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An Economic Hub for Fish Trade in the Municipality of Bulan, Sorsogon

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Abstract

The study focused on determining the feasibility of establishing an economic hub of fish trade in the municipality of Bulan, Sorsogon and knowing what the needed facilities are to establish an economic hub for fish trade. The respondents of the study are the registered fisherfolks and 8 government agencies that are involved in the fish trade activities in Bulan, Sorsogon. The researcher employed Slovin's Formula to calculate the sample size needed to randomly select potential respondents for the study. A total of 390 respondents and 8 government agencies were interviewed and surveyed. The study revealed that Bulan, Sorsogon has the potential to establish an economic hub for Fish trade since the result of the study tells that it is feasible to establish one. In terms of infrastructure development, the local government of Bulan, Sorsogon took some necessary steps like creating farm to

market roads, fish landing areas and the establishment of a regional fish port in Bulan. There are also 2 canning factories in Bulan, Sorsogon. Sorsogon. In terms of fish resources Bulan Regional Fish port generated 1500 metric tons or 15,000,000 kilos of fish per week according to the Philippine Fisheries development authority meaning in terms of raw material and natural resources, Bulan, Sorsogon can support an Economic hub for fish trade. The findings also revealed that Bulan Sorsogon must improve its organizational and management of the Fish trade activities in the municipality. Since during the feasibility study it got the lowest score resulting only to fairly feasible. Bulan has a very good potential to establish an economic hub for fish trade. It just needs to establish more ice plants and cold storage facilities and improve its organization and management.

Keywords: Philippine Fisheries Development Authority (PFDA), aquaculture, CETA, Sorsogon

Introduction

Fish represents a vital economic resource for local communities, serving as a primary source of income for over 100 million individuals and providing livelihoods to 660-820 million people globally (FAO, 2022) ^[4]. In the Philippines, Bulan, Sorsogon, stands out as a prominent fishery center. Renowned for its abundant marine resources, the municipality supports a thriving local consumption market and contributes significantly to national and international fish supply chains. According to the Philippine Fisheries Development Authority (PFDA), Bulan ranks third nationwide in fish production, with Bulan Fish Port alone unloading 1,543.25 Metric Tons of fish weekly, solidifying its position as a key regional hub (PFDA, 2017) ^[7].

However, according to Sethe (2021), the town of Bulan, Sorsogon, experienced a significant issue of fish wastage due to an overabundance of supply. Despite the community's reliance on fish as a primary source of livelihood, an overwhelming surplus led to the disposal of large quantities of fish, which were discarded in multiple tubs. This situation highlights the problems faced by local fishery-based economies, where the abundance of natural resources can result in inefficiency and loss (Tran *et al.*, 2019) ^[15]. Oversupply represents a missed economic opportunity but also raises concerns about sustainability and the management of marine resources (Asche & Smith, 2018) ^[2]. This overproduction indicates a need for better infrastructure, storage solutions, or alternative markets to prevent waste and ensure that the abundance of fish can be effectively utilized for the benefit of the local community and beyond.

Establishing an economic hub for fish trade offers a sustainable solution to the oversupply of fish (Zhang, 2018; Ahmed *et al.*, 2021; Tsolakis *et al.*, 2021; Pocaan *et al.*, 2024) ^[17, 1, 16, 10] especially in Bulan, Sorsogon. An economic hub may maximize the rich marine resources of Bulan and can provide long-term growth for the wider province of Sorsogon. An economic hub serves as a central point for business, trade, and services, driving regional development (Guo *et al.*, 2019) ^[5]. Bulan could attract

investment, generate revenue, and create employment opportunities, strengthening the local economy by maximizing its marine sources. Furthermore, sustainable practices are crucial to preserving the environment and ensuring the continued viability of the fishery industry (Charles, 2023) [3]. With the Philippines' vast marine biodiversity, maintaining sustainable measures is essential for long-term prosperity (Panga *et al.*, 2021) [6].

This study examines how Bulan, Sorsogon, can utilize its abundant fish resources to address oversupply by establishing an economic hub for fish trade. The findings of this study may guide policymakers in crafting regulations to enhance the fish trade in the municipality. Additionally, the study provides valuable information about the importance of good governance in economic development and highlights the potential for sustainable investment in the fish industry. The results are expected to benefit fishing communities by attracting more buyers, alleviating oversupply, and fostering long-term economic growth in Sorsogon. This research also contributes to the broader academic community, providing a valuable resource for future studies on regional economic development and fisheries management.

Literature Review

The significance of economic hubs for fish trade in economic development is critical, as these centers play a pivotal role in the distribution, marketing, and growth associated with fisheries and aquaculture. Dobeson (2019) underscores the socio-political and cultural aspects of modernization in fisheries, emphasizing the importance of gradual technological adaptation and the development of local capitalist classes to resist large-scale capital dominance. Vandergeest *et al.* (2020) emphasize the importance of modernization for economic hubs to adapt to changing market demands and logistical challenges. Dmitrijeva *et al.* (2018) discuss fish processing industry modernization through innovative techniques like co-extrusion, which enhances product diversity and meets evolving consumer demands. Cahaya *et al.* (2022) emphasize the importance of targeted, community-specific strategies to address the challenges of rural fishermen, thereby improving livelihoods and contributing to the broader economic development of these areas.

Rasiah *et al.* (2014) examined fish production and export support to socio-economic development in least-developed countries like Uganda and The Gambia and found that despite much-recognized improvements in the post-fish export crisis in Uganda, the lack of participation in the frontier phase of high-value-added products, control of supply chains and product development remains a challenge, and adverse supply-side constraints inhibit further developments in the industry. Valdovinos *et al.* (2019) mentioned that harvesting high-population biomass species can initially support fishery persistence and threaten long-term economic and ecological sustainability by indirectly inducing extinction cascades in non-harvested species.

