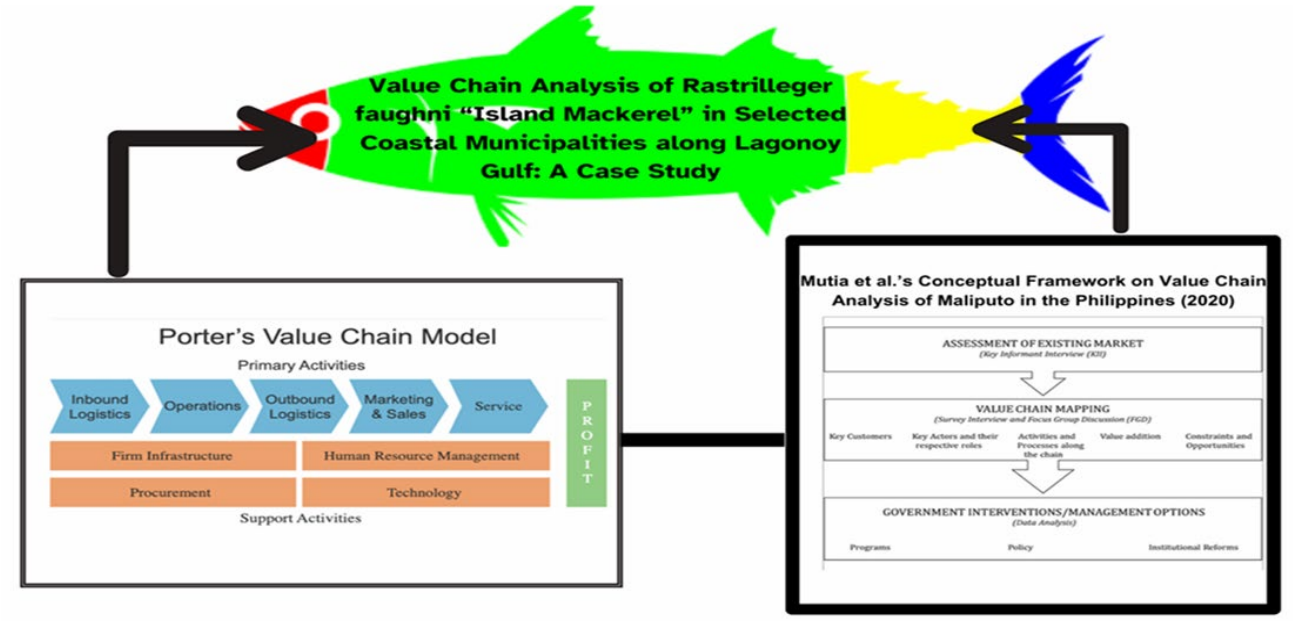

Figure 1. Theoretical Framework

This section describes the main players in the value chain, such as producers, traders, and processors. It specifically employs the percentage technique and weighted mean to quantify the responses of selected ambulant vendors (parabariwas/registration). This approach was chosen to accurately capture ambulant vendors' perceptions of the profit-sharing arrangements of all actors in the Buraw value chain.

The costs, value-added, and return on "buraw" production and distribution were calculated. It was designed to evaluate each actor's financial viability and economic contribution to the *buraw* (Rastrelliger faughni) value chain. It aims to determine how much each stakeholder, especially fishermen, middlemen, processors, and retailers, spends and earns throughout the chain, thereby identifying income disparities, inefficiencies, and potential value-adding opportunities.

This analysis is grounded in methodologies commonly used in agribusiness and fisheries economics, as referenced in Kumar and Rajeev (2016) and Delfino (2020), and aligns with the goal of the study. Formula for cost-return analysis in Table 1.

RESULTS

Value Chain Map Of Buraw Industry In Lagonoy Gulf

The value chain map of the buraw along the Lagonoy Gulf shows the interconnectedness of the various actors involved in the input, processing, and trading of commodities. There are ten buraw chains along the Lagonoy Gulf, including fishers, wholesalers, retailers, processors, and end-users. The chains are divided into three routine activities: primary, secondary, and nonroutine activities. The primary routines include sourcing the commodity, trading and processing activities, and the final sale of the fish to the end-user. Secondary and nonroutine activities are informal and sometimes bypass other players in the chain, leading to more complex relationship dynamics.

The regulatory bodies and enabling environments that affect the productivity and efficiency of players in this value chain include BFAR, LGU, MAO, DTI, DOLE, WWF-Philippines, DA, Partido State University Research and Extension, Department of Science and Technology, and Fishermen Association. BFAR V and LGU oversee permits, licenses, and monitors if fishers have the necessary permissions and guidelines to operate, ensuring adherence to the established standards of RA 8550. Additionally, the MAO and DA monitor the catch volume of fishermen to allocate government funding, but outdated data from coastal municipalities hinders accurate fund allocation. Better coordination between agencies can address this issue and support fishermen in industry. LGU, DOLE, DOST, WWF, and DTI provide equipment, capital, and market infrastructure for fishermen, wholesalers, and retailers, thereby promoting trade opportunities. The Fisheries Association represents fisherfolks and helps them access support from the LGU, enabling them to sustain their livelihood.

The Value Chain Map of Buraw in Lagonoy Gulf was adapted and contextualized from the value chain analysis models of Delfino (2020), Carlos (2018), Rodriguez (2024), and Castillo (2021), the value chain map of buraw in Lagonoy Gulf was developed using empirical data and stakeholder interviews in conjunction with existing literature on fisheries and agricultural value chains.

