VALUE CHAIN ANALYSIS OF BLACK TIGER SHRIMP CULTURE IN COX'SBAZAR DISTRICT, BANGLADESH

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Mamunul Quader

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ABSTRACT

This research aimed to explore the value chain of Black tiger shrimp in Cox'sbazar district, Bangladesh. Actors involved in the chain are farmers, wholesalers, commission agents and processors were interviewed by different questionnaires. A total sample size of 48 surveyed households were visited and analyzed for this research. Results showed a map of actors, costs and earnings, employment distribution, facilities and difficulties of each stage.

Farmers, wholesalers, commission agents and processors are the four main actors which contributed directly to shrimp production and influenced the economical value. Others actors Hatchery, nursery, seed collector impacted indirectly to the shrimp production as well as value chain development. The micro level producer, farmers are in worst condition as their revenue and cost share are the highest and the profit share are the lowest against revenue and cost. Other three actors are in same position enjoying with positive profit. Processors did a critical job with some challenges to fulfill the demand of importers.

To upgrade this chain, the actors specially the farmers should be trained up with scientific way, the corruption free environ should be established by government and micro level producers should be empowered to enjoy the perfect competitive market. In addition, wholesalers have to be facilitated with giving loan by government with easy term and conditions.

1. INTRODUCTION

Aquaculture has increased the supply of fish for consumption and contributed to improving livelihood for thousands of household in Bangladesh. Although the aquaculture industry has grown significantly over the years its full potential has not yet been realized and quicker development is required to keep up with the growth in demand for fish.

Shrimp farming in the south and southeastern coastal belt of Bangladesh began in the early 1970s and became rapidly one of the major foreign currencies earning product after 1980. Currently Bangladesh is the 7th largest shrimp exporting country in the world to the Japanese and the U.S. markets. There are 600,000 people employed in shrimp cultivation, and the industry earns $ 301 million per year (GOB, 2002). Over the last two decades, the shrimp industry was developed by international lending institutions including the World Bank, the Asian development Bank and others. The private sector and its export oriented activities such as the garments and shrimp industries have been developed to reduce the poverty by rapid job-creating economic growth and intervention (WB, 1994). The Bangladesh government declared shrimp farming as an industry under the Second Five-Year Plan (1980–85) and took necessary measures to develop shrimp production (Haque, 1994). Bangladesh was the 8th largest shrimp producing country in 2000. (Ahmed *et al*. 2002)

The coastal aquaculture has been developing for a long time. There is plenty of coastal area on the southern side of Bangladesh. The local residents used to practice shrimp farming in a traditional way which is locally called Bheri/Gher farming before the introduction of current shrimp culture method (DDP 1985). There, the fishermen at first would plot the area into small part with dam and some necessary wooden sluice gates would have been made. By those sluice gates tidal water could flow into the farming area and also could flow out when it was needed. They used to preserve the tidal water within the area and change it whenever it was needed. In such a system production was relatively low, since other shrimp and fish species (including predators) could enter the pond. As a result the traditional system was gradually changed by replacing *Penaeus monodon*fry collected from sea water in the coastal region. The farmers preserve in the farm area and when it grows older, they are caught for business.

In Bangladesh shrimp farming can be categorized into three categories; extensive, improved extensive and semi-intensive. Khondakar and Paul (1996) define the categories as follows: In extensive shrimp farming, the farming area is large, the dam of the area is high, the depth of water is 0.3 to 1.2 meters, the ground of the pond is not plain, water management is unregulated, there is no protection from predators and other species and 200-250 kg shrimp are produced by outset of 10,000 to 15,000 shrimp fry per hectare. In improved extensive shrimp farming, the farming is medium (less than 8 ha.), the area is square or rectangular, the ground of the pond is plain and 400-500 kg shrimp are produced by outset of 30,000 to 40,000 shrimp fry per hectare. In semi-intensive farming, the area is small (0.5-1 ha.), square or rectangular, the ground of the pond is plain, water management is planned, predators are controlled and 4-5 tons of shrimp are produced by outset of 70,000 to 150,000 shrimp fry per hectare. As the demand increased, farmers began to switch from extensive system over into improved extensive and semi-intensive systems and so the fishermen now produce better than from previously.

According to ICLARM (2002): *"shrimp farming is a capital intensive business with total production costs of US$ 735 per ha/crop for extensive system, US$ 1,837 per ha/crop for improved traditional systems and US$ 9,184 per ha/crop for semi intensive systems, the corresponding net income however is US$ 1,275, US$ 2,204 and US$ 153,061 per ha/crop respectively"*.

According to 'Statistical Year Book Bangladesh 2010', there were 217,877 hectares of shrimp farms in Bangladesh and it's total production was 145,585 metric tons and the area of shrimp/prawn farm at Cox'sbazar district in Bangladesh in 2008-09 was 32,018.21 hectare and the total catch was 18,723.21 metric tons. Department of Fisheries (a section under Ministry of Fisheries and livestock in Bangladesh) estimates that in 2007 there were about 57 *Penaeus monodon* (Bagda) hatcheries. In Bagda hatcheries about 51,000 million of post larvaes were produced. Almost all the Bagda hatcheries are situated in the Cox'sbazar district.

The familiar name of *Penaeus monodon* is the Black Tiger Shrimp and in Bangladesh, it's local name is 'Bagda Shingri'. It is named Black Tiger Shrimp for the grey-black stripes on it's back.

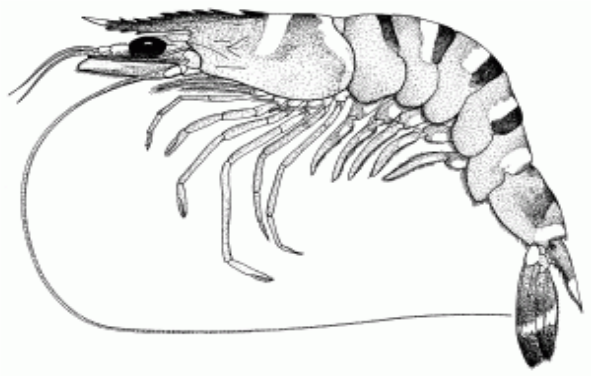

Figure1. Picture of Black Tiger Shrimp (*Source*: FAO)

Although some shrimp farmers earned good profits through the 1990s, the Bangladeshi industry entered a downturn afterwards due to a large-scale spread of disease. According to Cato and Santos (1998), the Bangladeshi shrimp farming faced the following problems: First, Bangladesh usually meet the international standards given by import countries, but sometimes do not meet the required standard of safety and quality. Second, shrimp farming lacks sufficient funds to invest in mechanical equipment, fishing boats, buildings, and skilled manpower. Inadequate and irregular supplies of electricity, inconsistent availability of high-quality water and ice, and poor transportation facilities also obstruct the use of modern sanitary practices.

