

Analysis of Vaname Shrimp Export Potential from Teluk Pambang Ponds to International Markets

Nurmafita¹, Muhammad Fuad Asrofillah²

^{1,2}*Business Administration Department, State Polytechnic of Bengkalis, Indonesia*
nurmafita04gmail.com¹, fuadasrofillah@polbeng.ac.id²

Abstract

*This study aims to analyse the export potential of vaname shrimp (*Litopenaeus vannamei*) from Teluk Pambang, Bengkalis Regency, to international markets. The research combines quantitative secondary data from national and regional sources, including the Ministry of Marine Affairs and Fisheries and Statistics Indonesia, with qualitative field observations and in-depth interviews with shrimp farmers, collectors, exporters, and local government officials. Findings indicate that Teluk Pambang has high and sustainable production potential, with pond productivity averaging 10–15 tonnes per hectare per cycle, supported by favourable environmental conditions and simple technological applications. However, several barriers limit export development, such as inadequate cold chain infrastructure, limited access to export certification, and insufficient direct market linkages. Despite these challenges, strong global demand, government support, and opportunities for sustainable aquaculture offer significant potential for expanding exports. Strategic recommendations include improving cultivation practices, integrating supply chain management, and enhancing policy support to facilitate certification and market access. The study contributes theoretically to comparative and competitive advantage frameworks, showing that regional production efficiency, supply chain innovation, and compliance with international standards can strengthen competitiveness. Practically, it provides policy and strategy guidance for local governments, business actors, and coastal communities to develop a sustainable and competitive vaname shrimp export sector in Teluk Pambang*

. Keywords: vaname shrimp, export potential, Teluk Pambang, supply chain, sustainable aquaculture

1. INTRODUCTION

Indonesia is one of the world's leading producers and exporters of fishery products, with vaname shrimp (*Litopenaeus vannamei*) being a leading commodity that contributes significantly to the country's fishery exports. Shrimp including vanamei is the main commodity dominating Indonesia's fisheries exports, with a value of USD 1.68 billion in 2024, or around 28.2% of total fisheries exports. Furthermore, in the period January–October 2024, the value of Indonesia's fisheries exports reached USD 4.81 billion, with shrimp being one of the main contributors to the export value. (Indonesia, 2024) However, despite the positive national trends in production and export value, the export potential of certain coastal areas such as Teluk Pambang, Bengkalis Regency, has not been analysed in depth. Some of the challenges that often arise are production quality, international standards (certification), supporting infrastructure (such as transportation and cooling facilities), and access to competitive global markets.



Figure 1. Vaname shrimp ponds in Teluk Pambang, Bengkalis Regency

As shown in Figure 1, the shrimp ponds in Teluk Pambang are semi-intensive systems with well-organized pond layouts. This visual representation illustrates the area's production potential and available infrastructure that supports shrimp farming, providing a context for subsequent discussion on export challenges and opportunities.

Empirically, the study ‘Analysis of shrimp exports in Indonesia 1993-2022’ by (Ramadhani & Ruchba, 2024) examines the determinants of Indonesian shrimp exports in the long and short term. The results show that the exchange rate has a positive effect on shrimp export volume in the short term, while new production has a significant effect in the long term. In addition, the study ‘Marketing Model to Increase Vaname Shrimp Export Sales Volume: A Case Study of UD. Jumari’ (Rivaldi et al., 2022) shows that efficient marketing strategies and supply chain management can increase the competitiveness of vaname shrimp products in the export market. Another study, ‘Vaname Shrimp Farming in Increasing the Income and Welfare of Smallholder Farmers in Bojo Village, Barru Regency,’ also confirms that vaname shrimp farming has great potential to improve the welfare of local communities and income, especially when supported by appropriate technology and good business management.

From a theoretical perspective, these studies can be viewed through the framework of comparative and competitive advantage theory. Comparative advantage theory explains that regions or countries will benefit from specialising in commodities where they have relatively low production costs compared to others. While competitive advantage theory (Porter et al.) emphasises that it is not only production and resources that are important, but also innovation, quality standards, operational efficiency and effective marketing that determine how competitive a product is in the global market.