Table 1. Formula for Cost-Return Analysis

	Formula
Cost of Goods Sold (COGS)	Direct Labor + Direct Material + Factory Overhead
Revenue/Sales	Goods x Selling Price
Gross Profit	Sales – Cost of Good Sold
Net Profit Margin	Net Profit/ Sales x 100
Gross Profit per Unit	Gross Profit/Quantity
Net Profit (Fishers)	Revenue – Expenses

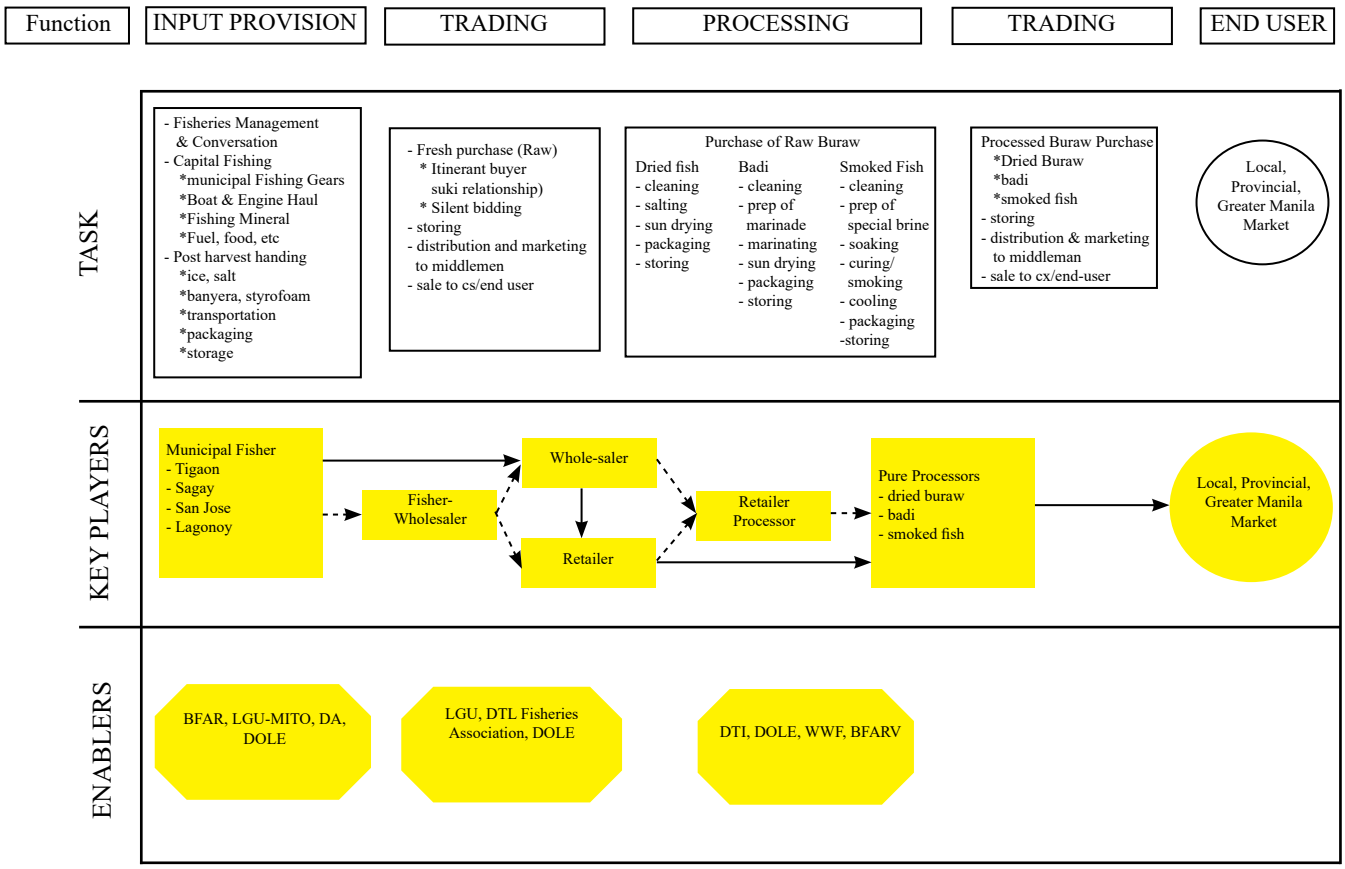

Figure 2. Value chain map of buraw in Lagonoy Gulf

Actors, Their Roles, And Links In The Value Chain Map

Several key actors and players were found to be involved in the value chain of Buraw in selected coastal municipalities along the Lagonoy Gulf: (1) fishers (municipal/small-scale fishers), (2) wholesalers, (3) fisher-wholesalers, (4) retailers, (5) processors, (6) retailer-processors, and end users. The value chain map of Buraw (Island Mackerel) defines the overall links between the chains' various actors with varying roles and channels for marketing products.

(1) Fisher (municipal or small-scale fishermen)

Municipal fishermen in the Philippines, regulated by RA 8550 (Fisheries Code), operate within 15 km of the coastline and primarily use various fishing gear, such as hooks, lines, gill nets, and traps. The average age of these small-scale fishers was 41 years, with less than 31 years of experience earning an average monthly income of ₱11,000. The starting capital ranges from ₱600,000 to ₱1,000,000. Fishing peaked from June to December, with an average catch of 644 kg of buraw per trip, whereas lean months from January to May saw an average catch of 50 kg. Selling prices vary by season, but are denoted as P120 during peak months and P180 during lean months per kilogram.

