Analysis of Shrimp Feed Demand (Case Study in South Sulawesi Province)

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Abstract. Indonesia is a country with great potential in fisheries, particularly in the shrimp farming sector. Shrimp has become one of the leading commodities due to the high market demand, both domestically and internationally. However, shrimp production is heavily dependent on feed, which accounts for about 60-70% of the total production costs. In South Sulawesi, which has great potential to become a shrimp production center, the continuously rising feed prices pose a challenge for farmers. This research aims to analyze the factors that influence the demand for shrimp feed in South Sulawesi Province.

This research method uses a qualitative descriptive approach by collecting data from farmers, feed distributors, and related agencies in South Sulawesi. The research results indicate that the main factors influencing shrimp feed demand include feed prices, feed quality, and feed availability, which affect their purchasing power. Meanwhile, the government's policy in supporting the provision of affordable feed also plays an important role. This research provides recommendations for the government and relevant parties to develop the fisheries sector through shrimp farming, supported by the availability of feed that meets the needs of farmers through various innovative and more efficient farming technologies, in order to enhance productivity and the welfare of shrimp farmers in South Sulawesi.

Keywords: feed demand, shrimp, South Sulawesi, shrimp feed, demand factors.

1 Introduction

Indonesia is one of the developing countries with a very large fishing potential. With more than 17 thousand islands and thousands of kilometers of coastline, Indonesia has an abundance of marine resource wealth. The potential of Indonesia's aquaculture is estimated to reach 17.2 million hectares with an economic value of up to USD 250 billion per year [1]. The fishing sector is not only a primary source of food but also provides employment opportunities for rural communities and plays a crucial role in the national economy.

One of the leading fishery commodities is shrimp. Shrimp products, whether from capture fisheries or aquaculture, significantly contribute to Indonesia's export value. In 2021, shrimp contributed US$ 1.5 billion to the total value of fishery exports and ranked fourth in Indonesia's fishery commodity exports [2]. Furthermore, in 2022, Indonesia became the largest shrimp exporter to the United States, with export values reaching US$ 1.1 billion [3].

The Ministry of Marine Affairs and Fisheries [3] through its shrimp revitalization program aims for a national production of 2 million tons by 2024, with hopes of export value reaching US$ 4.2 billion, an increase of 250% during the period from

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2019 to 2024. However, to date, national shrimp production has only reached 900 thousand tons per year, which means it is still far from the expected target.

South Sulawesi is one of the provinces with great potential in shrimp farming. This province has extensive pond areas and geographical conditions that support the development of aquaculture, particularly shrimp cultivation. According to BPS data [4], the area of ponds in Sulawesi reaches 120,738 hectares, and in 2021, aquaculture production in South Sulawesi reached 4,082 tons. However, most of the ponds in this province are still managed traditionally, resulting in low productivity.

One important component in shrimp farming is feed, which accounts for 60-70% of the total production costs. The quality and quantity of feed play a crucial role in determining the productivity of shrimp farms. However, the continuously rising feed prices pose a significant challenge for farmers. Feed for shrimp farming in Indonesia mostly comes from imported materials, with raw materials accounting for 75% [5]. Dependence on imported materials causes feed prices to fluctuate, which in turn affects the income and welfare of farmers.

With that background, this research focuses on the analysis of shrimp feed demand in South Sulawesi. This study will explore the factors influencing shrimp feed demand in the province, as an effort to provide solutions that can enhance shrimp pond productivity and improve the welfare of farmers.

2 Literature Review

2.1 Demand Theory

In economics, the term demand has a specific meaning, referring to a particular relationship between the quantity of a good that people want to buy and its price. The definition of demand is the quantity of a good that is desired and can be purchased at various possible prices over a specific period of time [6]. Demand is the quantity of a good that consumers are willing to purchase at a specific time and price [7].It is also explained that demand indicates the quantity of a good that will be purchased by an individual or a group of individuals at various prevailing price levels.

Economists distinguish between the concept of demand and the quantity demanded. The concept of demand refers to the list of quantities of goods that will be purchased per unit at a specific time at varying prices. In the demand curve, demand refers to the demand curve that describes the amount of goods that will be bought at different prices. The concept of quantity demanded refers to a specific amount of goods that will be demanded per unit at a specific time and at a specific price as well [8].

2.2 Factors Influencing Demand

The demand for a good or service is influenced not only by its price but also by various other factors, including [9]:

- The price of other goods (substitutes and complements): If the price of a substitute good is lower, the demand for the main good will decrease. In the

context of shrimp farming, the price of alternative feed or local feed ingredients can influence the demand for commercial feed.

- Consumer income: An increase in the income of fish farmers can enhance their purchasing power for better quality feed or in larger quantities.
- Preferences and tastes: The preferences of fish farmers for certain brands or types of feed also influence demand. Feed of better quality, even if it is more expensive, may still have high demand because it results in better shrimp productivity.
- Government policies: Subsidies, direct assistance, or import policies for feed raw materials from the government also affect the prices and demand for shrimp feed.