Nnaemeka *et al.* (2024) stressed that sustainable management practices in small-scale fisheries focus on balancing economic development and environmental conservation, addressing overfishing and habitat degradation to enhance resilience in West African coastal communities. Gourguet *et al.* (2013) emphasized the need for decision-support tools integrating ecological and economic drivers for sustainable management of fisheries, highlighting trade-

offs in mixed fisheries' environmental and economic sustainability.

Dushyantha *et al.* (2023) emphasized the need for sustainable blue financing practices to enhance economic resilience and environmental health in fish economic hubs, particularly in the context of Sri Lanka's marine ecosystems. Biber *et al.* (2023) emphasized the interdependencies of ecological, economic, political, and social factors in developing sustainable marine economies, highlighting strategies for resilient fish economic hubs within a Sustainable Blue Economy framework. Tufa *et al.* (2018) describe how fish are used to contribute to health, and how they contribute to a healthier population in the country of Kosovo, by reducing the risk of heart attack, reducing blood pressure, balancing, and balancing diet. Sangün *et al.* (2022) highlighted that consumer attitudes, socio-demographic factors, and market dynamics significantly influence fish consumption preferences, emphasizing the need for effective marketing strategies in the fish trade hub.

Jirgi *et al.* (2021) highlighted consumer preferences for local markets, emphasizing product quality, nutritional value, and price as key factors influencing fish purchasing decisions in Nigeria's fish trade dynamics. Moore *et al.* (2017) noted the need for integrated trade policies to enhance fisheries economic hubs, linking local community development with broader economic strategies for sustainable coastal ecosystem management.

Lim *et al.* (2023) mentioned the significance of tailored trade policy models for fisheries, emphasizing their role in enhancing export values and addressing the unique challenges economic hubs face in the sector. Daly *et al.*'s (2019) article examined how international trade policy impacts fisheries and local fishing communities by means of interactive governance theory, an institutional analytical approach is employed to examine the change in the fisheries and the governing system that CETA may bring, as well as the compatibility between the policies and principles of CETA with those governing the case study region.

Khoiriyah *et al.* (2019) described social capital as one of the great strengths to solve economic problems in traditional fishing communities and established a very strong relationship between the fishing community with Dipo (Place to sell the fishermen's fish). Mushy *et al.* (2023) highlighted marine fisheries' role in improving livelihoods and the national economy, emphasizing the need for modern infrastructure and resources to enhance socio-economic contributions in coastal communities. Moore *et al.* (2017) discussed the integration of interventions in coastal ecosystems to enhance local livelihoods, food security, and conservation, emphasizing the role of a fishery's economic development hub in community development.

Pace *et al.* (2015) describe the structure and evolution of the global seafood trade network, including metrics quantifying the globalization of seafood, shifts in bilateral trade flows, changes in centrality and comparisons of seafood to agricultural and industrial trade networks. Johnson *et al.* (2023) suggest that fragmented networks with strong intra-group connectivity can enhance biomass, relevant to globalization and fish trade hubs. Buchary *et al.* (2015) identified social-ecological syndromes linked to globalization and seafood trade, highlighting how international markets influence local fisheries across multiple continents, indicating interconnected trade dynamics. Bonanomi *et al.* (2021) mentioned the need for

state intervention in the fish trade to enhance sustainability practices, emphasizing the role of eco-labels and private sector measures in Switzerland's fish market.

Aldaco *et al.* (2022) emphasized eco-innovation and life cycle thinking in seafood supply chains, addressing sustainability challenges and promoting responsible practices in fisheries and aquaculture across the European Atlantic Area. Fuadi *et al.* (2021) highlighted that the development of the Kutaraja Ocean Fishing Port significantly impacts the socio-economic status of coastal communities. Amadi *et al.* (2022) examined the complex interplay of social and economic factors that influence the ability of fisherfolk to engage in community development.

Garaway *et al.* (2021) illustrate a resilient and pro-poor trade system that enables local communities to navigate various challenges while contributing to their economic stability and food security. Chapman *et al.* (2022) underscore the urgent need for conservation efforts and regulatory measures to protect threatened shark species in the face of ongoing international trade pressures. Moore *et al.* (2017) explain how integrated approaches, informed by science and innovation can effectively address the challenges faced by coastal fisheries and promote sustainable economic development. Sokol *et al.* (2017) emphasise the importance of addressing the challenges in fish policy and fisheries management to enhance food security and public health, particularly in the context of Ukraine's aquaculture sector. Tufa *et al.* (2018) identified cultural, economic, and personal factors influencing fish consumption trends in the fish trade, particularly in Kosovo. Chen *et al.* (2016) investigate consumer understanding of and responsiveness to a range of seafood sustainability initiatives by testing preferences and willingness to pay (WTP) for seafood across the three types of sustainability: Ecological sustainability, local origin and social sustainability. Results of the study indicate a growing consumer interest in sustainable seafood practices but also highlight the need for better public education on social issues related to fisheries to enhance consumer support for all aspects of sustainability.

While numerous studies have explored key topics for establishing an Economic Hub for Fish Trade in the Philippines, such as the importance of infrastructure, market access, sustainability, and gender inclusivity, there is limited research specifically focused on Sorsogon. This study addresses the gap by examining Bulan, Sorsogon, and its fishing communities, to make it an economic hub for fish trade.

