BUILDING A SUPPLY CHAIN OF PANGASIUS EXPORTS IN VIETNAM'S MEKONG DELTA

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Abstract

Data from the General Department of Customs show that in 2015 - 2019, pangasius export turnover increased by 28%, mainly thanks to the strong growth in the Chinese market (up 310%) and ASEAN (up 44%). These two markets make up for the significant decline of the EU market, down 35%, the US down 8.8%, Brazil down 21%, and Mexico down 3.6%. With high export value and role The critical significance of pangasius to the Mekong Delta region and the country in general, the government has identified pangasius as a crucial export product with a high competitive advantage in the international market. At the same time, the government requested the establishment of a Steering Committee for Pangasius production and consumption headed by the Minister of Agriculture and Rural Development.

Keywords: *Supply chain, pangasius export, Mekong delta.*

1. INTRODUCTION

Pangasius is considered an advantageous product of Vietnam when it has penetrated significant markets such as the EU, the United States, China, and ASEAN. Due to fierce competition in the international market, Vietnam's pangasius industry uses a cost-effective supply chain strategy: exporting in large quantities, at low selling prices, with a large proportion of natural products and high production volume. Products that meet international certifications on responsible farming are standard, and distribution channels must be more suitable. In volatile business, significantly changing consumption trends due to awareness of health, food safety, convenience, and the COVID-19 pandemic, the pangasius industry should actively adapt to the movement new to the market. Based on the concept of the responsive cost-effectiveness frontier and industry data for the period 2010-2019, the current position of the pangasius supply chain is identified, thereby recommending the industry to balance the supply chain cost-effective and responsive

supply chain. This strategy must build supply chains compatible with each market segment, increase product diversity, develop value-added products, and work closely with modern retailers. The fishery industry is one of Vietnam's critical economic sectors, contributing 8-10% of export value and about 6% of the country's GDP from 2001 to the present. From an almost anonymous position, Vietnam has entered the top 10 in the world in terms of exports, and in 2007, after a year of joining the WTO, Vietnamese seafood climbed to the 8th position in the ten exporting countries to seafood in the world. The success of Vietnamese seafood must be addressed by mentioning pangasius. In just ten years, from an unknown domestic fish species, pangasius has become a strategic product of Vietnam, contributing about 2% of GDP to the country, with a 50-fold increase in farmed production, exceeding 1. 2 million tons, export value increased 65 times, reaching nearly 1.5 billion USD per year and exported to 126 countries around the world. International experts admire the leaping development of pangasius production as a "miracle."

2. PANGASIUS PRODUCTION FOR EXPORT IN THE MEKONG DELTA REGION

Pangasius and basa are one of the aquaculture species being developed quickly in the Mekong Delta provinces (mainly concentrated in the two areas of An Giang and Dong Thap). They are one of the fish species with a high export value. Pangasius is a species of catfish; therefore, in the reports and scope of this study, pangasius and basa are collectively referred to as pangasius.

Pangasius, distributed in several Southeast Asian countries such as Cambodia, Thailand, Indonesia, and Vietnam, is one of the region's most important farmed fish species. These four countries have rich natural sources of pangasius. However, the warm weather and year-round fresh water source, which can be planted at any time, is a unique advantage of Vietnam that other countries in the Mekong River do not have. This factor makes Vietnam the country with the most significant pangasius production in the world, occupying an almost unique position (99.9%) of the pangasius market. Because of this feature, Vietnam's pangasius farming is mainly concentrated in the Mekong Delta region.

Along with rice production, pangasius production has become a key and strategic industry of the Mekong Delta. Pangasius production is crucial in exporting, earning a large amount of foreign currency, and creating jobs for tens of thousands of farmers in the Mekong Delta. This number is even more significant for a production industry that uses only a small farming area (about 6,160 hectares of water surface, as of December 2008) equal 1% of the shrimp farming area and 0.1% of the rice area. Still, it produces highly competitive products that capture a significant market share.

With high export value and the critical role of pangasius for the Mekong Delta region and the country, the government has identified pangasius as a crucial export product with a high competitive advantage in the global market. At the same time, the government requested the establishment of a Steering Committee for Pangasius production and consumption headed by the Minister of Agriculture and Rural

Development. These are the initial steps to make pangasius a strategic product of Vietnam's seafood industry.