2.3 Shrimp Farm

Shrimp ponds are artificial ecosystems designed for shrimp farming, particularly for the vannamei shrimp (Litopenaeus vannamei) and the giant river prawn [10]. Ponds are generally located in coastal areas, especially on land close to brackish water sources. Shrimp farming in Indonesia is still dominated by traditional ponds, which have lower productivity compared to semi-intensive and intensive ponds. Good pond management involves water management, feeding, and disease control. Based on data from the Ministry of Maritime Affairs and Fisheries, most of the ponds in South Sulawesi are still managed traditionally, resulting in suboptimal productivity.

2.4 Shrimp Feed

Feed is an important component in shrimp farming because it plays a role in the growth and health of the shrimp. Feed costs can account for 60-70% of the total production costs in shrimp farming [11]. Quality feed can enhance shrimp productivity, while poor feed can trigger diseases and reduce harvest yields. There are two types of feed used in shrimp farming:

- Natural feed: Primarily derived from microorganisms that grow in the ponds, such as plankton. Natural feed is mainly used in traditional ponds.
- Artificial feed: Commercial feed produced by factories to meet the nutritional needs of shrimp. Commercial feed usually contains the protein, fat, fiber, vitamins, and minerals that shrimp need to grow optimally.

3 Method

The approach used in this research is a descriptive qualitative approach. Descriptive qualitative research involves studies using methods or a case study approach. This research focuses intensively on a specific object studied as a case. Case study data can be obtained from all relevant parties; in other words, in this study, it is collected from various sources [12]. In this case, the researcher conducts a study by illustrating or describing the demand for feed in South Sulawesi Province

Research Location

This research is located in South Sulawesi, specifically in the Takalar Regency, Maros Regency, Barru Regency, and Pangkajene Islands Regency. The selection of this location is due to the area being the largest shrimp production site, with vast potential for shrimp farming land in South Sulawesi Province, which is proportional to its high productivity results.

Research Methodology

Data is an essential element in compiling information. The type of data collected and used in the research is qualitative data. Qualitative data is data that is not in numerical form, and the way to interpret this data is by describing it in detail and clearly so that it can facilitate drawing conclusions. The sources of data can be categorized into two types:

a. Primary Data
   Primary data sources are research objects that are directly observed with the research subjects, namely the informants. The data obtained from the informants consists of both words and actions of the informants. The sampling technique using Purposive means that the researcher selects research subjects with the aim of identifying key information that aligns with the focus of the study, done intentionally and naturally to enhance its accuracy. The criteria for the informants are government agencies, academics, feed producers, and shrimp farmers related to the research being conducted.
b. Secondary Data
   Sources of secondary data are data obtained indirectly in the field, rather than through direct observation, but rather from literature studies and documentation studies of various references and archives (video recordings of workers' activities in the batik industry) that support the discussion topic in this research to gain a deeper understanding of the issues being studied. The archives include developments, and the owner also serves as a supporting informant who can enrich the data.

4 Result and Discussion

4.1 Factors Influencing Shrimp Feed Demand In South Sulawesi.

With the increasing demand for shrimp exports and consumption in line with the demand for shrimp feed. Feed is a very important factor in shrimp farming as it accounts for 60-70% of the total operational costs. Providing feed that meets the needs will stimulate the optimal growth and development of shrimp, thereby increasing their productivity [13].

From the perspective of demand, the significant need for shrimp feed is highly dependent on several factors. These include the efficiency and quality of the feed produced, the price of the feed, and the ease of obtaining it. The three factors are interconnected for cultivators to consider when purchasing feed.

Price

The increase in shrimp feed prices is influenced by various factors, including fluctuations in raw material prices, changes in economic conditions, as well as other factors such as weather, politics, and resource availability. Although feed prices continue to fluctuate, the demand for feed remains very high. Based on the interview data, when feed prices fluctuate, achieving increased production and productivity often becomes a double-edged sword. On one hand, increasing production through enhanced productivity will generate revenue. On the other hand, increased production will also lead to higher costs.

The absence of a shrimp feed industry in South Sulawesi has led to a continuous increase in the demand for shrimp feed. Looking at the disparity between demand and the existing conditions of feed production, it illustrates the significant opportunity for shrimp feed demand currently in South Sulawesi. This presents an opportunity for the company to establish a shrimp feed industry in South Sulawesi.

From the interview, it was obtained that the price of feed is one of the factors influencing the demand for feed because it can affect the productivity level of farmers. However, since the cooperation with distributors regarding payment after harvest has been established, the price of feed no longer affects the productivity of farmers. The high demand for shrimp feed, especially in South Sulawesi, means that fluctuating feed prices do not affect demand because the market price for cultivated shrimp is high.

Feed Quality

High-quality feed is an important factor in increasing the productivity of farmers, as it is needed continuously to avoid disrupting the production process. Good feed quality also ensures optimal growth. In an effort to improve shrimp production results, selecting the best quality feed is essential to ensure that the shrimp also have the best quality. This is because low-quality feed will impact the success of shrimp farming in ponds.