The novelty of this research is that it will focus on analysing the export potential of vaname shrimp specifically in Teluk Pambang, an area that has not been widely discussed in the literature as a case study for exports. In addition, this study will combine national and regional quantitative secondary data (including data from the Ministry of Marine Affairs and Fisheries and Statistics Indonesia) with a qualitative field approach to identify specific supporting and inhibiting factors in the region, as well as recommendations for local-based export strategies appropriate to the conditions in Teluk Pambang.

2. REVIEW OF LITERATURE

Vaname shrimp (*Litopenaeus vannamei*) has become a strategic export commodity for Indonesia due to strong global demand and significant domestic production potential. Empirical studies show that shrimp export performance is influenced by a combination of production factors, macroeconomic conditions, and market access. (Ramadhani & Ruchba, 2024) found that long-term production and exchange rate variables affect Indonesia's shrimp export volume, making production stability and trade policy important for maintaining export performance (Ramadhani & Ruchba, 2024). Field research on a farm scale shows cost inefficiencies in feed and water management that reduce productivity (Asmawati et al., 2022). In addition, disease outbreaks such as IMNV directly reduce output and commodity quality, threatening the continuity of supply for the export market (Hidayatullah et al., 2024). Therefore, the adoption of hatchery technology, shrimp health management, and appropriate farming practices are priorities for maintaining the quality of export products (Jannah et al., 2018).

The supply chain and cold chain logistics system play a central role in maintaining the quality of shrimp as it travels to its destination market. Studies on inventory and supply chain management emphasise the importance of coordination between farmers, collectors, and exporters, as well as the implementation of cold chain to reduce quality degradation during shipping. Delays in distribution and weak cold chain management can undermine the confidence of international buyers and lead to price losses (Pramudia & Sriwana, 2025). In terms of marketing, integrated marketing models and long-term relationship strategies between value chain actors have been shown to increase export volumes (Rivaldi et al., 2022).

Environmental sustainability and certification issues are now a requirement for penetrating advanced markets (EU, Japan). Research on sustainable farming practices shows that the implementation of waste management, efficient feed use, and eco-labelling certification improves market access and export competitiveness (Hadie & Hadie, 2017). International studies have also found a positive relationship between sustainable aquaculture and export performance; for example, research in Bangka Belitung confirms the influence of

environmental management aspects on export growth (Salim & Astuty, 2023). In addition, intensive/super-intensive cultivation strategies coupled with environmental management can increase productivity without sacrificing sustainability (Mustafa et al., 2023).

Policies and certifications (e.g. halal, destination country quality standards) influence penetration of certain markets and can be a competitive added value, but their implementation requires costs and strict compliance. At the micro level, analysis of the costs of nursery and production shows that small-scale ponds require access to financing and technology transfer in order to meet export standards (Suderajad et al., 2024).

Socio-economically, vanamei farming contributes positively to the income and welfare of coastal communities if supported by technical assistance and market access (Faturrohman, 2023). However, the literature reveals a research gap: there are still few studies that integrate aspects of production, shrimp health, cold chain, international marketing, certification, and region-specific analysis (e.g., Teluk Pambang) into a single integrated framework. This study attempts to fill this gap with an approach that integrates national/regional quantitative data and qualitative field studies to comprehensively assess the export potential of vaname shrimp from Teluk Pambang.

3. METHOD

This study uses a descriptive qualitative approach with the aim of describing and analysing in depth the export potential of vaname shrimp from Teluk Pambang ponds to international markets. This approach was chosen because it provides a comprehensive understanding of the social, economic and technical phenomena that occur naturally in the field, without intervention. Through this method, researchers can explore the perceptions, experiences, and strategies of business actors and stakeholders involved in the shrimp export value chain, from farmers and collectors to exporters and local governments.

The research was conducted in Teluk Pambang, Bantan District, Bengkalis Regency, Riau Province, which is one of the coastal areas with great potential for vaname shrimp farming. This location was chosen purposively because it has active farming activities and is close to port routes that support the export distribution process.