Pangasius As a unique farmed white fish species of Vietnam, consumers increasingly love pangasius because of its convenience, neutral texture and flavor, ease of preparation, and reasonable price across all consumer segments. By 2022, Vietnamese pangasius will have conquered more than 140 markets worldwide, including traditional markets with strict requirements on food safety and technical regulations such as the US and EU and needs that farmed fish do not favor, like Japan.

In 6 years, from 2017 to 2022, although the pangasius farming area tended to decrease, fish production gradually increased from 1.2 million tons in 2017 to 1.7 million tons in 2022, showing the productivity of catfish farming increasingly improved.

The popularity of pangasius and the efforts of the Vietnamese business community to bring pangasius to all five continents have helped the industry bring in a significant source of foreign currency each year. With an annual export turnover of $1.5-2.4 billion, pangasius alone accounts for 16-26% of Vietnam's total seafood export value.

The main markets and market groups importing Vietnamese pangasius include China and Hong Kong, the US, CPTPP, EU, ASEAN, the Middle East, Mexico, Brazil, the UK, and Russia.

The number of Vietnamese enterprises exporting pangasius has increased continuously in recent years. In 2020, there will be 320 pangasius exporters, 380 in 2021, and 435 in 2022.

Frozen pangasius fillets (HS code 0304) still account for the most significant proportion of total pangasius exports in recent years. By 2020, this product will account for 89-90% of Vietnam's total pangasius export value. However, in the last 3 years, the proportion of frozen pangasius fillets has decreased to 85-86%.

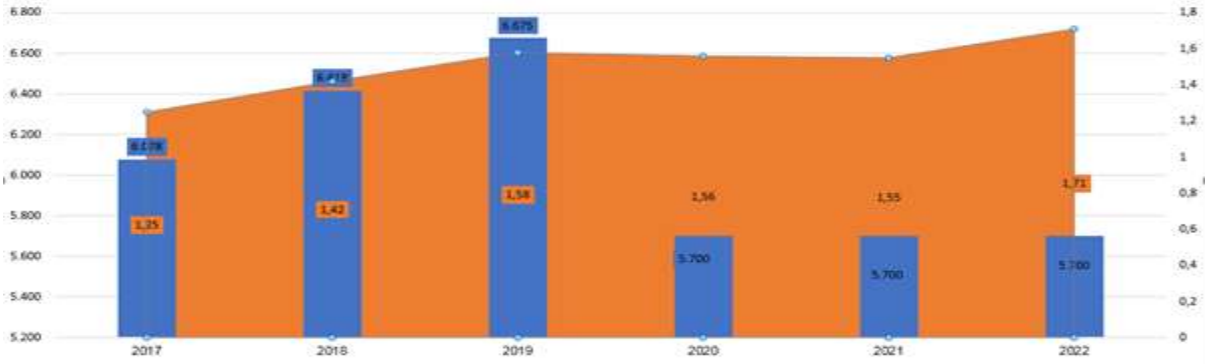

Figure 1. Pangasius area and quantity 2017 – 2022

Source: Mekong Delta Annual Economic Report, 2022 (VCCI)