In this context described above, updating economic data of the actors in the value chain are essential to assess the relationship between relevant institutions of shrimp industry. This could enable the adjustment of the management and administration policies of the government and market relationship to ensure stable development and sustainability and of the shrimp farming in Cox'sbazar district. So the growth of black tiger shrimp necessitates that it's value chain should be studied. This study attempts to identify the actors participating in the value chain of black shrimp, their activities as well as costs and earnings. This research aims to expose the distributions of revenues, costs and profit of different actors in the chain.

Objectives of the thesis

1) Identify the activities conducted by different actors in value chain.
2) Calculate the corresponding costs and earnings of those activities of the actors.
3) Evaluate the distribution of revenue, cost and profit along the chain.

Thesis structure

This thesis is organized as follows: Chapter 1 provides the introduction with the problem statement, the objectives and methodology procedure. Chapter 2 contains a more general background in Cox'sbazar district and Black tiger shrimp value chain in Bangladesh. Chapter 3 mentions definition of value chain, Value Chain Analysis (VCA) concepts. Chapter 4 describes the methods used for data collection and calculations, study scoping, sampling method, and sample size. Chapter 5 presents the results of the analysis. Chapter 6 presents conclusions and the main points of VCA and recommendations to increase this value chain efficiency.

2. A MORE GENERAL BACKGROUND

2.1 Study Area

Cox'sbazar district is located on the southeastern side of Bangladesh along the northeastern coast of the Bay of Bengal. The geographical location is between latitude 20°30´ and 22° N and longitude 91°45´ and 92°15´ E. The Chittagong Hill Tracts and Myanmar to the east, Bay of Bengal to the west, Chittagong district to the north and Bay of Bengal and Myanmar beach to the south surround the Cox'sbazar district. The district has 8 Upazilla (sub-district) of which the present study covered 3 Upazilla namely Chakaria and Cox's Bazar Sadar and Moheshkhali. The two major rivers, the Matamuhuri and the Baghkhali, flow from east to west. The local people depend largely on the coastal natural resources for living, which has led to destruction of the coastal natural resources to meet their demands. The fishing, and salt production, either as daily laborers or owners of such production facilities major activities of the people are shrimp

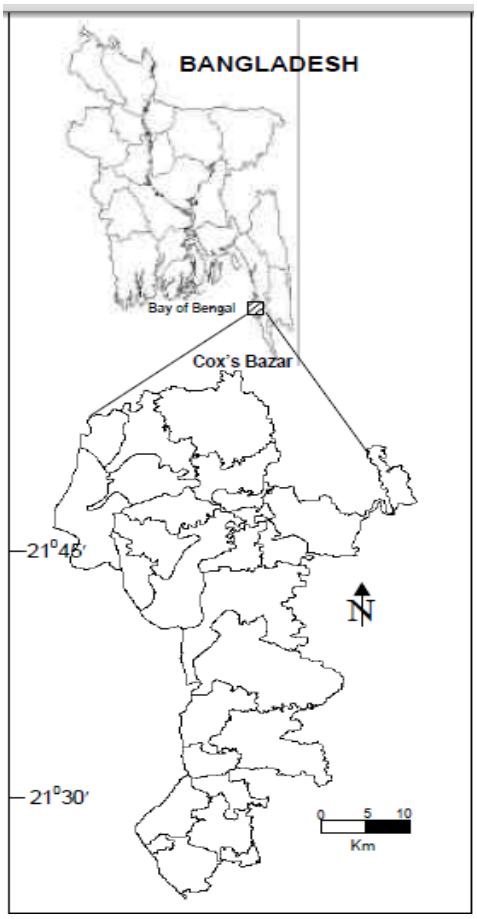

Figure 2:The geographical location of Bangladesh

(*Source:* Hossain and Lin, 2001)

According to Hossain and Lin (2001), the main economically important coastal resources are fisheries, aquaculture, salt, mangrove forest, land, water and cultural heritage. Sea level rise and low river flows would substantially contribute to that stress. Winter agriculture in the coastal areas is dependent on ground water. Rural water supply almost entirely depends on fresh water sources. The most natural and dynamic features include beach and dunes and both develop parallel to the coast. A long sandy beach of about 145 km runs from Cox'sbazar to Badarmokam. This stretch offers good tourism and recreational opportunities.

2.2 Shrimp production of Bangladesh

In 1986-87 economic year, the total cultured shrimp was 14,773 metric ton which is 20.29% of total shrimp production of both cultured and sea area and in 2009-10 it was 87,972 metric ton which is 47.07% of total production. From table 1, it can be seen that the cultured shrimp production is increasing from 1986 and it was in highest position in 2009-10 economic year. Bangladesh's coastal brackish water shrimp export sector has grown over the past thirty years in response to expanded global demand for high quality sea food and successful steps taken by Bangladesh governments since 1980's to liberalize and expand the economy (Pokrant et al, 2002). Rahman (1998) says that shrimp culture is as old as 700 years in South Asian region. But commercial production of shrimp culture is a current phenomenon.