(2) wholesaler

The wholesaler in the buraw industry buys buraws in bulk from fishermen and sells them locally to retailers, peddlers, registered fish vendors, and processors, thereby playing a crucial role in supplying fresh buraws. Typical capitalization for these wholesalers is P10,000-20,000, with working hours of to 6-8 hours a day, seven days a week. Women dominate this industry, comprising 68% of the workforce, and their livelihoods are closely linked to fishing. The supply chain is vulnerable to severe weather, which affects the fishing capacity. Itinerant customers, referred to as "suki," are key marketing outlets. Transactions often utilize a silent bidding mechanism called "bulungan," with sales conducted through direct or direct retail methods. Pricing is negotiated based on the harvest volume, quality, operational costs, and market competition. During the peak season, wholesalers typically purchase 1500 kg at P120 per kilogram and 650 kg in the lean season at P180-190 per kilogram. Markup is usually

5-10%, with selling prices at P140 per kilogram during the peak season and P190-200 during the lean season.

(3) fisher-wholesaler

Fishermen and wholesalers are key players in the buraw supply chain, merging their roles of fishermen and wholesalers (Delfino, 2020). The initial capital for fishing is P600,000 to P1,000,000, while wholesaling requires P10,000-15,000. The peak season runs from June to December, and the lean season from January to May. Changes in fishing patterns driven by destructive practices, such as trawling catanduanes, have reduced buraw catches, particularly in traditional breeding areas. Peak season catches are 400-500 kg at P120-135 per kilogram, whereas lean-season sales are 100-150 kg at higher prices. Outlet choices depend on prices and relationships. To ensure long-term sustainability, capacity-building programs are vital for adapting to market conditions and adopting sustainable fishing practices (Steenbergen et al., 2017; Torell et al., 2017).

(4) retailer

The fourth component of the buraw value chain is the retailer, which is a small-scale fish dealer. During the peak season, they buy about 90 kg daily at P160-180 per kg, with purchases dropping to 20 kg or less in the lean season, maintaining a 5-10% markup. The average capital required was P13,333.33. Retailers sell to itinerant buyers and market towns by adjusting the prices based on fish quality, catch volume, operating costs, and competition. During the COVID-19 pandemic, some people used motorcycles to reach rural customers. They typically purchase 90-150 kg of fresh buraws daily in the peak season and 50 kg in the lean season, with price increases due to rising operating expenses.

(5) processor

Processors, mainly women, transform raw fish into products like “tinapa,” “badi,” and “binalad,” often working from home with initial investments of at least P2,500. Production peaks from December to May owing to higher fish availability and tourist demand, with processors working 2-3 days a week during the peak season and 1-2 days during lean times. Retail prices range from P350-900 depending on the product. Payments are typically in cash or kind, mainly selling locally or as “pasalubong.” Limited knowledge and technological challenges restrict access to large markets in certain municipalities.

(6) Retailer processor

The retailer processor plays a vital role in the buraw value chain, acting as a “para-regaton that uses a motorcycle to sell dried and fresh buraws. They typically purchase buraw from fisher-wholesalers to benefit from lower prices and often process it into “badi,” which is more popular due to its distinct flavor. However, limited processing knowledge among retailers suggests a need for training in processing techniques, food safety, and product diversification. Strengthening connections within the value chain can optimize supply, reduce costs, and enhance market access to processed buraws. While each actor in the buraw (Island Mackerel) value chain plays an integral role, the fisherman is the most crucial element, serving as the primary source of the product. Their capacity to catch buraws directly affects the entire supply chain and its stability. However, the effectiveness of this role is significantly dependent on wholesalers and retailers, who facilitate market access and ensure the flow of goods. Thus, a collaborative approach among all actors is essential for enhancing the efficiency and resilience of the value chain.

Relationship Dynamics Of Actors In The Value Chain

A value chain map of the buraws along the Gulf of Lagonoys is shown in Figure 2. This illustrates the interconnectedness of the various actors involved in the input, processing, and trading of commodities. In this analysis, it was determined that there are 10 buraw chains along the Lagonoy Gulf: (1) from fisher to wholesaler to retailers and from processors to the end user, (2) from fisher to fisher-wholesaler to processor and end-user, (3) from fisher to fisher-wholesaler to retailer and end-user, (4) from fisher to wholesaler to retailer and end-user, (5) from fisher to wholesaler to retailer and end-user, (6) from fisher to retailer-processor then to end user, (7) from fisher to retailer to processor then to end user, (8) from fisher to retailer then to end user, (9) from fisher to fisher-wholesaler to end user, and (10) fisher directly to the end user. These activities are divided into three categories: primary, secondary, and non-routine activities.

Primary Routine

(1) Fisher, Wholesaler, Retailers, Processors, and End-users

The primary routine of the buraw value chain involves fishers selling their catch to wholesalers, who then distribute it to retailers and retailers sell it to processors. The processors add value to the commodity and sell it to the end-user. There is a formal agreement between fishers and wholesalers. The fishermen directly wholesale the buraw caught to the wholesaler, who sometimes finances their fishing operations. The sales terms include itinerant buyers or the "suki relationship" and, in some cases, silent bidding or "bulungan" during the peak season.

Similarly, wholesalers and retailers make formal pricing agreements. They sell their products to itinerant buyers, local markets, retailers, and processors. Sellers set prices based on fish quality, catch volume, costs, and competition. On the other hand, Buraw is bought from retailers at prices that are typically based on fish quality, volume, competition, and expenses. The processor usually sells processed buraws directly to consumers, increasing the value of the fish and diversifying market offerings. Processed buraw product prices are subject to change based on the availability of raw materials. Cash payment is the primary mode of payment; however, some buyers also offer cash plus kind or kind alone if the product is sold within the neighborhood. Formal agreements and practices within the chain ensure smooth operations, foster business relations between actors, enhance the economic value of the buraw, and avoid market fluctuations.

The existence of intermediary financing, price agreements, and quality-based pricing is aligned with Delfino (2020), who noted similar wholesaler-fisher agreements in the skipjack tuna trade in Lagonoy. In addition, Belton and Little (2014) emphasized how fishers' reliance on middlemen limits their bargaining power, a dynamic observed in this chain.

