The Shrimp Industry of Bangladesh: A Supply Chain Issue

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https://riiopenjournals.com/index.php/ Supply-Chain-Logistics-review

Citation: Jahangir, R. (2020). The Shrimp Industry of Bangladesh: A Supply Chain Issue. *Logistics & Supply Chain Review*, 1(1), 32-41.

Research Note

Abstract

Purpose: *The purpose of this study is to evaluate the shrimp industry of Bangladesh in terms of Porter's five forces model. It also aims to trace the supply chain of the shrimp industry.*

Methods: *The study uses both primary and secondary data. Primary data was collected through in-depth interview of the executives working for the shrimp industry. Secondary data was acquired through literature survey from related publications, magazines, reports etc.*

Results: *The rapid expansion of shrimp aquaculture throughout the southwestern coastal region of Bangladesh has led to both significant economic benefits and serious environmental impacts, thereby creating a hot debate over the pros and cons of developing an industry that has a great potential for growth, though not without certain problems.*

Implications: *If it is going to survive, the industry will have to embrace changing trends in the global market with a strategy to meet a growing world demand for high quality shrimp, produced in an environmentally and socially sound way. This will necessitate some form of transparent and recognized certification program.*

Keywords: Shrimp, Proter's Five Forces, Cultivation, Process, Supply chain, Bangladesh

1. Introduction

"Shrimp cultivation has a long and largely quiet history in Bangladesh, but during its rapid growth over the past two decades, in response to expanding global demand, it has acquired a highly contested status." (*Bangladesh Centre for Advanced Studies,* 2001) Shrimp is the second most important source of export accounting for a yearly earning of over $US 365 million.(*EPB*,2019) Of all the exportable agro-based primary commodities, shrimp is by far the most important contributing more than 95% to the total frozen foods export.(*Salim, 2008)*. Bangladesh entered the global export market for shrimp in the early seventies. The increasing demand and steadily rising prices of shrimp encouraged its cultivation in the coastal belt of the country. Currently, an area of an estimated 160,000 Ha (hector acres) is under shrimp farming, although actual numbers may differ somewhat. Of the total shrimp farming area, some 30,000

ha is fresh water shrimp farming while the rest is devoted to marine shrimp farming.(*Karim,2004*) The main districts in which marine shrimps are being farmed in Bangladesh include Satkhira, Khulna, Bagerhat and Cox's Bazar. The main Fresh water shrimp farming districts are Khulna, Bagerhat, Jessore, Narail, Gopalganj, Pirojpur and Noakhali. Despite positive points, there are views that the shrimp industry is not without vices. While its supporters see it as a valuable way of generating foreign exchange, those against it point to the environmental damage that result from unplanned cultivation trying to meet the growing luxury demands of distant Western consumers. The present study aims: (1) to understand the shrimp industry of Bangladesh and how it functions, (2) to evaluate the shrimp industry scenario of Bangladesh in terms of Michael Porter's 5 factor model, and (3) to comprehend the supply chain of the shrimp industry.

2. Literature Review

2.1. The supply Chain

Marketing channel consists of distributors, retailers and others who connect the company to its buyers. The supply chain describes a longer channel stretching from raw materials to components to final products that are carried to final buyers. For example the supply chain for women's purses starts with hides, and moves through tanning operations cutting operations, manufacturing and the marketing channels bringing products to customers. Each member of the supply chain creates and captures only a portion of the total value generated by the supply chain. Thus the supply chain is a value added flow from suppliers to final users. Companies today are strengthening their connections with partners all along the supply chain. They know that their fortunes rest not on how well they perform but also on how well their entire supply chain performs against competitors supply chain.

2.2. External environment analysis (opportunity& threat)

The major purpose of environmental scanning is to discern new marketing opportunities and detect threats. An organizational opportunity is an area in the environment that, if exploited may generate higher performance. Opportunities can take many forms and marketers have to be good at spotting them. For instance,

- A company may make a buying process more convenient or efficient.
- A company can meet the need for more information and advice.
- A company can customize a product or service that was formerly offered only in a standard form.
- A company can introduce a new capability.
- A company may be able to deliver a product or a service faster.
- A company may be able to offer a product at a much lower price.