Methodology

Research Design

This study used an exploratory sequential design of mixed methods where the quantitative phase of data collection and analysis follows the qualitative phase of data collection and analysis (Creswell, 2019; Pocaan, 2022; Pocaan & Pocaan, 2023). Thus, this study aimed to describe the fishing activities and determine the potential of developing a fish trade economic hub in the municipality of Bulan, Sorsogon that follows the pattern of gathering quantitative responses followed by qualitative data.

Participants and Sampling

The respondents of this study are the registered fishers in the Business Permit and Licensing Office (BLPO) of the

municipality of Bulan, Sorsogon. Only the registered fishers were included in the study and were interviewed individually as key informants regarding their fishing activities to determine the feasibility of a potential fish trade economic hub as the proposed measures of this study. Seven government agencies, through the heads of offices, were also respondents of this study since these seven government agencies are involved in fishing activities in Bulan, Sorsogon.

To ensure a comprehensive understanding of establishing an economic hub for fish trade in the municipality of Bulan, Sorsogon, a purposive sampling technique was employed (Pocaan *et al.*, 2023). This is composed of 370 fisher folks and 7 government institutions involved in the fishing activities in Bulan, Sorsogon. Targeting individuals with deep-seated knowledge and firsthand experience in the fishing activities in Bulan, Sorsogon ensured a rich and insightful data collection.

Data Gathering Procedure

The researcher prepared a letter request addressed to the Business Permit and Licensing Office (BPLO) and MAO to request for the list of registered fisher folks in Bulan, Sorsogon. The said letter was first submitted to the Dean of UST graduate school for notation, upon receiving the list of registered fisher folks in Bulan, Sorsogon. Copies of the validated and refined instrument were distributed to the identified respondents. The questionnaire was distributed by the researcher on the scheduled date to the fisher folks in Bulan, Sorsogon. The fisher folks in Bulan, Sorsogon were briefed on how they would answer the questionnaire. The administration of the survey questionnaire was done by the researcher himself. The respondents were given time to accomplish the questionnaire. Afterwards the researcher personally retrieved the questionnaire. Due to the cooperation of the respondents a very high retrieval rate of 98% was yielded. Soon after, the retrieved survey questionnaires were edited, and the data were tabulated and organized for data analysis (Pocaan, 2023). The data were processed using Excel. To ensure accuracy, the researcher did the data collection himself.

The survey questionnaire has two kinds of retrieved data: Quantitative data which are mainly analyzed using descriptive statistics and qualitative data which are generated by open-ended questions. The respondents of this study were the registered fishers in the Business Permit and Licensing Office (BLPO) of the municipality of Bulan, Sorsogon. Only the registered fishers were included in the study and were interviewed individually as key informants regarding their fishing activities and determined the feasibility for a potential fish trade economic hub as the proposed measures of this study.

Data Analysis

Descriptive statistics, such as frequency, mean, mode, and ranking, were used to identify the volume of fish generated, the number of fisher folks, the fishing methods employed, and the marketing practices of the fisherfolk. A combination of descriptive statistics and qualitative analysis were applied to assess the feasibility of developing a fish trade economic hub across the identified dimensions. Mean was used to identify the level of feasibility while triangulation through qualitative information was integrated to validate results. Data triangulation from was used to synthesize findings and

propose recommendations for the establishment of a fish trade economic hub, ensuring that these are evidence-based and aligned with stakeholder perspectives.

Ethical Considerations

To test the validity of the questionnaire the researcher asked for consent from the 15 fisher folks; a dry run was conducted by the researcher involving the fisher folks of Bulan, Sorsogon. This was also done to avoid biases in the study. They were not included as respondents in this study because they were part of the trial respondents; 15 trial respondents were requested to comment/react on the prepared survey tools. 10 government employees from different government agencies that are involved in the fish trade in Bulan were also part of the dry run. They were also asked to comment /react on the prepared survey tools. After this process, all reactions or comments from the trial respondents were collected and incorporated into the finalized survey tool. The refined questionnaire, freed from errors and biases, was reproduced for administration to the intended respondents.

The researcher made sure that the survey tool would fit the study that was conducted. By doing this it was crucial to ensure the research is conducted responsibly and respect all stakeholders. The researcher asked for informed consent involving stakeholders to ensure fishers and traders, local government officials, and other participants are fully informed about the proposed methods and potential outcomes of the study. The researcher asked for voluntary participation to obtain clear consent emphasizing that participation is optional and can be withdrawn at any time. The researcher also recognized the cultural and social practices of the fishing community in Bulan, Sorsogon to avoid actions that might disrupt their way of life or cause social tension. Data privacy and confidentiality was considered by the researcher to protect sensitive data about individuals or businesses involved in the fish trade.

Results and Discussion

Feasibility of Establishing an Economic Hub for Fish Trade in Bulan, Sorsogon

An economic hub serves as a central point in a community or country for business, trade, finance, communication, and transportation to facilitate the flow of products and services across different locations (Arise, 2022; Pocaan *et al.*, 2022). Bulan, being a coastal municipality and one of the biggest towns in the province of Sorsogon, has a potential to become an economic hub. Its strategic location tells exactly why it is rich in marine resources – it is in front of Ticao Pass which is very rich in marine biodiversity. However, there are still beyond many to examine to show certainty in this plan. A feasibility study is a detailed analysis that considers all the critical aspects of a proposed project in order to determine the likelihood of it succeeding (Drury & Perez, 2024). Hence, the present study aimed to evaluate the feasibility of establishing an economic hub for fish trade in Bulan, Sorsogon and its potential in enhancing the long-term

economic growth of the town and its nearby municipalities.