The types of data used in this study consist of primary and secondary data. Primary data was obtained through in-depth interviews with various parties directly involved in shrimp farming and export activities, such as farmers, collectors, local exporters, and officials from the Bengkalis Regency Fisheries Service. The interviews were conducted in a semi-structured manner to explore information about the production process, export constraints, and strategies to increase competitiveness in the global market. In addition, field observations were conducted to observe the condition of the ponds, the farming system, supporting facilities such as cooling facilities, and the condition of the logistics infrastructure that supports export activities. Secondary data was obtained from various official sources such as reports from the Ministry of Maritime Affairs and Fisheries, export data from the Central Statistics Agency (BPS), scientific journal articles, and local government policy documents relevant to the development of the fisheries and foreign trade sectors.

Data analysis was carried out using descriptive qualitative methods through the stages of data reduction, data presentation, and conclusion drawing. Data reduction was carried out by selecting important information relevant to the research focus, such as production potential, obstacles faced by farmers, and opportunities for export development. The data was then presented in a structured narrative to facilitate interpretation and conclusion drawing. Conclusions were drawn inductively, based on empirical findings in the field, which were then linked to theory and previous research results.

To ensure data validity, this study uses source and method triangulation techniques. Source triangulation is carried out by comparing information from various informants, such as farmers and exporters, while method triangulation is carried out by comparing the results of

interviews, observations, and official documentation. This step aims to increase the validity, credibility, and reliability of the research findings. With this method, the research results are expected to provide a realistic and in-depth picture of the export potential of vaname shrimp from Teluk Pambang, while offering strategic recommendations for sustainable and competitive export development in the international market.

4. RESULT & DISCUSSION

4.1 Vaname Shrimp Production Potential in Teluk Pambang

Research findings indicate that Teluk Pambang possesses high and sustainable production potential for vaname shrimp. Based on interviews with shrimp farmers and data from the Bengkalis District Fisheries Office, the area of active shrimp ponds in this region exceeds 150 hectares, with an average productivity of 10–15 tonnes per hectare per harvest cycle. The high level of stable seawater salinity, availability of natural pond land, and coastal environmental support make Teluk Pambang an ideal location for vaname shrimp farming.

In addition, the use of a semi-intensive system with the application of simple technologies such as aerators and measured feed has been proven to significantly increase harvest yields without causing environmental degradation. These findings are in line with the results of research by (Asmawati et al., 2022), which explains that environmental factors, water quality, and feed efficiency are the main determinants of shrimp pond productivity. With the implementation of proper water quality management, the survival rate of shrimp in Teluk Pambang can reach more than 85%.

To clarify production conditions, the following is an estimate of vaname shrimp pond productivity in the Teluk Pambang area based on observations and secondary data.

Table 1. Productivity of Vaname Shrimp Farms in Teluk Pambang (2022–2024)

Year	Active Pond Area (ha)	Average Production (ton/ha/siklus)	Total Production (ton/Year)
2022	120	9.5	1,140
2023	135	11.2	1,512
2024	150	13.5	2,025

Table 1. shows an increase in the area of ponds and total production of vaname shrimp over the last three years. This increase has been driven by improvements in cultivation management, support for simple technology, and increased public interest in high-value export commodities such as vaname shrimp. In addition, the location of Teluk Pambang, which is close to the Port of Bengkalis, provides significant logistical advantages for the distribution of export products.

4.2 Export Barriers and Opportunities

Despite its large production potential, the study identified several barriers that still need to be overcome in order to increase exports. The main barriers stem from limitations in post-harvest infrastructure, such as cold storage facilities and adequate refrigerated transport. Most farmers still sell their harvest to local collectors because they do not yet have direct links to exporters, resulting in lower profit margins. A similar phenomenon was also found by (Prambudia & Sriwana, 2025) who mentioned that delays in distribution in the cold chain logistics system affect product quality and the trust of international buyers.