Table 1: Shrimp production at different economic year in Bangladesh

Economic Year	Shrimp production (Metric ton)						Grant total	Percentage Of cultured shrimp
	Cultured Area			Sea area				
	Open	Cultured	Total	Trawler	Artisanal	Total		
1986-87	42,882	14,773	57,655	4,488	10,666	15,154	72,809	20.29
1987-88	36,386	17,889	54,275	3,545	11,535	15,080	69,355	25.79
1988-89	42,824	18,235	61,059	4,893	12,211	17,104	78,163	23.33
1989-90	36,284	18,624	54,908	3,117	12,751	15,868	70,776	26.31
1990-91	43,262	19,489	62,751	3,696	13,973	17,633	80,384	24.24
1991-92	61,042	20,335	81,377	2,902	17,140	20,042	101,419	20.05
1992-93	78,226	23,530	101,756	4,188	19,787	23,975	125,731	18.71
1993-94	50,721	28,302	79,023	3,479	18,040	21,519	100,542	28.15
1994-95	58,973	34,030	93,003	2,416	17,947	20,363	113,366	30.02
1995-96	44,079	46,223	90,302	3,588	22,765	26,353	116,655	39.62
1996-97	41,868	52,272	94,140	3,537	21,281	24,818	118,958	43.94
1997-98	46,635	62,167	108,802	2,444	22,346	24,790	133,592	46.53
1998-99	49,296	63,164	112,460	3,765	27,977	31,742	144,202	43.80
1999-00	43,167	64,647	107,814	2,915	28,480	31,395	139,209	46.44
2000-01	44,343	64,970	109,313	3,172	27,865	31,037	140,350	46.29
2001-02	54,965	65,579	120,544	3,168	28,808	31,976	152,520	43.00
2002-03	60,876	66,703	127,579	2,486	29,445	31,931	159,510	41.82
2003-04	63,103	75,167	138,270	3,075	33,413	36,488	174,758	43.01
2004-05	68,768	82,661	151,429	3,311	40,950	4,4261	195,690	42.24
2005-06	77,381	85,510	162,891	3,444	44,675	48,119	211,010	40.52
2006-07	82,422	86,840	169,262	2,175	49,694	51,869	221,131	39.27
2007-08	75,678	94,211	169,889	2,620	50,586	53,206	223,093	42.23

2008-09	89,901	102,854	192,755	2,932	49,285	52,217	244,972	42.00
2009-10	46,388	87,972	134,300	2,496	50,096	52,592	186,892	47.07

Source: DOF (2011)

2.3 Black tiger shrimp value chain in Bangladesh

The Black tiger shrimp value chain in Bangladesh is a buyer-driven chain. The farmers can influence a little the price and marketing of it. Shrimp's value chain involves different actors

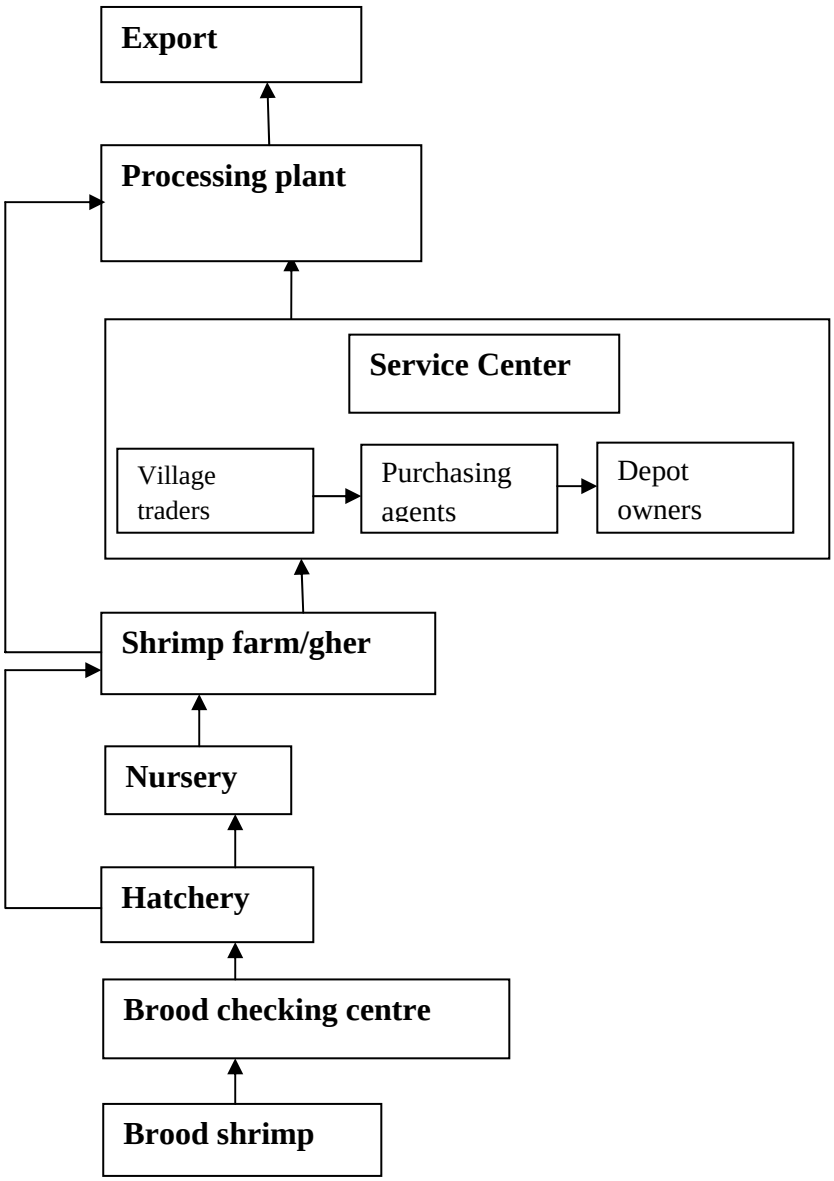

Figure 3.Value Chain of Shrimp in Bangladesh (*Source*: BFFEA , 2007)

with their institutional arrangements and actions from brood shrimp collection to export. In Bangladesh, shrimp produced in the farm is marketed to overseas consumers through a number of channels that is from farm to village traders, purchasing agents, depot owners and final delivery to the processing plants. All the steps of value-added activities are strictly controlled under GMP (Good Manufacturing Practices) and SSOP (Standard Sanitation Operating Procedure).