Fig 1 shows the assessment of the three hundred seventy-nine (379) respondents on the feasibility of establishing an economic hub for fish trade in Bulan, Sorsogon. It focuses on the comprehensive evaluation of several key areas namely, Technical, Marketing, Organization and Management, Financial, Socio-Economic, and Environmental Sustainability. Each has been assessed using mean score from a 5-point Likert scale survey which was categorized as follows: Very Feasible (4.50-5.00), Feasible (3.50-4.49), Fairly Feasible (2.50-3.49), Less Feasible (1.50-2.49) and Not Feasible (1.00-1.49). It can be seen that two hundred sixty-five believe that an economic hub is feasible based on the provided criteria for its readiness and only seventeen signify that it is very feasible based on the municipality's present resources and capital. Meanwhile only ninety-six (96) and one (1) tells it is fairly feasible and less feasible, respectively. Furthermore, no one said that it is not feasible. These data imply that the respondents view the need of the town for this kind of industry and that seeing the ability of Bulan to become one.

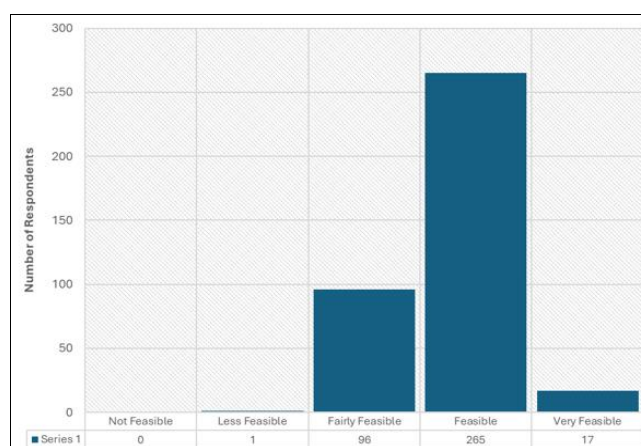


Fig 1: Feasibility of the Proposed Economic Hub According to the Fisherfolks

To have a closer look at the indicators that influenced these results, the succeeding tables present the summary result of the feasibility survey on the proposed economic hub which serves as a basis in crafting its structure and features.

Technical Feasibility of the Proposed Economic Hub in Bulan

Technical feasibility helps organization to determine if they have the technical resources to have a fully and profitable system (Indeed, 2024). The term technical, as used in this study, refers to the specialized and technological requirements necessary to support the proposed economic hub. It covers the infrastructure, equipment, technology, and facilities available for usage and operation. Table 2 A presents the summary results of the feasibility survey for the economic hub, specifically assessing technical indicators essential for the fish trade.

Table 1: Feasibility Survey on the Proposed Economic Hub in terms of Technical

Indicators for Technical	Mean	Descriptor
There are sufficient infrastructure and facilities in Bulan to support an economic hub for fish trade.	3.56	Feasible
Ice-making plants in the municipality are enough to produce ice that preserve fish during transport.	3.55	Feasible
Roads and bridges leading to and from fish markets are available and well-maintained.	3.88	Feasible
Fish storage facilities in Bulan have adequate capacity.	3.37	Fairly Feasible
The existing transport network efficiently connects various fish markets.	3.63	Feasible
The necessary resources for fish trade are available in the local community.	3.38	Fairly Feasible
The technology used in fishing, preservation, storage, packaging and marketing is up-to-date and efficient to use.	3.50	Feasible
Overall	3.55	Feasible

The table outlines the results for technical feasibility along its seven indicators. An overall mean score of 3.55 suggests that the present infrastructure and facilities are adequate and suitable for supporting the establishment of an economic hub. These results encourage continuing and further investment and development in technical support as they provide a solid foundation for good fish trade in Bulan.

Notably, the high rating of 3.88 for the condition of roads and bridges leading to fish markets indicates strong transport accessibility. Additionally, these indicators show the preparedness of Bulan in terms of equipment and facilities for the establishment of an economic hub for fish trade. This is very important for the operational efficiency once the economic hub is established. The Municipality has farm-to-market road which connects a coastal barangay to the municipal center. This shows the municipality's capacity to provide accessible trade between remote areas where fishes are caught

Financial Feasibility of the Proposed Economic Hub in Bulan

Financial feasibility is directed in examining the initial investment, funding accessibility, projected financial stability, and anticipated return on investment. It describes whether or not the project is fiscally viable (Martins, 2024).

Table 2: Summary Result of the Feasibility Survey on the Proposed Economic Hub in terms of Financial

Indicators for Financial	Mean	Descriptor
Initial investment costs for fish trade infrastructure are acceptable.	3.52	Feasible
The funding sources fish trade can be easily accessible.	3.60	Feasible
Long-time financial sustainability of the project is very likely.	3.37	Fairly Feasible
The return on investment in this project is highly reliable.	3.24	Fairly Feasible
This fish trade can be seen to be financially stable.	3.39	Fairly Feasible
There will be investors for the project.	3.40	Fairly Feasible
Overall	3.42	Fairly Feasible

The table shows that an overall mean score of 3.42 reflects a "fairly feasible" rating for the project's financial viability, suggesting that while foundational financial aspects are favorable, some elements may require further planning. The relatively higher scores for initial investment costs ($\bar{x}=3.52$) and accessibility to funding ($\bar{x}=3.60$) indicate that obtaining the necessary resources for start-up may be achievable. However, concerns regarding long-term financial sustainability ($\bar{x}=3.37$) and the reliability of returns on investment ($\bar{x}=3.24$) suggest that strategic financial planning is crucial to securing on-going investor interest and ensuring the hub's profitability. Also, they are also

concerned that it will be financially stable ($\bar{x}=3.39$) and that there will be investors to finance the project ($\bar{x}=3.40$).