In addition, export certification processes such as Good Aquaculture Practice (GAP) and export quality certification from the Fish Quarantine Agency are still considered complicated and require additional costs for small-scale farmers. Sustainability certification and eco-labelling are important factors for penetrating the European and Japanese markets.

The low level of certification among fish farmers is a challenge that must be overcome in order for Teluk Pambang to compete in the global market.

However, export opportunities remain wide open. Based on data from the Ministry of (Faturrohman, 2023), global demand for vaname shrimp is increasing in line with the trend towards healthy, high-protein seafood consumption. Major markets such as the United States, Japan and the European Union are showing increased demand for environmentally friendly and sustainability-certified products. Local government support through technical training and market access facilitation also strengthens export opportunities from the Bengkalis region.

4.3 Strategy for Developing Vaname Shrimp Export Potential

The strategy for developing vaname shrimp export potential from Teluk Pambang focuses on three main aspects, namely increasing production capacity, strengthening the supply chain, and supporting policies. In terms of production, improving cultivation quality through the application of environmentally friendly technology and water quality management is a top priority. Technological innovations such as automatic aeration systems and the use of natural probiotics have been proven to reduce disease risk and improve feed efficiency.

In terms of the supply chain, integration between business actors must be strengthened. (Rivaldi et al., 2022) emphasise that vertical collaboration between farmers and exporters can improve distribution efficiency, reduce the risk of quality loss, and expand access to international markets. Local governments are also expected to play an active role in providing policy support such as certification cost subsidies, technical assistance, and export promotion through cooperation with international trade institutions.

The results of research by (Salim & Astuty, 2023) confirm that sustainable aquaculture has a significant influence on increasing shrimp exports in coastal areas of Indonesia. Therefore, the development strategy for Teluk Pambang must prioritise the principles of sustainable aquaculture, which take into account economic, social and environmental aspects in a balanced manner. The research by (Prastika et al., 2023) also reinforces that improving crop quality and logistics systems are key to the success of Indonesian shrimp exports to Japan. Thus, strengthening production quality, cold chain infrastructure, and compliance with international standards are strategic factors in increasing the competitiveness of vaname shrimp exports from Teluk Pambang in the global market.

5. CONCLUSION

This study shows that Teluk Pambang has great potential to become one of the centres of production and export of vaname shrimp (*Litopenaeus vannamei*) in the coastal area of Bengkalis Regency. Supportive environmental conditions, such as stable seawater salinity, availability of extensive pond areas, and the coastal community's experience in aquaculture, are the main factors that strengthen the competitiveness of this region. From field observations, the productivity of shrimp ponds in Teluk Pambang reaches an average of 10–15 tonnes per hectare per cycle, a figure that indicates technical readiness to enter the export market.

However, this study also found a number of obstacles that still need to be overcome. The main obstacle lies in the limitations of cold chain facilities and logistics infrastructure, which affect product quality during the shipping process. In addition, the lack of access for farmers to export quality certification, licensing, and global market networks is a major limiting factor in expanding export reach. Nevertheless, international market demand for Indonesian vaname shrimp remains high, especially from the United States, Japan, and the European Union, which increasingly emphasise the principles of sustainability and food safety.

From the analysis results, a strengthening strategy is needed in three main aspects: increasing production capacity through sustainable cultivation technology innovation; integrating the supply chain between farmers, collectors, and exporters through transparent partnerships; and local government policy support in the form of certification facilitation, financing, and export promotion. The implementation of this strategy will strengthen the position of Teluk Pambang as a leading export area for highly competitive and sustainable vaname shrimp.

Theoretically, this study reinforces the theory of comparative and competitive advantage by showing that the potential of coastal areas can be optimised through production efficiency and supply chain system innovation. In practical terms, the results of this study provide policy and strategy recommendations for local governments, business actors, and coastal communities to jointly develop the vaname shrimp-based fisheries export sector. Thus, the management of vaname shrimp export potential in Teluk Pambang not only contributes to increasing foreign exchange earnings but also to the sustainable welfare of coastal communities.

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