Figure 4: Black tiger shrimp culture in Chakaria, Cox'sbazar.
(Source: Own photo)

Figure 3 provides a complete flow diagram of the shrimp industry that traces how inputs are transformed into outputs and how shrimp is farmed, processed and exported. In Bangladesh, shrimp is exported to overseas consumers through a number of channels that is from farm to village traders, purchasing agents, depot owners and final delivery to the processing plants. All the steps of value-added activities are strictly controlled under GMP (Good Manufacturing Practices) and SSOP (Standard Sanitation Operating Procedure). Competent authority like FIQC (Fish Inspection and Quality Control department under the Ministry of Fisheries, Government of Bangladesh) and some independent international quality assurance organizations specifically

France based SGS (Societe Generale de Surveillance), United Kingdom based Lloyd's and Denmark based Baltic Control perform inspection, testing, certification and verification services following the Codex guidelines, code of practice, standards and directives of European Union Food Law, HACCP regulations and requirements of other import countries. To ensure safety and quality of the shrimp, Department of Fisheries monitors the hygiene and sanitation conditions of the food through quality management and process-oriented supervision throughout the shrimp value chain.

Figure 5: A picture of shrimp culture in Moheshkhali, Cox'sbazar.

(Source: Own photo)

3. THEORY

In this chapter, a short definition and concepts of VCA will be showed. It contains a brief overview of the development of the value chain concept and different analytical approaches.

3.1 DEFINITION

The value chain analysis is a route of breaking a chain into its constituent parts for better understanding of its functioning and structure. *"The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities"* (UNIDO, 2009).

According to Kaplinsky and Morris (2001), *"The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use"*.

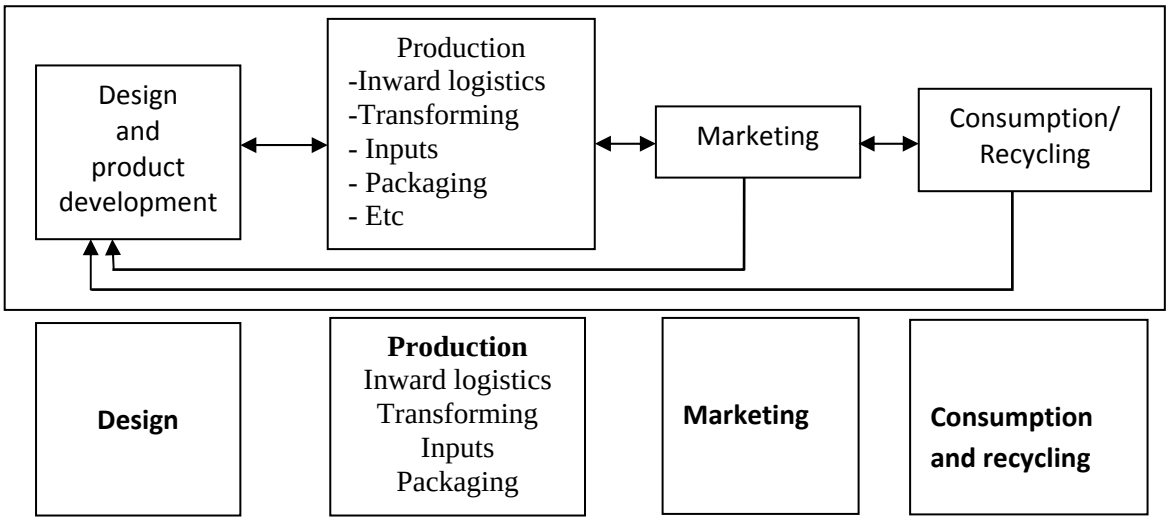

Figure 6. Four links in a simple value chain (*Source:* Kaplinsky and Morris 2001:4)

Based on this definition, a value chain can be classified into simple and extended value chain. In the **simple value chain**, there are series of functions within each link of the chain. A simple

value chain entails the range of activities carried out in a business organization to produce a certain product. This might include the design and product development stage, the production stage, the marketing and distribution activities and consumption and recycling. All of these activities form the value chain which links producers to consumers and each activity adds "value" to the final product (Figure 4).

The **extended value chain** is much more complex than the simple value chain. It includes many links in the chain. According to Bay (2011), "*the extended value chain includes primary producers, processors, traders, service providers, etc to bring a raw material pass though the chain to the sale of the final product to customers. This chain begins from raw materials production and tends to be more links with other factors involve in assembling, trading, processing, exporting, recycling and so on. It does not look at the activities implemented by a business organization. But it includes all its backward and forward linkages, until the level that the raw material production will be linked to the final consumers"*.

The concept of value chain implies that enterprises are no more treated as a single unit but as part of an integrated chain of economic activities and associations across geographic boundaries (Gudmundsson , Asche , Nielsen , 2006). In the value chain, one constituent is the buyer of the earlier entity and the supplier for the later constituent. The purposes of all the constituents are to produce final goods that can fulfill the final consumer's demands. They are closely connected to work together in order to achieve such purposes by keeping up their independence.

Moreover, the concept of a value chain is closely related with the concept of governance. Gereffi *et al.* (2005) identifies that there are five types of global value chain governance such as market, modular value chains, relational value chains, captive value chains, hierarchy. Humphrey and Schmitz (2000) pointed out the role of supplier's capability in determining the scope of subordination of suppliers to buyers.

Furthermore, there are two types of value chains such as 'producer- driven' and buyer-driven are established for both industrial and commercial firms to promote globalization (Gereffi, 1994 & 1999). In producer-driven value chains, usually intercontinental manufacturers play the vital

roles in organizing manufacture networks (including their backward and forward linkages) and it is a capital-intensive as well as technology-intensive industry such as the aircraft, computer, and costly machinery industries. And in the buyer-driven value chains, retailers, marketers and brand manufacturers play the key roles in establishing decentralized manufacture networks in the exporting countries, especially in the developing countries. This industrialization is common in labor-intensive industries that generate consumer products such as garments, footwear, toys, electronics and others.

3.2. THE CONCEPTS OF VALUE CHAIN ANALYSIS

There are many concepts in the value chain analysis. Two important concepts are described below:

3.2.1. THE PORTER FRAMEWORK

This research stream was given by Porter on competitive advantages. According to Porter (1998), "*Competitive advantage introduces the concept of value chain, a general framework for thinking strategically about the activities involved in any business and assessing their relative cost and role in differentiation"*. He also noted that the value chain provides an accurate way to recognize the source of buyer value that will command a premium price, and why one product or service substitutes for another.