These findings emphasized the need for a detailed financial strategy to solidify the project's economic foundation and to attract investment by demonstrating clear growth and profitability potential. Hence, a vivid and smart financial planning must be done in order to benefit in this project.

Socio-Economic Feasibility of the Proposed Economic Hub in Bulan

Socio-economic feasibility aspect of a project is used to determine what social implications are for society, as well as the economic and environmental implications. It assesses the broader community impact and cultural significance of a proposed project, such as the potential for job creation, local development, and quality of life improvements. Table 2. presents a summary of the socio-economic indicators for this initiative.

Table 3: Feasibility Survey on the Proposed Economic Hub in terms of Socio-Economic

Indicators for Socio-Economic	Mean	Descriptor
Economic hub for fish trade in Bulan can create numerous job opportunities.	4.20	Feasible
An economic hub can positively impact the local community.	4.09	Feasible
An economic hub can contribute to the overall development of Bulan.	4.15	Feasible
It can enhance the quality of life for local residents.	4.17	Feasible
It is culturally significant to the community.	4.25	Feasible
Overall	4.17	Feasible

With an overall mean score of 4.17, the socio-economic indicators reflected a feasible outlook for the economic hub, highlighting its potential to benefit the community substantially. The highest score (4.25) underscored the cultural significance of the hub, suggesting it aligns well with the community's values and identity, thereby enhancing local support. As it indeed reflects their culture demonstrated in various aspects like festivals, livelihood and crafts. Additionally, the anticipated creation of numerous job opportunities (4.20) points to the hub's capacity to reduce unemployment and stimulate economic activity within Bulan.

Furthermore, the viewed impact on the quality of life for residents (4.17) and contributions to local development (4.15) emphasized the hub's role in improving both individual and community welfare. Together, these indicators present a strong case for establishing the economic hub as a catalyst (Pocan *et al.*, 2022) for sustainable socio-economic advancement in Bulan, supported by its alignment with the community's cultural context and its promising potential for widespread local

benefits. As one respondent mentioned, “*Ang pagkakaroon ng fish trade economic hub ay maaaring magbigay ng dagdag na trabaho sa mga mangingisda at sa iba pang miyembro ng komunidad na makakapagpapaunlad sa bawat isa hindi lang sa komunidad*” [Having a fish trade economic hub could provide additional jobs for fishermen and other community members, contributing to the development of each individual as well as the community as a whole]. Emphasizing its positive viewed impact on socio-economic aspects hence, making it feasible in this factor.

Environmental Sustainability of the Proposed Economic Hub in Bulan

Environmental sustainability evaluates the feasibility of a project with respect to its ecological impact, resource conservation, and alignment with environmental regulations. For the proposed fish trade economic hub in Bulan, these indicators highlighted the project’s potential to operate in harmony with the environment while supporting sustainable fishery practices. Table 2.F summarizes the key environmental sustainability indicators for the project.

Table 4: Summary Result of the Feasibility Survey on the Proposed Economic Hub in terms of Environmental Sustainability

Indicators for Environmental Sustainability	Mean	Descriptor
This fish trade economic hub can minimize environmental harm.	4.27	Feasible
Environmental regulations can strictly be followed.	4.26	Feasible
It can protect the marine ecosystems.	4.28	Feasible
It can prevent overfishing.	4.25	Feasible
Resource conservations can be practiced.	4.31	Feasible
Water resources can be used sustainably.	4.32	Feasible
Overall	4.28	Feasible

The mean score of 4.28 indicated that the economic hub is feasible in terms of environmental sustainability. Remarkably, it scores highest in the potential for sustainable use of water resources ($\bar{x}=4.32$) and resource conservation practices ($\bar{x}=4.31$), emphasizing the hub's commitment to responsible resource management. Moreover, the ability to protect marine ecosystems ($\bar{x}=4.28$) and prevent overfishing ($\bar{x}=4.25$) indicates that the hub aligns with sustainable fishery goals, which is critical for long-term environmental balance in Bulan. Additionally, minimizing environmental harm ($\bar{x}=4.27$) and adhering to environmental regulations ($\bar{x}=4.26$) reflect the feasibility of integrating eco-friendly practices into the hub’s operations. Together, these findings demonstrated that the proposed hub has the potential to serve as a model for sustainable development in the fish trade industry, showing compatibility with environmental priorities and a strong foundation for sustainable economic growth in Bulan.

Overall, the respondents agreed that across the six key areas of Technical, Marketing, Organization and Management, Financial, Socio-Economic, and Environmental Sustainability, the economic hub is feasible with at an overall average of 3.79 though improvement in the statement with descriptors ‘fairly feasible’ must still be address in its proposal.

Table 5: Feasibility Survey on the Proposed Economic Hub per Indicator

Indicators	Mean	Descriptor
A. Technical	3.55	Feasible
B. Marketing	3.98	Feasible
C. Organization and Management	3.32	Fairly Feasible
D. Financial	3.42	Fairly Feasible
E. Socio-Economic	4.17	Feasible
F. Environmental Sustainability	4.28	Feasible
Overall	3.79	Feasible

The table above shows the evaluation of the respondents across different indicators in each of the six areas of interest. As presented by each statement, the table tells that each statement received either feasible or fairly feasible description based on each mean. In summary, the proposed economic hub for fish trade in Bulan is deemed feasible, with particular strengths in marketing, socio-economic impact, and environmental sustainability. Some areas, such as organization and management and financial planning, would benefit from targeted improvements to fully realize the hub’s potential for sustainable development and community benefit.