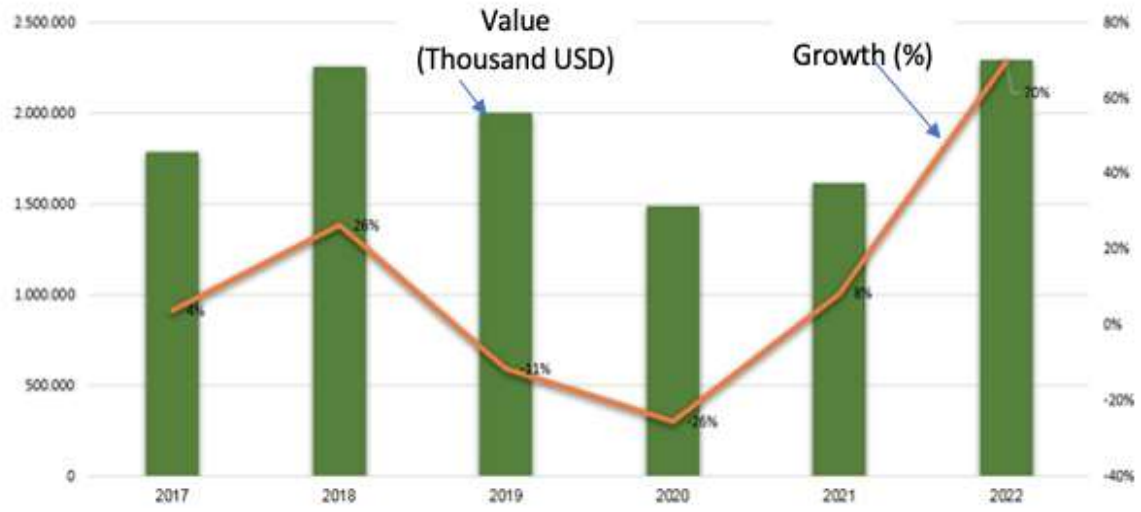

Figure 2: Pangasius export 2017 - 2022

Source: Mekong Delta Annual Economic Report, 2022 (VCCI)

The catfish farming industry formed and developed in the Mekong Delta is associated with favorable natural conditions. However, the formation and development of the processing industry are associated with the needs and development of the export market. The Pangasius farming, processing, and exporting industry in the Mekong Delta has developed rapidly since 2000, making an essential contribution to the success of pangasius exports nationwide. In 2019, the pangasius farming area reached more than 6,000 hectares; the output reached 1.4 million tons, and the export reached over 2 billion USD, accounting for 95% of the country; demand for breeding stock is about 3-4 billion animals; The whole region has 230 production establishments producing pangasius fingerlings, about 4,000 households raising fish fingerlings with an area of about 3,500 ha, mainly in Dong Thap, An Giang, Tien Giang, Can Tho, the number of seed produced is nearly 4 billion children (VCCI, 2020)

Table 1. Overview of pangasius production and processing industry for export in the Mekong Delta

Evaluation criteria	**2000**	**2010**	**2015**	**2019**	**2000-2009**	**2010-2019**
Area (ha)	2 123	5 420	5 623	6 600	12.3%	0.9
Quantity (thousand tons)	93	1 141	1 120	1 420	31.4	2.7
Average yield (tons/ha)	44	211	199	215	17.1	1.8
Turnover (millions USD)	3	1 428	1 565	2 003	97.0	4.1

Source: Mekong Delta Annual Economic Report, 2020 (VCCI)

3. THE CURRENT SITUATION OF THE SUPPLY CHAIN BETWEEN STAGES IN THE PRODUCTION OF PANGASIUS FOR EXPORT IN THE MEKONG DELTA

The linkage in export pangasius production in the Mekong Delta needs to be stronger in both vertical and horizontal linkages

In the pangasius value chain, there are two vertical and horizontal links. Vertical linkage is the link between components participating in the production chain, such as farmers, the exact source of raw materials in processing factories, and between fish farmers and suppliers of feed and seed. Horizontal linkage is the link in each stage, such as the link between the Ministry of Agriculture and Rural Development that manages the sector, the Vietnam Association of Seafood Exporters and Producers, the Vietnam Fisheries Association, the connection between the fish farmers, internal linkages between processing plants, even links of seed suppliers, linkages between feed mills, etc. In general, in the past time, both relationships have been linked. These are both lacking and weak, and conflicts of interest often appear.

- Vertical linkage: The rapid development of the pangasius industry while the business environment has not developed commensurately increases the conflict of interests between the participants in the chain, leading to the situation of "strong and weak people." That's it." The most acute conflict of interest in the vertical linkage is between farmers and processing enterprises.

There is a situation that has persisted for many years: pangasius raw materials for export processing from surplus to shortage. The crux of the problem is that the link between farmers, farming areas, farming output, processing enterprises, and processing capacity is far removed. Due to unplanned, spontaneous development, when the price of fish increased, people rushed to raise fish massively, despite warnings of an oversupply crisis. Towards the end of the season, there was a crisis of raw fish, which made it difficult for farmed fish to be consumed 32 selling prices were lower than farming costs, causing farmers to suffer heavy losses and stand on the brink of bankruptcy. The shortage of raw materials for processing occurred, leading to most of the factories operating in moderation, due to lack of raw materials, having to put workers off work indefinitely because of no jobs. The link between processing enterprises and farming sources is still loose because the contract of product consumption is tight enough. And the person in a passive position, at high risk of injury in this connection, is the fisherman.