Porter introduced the value chain as the basic tool to examine all the activities such as designing, producing, marketing, delivering and supporting a firm performs and how they interact is

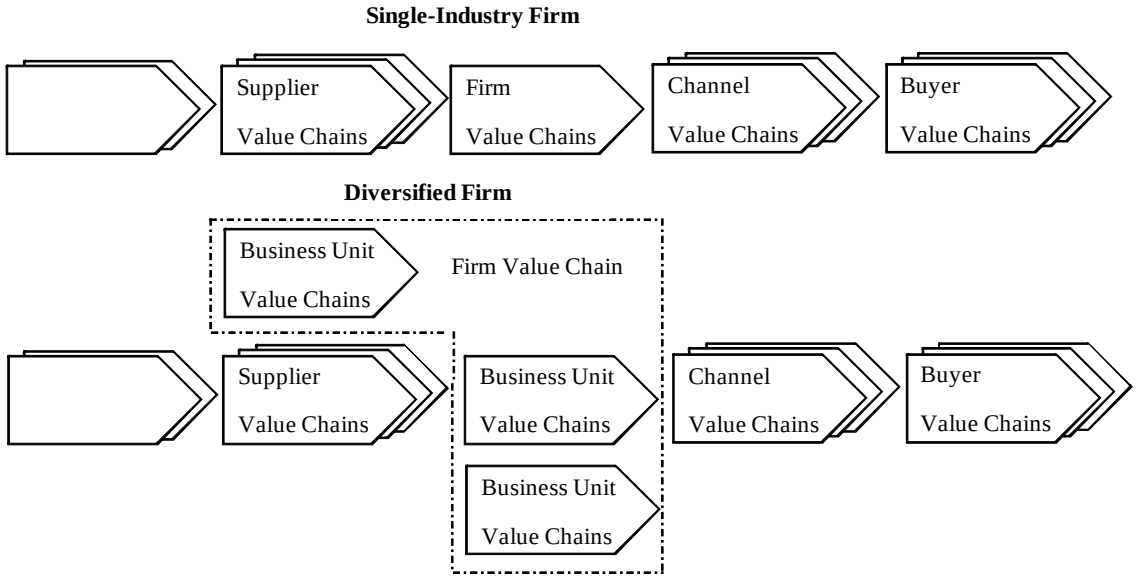

Figure 7. The Value model according to Porter (1998:35)

important for analyzing the source of competitive advantage in a systematic way. He also terms the firm's value chain as the value system that is embedded in a large stream of activities shoed in figure 5. Suppliers have value chains that can be said as *upstream value*, create and deliver purchased inputs used in a firm's chain. They not only allocate a product or service but also can manipulate firm's performance in many other ways. Moreover, many goods pass through the value chains of channels on their way to the buyers.

The value chains of firms in an industry make differences with competitors and reflect their

histories, strategies, and success at implementation. One of the major differences is that a firm's value chain may differ in competitive scope from it's competitors, representing a potential source

of competitive advantage.

Every firm's value chain is constitute of nine generic categories of activities which are connected together in distinctiveness way. The generic value chain is used to express how a value chain can be constructed for a particular firm, reflecting the specific performance it performs. A firm is a combination of activities that are performed to design, produce, market, deliver and support it's product. All these activities can be represented using a value chain shown in figure 6. Porter shows that value activities and accounting activities are rarely the same. The value chain Presents total value and includes value activities and margin. Margin is the difference between total value and the total costs of performing the value activities.

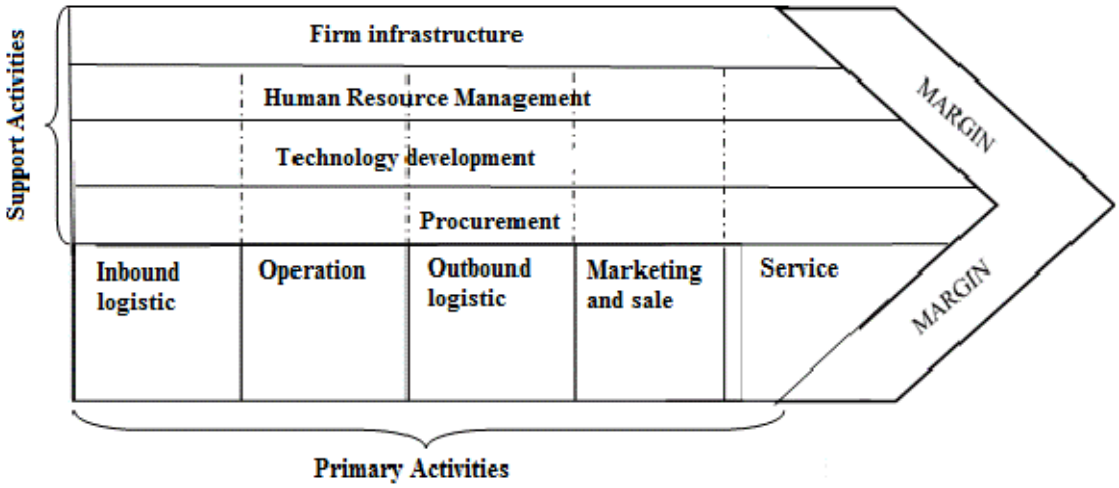

Figure 8. The generic Value Chain according to Porter (1998:37)

Porter mentioned that there are five generic categories of primary activities involved in competing in any industry that shown in figure 6. Each category can be divided into a number of distinct activities depending on the particular industry and firm strategy. They are inbound logistic, operations, outbound logistics, marketing and sales, and service. Each of the categories is important to competitive advantage depending on the industry.

In Porter's framework, support value activities involved in competing in any industry can be divided into four generic categories, also shown in figure 6. As with primary activities, each category of support activities can be divided into a number of distinct value activities that are specific to a given industries. Support activities which support the primary activities and each other by providing purchased inputs, technology, and various firm wide functions; and have an indirect effect on the final value of the product. Supporting activities comprise of firm infrastructures, human resources development, technology development and procurement.

This analysis supports management decisions and executive strategies. Additionally, it identifies a number of primary and support activities that are common to a range of businesses. The value

chain activities pass through a firm can create value so that is a useful to simplify analysis. But in strategic decision, the concept of value model is mostly a tool for assisting firm executives.