Secondary Routine

(2) Fisher, Fisher-Wholesaler, processor, end-user

In chain 2, the processor-end user relationship is the same as in chain 1. However, the fisher and fisher-wholesaler, and the fisher-wholesaler and processor have unique relationships and channels because of the combined fisher-wholesaler, where they are responsible for both sourcing the buraw and selling it to the market outlet. In this chain, the fisher-wholesaler may have bargaining power to negotiate prices with the processor and secure better prices for their catch, thereby increasing earnings. Prices may be based on the capture volume, fish quality, competition level, operating costs, and seasonal or weather conditions. This dual role echoes Rodriguez (2024), who observed overlapping actor functions (e.g., producer processors in the mushroom value chain). Such hybrid roles improve the profit margins and supply consistency. Moreover, Castillo (2021) and Mengumphan (2016) found similar setups in livestock and tilapia chains, in which actor consolidation increased bargaining power and pricing control. This dual role allows for better margins and increased autonomy for the fishers.

(3) Fisher, Fisher-Wholesaler, Retailer, End User

The relationship between channels in this chain is similar to that in the previous chain. The fisher-wholesaler in this chain takes on the roles of both the fisher and wholesaler, selling fish to the retailer, who then sells it to the end-user. The fisher-wholesaler has significant control over prices and terms with the retailer.

(4) Fisher, Wholesaler, Retail-processor, End-User

In this supply chain, the retailer processor can buy fish in bulk from wholesalers and either sell it directly to end users or process it for value-added sales, based on market demand and business strategies. They may have negotiated agreements with wholesalers or "suki" relationships to ensure a steady fish supply.

(5) Fisher, Wholesaler, Retailer, End-User

The marketing relationship between the various channels in this chain is similar to that between chains 1 and 4. As the primary supplier of Buraw fish, the Fisher holds bargaining power and can negotiate prices and terms with the Wholesaler based on catch volume, fish quality, competition, operating costs, seasonal conditions, weather, and demand. This reinforces the point made by Elliott et al. (2022) that fishers often incur the largest costs, but receive the smallest returns. The fisher's pricing power depends on seasonal catch volume and market competition.

(6) Fisher, Retail Processor, and End User

The relationship and linkage between fishermen and retailer processors in this chain are similar to those in other supply chains. However, in this chain, bargaining power is on the fisher's side, but retailer processors often have more control because of their ability to dictate prices and demand based on consumer preferences.

(7) Fisher, Retailer, Processor, End User

In this chain, the fisher sells the commodity to the retailer, and sells it to the processor. The processor adds value to the fish and sells it to the end-user. Fishermen have bargaining power over the chain.

Non-Routine

(8) Fisher, retailer, and end-user

This supply chain operates without formal agreements between the fisher, retailer, and end user, allowing the fisher to sell directly to the retailer and the retailer to sell to the end user without involving intermediaries. This non-traditional approach gives the fisher more control over pricing and distribution, resulting in higher profits. This corroborates the study by Belton and Little (2014), which reflects informal but efficient small-scale market operations.

(9) Fisher, Fisher-Wholesaler, and end user

The chain is similar to chain 3 in this study, but the fisher-wholesaler sells directly to the end user, bypassing traditional intermediaries and increasing profits. Similar patterns were found by Flores and Genodepa (2019) in the blue swimming crab trade, in which direct-to-consumer strategies enhanced fisher earnings.

(10) Fisher, End User

Unlike other actors, fishers and end users in this chain have no formal purchasing agreements. The market linkage between them is on a "first come, first served' basis and is highly dependent on the availability of the products. A "suki relationship" transaction, however, also occurred sometimes where consumers were given purchase discounts or just given extra kilograms of the product. The lack of formal agreement also means that the pricing structure for a commodity is generally inconsistent across different actors in the chain, indicating an informal marketing approach.

The three routine activities in the chain indicate interconnected value-chain dynamics, manifesting as formal and informal channels outside the government's regulatory system. This signals intense competition in the industry, emphasizing the need for laws that consider informal markets. This could lead to more inclusive laws and regulations that promote the industry's long-term expansion and development. Compared to Delfino (2020) and Carlos (2018), this study reveals a more diverse and complex chain structure, including informal systems outside formal government oversight. These findings highlight the need for inclusive policy approaches that integrate informal markets to ensure fair value distribution, market resilience, and sustainable growth in burawed industries, as suggested by Elliott et al. (2022) and Castillo (2021).

Summary Of Core Processes, Costs, Returns, And Value Addition Of Buraw

Table 2 provides a comprehensive overview of the primary processes, costs, returns, and value addition in the buraw value chain along the Gulf of Lagonoy. It includes details, such as selling prices, product types, costs, value-added, and net profit margins for each player. The analysis showed that fishermen have the largest net profit margin, emphasizing the financial benefits of participating in fishing operations.

The retailer's net profit margin is smaller, but both parties achieve respectable returns. Choosing a career as a fisherman offers a significant opportunity for profitable investment compared with becoming a retailer (Delfino, 2020). However, income and expenses are directly influenced by changes in the quantity of fish products in the area. This result aligns with previous research by Dobrzykowski et al. (2014), who emphasize the complex relationship between market dynamics and the financial success of chain members in the fish value chain. These studies show how supply fluctuations can be influenced by factors such as market demand, seasonality, environmental conditions, prices, and income levels. Understanding these dynamics is crucial for stakeholders to make informed decisions and to develop strategies to mitigate supply related risks.