The informant's statement indicates that shrimp farmers tend to prioritize the quality of feed, which includes factors such as nutritional composition and digestibility. This

preference reflects the farmers' need to ensure optimal shrimp growth and good health. Therefore, a marketing strategy that emphasizes superior feed quality can provide a competitive advantage and support demand stability.

The quality of feed is crucial for farmers, so in developing business strategies, a deep understanding of market preferences and demands regarding feed quality can help feed producers design products that better meet the needs of shrimp farmers. Focusing on innovation and meeting the highest quality standards can also serve as a catalyst for increasing demand and strengthening market position in this competitive industry. This is in line with the demand theory according to Kotler [14] that human desires, supported by purchasing power, will lead them to buy products that provide satisfaction. Therefore, the quality of feed is a key factor driving the dynamics of shrimp feed demand in the fisheries industry.

Feed Availability

In the shrimp farming process, feed availability is one of the efforts to increase production quantity [15], the problem faced in shrimp farming production is low yields due to high mortality rates. This is due to the insufficient supply of feed in terms of both quantity and quality. The demand for feed by farmers is greatly influenced by several factors related to the availability and accessibility of feed that meets quality standards and the nutritional needs of shrimp.

In this context, the demand for shrimp feed is affected by the availability of both feed and the raw materials for feed production. The fluctuation in feed availability affects the growth of the shrimp farming industry. Therefore, wise management of feed availability is needed, involving collaborative efforts between feed producers, shrimp farmers, and other related parties. This includes strategies for diversifying raw material sources, supply risk management, and innovation in feed formulation to ensure consistent fulfillment of shrimp nutritional needs. Thus, the availability of feed is not only a determining factor in the sustainability of farmers but also supports sustainable growth in the shrimp farming industry as a whole.

4.2 The South Sulawesi Goverments Policy in Supporting The Provision of Feed to Shrimp Farmers

The government plays a key role in supporting the shrimp fishing industry through policies aimed at facilitating the provision of feed to shrimp farmers. Several government initiatives implemented locally have made a positive contribution to maintaining the sustainability of shrimp production and improving the welfare of farmers.

The National Independent Fish Feed Movement Program is the government's effort to provide alternative feed that is much cheaper and of higher quality, as well as to ensure sufficient feed availability for farmers. The Ministry of Marine Affairs and Fisheries ensures that the self-produced feed meets the quality standards of circulating feed registration. This is done to provide self-feed producers with comfort and security in their business endeavors [16].

The challenges faced by independent or local feed producers include the provision of raw materials, one of which is fish meal, whose usage in shrimp feed formulations ranges from 20% to 30% of the composition. The use of high-quality local fish meal as a raw material for feed is key to the development of independent feed production because it can reduce dependence on imported fish meal and ensure the availability of feed in aquaculture efforts [16].

With the government's role in initiating the independent feed movement, it assists household-scale feed producers in increasing production and maintaining quality according to standards. This can be seen as an alternative to the demands of cultivators who seek affordable and quality feed.
Based on the interview data, it is known that the feed requirements for farmers practicing intensive aquaculture have not yet been met by local-scale feed producers. This is because the technology for producing shrimp feed that matches the mouth opening of shrimp is only possessed by industrial-scale feed manufacturers.

The government's involvement in meeting the demand for shrimp feed through the National Independent Feed Movement is expected to ensure the availability of affordable feed for farmers by using local raw materials [17]. However, in its implementation, it faces many challenges, such as feed producers experiencing a shortage of raw materials amid the increasing demand for feed, as well as feed production technology that has not yet been able to meet the needs of intensive shrimp farming.

The demand for shrimp feed will continue to be high, and this presents a great opportunity for Sipakario to enter the market. Therefore, it is hoped that all stakeholders can synergize and collaborate together in efforts to boost feed production in Indonesia. So that the shrimp feed production target is achieved to realize a national shrimp production of 2 million tons in 2024 with an export value of US$ 4.2 billion [3].

5 Conclusion

Several key factors that influence the demand for shrimp feed in Sulawesi. First of all, although fluctuations in feed prices are common, partnerships with distributors that allow for post-harvest payments have significantly reduced the impact of these prices on shrimp farmers' productivity. The high market prices for shrimp products further stabilize feed demand, ensuring that farmers can continue to invest in their businesses. In addition, the quality of feed emerges as a crucial determining factor in demand. Feed producers are encouraged to focus on innovation and adhere to high-quality standards to effectively meet the needs of shrimp farmers. A marketing strategy that prioritizes quality can play an important role in strengthening their competitive position within the industry.

In addition, the availability of feed and raw materials needed for feed production greatly affects the growth of shrimp farming. Effective management and collaboration between feed producers, shrimp farmers, and relevant stakeholders are essential to ensure a consistent and sustainable supply of feed. The government's involvement through initiatives like the National Self-Sufficient Feed Movement (Gerpari

Nasional) aims to ensure affordable feed for farmers by utilizing local raw materials. However, the implementation of this initiative faces challenges, such as a shortage of raw materials for feed production and inadequate technology to meet the needs of intensive shrimp farming. Overall, addressing these factors is crucial for enhancing the shrimp feed market and supporting the sustainable growth of the shrimp farming industry in Sulawesi.

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