On the other hand an organizational threat is an area in the environment that increases the difficulty of an organization's achieving high performance. It is a challenge posed by an unfavorable trend or development that would lead in the absence of defensive marketing action

to deterioration in sales and profit. To deal with threats the company needs to prepare contingency plans that spell out changes it can make before or during the threat.

2.3. Five Forces Model

Michael E. Porter of the Harvard school of business administration has developed a framework that determines the intrinsic long run profit attractiveness of a market or market segment. This model focuses on five forces that shape competition within an industry.

Threat of new entrants: A segment is attractive if entry barriers are high and entry barriers are low. Few firms can enter the industry and poor performing firms can easily exit.

Degree of rivalry: A segment is an attractive if it already contains numerous, strong or aggressive competitors. bargaining power of buyers A segment is an unattractive if buyers possess strong bargaining power that allow them to force prices down.

Bargaining power of suppliers: A segment is an attractive if the company's suppliers are able to raise prices or reduce quantity suppliers.

Threat of substitute products: A segment is an unattractive when there are actual or potential substitutes for the product that place a limit on prices and profits.

2.4. Emperical studies

A recent study on the shrimp study of Bangladesh stated that to comply with the rules and regulations of HACCP the frozen food exporters of Bangladesh spends about US$2.2 million per year and the GOB spends on an average US$225 thousands to maintain a HACCP monitoring program. (IUCN,2004) Another study stated that during early 1990, some farmers started semi intensive for shrimp farming at a very small scale. But within a year or two a viral disease (white spot disease) known as the 'china virus' broke out. This disease spread out the in the entire shrimp farming area of Cox's Bazaar and Khulna causing heavy loss to the shrimp industry in country. The cause of the outbreak of this disease in Bangladesh was identified to be shrimp fry imported from Thailand. Thus shrimp farmers largely became dependent on the supply of natural fries and limited in country hatcheries (Ali,2000).

A study on environmental impacts of shrimp farming critically analyzed the ecological problems created by unplanned shrimp cultivation particularly in the Chokoria Sundarbans. The report concluded that the extinction of mangroves in Chokoria Sundarbans by introducing shrimp farming was a tragic example of how commercial interest have been allowed to direct the development process, which has led to the destruction of natural resources. (Gregow, 1997).

Another research studied the impacts of shrimp farming on soil and water quality in some selected areas and the results of the study demonstrated some adverse impact of shrimp farming on soil properties by increasing soil salinity levels (upto 500%) in non-saline area that hampered crop cultivation seriously. Water bodies were also found contaminated with high salinity that does not favor growth of many fresh water organisms. (Islam,1999).

Another study on quality stated that However, the external buyers were not satisfied with the existing rules and regulations of Bangladesh regarding quality and safety assurance and they imposed more conditions. The EU countries introduced new system of quality control and

safety for fish and fish products namely, "Hazard Analysis Critical Control Points" (HACCP). The main concept of HACCP system is to follow or maintain quality and safety programs set under HACCP system at every step of marketing starting from production place to the last point. (Toufiq,1998)

3. Research Design & Methodology

This paper is based on both primary and secondary data. Primary data was collected through in-depth interview of the executives working for the shrimp industry. Secondary data was acquired through literature survey from related publications, magazines, reports etc. Qualitative analysis was used to interpret the findings. In addition Michael Porter's five factor model was also used as a tool for analyzing data.

4.0 Findings and Analysis

4.1 The shrimp industry of Bangladesh

Frozen food is one of the largest sectors in the export trade of Bangladesh. This sector deals with the export of sea food in frozen form of which shrimps are of utmost significance, covering more than 90% to the export volume. Shrimp export and cultivation in Bangladesh has undergone rapid expansion over the last two decades. Between 1983 and 2003 the volume of shrimp cultivation has increased more than 14 times (DoF, 1985-2004). Over the same period, the area of ponds devoted to shrimp production has more than trembled. The main cultured species of shrimp is the marine tiger shrimp locally known as *bagda* shrimp (technical name: *Penaeus monodon*) and the fresh water species, locally called *galda*, ((technically known as *Macrobrachium rosenbergii*).The country's unique natural features, including large areas of low-lying tidal land, a favorable environment, and a high market demand, all in total favor shrimp production. (WARPO, 2003).