The Proposed Fish Trade Economic Hub in Bulan, Sorsogon

As a product of this research and action to the existing problems, the research proposed an economic hub for fish trade in Bulan, Sorsogon anchored on this study’s theoretical framework and considering the result and findings from the responses of the fisher folks. This study aimed to define the economic hub’s objectives, the products to be accepted and services to be offered, the market, the information on the industry and business environment, management team, marketing plan, and the financial projections.

Title: Economic Hub for Fish Trade in Bulan, Sorsogon.

Objectives:

1. To establish a centralized hub that enhances efficiency of fish trade in the municipality of Bulan from catch to marketing to distribution.
2. To promote economically and environmentally sustainable fishing practices aligned with local and national regulations.
3. To ensure long-term economic growth for Bulan and nearby municipality through infrastructure improvements and technological innovations.

Products

1. Fresh Fish - Primary species such as Lawlaw, Buraw, Sibobog, and Turingan which are in high demand locally and regionally.
2. Processed Seafood
3. Wholesale and retail.

The Market:

1. **Local Markets:** The hub will primarily serve Bulan and neighboring municipalities, ensuring fresh fish

availability to local wet markets and community fish vendors.

2. **Regional Markets:** Distribution will expand to major cities in the Bicol Region, particularly Legazpi City, Naga City, and eventually Metro Manila, where demand for fresh seafood is high.
3. **Export Markets:** Explore partnerships to export processed seafood, particularly canned or frozen products, to Southeast Asian countries like Japan and South Korea, which have growing demand for quality seafood.

Information on the Industry and Business Environment:

Given some infrastructure limitations, such as inadequate storage facilities and outdated fishing technologies, hinder its growth potential. However, the economic hub will address these issues by providing modern cold storage and processing facilities, improved transportation networks, and better access to technology. In addition, the hub aligns with national initiatives to promote sustainable fishing and prevent illegal fishing practices, which will enhance the industry's long-term viability.

Management Team

To address the problems in terms of organizational structure as also reflected in the result of the feasibility survey, a defined, well-structured, and representative organizational framework is proposed. The management team will be divided into two: The executive team which consists of the general managers and other key officers, and the legislative team tasked for policy making and review which consists of board of directors from different sectors and stakeholders.

The executive team consists of the General Manager who is responsible for the overall strategic direction of the hub, including partnerships, investments, and sustainability initiatives; Operations Head that manages the day-to-day activities, including processing, storage, and logistics, ensuring that fish products are handled efficiently; Marketing Director that develops and oversees marketing strategies to promote Bulan's fish products, focusing on local, regional, and international markets; the Sustainability Supervisor which will ensure the compliance with environmental regulations and promotes sustainable fishing practices within the hub's operations; and the Financial Officer who will manage the hub's finances, monitors investments, and oversees the profitability of the fish trade. Meanwhile, five members in the board of trustees will act as the policy makers and reviewers of the economic hub wherein the general manager is ex-officio and the other four are from Local Government Unit, Representative of the Fisher Folks, Representative from the Environment Sector, and the Representative from the Consumers. They will consist of the management team of the hub to ensure a well implemented and fair fish trading in the municipality.

The cash budget for 2026 to 2030 is designed to reflect the financial strategy of the economic hub to address the basic components of its operation specifically the aspects on technical, marketing, organization and management, financial, socio-economic, and environmental sustainability. It will start with the initial investment in 2026 into stable operational costs and revenue generation from 2027 onwards then later the computation of its Return on Investment (ROI) to show its significance and economic impact once established.

Table 3: Financial Projections

Cash Budget Year 2026 to Year 2030					
Category	2026	2027	2028	2029	2030
Initial Investment					
• Infrastructure Costs -Main Building, Service Building, Guard House, Parking Area, Open Space & Landscape Area)	P383,386,000	P0	P0	P0	P0
• Equipment - Cold Storage	P20,000,000	P0	P0	P0	P0
- Transportation (Trucks)	P20,000,000	P0	P0	P0	P0
Expenses					
• Operating Expenses					
- Employee Salaries	P12,453,120	P12,702,182	P12,956,226	P13,215,351	P13,479,658
- Utilities & Maintenance	P10,000,000	P10,200,000	P10,404,000	P10,612,080	P10,824,320
- Marketing	P7,000,000	P7,140,000	P7,282,800	P7,428,456	P7,577,025
• Buying of Fish	P0	P825,776,000	P825,776,000	P825,776,000	P825,776,000
Revenues					
• Products (Fresh Fish, Processed Seafood)	P0	P1,179,680,000	P1,179,680,000	P1,179,680,000	P1,179,680,000
• Services	P0	P10,000,000	P10,000,000	P10,000,000	P10,000,000
Total Initial Investment	P423,386,000	P0	P0	P0	P0
Total Expenses	P29,453,120	P855,818,182	P856,419,026	P857,031,887	P857,657,003
Total Revenues	P0	P1,189,680,000	P1,189,680,000	P1,189,680,000	P1,189,680,000
Profit Before Taxes	P0	P333,861,818	P333,260,974	P332,648,113	P332,022,997
Taxes (30%)	P0	P100,158,545	P99,978,292	P99,794,434	P99,606,899
Net Sales	P0	P1,189,680,000	P1,189,680,000	P1,189,680,000	P1,189,680,000
Net Income	P0	P233,703,273	P233,282,682	P232,853,679	P232,416,098
Return on Sales	0	19.64%	19.61%	19.57%	19.54%
Return on Investment	0	-44.80%	10.30%	65.30%	120%

