International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

Vol. 32 No. 2 May 2022, pp. 213-217

Analysis of Vannamei (Litopenaeus Vannamei) in Agroindustry Supply Chain

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***Abstract*— Vannamei shrimp (Litopenaeus vannamei) agroindustry is an agroindustry that has big challenges, namely the characteristics of perishable products, quantity availability, product quality, customer service and competitive prices for consumers. Therefore, it is very important to analyze the business process to find out the conditions and problems that exist in the vannamei shrimp supply chain. This study aims to determine the business process and supply chain flow of vannamei shrimp in Banyuwangi Regency. Supply chain analysis is carried out on every activity carried out during the vannamei shrimp production process from upstream to downstream. The vannamei shrimp supply chain study was conducted in Banyuwangi Regency, East Java Province. The selection of locations and respondents was carried out by purposive sampling technique based on the criteria as the location of vannamei shrimp production centers and the representation of all information needed in the supply chain. This research method uses descriptive analysis to determine business processes and supply chain activities. Based on the results of the analysis, it was found that the condition of the vannamei shrimp agro-industry supply chain that was formed was optimal. It is shown that the vannamei shrimp market is a captive market where the market or customer for the frozen vannamei shrimp is certain and the cooperation of every stakeholder in the supply chain is based on a contractual relationship.**

Keywords—agroindustry; supply chain; litopenaeus vannamei; captive market

I. INTRODUCTION

Vannamei shrimp is one of the perishable fishery products. The damage was caused by the enzymatic activity of the shrimp body itself. Therefore, to reduce damage due to the activity of microorganisms or the process of fat oxidation by air, it is necessary to handle it during distribution. The handling is in the form of processing and preserving shrimp, namely using low temperatures, high temperatures, reducing water content, using antiseptic substances, packaging with modified atmosphere packaging (MAP) and others (Li et al., 2022; Pês et al., 2018; Qian, Yang, Ye, & Xie, 2018).The handling process aims to extend the shelf life will automatically increase production costs so that the selling price of shrimp will increase at the consumer level. The cost of storing and handling materials in the vannamei shrimp supply chain is present at all stages of the shrimp supply chain, from the cultivation process to the hands of consumers.

The challenges faced by the industry are getting tougher, which is to produce quality products and at consumer prices that can

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be minimized. Productivity is still important, but not enough to become a competitive stock in the market. In improving product quality and quality control is no longer enough with product inspections, even people have begun to realize that product quality is an inseparable series from raw materials to products in the hands of consumers.

Awareness is the importance role of all parties in maintaining product quality, cheap and fast prices, the concept of supply chain management is very important. Supply chain management was used by many companies to maintain business and prevent risk (Fitrianto & Hadi, 2012).From discussion above, to better understand how the structure of the supply chain, how the flow of cost, value and data information, it is important to analyze the supply chain of the vannamei shrimp agroindustry.

II. METHODS

The type of research used was descriptive qualitative research. The analysis of the vannamei shrimp agro-industry supply chain analysis was carried out on all stakeholders who play a role in vannamei shrimp fisheries business activities. This section covers the location and time of the research.

A. Location and Time of Research

Research on the vannamei shrimp agro-industry supply chain was done in October 2020-June 2021. The selection of research locations was carried out by purposive sampling technique in the Kalipuro, Bomo, Rogojampi, Banyuwangi district. These areas were chosen because they have the potential to develop the vannamei shrimp agro-industry supply chain.

B. Determination of Respondents

The sample of respondents in this initial study was purposive sampling. The selection of respondents was carried out based on pre-determined considerations such as identifying organizations and individuals who have certain specificities, whether related to position, expertise, or experience in the organic rice business. However, when in the field, the snowball sampling technique was used for the development of other respondents' subjects. This aims to obtain more detailed data for stakeholders in the supply chain (Pradeka Brilyan Purwandoko, Kudang Boro Seminar, Sutrisno, 2018). The respondents used in this study are hatchery farmers, shrimp growers, head of the Banyuwangi Shrimp Association group, cold storage industry.

C. Data Collections

The collection of data and information in this study was carried out in several ways, namely: (1) Field observations to identify stakeholders who play a role, understand the structure of the vannamei shrimp agro-industry supply chain, and the interactions that occur in it; (2) Interviews with stakeholders in the supply chain; and (3) Limited discussion or focus group discussion (FGD) with stakeholders ranging from hatchery farmers, shrimp growers, head of the Banyuwangi Shrimp Association group, cold storage industry to review and confirm the initial study in the field survey.