4.2. Shrimp Processing Overview

Shrimps are available from two sources: (1) Production or Cultivation, and (2) Deep sea Fishing. Currently the following four types of shrimp cultivation are found in practice: (1) Traditional, (2) Extensive, (3) Semi Extensive and (4) Intensive.

Cultivation: In Bangladesh generally only the Traditional system is used where shrimp grows with other white fish on natural feed. The traditional production system is referred to as the *bheri* or pond method, which has subsequently been modified to take place in the large polder areas known as *ghers* (farms). Simple efforts are taken to prepare the *ghers* and usually no food or extra nourishment is provided to the fry. Investment is low, return is low, yield is low and the risk is also low. The main advantage in this type of culture is that, in case of virus attack on shrimps, the farmer still gets a fair amount of white fish each, which sustains the family.

In the extensive system shrimp fries are collected and cultivated independently, not with any other fish. The shrimps grow on locally prepared feed. Yield is better than the traditional system though investment is not very high. Bangladesh is gradually moving toward extensive culture. Extensive Culture takes place for *Bagda* with saline water ponds and for Golda in fresh water

ponds. For this reason the culturists dig up dykes or embankments along the estuaries and rivers to allow sea water into their ponds with shrimp fries. In semi intensive culture yield is generally ten times more than Extensive Culture but requires high investment of funds, time, and technical assistance Intensive Culture gives 2 to 3 times more yield than Semi-intensive Culture as investment is higher, and needs 24 hours close monitoring. But theses two systems are not in practice in Bangladesh.

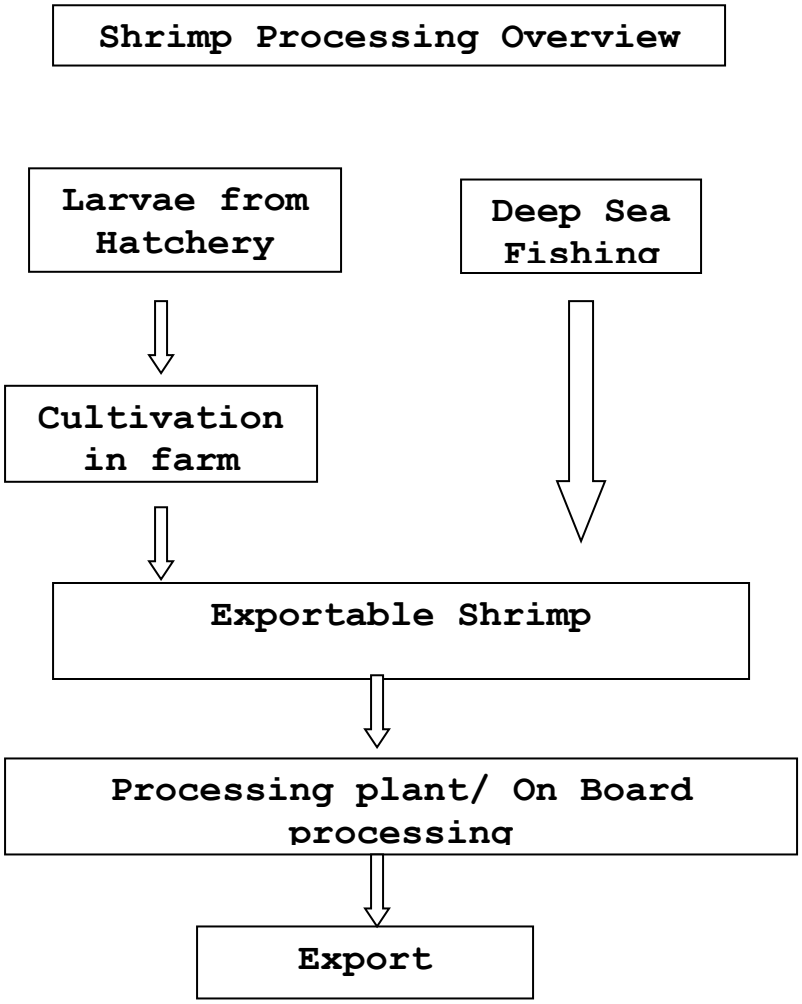

Fig.1: Function of Shrimp Processing Overview

Deep sea fishing: Shrimps grow naturally in the ocean and fishermen catch shrimps along with other fish from the Bay of Bengal. Well –equipped trawlers are used for this purpose that often have on board processing facilities. Most of the farmers and hatcheries obtain the brood-mother shrimp from this system. The shrimp gathered from the open waters are both sold to the domestic and foreign market. Bangladesh enjoys the scope for extensive marine shrimp capture throughout its coastal areas. In the Bay of Bengal the coast line continues for 440 miles. Various trawlers, mechanized and non-mechanized boats are currently involved in this type of fishing.