3.2.2 MAPPING THE VALUE CHAIN

Mapping a value chain eases a clear understanding of the series of activities and the main actors and relationships involved in the value chain. It provides tools and examples on how to capture the different dimensions of a value chain. So, VCA begins with the process of mapping the value chain. Mapping a chain means constituting a visual illustration of the connections between the industries in value chains as well as other market players (UNILO, 2009). *"A picture is worth a thousand words"* (mp4, 2008). So, models, figures, diagram and tables are used to understand a value chain. A value is a means of making what is seen and encountered more easily to understood (mp4, 2008). Constructing a value chain map is not a quick work. There are many potential dimensions of a value chain which could be included in the mapping exercise.

The following dimensions are essential and therefore should be mapped to provide an overview of the studied value chain

First, the core process in the value chain might be identified**.** In other words, what are the main activities carried out of raw material in the value chain to manufacture the final product? However, it is important to limit the main activities between the start of the production process and sale to the final customer. Otherwise, it will too difficult and therefore too much time and resource are consumed.

Second, step is to identifying and mapping the key operators involved in these activities and their roles. It is important to differentiate to categorize the actors according to their occupation. One more thing is if the value chain geographically spread out over locations, it would be useful to assign locations to processes. In the shrimp industry in Cox'sbazar district, processors perform the processing of shrimp, while farmers are involved in production. This type of categorization is simple but does not provide much information. Shrimp farmers can be classified into large, medium and small-scale farmers. The classification can also be grouped into intensive, semi-intensive, extensive.

Third, After completing step 1 and 2, the actors and specific activities in the value chain have been mapped out. Then the next step is to map the flows of the products through the value chain.

In this step, the products are identified in every stage of the process, since they are transformed from inputs to raw materials, to intermediate products, and to final products. This step creates a clear picture of the flow of products from raw materials to final product, which is ready for sale to the final customers. The amount of the product, when identified, can give a view of the sizes of different channels within the value chain.

Fourth, mapping the value at different levels of the value chain by measuring cost and margin will provide an overview of the earnings at the different stages.

Fifth, the value chain map includes the initial identification of difficulties faced by different actors in the value chain while they are performing their functions. During the value chain analysis, other difficulties could be indentified and added. It is needed to keep in mind that difficulties are listed. The causes of these difficulties and their solutions are kept for further analysis.

4. METHODOLOGY

This section presents the methodology of my VCA approach in Cox'sbazar district. It includes, analyzing costs and margins, and analyzing employment distribution.

4.1. ANALYZING COSTS AND EARNINGS

After mapping the value chain, certain aspects of the value chain could be put into analysis for better insights. Analyzing of costs and earnings is one of them. This analysis provides an idea on costs incurred by different actors as well as revenues and profits.

Costs are classified into variable and fixed costs. Variable costs are relevant to economic decision-making in the short run. Variable costs vary in proportion with level of output. On the other hand, fixed costs are costs that are independent on the level of output. All costs cannot be easily categorized into variable costs and fixed costs. So, assumptions in some cases are therefore essential. Once the classification is completed, costs per unit can be calculated and presented for each stage of the value chain. In this analysis, allocation of costs factor are showed. Furthermore, the analysis also shows the fluctuations in cost components as well as the total costs. In addition, this analysis explains the fluctuations in revenues over years as well as core causes. And this analysis reveals the income of different actors from their business by comparing the revenues and costs.

4.2. DISTRIBUTIONS OF REVENUES, COSTS AND PROFITS

The revenue is made up of marketing margins belonging to different actors in the value chain. *Marketing margin is the difference between selling price paid by the next stage and purchasing price paid to the previous stage* (Chuong 2011). Marketing margin must cover all costs that required transferring the particular product from one stage to the next stage and a reasonable return to perform the job (Shepherd, 2007).

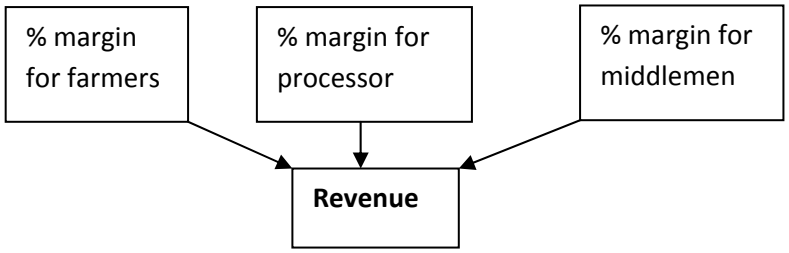

Figure 9: The distribution of revenue

Total cost of the final product sold to the final consumer is formed of added costs incurred by different actors in the chain that showed in figure 8. Added costs computed by extracting from the total cost the purchasing price paid from the previous level in the value chain. Added costs reflect efforts of different chain actors in adding values to the final product.

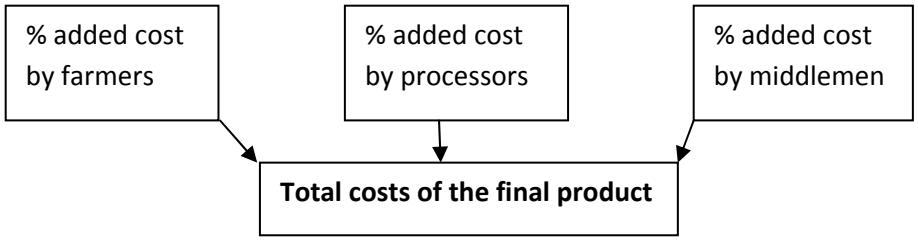

Figure 10: The distribution of cost

Then, profit from selling the final product to the final customer includes of profits ensuing to different chain actors that shown in figure 9.

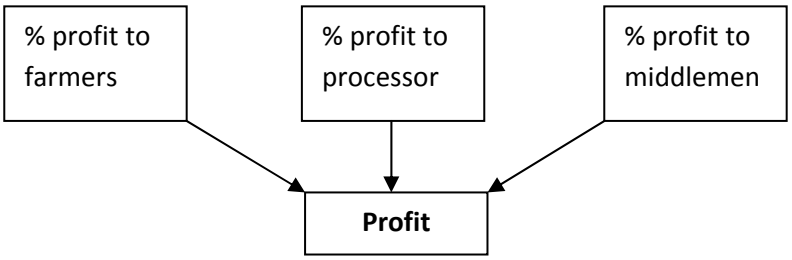

Figure 11: The distribution of profit

The distributions of revenue, profit and added cost are shown in the bellow graph as an example.