D. Data Analysis

Data analysis was conducted to examine the role of supply chain stakeholders in vannamei shrimp agroindustry. For the purposes of supply chain analysis was descriptive analysis using the agricultural product supply chain development method developed by the Asian Productivity Organization (APO) based on a modified framework from Van der Vorst (2006). The analysis includes a study of the supply chain activities of vannamei shrimp agroindustry from upstream to downstream. The aspects analyzed were based on chain structure, chain objectives, chain management, business processes, and supply chain resources.

III. RESULTS AND DISCUSSIONS

A. Structure of Vannamei Shrimp Agroindustry Supply Chain

The supply chain is a series of several points in an integrated business starting from raw materials ending with satisfied customers. When each point in the supply chain makes efforts and strategies, the ultimate goal is to maximize competitive advantage for the final consumer (Heizer, 2015). So, in an effort to facilitate the flow of products and information, it is important to analyze it in Figure 1, namely the supply chain structure of the vannamei shrimp agroindustry starting from upstream to frozen products marketed to the domestic and foreign (export) markets.

Figure 1 shows the design, operation and supply chain system of the vannamei shrimp agroindustry. Each network is

controlled by a different company where in the supply chain structure there are flows or processes that physically move information and products. To facilitate the physical flow of products, data and financial information, supply chain management is needed (Jacobs, F.R., & Richard, 2015)

Effective supply chain management will depend on early identification of the supply chain structure so that the company will be able to maintain relationships at each tier and supply chain members as they influence each other. The more optimal the supply chain of a business, the more impact on the cost structure and price of shrimp at the consumer level. The shorter the supply chain, the more profitable it will be for consumers (Burgess & Sunmola, 2021; Tamtam & Tourabi, 2021).

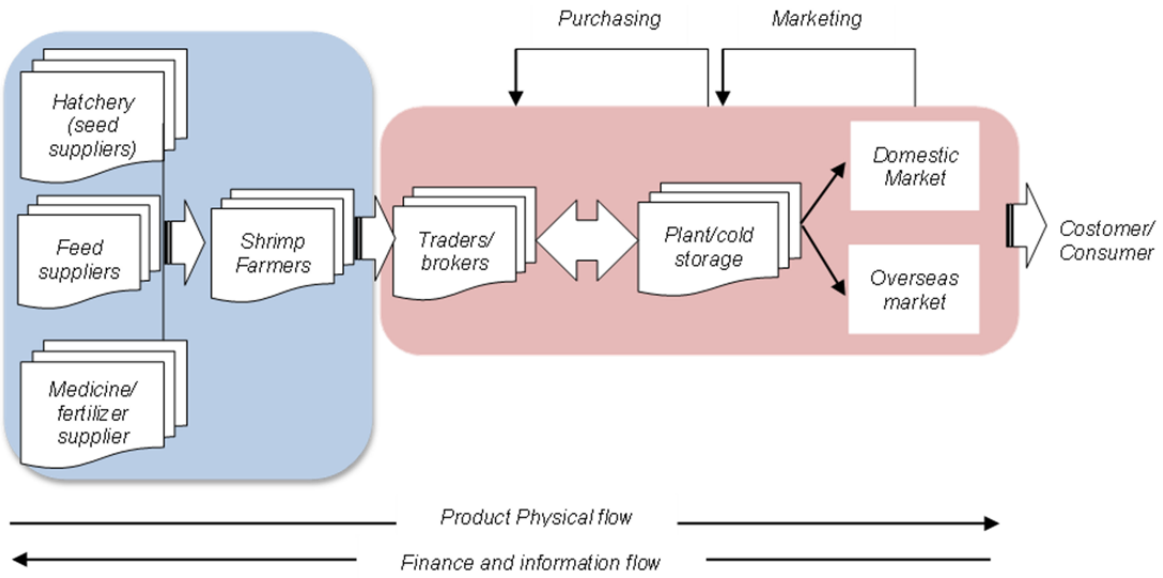

Fig. 1. Supply Chain Structure of Vaname Shrimp Agroindustry (Source: Interview with the Chairperson of the Banyuwangi Shrimp Association (2020))

B. The Role of Members and the Mechanism of the Vannamei Shrimp Agroindustry Supply Chain System

Based on the structure in Figure 1, each member in the supply chain will play an important role in maintaining product quality, quantity, and continuity. Therefore, each member has a different function in achieving their respective business goals. The following table shows the role of members in the vaname shrimp supply chain.