Table 2. Summary of the core processes, costs, returns, and value addition of different actor

Core Process	Input Provision		Input Provision & Unloading		Unloading					
Actors	Fisher (Municipal)		Fisher-Wholesaler (Municipal)		Wholesaler		Retailer (ambulant vendors)		Retailer (motorcycle operated vendor)	
Season	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean
Product Type	Fresh Buraw		Fresh Buraw		Fresh Buraw					
Selling Price (₱)	120	180	135	190	140	200	180	240	190	260
Cost per kg unit (₱)	5.64	72.63	60.34	180.17	3.34	7.71	152.66	218.14	145.93	222.783
Value Added (₱)	111.36	107.37	74.66	9.83	136.66	192.29	27.34	21.86	44.07	37.217
Net Profit Margin (%)	95.30	57.65	55.30	5.18	23.14	5.84	15.19	9.11	23.20	14.31

Table 2. Summary of the core processes, costs, returns, and value addition of different actor (continue)

Core Process	Unloading & Processing		Pure Processing					
Actors	Retailer-Processor (Badi Only)		Processor					
Season	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean
Product Type	Fresh and Processed (Badi) Buraw		Smoked Buraw		Smoked Dried Buraw		Dried Buraw	
Selling Price (₱)	500	800	350	400	500	800	300	370
Cost per kg unit (₱)	208.11	328.73	240.87	351.75	210.44	295.87	240.87	351.75
Value Added (₱)	291.89	471.27	109.13	48.25	289.56	504.13	59.13	18.25
Net Profit Margin (%)	82.84	77.33	31.18	12.06	57.91	63.91	19.71	4.93

The ability of fishermen and value chain participants to adapt to market shifts is linked to financial performance. Investments in infrastructure, training, and technology can enhance productivity and reduce expenses, thus making the industry more resilient. Policymakers and industry leaders should focus on creating environments that facilitate such investments and build resilience in fishing communities.

Analysis of buraw fishermen provides significant economic insights throughout the year. During the peak season, the cost per kilogram is ₱5.64, with a selling price of ₱120, leading to a high net profit margin of 95.30%. By contrast, during the lean season, costs increased to ₱72.63, with selling prices at ₱180, resulting in a reduced net profit margin of 59.65%. Both margins exceed the ideal net profit margin of 20.2% for fishing, indicating efficient production. The value-added per kilogram was ₱114.36 in the peak season and ₱107.37 in the lean season. Notably, fishermen do not have a profit-sharing structure because they typically employ family members, which allows them to maintain all earnings. The results show that fishermen maintain the highest profit margins, particularly during peak seasons, owing to low input costs and direct access to catch. This finding supports Delfino (2020), who noted that direct involvement in harvesting yields the most financial benefits, although profits dip significantly during lean months. Accurate accounting proves crucial, particularly during lean periods, to track costs and support strategic decision making. Research suggests that improving postharvest and financing facilities can enhance the efficiency and revenue of fishermen.

Important market trends are revealed in wholesalers' financial operations. During the peak season, wholesalers sell 1,500 kg at ₱140/kg, generating ₱210,000 sales and a net profit of ₱48,598.19, reflecting a 23.14% margin. Conversely, in the lean season, selling 650 kg at ₱200/kg results in ₱130,000 sales, with a net profit of ₱7,598, resulting in a lower margin of 5.84%. This highlights the impact of seasonality on profitability, and underscores the need for effective management strategies. Despite having a high value added per kilogram, wholesalers face low net profit margins, making the establishment of a buraw wholesale operation challenging. This indicates vulnerability to volume changes and operating cost pressures, echoing Dobrzykowski et al. (2014), who emphasized the importance of infrastructure and collaboration in maintaining stable returns across chains. Therefore, enhancing value-added services, managing operating costs, diversifying, and adopting technology are essential for long-term resilience (Bachtiar, 2023).

However, the combined financial analysis of fishing and wholesaling indicates that, during the peak season, selling 644 kg of fish generates a gross margin of ₱90,416.15, with total sales reaching ₱154,440. In contrast, during the lean season, selling 50 kg resulted in a lower gross margin of ₱6,976.15 and total sales of ₱38,000. Wholesale costs are significantly impacted by purchases, freight, and operating expenses, which are higher at ₱180.17 per kilogram during lean seasons. The value-added per kilogram is ₱74.66 in the peak season but drops to ₱9.83 in the lean season, emphasizing the need for marketing improvements. The net profit margin during the peak season is 55.30% (₱85,406.65), whereas it plummets to 5.18% (₱1,966.65) during the lean season, underscoring the necessity for strategic planning to mitigate losses and maximize profits. This dual-role model aligns with Rodriguez (2024) and Mengumphan (2016), who noted that while actor role consolidation may increase bargaining power, it also concentrates on operational risks, particularly under volatile supply conditions.

The financial analysis of small-scale retailers highlights the significant seasonal variations in sales and profitability. During the peak season, retailers sell 90 kg of fish at ₱180 per kg, totaling ₱16,200, with a gross margin of ₱3,450 and a net profit margin of 15.19%. In contrast, during the lean season, sales dropped to 20 kg at ₱360 per kg, yielding only ₱7,200, with a gross margin of ₱1,050 and a reduced net profit margin of 9.11%. The cost per kilogram rises from ₱152.66 in the peak season to ₱218.14 in the lean season, leading to a decrease in value-added per kilogram from ₱27.34 to ₱21.86, indicating a need for improved efficiency and cost management.

Similarly, for Regaton's buraw sales, in the peak season, 150 kg is sold at ₱190/kg for a total of ₱28,500, with costs of ₱20,486.67, resulting in a gross margin of ₱8,013.33 and a net profit margin of 23.20%. However, during the lean season, sales fall to 50 kg at ₱260/kg, totaling ₱13,000, with costs of ₱9,736.67, leading to a gross margin of ₱3,263.33 and a net profit margin of 14.31%. The analysis emphasizes the necessity for cost control and stresses that small-scale retailers can achieve higher profit margins than traditional retailers by leveraging remote locations to serve customers effectively.