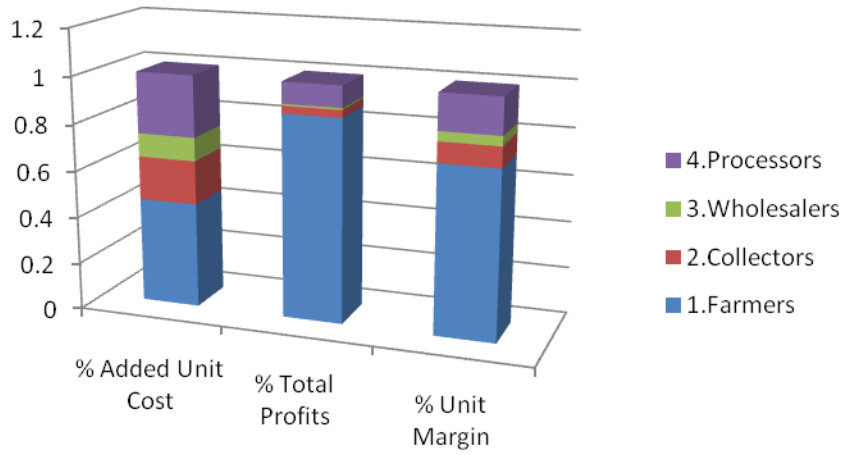

Figure 12. The distribution of revenue, profit, and added costs
(*Source:* M4P 2008, cited from National Economic and Social Development Board of Thailand (2004): Training course on integrating value chain analysis and methodologies into policy analysis)

4.3. DATA COLLECTION

Secondary data were collected from other scientific papers. Primary data were also collected through interviews from shrimp farmers, middlemen and processor for three years 2011, 2010 and 2009. Twenty six farmers, sixteen wholesalers and three commission agents and three processing companies were surveyed.

4.3.1 DATA COLLECTED FROM SHRIMP FARMERS

Table 2: Information from revealed by farmers (From 26 surveys)

Items	Descriptions	Number	Percentage
Scale (26 surveys)	Small (1-50 ha)	12	46%
	Medium(51-100 ha)	8	31%
	Large (> 100 ha)	6	23%
Shrimp buyers	Middlemen	23	89%
	Processor	3	11%
Seed suppliers	Open access	12	46%
	Hatchery	14	54%
Contract types	Legal contract	0	0%
	Verbal contract	26	100%
Difficulties	Lack of virus-free seeds	19	73%
	Uncontrolled due to large area	12	46%
	Lack of water treatment	15	58%
	Preservation problems	26	100%
	Electricity fall	20	77%
	Lack of bio-security	13	50%
	Lack of capital	17	65%
Facilities	Loan from bank	5	19%
	Training for culturing	1	4%
	Market information	10	38%
Dependence to middlemen	Easy to sell	26	100%
	Easy transaction	23	88%
	No need to process	20	77%
	Payment security	25	96%

Source: Surveys from farmers

The total shrimp culture is categorized into small, medium and large scale. Out of twenty six surveyed farmers, twelve are under small scale, eight are under medium scale and six are under

large scale. For collecting seeds, farmers can buy either from local market or hatchery. Here, local market is the source that collected the seeds from the Bay of Bengal which is open access. The survey shows that almost all the farmers run their business with verbal agreement and do not comply with regulations. Bio-security cannot be maintained, so the cattle can easily enter into the firm and they spread virus. As a result diseases are broken out. Farmers sell their harvested shrimps to middlemen and processor. While surveying it is noticed that farmers are very anxious about the disease and they do not have any about feed. Flour, cow dung are used as feeds and virus are spread from that. Training from Government Organization (GO) or Non-government Organization (NGO) to the farmers is scarcely found while surveying. It is interesting that majority of the farmers can know the market information after carrying their products to local market. Immediate payment, reliance and easy communication also serve as catalysts for the dependence of farmers on middlemen.

4.3.2 DATA COLLECTED FROM WHOLESALER

Table 3: Information revealed by wholesalers (From 16 surveys)

Items	Descriptions	Number	Percentage
Shrimp buyers	Commission agent	16	100%
	Processor	0	0%
Difficulties	Lack of capital	12	75%
	Highly competitive market	10	63%
	Lack of knowledge of grading technique	11	69%
	Electricity fluctuation	13	81%
	Lack of knowledge of Ice using	10	63%
Facilities	Cash payment by agents	14	88%
	Government loan	2	13%
	Quick payment	15	94%

From surveying the wholesalers, it is found that they cannot sell the products directly to the processing company. They have to sell to the commission agent. While surveying, the interviewee told that if they cannot fulfill their target, they have to incur loss. Insufficient supply of ice is another great problem and for that shrimp are wasted. If shrimp are kept in cool-storage, the color of shrimp is changed and so the wholesalers have to incur loss. Miscreants are another problem which has to be faced by wholesalers.

4.3.3. DATA COLLECTED FROM COMMISION AGENT (From 2 surveys)

Table 4: Information revealed by commission agents

Questions	**Agent 1**	**Agent 2**
From how many wholesalers do you control?	25	22
What kind of problem do you face?	Lack Transportation	Transportation cost is high
	Payment is not in time	Unable to fulfill the target
	Factory doesn't send transportation	Factory doesn't send transportation
How much do you earn?	6 taka per kg	6 taka per kg

From surveying the Commission Agent, it is observed that the processing industries buy shrimp only from the Commission Agent. The wholesaler or farmers can hardly sell their products to the processing company. While surveying them, another important thing is that the transportation cost is the main problem in their business. In pick seasons, the processing companies facilitate those providing vehicles for carrying the products but in off seasons they do not. Payment irregularity is another problem of them. As the Agents are not paid in time, so the agents cannot pay the wholesaler in time also.