In addition to the main link between the actors directly involved in the production chain, there is also a link between feed service providers, veterinary, banks, and growers and processors. In general, these linkages are based on economic contracts. Banks act as lenders, providing capital to institutions. Processors and especially growers still need help accessing significant capital.

- Cross-linking: The linkage between the Ministry of Agriculture and Rural Development, the Vietnam Association of Seafood Exporters and Producers, and the Vietnam Fisheries Association still needs to close. By 2019, we had launched a project

and established a steering committee for pangasius production and consumption. Previously, functional agencies have yet to coordinate the regulations on planning, management of farming areas, food hygiene, and safety standards to solve existing problems thoroughly. Besides, the great concern is the competition using price fixing between processing enterprises. To compete in the market, processing enterprises, instead of cooperating, businesses compete unfairly with each other by lowering product prices, cutting production costs, and cutting quality monitoring costs. Quality and food safety reduces product prices to the detriment of enterprises and the risk of facing product dumping. Unfair competition among domestic companies has significantly affected the brand reputation and quality of exported pangasius products. Faced with the above situation, the Ministry of Agriculture and Rural Development has established a model of the Executive Board for exporting pangasius to the Russian market and has initially brought into play the effect of the advantage of cross-linking. The Board of Management represents the Vietnamese pangasius processing and exporting business community to negotiate to reach an agreement with the Russian partner on the output, quality, and price of frozen pangasius fillets exported to the Vietnam-Russian Federation market. With the initial results, it is considered a success in cross-linking cooperation between processing and exporting enterprises.

An information-sharing mechanism has yet to be established, leading to a lack of information, and inaccurate and incomplete information makes pangasius production unstable in terms of output, quality, and price.

In the past, the lack of information and incomplete forecast information frequently occurred for farming establishments, breeders, and even processing enterprises. According to the movement, the development of fish farming, the discrete connection between fish farmers and processing factories, has led to farmers needing to learn about market demand; processors need to know the real fish output at the ponds. The information system to forecast supply and direction of the market has yet to be focused, along with that between farmers and processing enterprises, an imbalance of information occurs every time the fish harvest season comes, leading to a supply-demand imbalance and processing factories squeeze farmers' prices. The people most at risk due to lack of information are breeding and rearing establishments. The lack of inadequate information and market information leads to the actors involved in the supply stages of pangasius products always being in a passive state in production; unbalanced output will affect the response. It was responding to orders from pangasius importers. The fact also shows the massive export of products by processing enterprises to markets despite all warning information about food safety and hygiene standards, exchange rate risks, and the risk of being sued for dumping. It is causing the price of Vietnamese pangasius to decrease continuously in recent years. The average price in 2020 was 5.76 USD/kg; in 2007, the price was only 5.53 USD/kg.

The information system provides information on market forecasts or production plans of the components involved in the production process. It includes updated technical

reports on farming and processing, food hygiene and safety standards of markets, and product feedback from export markets. This information is the basis for pangasius products that can better meet customer needs, but it is shared with only some components involved in those production stages. The information about the production stages needs to be clarified, making it difficult to trace the origin and grant the farming area code that can be exported. This will directly affect the product's food safety and hygiene quality, damaging the pangasius brand.

In short, information is the foundation for the links in the production chain to be proactive in unifying production plans and inventory levels and establishing long-term goals. However, the fact that the pangasius production industry for export in the Mekong Delta needs a coordination mechanism for the smooth flow of information in the chain leads to many needs for more production planning and forecasting, significantly affecting the overall profitability of the industry as a whole.

The infrastructure system in transportation and storage has yet to be developed commensurate with the industry's growth rate, leading to the disruption of the flow of goods (raw pangasius and processed products), affecting post-harvest

Most raw pangasius farming establishments are distributed mainly around productivity, the ability to respond to orders, and product quality basins of Song Tien and Song Hau, so it is very convenient to transport the harvested pangasius to the processing plant. Buying fish is usually done by two main subjects: traders and processing enterprises that sign contracts for product consumption. Transporting raw fish to processing plants is usually by rudimentary means, not specialized vehicles, such as boats, boats, and cars. Traffic infrastructure needs to be synchronized. Moreover, pangasius farming facilities are often scattered and not concentrated in large-scale areas. This also needs to be improved in transportation and procurement, affecting post-harvest yield. Due to the characteristics of seafood products in general and pangasius in particular, which is a short product life cycle, it is straightforward to spoil, so the purchase and transfer of raw fish to factories as well as cold storage, require Ask quick and prompt to ensure the fish is still fresh. Moreover, raw pangasius must be harvested when the size and weight of the fish meet the standards (usually about 1.0-1.1 kg). If gathered quickly, the fish will be completed on time, and the price will be reduced, not guaranteed the strict standards required by the importer.