But unfortunately due to inadequate enforcement and insufficient marine patrols a large number of fishing boats violate regulations which results in over-fishing.

4.3 The Shrimp Industry of Bangladesh: Through the Lens of Michael Porter's 5 Forces Model

Porter's (2008) Five Forces Framework is a method for analyzing competition of a business. Following is the analysis of Bangladesh Shrimp Industry in term of Porter's Five Forces.

- **Threat of new entrants:** The shrimp industry is an attractive one. This is due to its high returns and growing demand globally. Even though this attracts competition, still the number of potential competitors is less, the reason being enormous investment, technology and expertise, all of which act as high entry and exit barriers for this sector. In addition the recent trends of compliance issues also restrict new entrants to some extent. Thus the entry by competitors is a moderate threat to the sector.
- **Bargaining power of suppliers:** The numbers of suppliers in this industry are plenty, but there is a lack of quality suppliers. Such suppliers are few in number who maintain international standard, which is crucial in shrimp processing. This is because exporting low quality shrimps could be a disaster in the global market, in the form of cancellation of shipment, or even embargo hurting the image and profit of the shrimp companies. Thus the high bargaining power of suppliers can be viewed as a threat in this sector owing to their scarcity.
- **Availability of substitute products:** When considering shrimps as seafood, all other seafood may act as an alternate. But when it comes to taste, the true picture reveals that Shrimps are usually not substituted for any other seafood. The only other seafood that tastes more or less like shrimps, are crabs. But still due to its exotic and luscious taste, people are not likely to switch shrimps for anything. No wonder it is a delicacy around the world. Thus the non-availability of close substitutes makes this sector an attractive one and gives the shrimp companies' opportunity to raise prices and earn additional profits.
- **Bargaining power of buyers:** Due to the huge demand for shrimps in the international market, the shrimp buyers have less power. Moreover they are not price sensitive and are willing to pay a premium to get quality shrimps. From this point the sector is an attractive one as the shrimp sellers can raise their prices and earn greater profit, giving the buyers little ground to bargain. But this is only applicable for branded processing companies. who have proper processing plants or who comply with EU standards like the HACCP seal of quality compared to other players in the industry. But for companies that have not yet established a brand name, it is a different scenario. Such greenhorn companies have to rely on merchant distributors, who take title of the goods. And so having no brand name these companies thrive to get linked with big distributors like Coles or k-mart, where they have less bargaining power.
- **Degree of rivalry in the industry:** The degree of rivalry in this industry is great at this moment. The main reason behind this being the shortage of raw materials (unprocessed shrimps) that processing companies thrive to get. Earlier due to the profitability of the

sector, shrimp processing plants, increased rapidly. But the scarcity of raw materials forced most of them out of business. But incumbent companies in the sector are engaging in price wars to get raw materials making the competition more and more intense, since the supply of raw shrimps are not increasing Thus this strong significant rivalry is a major threat to this industry.

4.4 The Shrimp Industry Supply Chain

Shrimp production involves a very complex system where, many groups are in action. It comprises a chain of agents or sub sectors who are involved in the process from fry catching to the final processing and packaging. It is important to mention that the processing plant sub-sector has ultimate command of the marketing system. Most of the people engaged in shrimp marketing are either directly or indirectly employed by this sub-sector.

4.4.1. Fry Catching

Fry or post larvae (pl) catching takes place widely throughout Bangladesh. Shrimp fries are collected in the wild from the rivers or sea shores using nets. Shrimp fries are also produced in hatcheries from the mother shrimp. The shrimp fries then pass through a chain of middlemen before reaching the hatcheries.