In 2026, a large initial investment of more than P423 million is envisioned to cover the essential capital expenditures on building and facilities including the receiving, distributing facilities and ice plants which are the common need identified by the fisher folks in the initial survey. These infrastructures are essential for handling and storing perishable goods, ensuring product quality, and supporting distribution. Initially, the estimated cost for the whole infrastructure is about P383 million covering a 17,780 sq. meters of targeted land. According to Architect Jobel Bartolome a professor at Bicol University, the calculation for the building cost is as follows:

Table 3: Estimated Costing of the Economic Hub

DEVELOPMENT PROBABLE COST			
	AREA (M2)	CONSTRUCTION COST (M2)	PROBABLE CONSTRUCTION COST (PCC)
1. MAIN BUILDING	7,715.00	P45,000.00	P347,085,000.00
2. SERVICE BUILDING	480.00	P20,000.00	P9,600,000.00
3. GUARD HOUSE	36.00	P20,000.00	P720,000.00
4. PARKING AREA	4,965.00	P2,000.00	P9,930,000.00
5. OPEN SPACE & LANDSCAPE AREA	4,586.00	P3,500.00	P16,051,000.00
DEVELOPMENT PROBABLE CONSTRUCTION COST			P383,386,000.00

Additionally, a P20 million budget was allocated solely for the cold storage equipment to ensure the freshness of the seafood products before they are processed or sold. The estimate for this is between \$250 to \$350 per square foot or P152,040.30 to P212,856.42 per sq. meters. So, the budget of P20 million might cover around 100 sq. meters of storage room. Also, twenty (20) transportation trucks will also be included in the purchase amount to P1,000,000 each. Meanwhile, P7,000,000 initial budget for marketing will be allocated to collect investors, partners, and clients for this project; P10,000,000 for utilities and maintenance especially the observance of clean and sustainable environment is also included, and the more than P12 million salary of over 50 employees consisting of 30 minimum wage employees, 10 specialist, and 10 top officials. According to Remote Group (2024), the new minimum wage for agriculture, service or retail sector is now P608 per day, hence, the commutation for the salary is presented below:

Table 3.C: Estimated Salary of Personnel

Minimum Wage Worker	P608 per day X 24 days X 12 months X 30 workers	P5,253,120
Technical Specialist	P35,000 per month X 12 months X 10 specialist	P4,200,000
Management Officials	P25,000 per month X 12 months X 10 officials	P3,000,000
Total		P12,453,120

It can be seen in the table that the budget gradually increases each year through 2030 by 2% in order to meet the inflation and potential workforce growth as the economic hub scales. The 2% gradual increase is also true for Marketing and Utilities & Maintenance. In total, the initial proposed investment for this project is P423,386,000.

Nonetheless for the succeeding years 2027 to 2030, it is projected that the economic hub will start collecting for revenues and will not spend for Infrastructure but only for its operation. It was expected that the revenue for products will be around P1.18 billion and an extra of P10 million on services. The products include freshly caught fish and some processed seafood while services focus on gate toll of visiting trucks plus packaging on wholesale/retail of fish products. The computation is based on the average volume

(in kg) of fish caught reported in the results and discussion. Also, the price is directly asked from the vendors in Bulan Public Market.

Table 3: Variety of Fish, Price per Kilo and Average Volume of Fish Generated Per Week

Name of Fish	Average volume (in kg) of fish generated per week [based on the results of survey]	Price (per kg in pesos) [actual price interview at Bulan Public market as of October 2024]	Average Cost (in pesos)
Lawlaw	406	100	40,600
Buraw	207	180	37,260
Sibobog	165	160	26,400
Turingan	158	160	25,280
Baraka	150	300	45,000
Kanase	148	160	23,680
Matambaka	112	160	17,920
Bolinaw	98	160	15,680
Suga	66	250	16,500
Pusit	49	300	14,700
Sapsap	41	160	6,560
Alimango	32	400	12,800
Galunggong	29	160	4,640
Bangus	21	180	3,780
Tilapia	18	140	2,520
others	16	100	1,600
Average Total Revenues per Week			P294,920

According to the Philippine Fisheries Development Authority, Bulan Fish Port generates 1,543.25 Metric Tons of fish weekly as of June 28- July 4, 2021, making Bulan fish port number 3 in the Philippines Regional Fish Port with the highest unloading of fish weekly.

On March 2024 Fish unloading in Philippine Fisheries Development Authority (PFDA) Regional Fish Ports (RFP) peaked at 55,277.46 metric tons (MT) equivalent to a 35.82% increase compared to the previous month's unloading.

Based on previous reports, this month's fish unloading is the highest volume recorded in 2024, and the first to reach the 50K mark since July 2022.

Leading this significant increase is the PFDA – Navotas Fish Port Complex (PFDA-NFPC) with 21,064.79 MT (75.59% increase) of fish delivered to its clients and stakeholders. Continuous positive fish unloading is expected in the succeeding months as the Navotas port welcomes the peak season.

Moreover, the PFDA – General Santos Fish Port Complex (PFDA-GSFPC) maintained a positive trend in its monthly unloading volume with 26,904.01 MT (15.54% increase).

Meanwhile, in terms of percentage increase, the PFDA – Bulan Fish Port Complex (PFDA-BFPC) dominated the chart after recording 2,422.95 MT of fish, or a 333.79% increase compared to last month's volume.

Furthermore, the sole Visayas port, the PFDA – Iloilo Fish Port Complex (PFDA-IFPC), maintained an upward streak with 2,287.43 MT of fish (4.95% increase).