The processor's weekly operations for smoked, seasoned dry, and dried buraws showed varied financial performances based on the season. In the peak season, sales totaled ₱16,500 (~$298.05), while in lean season they drop to ₱11,850 (~$214.05). The direct material costs were ₱1,800 (~$32.51) for smoked and dried buraw and ₱3,600 (~$65.02) for seasoned dried buraws. The profit margins differed significantly: 31.18%, 57.91%, and 19.71% in the peak season, and 12.06%, 63.02%, and 4.93% in the lean season, respectively. Value addition per kilogram reveals smoked buraw increases by ₱109.13 (~$1.97) (peak) and ₱48.25 (~$0.87) (lean); seasoned dried buraw shows increases of ₱289.56 (~$5.23) and ₱504.13 (~$9.10), while dried buraw increases by ₱59.13 (~$1.06) and ₱18.25 (~$0.32). There is a clear need for cost control during lean seasons and for enhancing the value addition of smoked and dried buraws. Market access limitations hinder growth, whereas better packaging and equipment can improve profitability.

Finally, for retailer processors selling seasoned dry fish ("badi"), peak season sales reach ₱48,500, dropping to ₱29,000 in the lean season, indicating strong seasonality. The processing costs are ₱5,041.67 for lean and ₱6,791.67 for peak seasons. Gross margins are ₱41,708.33 and ₱23,958.33, with net profits of ₱22,425.48 and ₱40,175.48, yielding net profit margins of 82.84% and 77.33%, respectively. The value addition per kilogram was ₱291.89 during the peak season and ₱471.27 during the lean season. To mitigate reliance on peak seasons, retailer processors should consider diversification and product innovation and expand their customer base. Processors and retailer processors exhibit more stable margins, especially for value-added products such as badi and dried buraws, confirming Castillo (2021) and Rodriguez (2024), who advocate for processing and product diversification as strategies to improve income and resilience.

SWOT Analysis of the Chain

An in-depth analysis of the buraw industry was conducted using SWOT Analysis in coastal municipalities along the Gulf of Lagonoy. This study identifies the industry's strengths, weaknesses, opportunities, and threats, providing insights to stakeholders, governments, and industry players, as presented in Figure 3. These findings can aid in utilizing resources, addressing weaknesses, making investment decisions, and creating mitigation plans. Proactive measures can lead to advancements, favorable legislative conditions, and increased market demand, benefiting the industry financially and environmentally.

	Strengths	**Weaknesses**
	• Abundant fish resources • Experienced fishers of Buraw and other species. • Established local and national markets.	• Reliance on traditional fishing practices. • Lack of cooperatives for fisherfolk. • Minimal government funding or support. • Limited financial access and low financial literacy. • Poor post-harvest handling. • Limited market access and decreased catch volumes. • Lack of knowledge in fish processing. • Majority of processed products (e.g., Badi, tinapa) are only for consumption. • Vulnerability to environmental factors. • Poor record management of fishers' catch.
Opportunities • Technological advancements in fisheries and related industries. Potential for value-added processing of fish products. • Cooperative marketing initiatives and establishment of Integrated Fisheries and Aquatic Resource Management Councils (IFARMCs). • Presence of a neighboring university specializing in fisheries, management, ICT, research, and extension services, with a shared service facility.	Strengths and Opportunities (SO Strategies) • Utilize abundant fish resources for large-scale harvests to support value-added processing, increasing product value and profitability. • Apply fishers' expertise to integrate modern technology into fishing operations. • Implement cooperative marketing to expand market presence • Collaborate with neighboring universities for training, capacity building, and value-added product development.	Weaknesses and Opportunities (WO Strategies) • Modernize fishing practices through technological innovation to improve quality, quantity, and sustainability. • Use cooperatives and IFARMCs to pool resources for processing, finance, and technical support • Leverage university research and extension to enhance resource management, financial literacy, and market expansion.
Threats • Strict and inapt implementation of RA 8550. • Municipal delineation issues. • Stringent and poorly suited fisheries regulations. • Competition from larger fishing vessels. • Market fluctuations. • Climate change.	Strengths and Threats (ST Strategies) • Strengthen regulatory compliance and ensure responsible enforcement of RA 8550. • Promote cooperation via IFARMCs for sustainable resource management. • Diversify market channels and value-added products to reduce market and competition risks.	Weaknesses and Threats (WT Strategies) • Transition to modern fishing methods. • Establish cooperatives for better resource sharing. • Train fishers in ICT-based recordkeeping and market diversification. • Advocate for increased government funding and infrastructure. • Provide ongoing education to improve processing skills and knowledge.