4.4.2 Hatcheries

Hatcheries produce fry from mother shrimp, under controlled conditions. The hatcheries obtain the mother shrimp from marine fishermen. Hatcheries that cultivate bagda fries need infrastructure to bring seawater inside and return it for disposal. Due to the demand for post larvae, the number of shrimp hatcheries increased rapidly. Currently, in Bangladesh, there are approximately 55 hatcheries for bagda and 70 for Golda. (BFFEA, 2004); Hatchery bred fry has the potential to augment wild-fry and eventually displace wild fry in the value chain.

4.4.3 Fry supplier

Fry suppliers are agents that buy fry either from wild fry catchers or from hatcheries and then resell to shrimp culturists, who then cultivate them in ponds or other agents. Fry suppliers are also known as *farias* or *aratdars.*

4.4.4 Culturist/farmer

The culturists are the groups that produce adult shrimps by cultivating them in ghers(ponds). They collect fries from natural sources, fry suppliers or directly from hatcheries and culture both fresh water and marine shrimps through traditional or extensive methods in ponds. Then they sell these cultured shrimps to shrimp suppliers(agents) which is the usual practice or they may sell directly to processing plants which is rare.

4.4.5 Shrimp Supplier

Shrimp suppliers are agents that buy shrimps from culturists and keep them in depots until they are resold to processing companies. These suppliers who are also known as shrimp farias or shrimp aratdars who are facing new challenges today as their depots have to meet compliance standards in accordance with authorization from the EU and US.