4. PROPOSAL TO BUILD A SUPPLY CHAIN OF PANGASIUS FOR EXPORT IN THE MEKONG DELTA REGION

4.1 Supply chain modeling will overcome limitations created by vertical integration

In a pure market relationship, management is based on a separate stage. In contrast, in an interconnected (vertical) supply chain, management is based on the smooth coordination of the whole system to achieve a goal. The only goal is to satisfy customers with the lowest cost, earning the highest profit. The cooperation between the units constituting the supply chain will create a solid basis for a better and more effective

organization of the division of labor among the member units. It also allows forging relationships and collaboration with related businesses throughout the supply chain, sharing or helping each other overcome business risks.

In fact, most components in the seafood production chain, particularly pangasius, seek to form and maintain long-term relationships with their partners and customers. The reality shows that processing enterprises and farmers often use product off-take contracts, and feed manufacturers and growers use contracts or oral agreements. However, there must be an asymmetry in scale: farming households must be more significant than processing enterprises and feed companies. Farmers are more easily exposed to many risks (risk of product output, access to finance) than others. The linkage of farming households (cross-linking), forming a link in the supply chain, will have a stronger voice.

Moreover, the supply chain can help reduce the cost of information search, coordinate pricing, share risks, and take full advantage of scale and specialization in each stage. Spillover effect and facilitate the focus on better addressing customer needs, using contracts and strategic alignment mechanisms. These realities can be overcome and evolved in the formation of supply chains.

4.2 Building a supply chain linking the components involved in the production and supply process is the basis for solving well the shortcomings and limitations in the production of pangasius in the Mekong Delta, ensuring the operation of pangasius production is stabilized.

Building a supply chain that focuses on building information systems, transportation, planning (positioning) production for the whole chain as well as cooperation mechanism between chain participants will be the basis for each step to help solve the situation of lack of links, fragmented and small production, and conflicts between components. Thereby increasing the value of the entire chain by ensuring the harmony of the members' interests. In addition to the above advantages, building a pangasius production supply chain also helps chain participants (links) increase their access to information, especially information on food safety and food Best product quality through customer feedback. Food hygiene, safety, and product quality are vital issues that determine the consumption of products. Facilitates traceability, meeting increasingly stringent requirements of consumers. This is the weakness of seafood products in Vietnam. We only trace the origin to the pond or the agent supplying raw materials but not to the previous stages (seedlings, food production, etc). This will significantly affect the reputation of Vietnamese pangasius products.

With the advantages of pangasius production that few regions in the world have, along with total production and processing areas in one area, this is indeed one of the favorable conditions in planning fish farms link, reducing transportation costs, and limiting geographical risks.

4.3. Building a supply chain of pangasius products for export increases competitiveness, strengthens the brand position of the product, and is considered an industry development strategy in line with the inevitable development trend.

The construction of a supply chain for pangasius for export aligns with the current development trend of applying supply chain construction and management to production on an enterprise scale and the whole industry. The Dutch flower supply chain is an excellent example of how effective and successful the supply chain model can be for the flower industry in this country. To sustainably develop pangasius production for export, building a supply chain for the sector through building a supply chain for businesses involved in production must be a top priority. Therefore, creating an efficient supply chain for the export pangasius industry is an inevitable step to promote the development of the pangasius industry in the Mekong Delta as well as the Mekong Delta such as creating a solid resistance for this staple product in the increasingly fierce competition trend, developed countries are applying strict requirements on product quality standards and sophisticated protection.

5. CONCLUDE

The construction of the supply chain is done through two steps. The first is to propose a supply chain model suitable to the characteristics of the export pangasius industry, and the next is to describe the economic cooperation mechanism. The supply chain is built on the model of a network of agents who store goods and deliver parcels. The processing plant is the initiator and plays the leading role. Measures to successfully build the supply chain have been proposed with two main groups: specific solutions for each component of the chain and a macro solution group. Which emphasis is placed on the group of micro-solutions due to the specificity of the supply chain, which is economic cooperation?

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