Figure 3. Summary of SWOT Analysis

The buraw-fishing industry in the Lagonoy Gulf has a rich tradition and significant potential for growth, drawing on extensive local fishing knowledge and ideal breeding conditions. However, it faces challenges including outdated fishing methods, insufficient implementation of regulations, and limited access to funding and technological advancements, which threaten sustainability and profitability. These findings are supported by Kumar et al. (2022), who show how cooperative marketing techniques improve the revenue and competitiveness of small-scale fishermen. Similarly, Rahman et al.'s (2020) research emphasizes how crucial technology adoption is to raise productivity and efficiency in value chains that support the overall industry. Khan et al. (2021) provide sufficient evidence of the role that extension services and research play in empowering fishermen via the transmission of knowledge and skills. Despite these obstacles, opportunities for development exist through the adoption of modern technologies to improve production efficiency, formation of cooperative associations to enhance resource access, and expansion of market channels. Strategic collaborations with local governments and NGOs can empower fishermen through training and financial support, effectively addressing weaknesses while leveraging local strengths for long-term growth in this vital sector. Additionally, the Buraw industry struggles with challenges, such as outdated fishing practices, restricted access to funding, and inadequate government support, all of which adversely affect profitability and catch volume. The paper "Marine Life Preservation: How Governments Can Help Drive Conservation" by Gray Group International (2024) highlights the need of cooperative efforts and efficient enforcement in preserving marine resources and sustaining livelihoods. They proposed that the preservation of marine life is greatly aided by government agencies and non-governmental organizations (NGOs). These organizations enforce laws and rules, monitor marine ecosystems, and conduct research to support conservation initiatives. Furthermore, value addition and diversification are beneficial for boosting the resilience of communities that depend on fisheries according to a study by Stacey et al. (2021). They posited that these interventions seek to promote value-adding or alternative livelihood alternatives, increase productivity and/or sustainability, and improve current livelihoods. However, significant opportunities for development lie ahead of embracing modern technology, establishing cooperatives to bolster bargaining power and increasing access to financial resources. Partnerships with local governments and NGOs can provide crucial assistance through equipment and training programs that focus on processing and adding value. By emphasizing skill development and income diversification, such as aquaculture and ecotourism, coastal communities can enhance their resilience to economic and environmental shocks while promoting sustainable fishing practices and better resource management.

Managerial Implications

This study highlights the importance of inclusive policy approaches that integrate both formal and informal market channels. This integration is essential for ensuring an equitable distribution of value, enhancing market stability, and fostering sustainable growth within the industry. Investments in critical infrastructure, such as cold storage facilities and improved market links, are vital for optimizing supply chains, reducing costs, and increasing market access for processed products. Moreover, the findings reveal that stronger collaboration among stakeholders, including fishers, wholesalers, retailers, processors, and government agencies, is necessary. Current inefficiencies and limited support hinder chain performance, making coordination essential for improving the overall efficiency and resilience. Finally, a thorough understanding of market dynamics is crucial for informed decision making and mitigating supply related risks, ultimately supporting the long-term viability of the value chain.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on these findings, this study concludes that the value chain of the buraw industry along the Lagonoy Gulf exhibits strengths rooted in a long-honored tradition of fishing, but faces challenges, emphasizing the need for modernized technology, diversification, sector collaboration, cooperatives, government, NGO, and the private sector to support the enhancement of the overall buraw industry. Furthermore, this study emphasizes the complex interactions among many participants in the Buraw sector supply chain, with formal and informal dynamics in the chain. This demonstrates that conventional marketing tactics frequently include itinerant buyers, resulting in long-term "suki relationships" between fishermen and purchasers.

Furthermore, the practice of silent bidding, which is especially prominent during peak seasons, demonstrates the fishermen's reliance on fishing activities. This insight highlights the deeply rooted ties and informal networks in the Buraw market. The existence of itinerant buyers who provide constant patronage and some engaging in silent bidding demonstrates the widespread existence of these trade methods. Such actions not only reflect the connection between fishermen and consumers but also highlight fishermen's reliance on the income generated by their fishing activities. The economic dynamics reveal the varying profit margins of different actors during the peak and lean seasons, finding that wholesalers have the least profit margin among the players. Several problems have also been established, such as the strict and inadequate implementation of RA 8550 and questions lingering to fisherfolks about the municipal delineation by NAMRIA. Profit losses due to bad weather conditions have been a major concern, as well as the seasonality of buraws, which makes all actors more reliant on the peak season and experience drastic losses during the lean season.

Overall, opportunities for growth in terms of maximizing processing efficiency, enhancing market positioning, product development in the buraw processing industry, and fostering collaboration were observed to ensure the long-term continuity and profitability of the buraw industry in the Lagonoy Gulf.

Recommendations

Based on these findings, important suggestions were made to improve the overall value chain of buraws (island mackerel) in the Lagonoy Gulf. To enhance fishery management and compliance with RA 8550 in the Lagonoy Gulf, Integrated Fisheries and Aquatic Resources Management Councils (IFARMCs) should be strengthened, and Barangay FAMRCs should be established. Additionally, government assistance and low-interest credit programs should be launched for small-scale fishermen, along with training programs and capacity building through technology transfer. Government organizations such as the DOST, DOLE, and DTI may need to strengthen their initiatives, and financial literacy programs should be encouraged. Establishing and growing fishery cooperatives is important, and support from nearby universities and government organizations can fill the knowledge gaps of fisherfolks in managing cooperatives. Utilizing shared service facilities and technology transfers can also aid the sustainable growth of the buraw industry. Finally, the expertise of the Partido State University-IT Department's ICT-based solutions in partnership with the WWF Philippines can expedite and aid data management for small-scale pelagic fishermen. Further studies are required to fully understand the island mackerel value chain. This research may either concentrate on certain regions or cover the entire Philippines. It is advisable to investigate further study areas, such as assessing the island mackerel processing business.