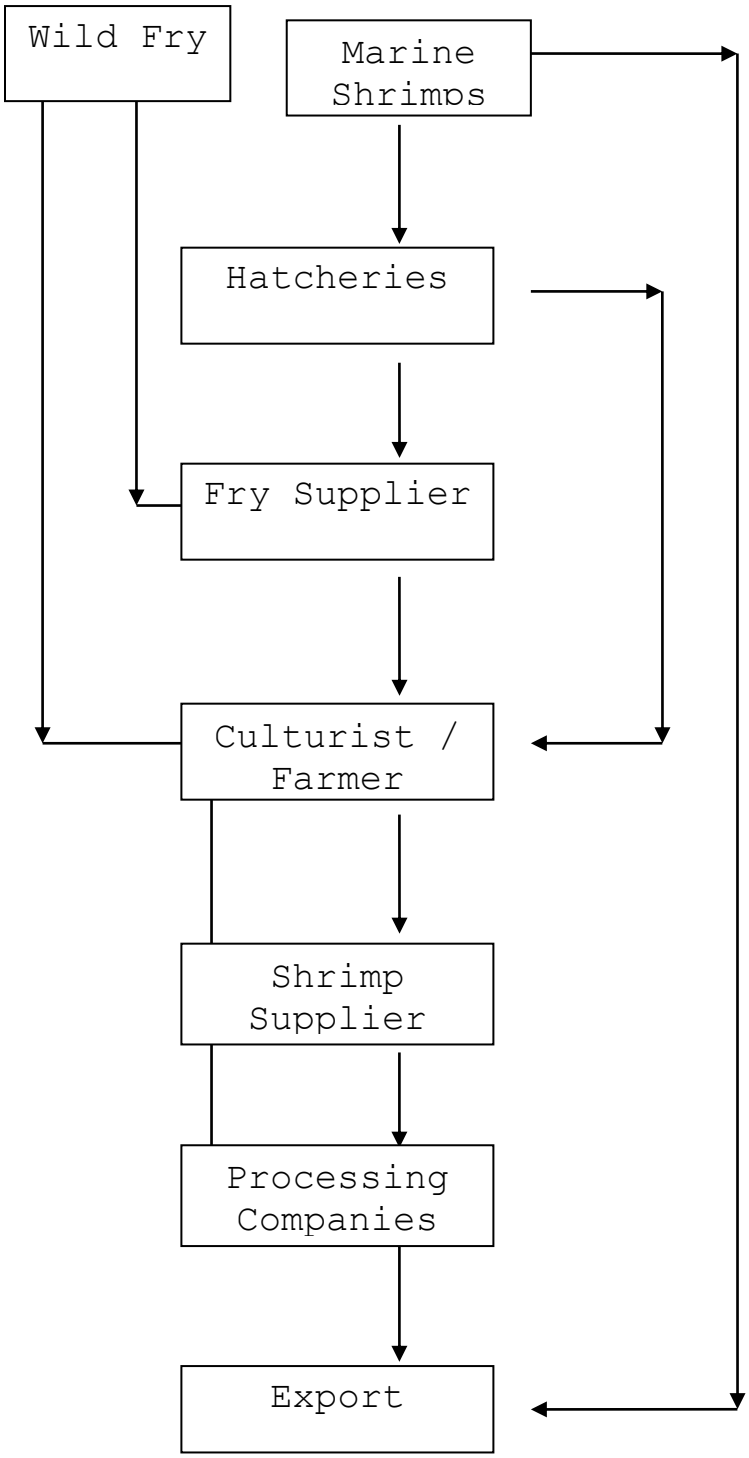

Fig. 2: Shrimp Industry Supply Chain

4.4.6 Processing companies

Processing companies buy shrimps from the shrimp suppliers and upgrade it so that they are ready for export. Most of the processors sell shrimp using their own brand name and they also pack and use the brand name of importers and buyers. The infrastructure, hygiene practice, location etc. of the processing plants has to be in accordance with the compliance issues set by the two main global markets EU and USA.

Although there are plenty of processing plants in Bangladesh but the majority of them are underutilized and operate under capacity reflecting the insufficient and discontinuous shrimp supply. In addition to this some companies have on-board facilities in their trawlers that give them the access to process and pack the shrimps, immediately after the catch, ready for export.

4.6.7 Other groups

There are also other stakeholders in the shrimp industry whose livelihood depends on the sector as they are involved in the chain. They are feed mills, transportation companies, packaging companies, ice manufacturing companies.

5.0 Conclusion

Shrimp is an important export for Bangladesh. It earns around $400 million annually in the form of foreign currency for the country (*EPB, 2019*). There are great opportunities in the sector as the global demand for sea-food is on the rise. In addition the climate conditions and vast coastal belt of Bangladesh highly favor shrimp cultivation. But there are some environmental costs that have led to both significant economic benefits and serious environmental impacts, thereby creating a hot debate over the pros and cons of developing an industry that has a great potential for growth, though not without certain problems. If it is going to survive, the industry will have to embrace changing trends in the global market with a strategy to meet a growing world demand for high quality shrimp, produced in an environmentally and socially sound way.

Conflicts of Interest: The author declares no conflict of interest.

REFERENCES

Bangladesh Centre for Advanced Studies (BCAS) (2002).*The coastal shrimp sector in Bangladesh.* Dhaka, Bangladesh:

Bangladesh Centre for Advanced Studies (BCAS), (2001). *The costs and benefits of bagda shrimp farming in Bangladesh.* Dhaka, Bangladesh:

Department of Fisheries. (2002). *Shrimp aquaculture in Bangladesh: A vision for the future.* Dhaka

Gregow K., 1997. *When the Trees are Gone... Social and Environment Costs of Converting Mangroves into shrimp Fields*- A Case Study from Chakoria to Sundarbans, UBINIG, Dhaka, Bangladesh.

Hagler, M.(1992, May). *The devastating delicacy: the explosion of shrimp farming and the negative effects on people and the environment*. Greenpeace Foundation.

Jones & Hill (2001).*Strategic Management: An Integrated Approach,* fifth edition, Houghton Mifflin Company.

Karim, M. (2003). *A gross oversimplification: Stop blaming shrimp*. Dhaka.

Kotler, P. (2003). *Marketing Management*, eleventh edition, prentice hall.

Porter, M.E. (2008). The Five Competitive Forces that Shape Strategy, *Harvard Business Review*. 88(1), 78-93.

Salim, L. (2008), *Bangladesh Shrimp Exports Top $500 Million*. Retrieved from: https://www.seafoodsource.com/news/supply-trade/bangladesh-shrimp-exports-top-500-million#:~:text=Shrimp%20production%20accounted%20for%2095,the%20year%20was%20%2412.18%20billion.

Williams, D. & Khan, N. A. (2003). *Freshwater prawn farming in gher systems: Indigenous Technology Developed in South-West Bangladesh.* GOLDA Project, CARE Bangladesh.

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