Table 1. The role of supply chain members ([a])

Tier	Member	Role
1	Seed Industry	Shrimp seed supplier, sales, delivery.
	Feed Industry	Production, sale and delivery of feed.
	Medicine Industry	Drug formulation, production and delivery.
2	Fisherman	Cultivation, enlargement, harvesting, grading and sorting of shrimp.
3	*Trader or Broker*	Make direct purchases to pond farmers, determine size and price for farmers, as an intermediary between farmers and cold storage factories.
4	Factory / Cold storage	As a buyer to traders/brokers based on size, grading, sorting, packaging and storing cold storage, supplying and selling for domestic and foreign markets.
5	Domestic and foreign market	As a buyer and price maker.
6	Consumer	As users and take advantage of the use value of the final product.

[a] *Source: Primary data that has been processed (2020)*

It can be seen from the supply chain structure that the mechanism of the relationship of each point involved in the vannamei shrimp supply chain which is broadly the same as other agroindustry. Each point has a relationship cannot be separated or stand alone. There are several parties engaged in the hatchery, feed industry and the drug and fertilizer industry. This industry is very closely related to pond farmers as providers of feed, seeds and medicine so that pond farmers can cultivate vannamei enlargement until it is ready to harvest.

Pond farmers will provide goods ordered by traders or brokers based on price and size agreements, where the broker or trader determines the price. However, aquaculture farmers have the right to refuse a trader or broker if the price offered is not suitable. Generally, the relationship between farmers and traders or brokers is a relationship based on trust without a contract.

The processing industry or cold storage does not make direct purchases to farmers but must go through a trader or broker, cold storage parties call it a supplier for market needs both domestically and abroad. The number of domestic and foreign market demands for vannamei shrimp each month is relatively the same and tends to increase every year (Mufidah, Suwasono, Wibowo, & Soedibyo, 2017). This shows that the white vaname shrimp market is a form of captive market where the market or customer for the frozen vaname shrimp is certain and based on a contractual relationship.

Table 2. Analysis of the supply chain condition of vannamei shrimp agroindustry in Banyuwangi Regency ([a])

Descriptive Analysis	Supply Chain Condition
Chain Structure	The supply chain consists of 6 network tiers with 9 members, namely seed suppliers, feed suppliers, drug and fertilizer suppliers, aquaculture farmers, traders or brokers, factories or cold storage, domestic markets, foreign markets, end consumers.
Chain Goal	• The target market is every consumer who has a seafood consumption pattern. • The target of product quality is to meet consumer quality criteria including HO (Head On), HL (Head less), PTO (Peeled Tail On), PND (Peeled and Deveined), etc.
Chain Management	• Cooperation and partner selection between aquaculture farmers and suppliers of seeds, feed, and medicine as well as the processing industry through formal and informal partnerships • There is no contractual agreement between aquaculture farmers and traders or brokers, all based on mutual trust. • There is a contractual agreement between the processing industry and a trader or broker or directly with aquaculture farmers. • The deal covers quantity, quality and price.
Chain Resources	Cultivation land or ponds are still limited.
Chain Business Process	• Carry out a collaborative planning process between producers and processing industries • In general, distribution follows the contract pattern of domestic and external consumer demand

[a] *Source: Primary data that has been processed (2020)*

Based on the table above, the condition of the vannamei shrimp agroindustry supply chain has worked optimally, it depends on the effectiveness of the integration system of each member in the supply chain. For example, the productivity of aquaculture products will be greatly influenced by the previous tier or supply chain level, namely suppliers of seeds, feed and drugs. Globalization demands that every business be able to increase the productivity of each network cannot be separated from how to improve and manage supply chain performance (Blanda et al., 2017; Sofyalıoğlu & Kartal, 2012).

IV. CONCLUSIONS

Based on the results of the analysis, it was found that the vannamei shrimp supply chain in Banyuwangi Regency was running well. The target market has a clear target and market access. The processing industry or cold storage still has limitations in the availability of raw materials because they have to access raw materials from outside Banyuwangi Regency. In addition, limited

resources in the form of cultivated land are an obstacle in the supply chain.

V. ACKNOWLEDGMENT

The authors would like to thank to Banyuwangi Institute of Technology and Business Muhammadiyah (ITBM Banyuwangi) through the campus internal grant program. Thanks to PT. Istana Cipta Sembada and the Chairperson of the Banyuwangi Shrimp Club Association for providing information and support.

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