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REFERENCES

Bachtiar, N. K., Setiawan, A., Prastyan, G. A., et al. (2023). Business resilience and growth strategy transformation post crisis. Journal of Innovation and Entrepreneurship, 12(77). https://doi.org/10.1186/s13731-023-00345-5

Belton, B., Bush, S. R., & Little, D. C. (2017). Not just for the wealthy: Rethinking farmed fish consumption in the Global South. Global Food Security, 16, 85–92. https://doi.org/10.1016/j.gfs.2017.10.005

Cabral, R., Geronimo, R., Mamauag, A. S., Silva, J., Mancao, R., & Atrigenio, M. (2023). Ensuring aquatic food security in the Philippines. The Philippine Journal of Fisheries, 30(2), 298–313. https://doi.org/10.31398/tpjf/30.2.2022-0031

Carlos, M. (2018). A value chain analysis of Philippine coffee. DOST-PCAARRD. https://www.pcarrd.dost.gov.ph/wp-content/uploads/2018/05/Value-Chain-Analysis-of-Philippine-Coffee.pdf

Chakraborty, S., Bhattacharya, S., & Dobrzykowski, D. D. (2014). Impact of supply chain collaboration on value co-creation and firm performance: A healthcare service sector perspective. Procedia Economics and Finance, 11, 676–694. https://doi.org/10.1016/S2212-5671(14)00233-0

Delfino, A. B. (2023). Analysing the value chain of skipjack tuna (Katsuwonus pelamis) in Partido District, Camarines Sur, Philippines. International Journal of Value Chain Management, 14(1), 82–92. https://doi.org/10.1504/IJVCM.2023.129271

Dobrzykowski, D. D., Bhattacharya, S., & Chakraborty, S. (2014). Impact of supply chain collaboration on value co-creation and firm performance: A healthcare service sector perspective. Procedia Economics and Finance, 11, 676–694. https://doi.org/10.1016/S2212-5671(14)00233-0

Mengumphan, K. (2016). Value chain analysis of the tilapia sector in Thailand. Journal of Applied Aquaculture, 28(2), 127–143. https://doi.org/10.1080/10454438.2015.1117812

Castillo, L. B. (2021). Value chain analysis in Philippine livestock industry. Agriculture, 11(4), 319. https://doi.org/10.3390/agriculture11040319

Carlos, M. M. (2018). A value chain analysis of Philippine coffee. DOST-PCAARRD. https://www.pcarrd.dost.gov.ph/wp-content/uploads/2018/05/Value-Chain-Analysis-of-Philippine-Coffee.pdf

Elliott, V. L., Lynch, A. J., Phang, S. C., Cooke, S. J., Cowx, I. G., Claussen, J. E., Dalton, J., Darwall, W., Harrison, I., Murchie, K. J., Steel, E. A., & Stokes, G. L. (2022). A future for the inland fish and fisheries hidden within the Sustainable Development Goals. Frontiers in Environmental Science, 10, 756045. https://doi.org/10.3389/fenvs.2022.756045

Flores, J. R., & Genodepa, J. G. (2019). Value chain analysis of blue swimming crab (Portunus pelagicus) in Negros Occidental, Philippines. Aquaculture Economics & Management, 23(1), 1–14. https://doi.org/10.1080/13657305.2018.153657

GGI Insights. (2024, March 19). Marine life preservation: How governments can help drive conservation. https://www.graygroupintl.com/blog/marine-life-preservation

Kumar, K. S. N. P., & Ansari, M. A. (2022). Identifying and addressing extension service delivery gaps: A study on fish farmers of Andhra Pradesh, India. International Journal of Agriculture Extension and Social Development, 7(2), 42–47. https://doi.org/10.33545/26180723.2024.v7.i2a.313

Porter, M. E., & Kramer, M. R. (2011). Creating shared value. Harvard Business Review, 89(1/2), 62–77. https://hbr.org/2011/01/the-big-idea-creating-shared-value

Mitra, S., Khan, M. A., Nielsen, R., & Rahman, M. T. (2021). Improving aquaculture productivity, efficiency and profitability in Bangladesh: Does land ownership matter? Aquaculture Economics & Management. https://doi.org/10.1080/13657305.2021.1983069

Mutia, M. T. M., Muyot, M. C., Balunan, R. L., & Muyot, F. B. (2020). Value chain analysis of maliputo (Caranx ignobilis) in the Philippines. The Philippine Journal of Fisheries, 27(2), 137–156. https://doi.org/10.31398/tpjf/27.2.2018A0003

National Fisheries Research and Development Institute–Bureau of Fisheries and Aquatic Resources. (2023). National stock assessment program (NSAP) interactive atlas. https://nsap.nfrdi.da.gov.ph

Olaño, V., Lanzuela, N., & Paredes, K. (2018). Assessment of fishery resources in the Lagonoy Gulf, Philippines. The Philippine Journal of Fisheries, 25(1), 62–76. https://doi.org/10.31398/tpjf/25.1.2017C0007

Philippine Statistics Authority. (2016). Fisheries situationer. https://psa.gov.ph/fisheries-situationer

Rodriguez, J. M. (2024). Unveiling the mushroom value chain: Opportunities and constraints in Partido District, Camarines Sur, Philippines. Jurnal Manajemen & Agribisnis, 21(1), 13–24. https://doi.org/10.17358/jma.21.1.13

Santos, J., Gouveia, R. M., & Silva, F. J. G. (2017). Designing a new sustainable approach to the change for lightweight materials in structural components used in truck industry. Journal of Cleaner Production, 164, 115–123. https://doi.org/10.1016/j.jclepro.2017.06.174

Southeast Asian Fisheries Development Center. (2022). SEAFDEC. http://www.seafdec.org/

Stacey, N., Gibson, E., Loneragan, N. R., Warren, C., Wiryawan, B., Adhuri, D. S., Fitriana, R., et al. (2021). Developing sustainable small-scale fisheries livelihoods in Indonesia: Trends,

enabling and constraining factors, and future opportunities. Marine Policy. https://doi.org/10.1016/j.marpol.2021.104654

Steenbergen, D. J., et al. (2017). Understanding influences in policy landscapes for sustainable coastal livelihoods. Marine Policy, 82, 181–188. https://doi.org/10.1016/j.marpol.2017.04.012

Torell, E., et al. (2017). Coastal livelihood diversification as a pathway out of poverty and vulnerability: Experiences from Tanzania. Coastal Management, 45(3), 199–218. https://doi.org/10.1080/08920753.2017.1303718