In addition, the PFDA – Zamboanga Fish Port Complex (PFDA-ZFPC) and the PFDA – Davao Fish Port Complex (PFDA-DFPC) recovered from their slight decline last month. This March, the two Mindanao ports delivered 668.08 MT (1.27% increase) and 216.57 MT (6.28% increase) of fish and other fishery products, respectively.

On the other hand, the PFDA – Lucena Fish Port Complex

(PFDA-LFPC) experienced bad weather in March. Nevertheless, the Quezon port unloaded 1,687.55 MT of much-needed fish to its consumers.

Subsequently, the PFDA – Sual Fish Port (PFDA-SFP) and the PFDA – Camaligan Fish Port (PFDA-CFP) continue their efforts to deliver fish to their clients and stakeholders. The two Luzon ports unloaded 24.5 MT and 1.59 MT of fish, respectively. (pfda.gov.ph)

The estimated average total revenues per week from various fish products is P294,920. Then, to estimate the annual revenue, it must be considered that there is 4 weeks in a month and that there are 10 months (December to September) that fisher folks can fish. Hence, if there are 100 active fishermen per week doing the job, the total revenue is P1,179,680,000. However, it must be noted that these fishes are bought from the fishermen by at least 70% of the price in the market making the revenue at around 30% of the computed total.

To compute for the profit, subtract the expenditures to the revenues giving a good profit. But taxes of approximately 30% must be paid to the government giving more than P200 million net profit per year. Despite the high initial investment, the economic hub is projected to remain profitable throughout the forecast period. Adding all the net profit from 2027 until 2030 then subtracted by the initial investment equates to the project's Return on Investment (ROI) that is P508,869,732 for a period of five years considering that the prices and financial policies are consistent to the estimate. It can be noted that a complete Return on Investment will take place at the end of 2030. This consistent profitability underscores the effectiveness of the company's financial strategy, balancing substantial initial investments with stable operational management and sustained revenue generation. For visualization of the computation, the table is presented.

Table 3: Estimated Profit

Revenues				Investment
2027	2028	2029	2030	2026
P233,703,273	P233,282,682	P232,853,679	P232,416,098	P423,386,000
P932,255,732				P423,386,000
ROI				P508,869,732

Sources of Fund

The economic hub's funding will primarily rely on a Public-Private Partnership (PPP), emphasizing initial investment needs, infrastructure development, and the on-going operational requirements where the economic hub will be a shared resource for the LGU and a private company. For the workforce, the hub will have a strong organizational structure with fifty employees and that other working individuals for its operations such as Wholesalers/Brokers/Retailers/Exporters. In terms of equipment and machines, the trucks and other transport equipment will be from the private partners and that available and existing facilities for storage and fish receiving facility will be coordinated by the LGU. Also, the initial investment of P320,453,120, will be solely from a private company and the contribution from LGU and other public agency is on its operations and system support.

Site Development Plan and Costing of the Proposed Economic Fish Trade Hub



Fig 2: Site Development Plan and Costing

This site development plan is designed as blueprint for the proposed establishment of an economic hub in Bulan for fish trade which would ensure the functionality, accessibility, and efficiency of services and products to cater to the needs of fish traders, suppliers, and buyers. The main feature of this plan are the two (2) two-storey buildings (Building-01 and Building-02), which will serve as the administrative offices and processing facilities for fish trade-related activities. Their central and symmetrical placement ensures that key operations are easily accessible to all stakeholders, facilitating smooth transactions and workflows.

Additionally, since security is also a vital aspect of the any establishment, two guard houses near Gate-01 and Gate-02 are strategically positioned to regulate the entry and exit of vehicles, goods, and individuals. Also, to accommodate the transportation needs of traders and suppliers, the plan includes a designated truck parking area along a wide driveway, ensuring the efficient movement of goods. Separate parking spaces for motorcycles and employees/visitors are provided, allowing for an orderly and accessible environment for all.

Furthermore, support facilities, such as a generator room and materials recovery facilities, are included in the plan to provide essential services without disrupting the primary trading activities. While additional landscaped areas are placed to at least enhance the hub's overall appeal, providing a welcoming atmosphere for stakeholders while promoting environmental sustainability.

Overall, the plan is thoughtfully designed to meet the demands of a bustling fish trade center. It balances operational efficiency, security, and sustainability, making it an ideal layout for establishing Bulan as a key economic hub for fish trade in the region. This facility aims to boost local commerce, create employment opportunities, and strengthen the municipality's position as a leader in the fisheries sector.

Conclusions and Recommendations

Feasibility assessments for an economic hub for fish trade in Bulan show positive results, with strong support from both

fisherfolk and government officials. The infrastructure is mostly ready, but improvements in fish storage and transport are needed. Market demand for Bulan's fish is strong, and the municipality has competitive advantages, although financial and organizational management aspects need development. The project promises significant socio-economic benefits, including job creation and community development, and shows potential for environmental sustainability by promoting responsible fishing practices. Financial projections suggest a good return on investment starting in 2027, supported by infrastructure like cold storage and processing facilities.

It is recommended that LGU Bulan address the over-supply of fish by investing in cold storage and ice plants, and strengthen its financial capacity to support the hub. If necessary, Public-Private Partnerships (PPP) could be explored. Organizational improvements, such as a clear structure and qualified staff, are crucial for efficient operations. The hub should prioritize cold storage, ice plants, and fish landing areas. The study's findings may guide other LGUs and encourage further research to refine recommendations. The establishment of the economic hub should be prioritized to boost the local economy and promote sustainable fishing practices.

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