4.3.4 DATA COLLECTED FROM PROCESSOR

Table 5: Information revealed by processor

Questions	**Processor 1**	**Processor 2**	**Processor 3**
Who are your suppliers	100% from Commission Agent	100% from Commission Agent	100% from Commission Agent
Why do you buy more shrimp from commission agent than from farmers and wholesaler?	Without buying from them, business is quite impossible.	Without buying from them, business is quite impossible.	It is easy to make communication.
To whom do you sell your products?	Importers	Importers	Importers
What are the steps of processing?	Buying the shrimp	Do	Do
	Grading		
	Devein		
	Freeze		
	Preservation		
	Package		
Do You have any difficulties in your business?	Shortage of raw materials	Shortage of raw materials	Shortage of raw materials
	Cheating by closing the hole of shrimp	Lack of capital	High competition of buying shrimp
	High competition of buying shrimp	High competition of buying shrimp	Lack of capital
What kinds of regulations that	FIQC	FIQC	FIQC

The survey showed that 100% shrimp for processing industries is bought from commission agents. The officials of the surveyed firms said that without buying from agent that was very difficult to buy shrimp from farmers or wholesalers. Raw shrimp are exported only to the foreign countries but a little is sold to the local markets (approximately1%). According to the officials of Ark Sea Food, there are about thirty shrimp export firms in Bangladesh but raw products are only for fifteen firms. So there is a high competition for raw materials. Processing companies are compelled to manage the commission agent by giving various facilities for getting raw products. Another problem is that when the shrimp are processed in middlemen level, four holes are done so that the water from ice can come out. But the middlemen close those holes while processing in their stages. As a result, Ice are melt and for travelling for 8/10 hours the shrimp losses their qualities and there is shortage of two kg out of hundred kg. The processing companies follow FIQC (Fish Inspection and Quality Control) that is issued by Bangladesh government.

4.4. DATA ANALYSIS

The methods of data analysis are simple statistical indicators such percentage and average were used to explain cultured area of farming models. Microsoft Excel was used for data analysis.

5. RESULT AND DISCUSSION

5.1 The value chain of Black tiger shrimp in Cox'sbazar Distrct, Bangladesh

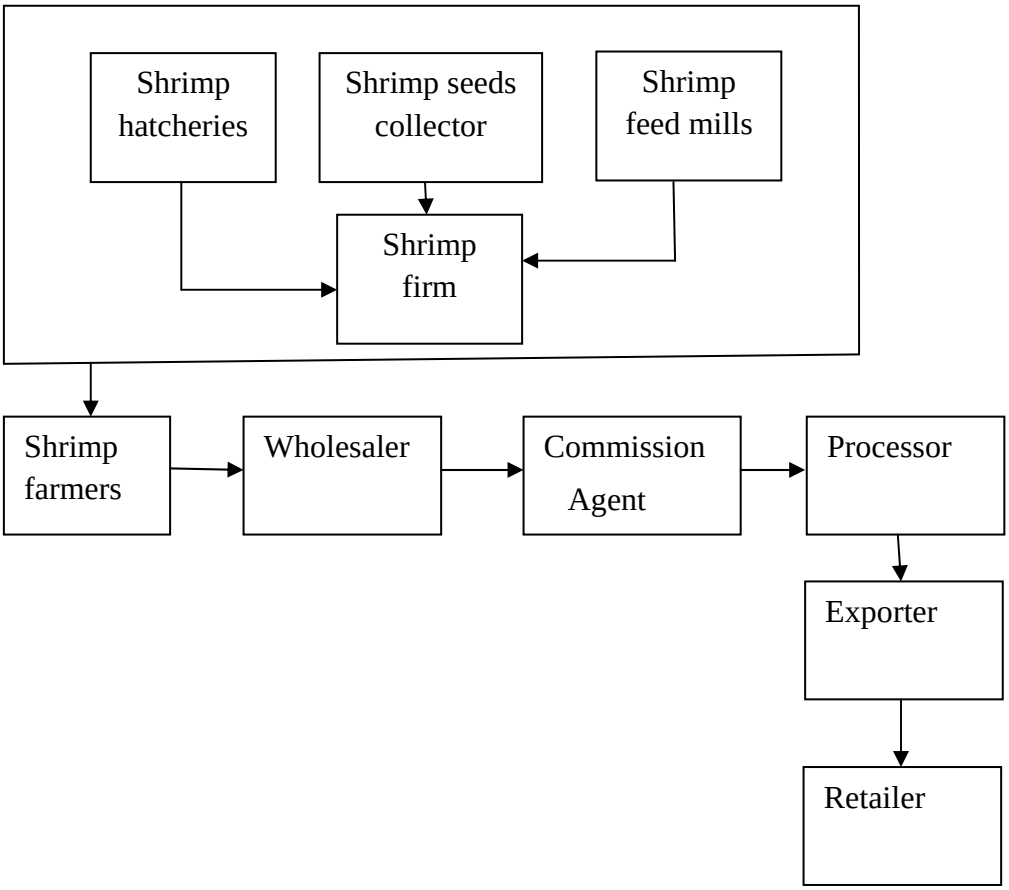

Figure 13: The value chain of Cox'sbazar district

From figure it can be seen that starting from hatcheries to processing companies many actors were identified in the Black tiger value chain in cox'sbazar district. These actors are mainly farmers, wholesalers, commission agent and processors that are engaged to produce the products to the final consumers. All the actors have formed a chain and perform as elements of the shrimp value chain.

Through the survey, the relationships of the contributors related to the shrimp value chain have been identified. The Black tiger value chain in Cox'bazar, Bangladesh has been depicted in figure 11. These are the major actors that dominate the value chain from raw input up to the final

consumption. The first channel was vertically integrated international chain, involving all steps from farmers to processors and foreign markets. The trade, in recent years expands to well establish markets such as Europe and Russia.

Figure 14: Dam and sluice gate of extensive shrimp farming

(Source: Own photo)

From the figure 11, it can be explained that farmers culture the shrimp in the gher and from shrimp hatcheries and shrimp collector they get seeds and from feed mills they get feeds. After harvesting shrimp, farmers largely depend on wholesalers to sell their products. The wholesalers buy the raw products from farmers and use ice to sell to Commission agents. Commission agents buy the shrimp and sell to processors. Then the raw materials are processed and made ready for export.

5.2 THE VALUE CHAIN OF BLACK TIGER SHRIMP

5.2.1 Farming stage

Farmers have to follow some procedure to cultivate and expand the shrimp culturing business which is described below:

Selecting suitable farm: To cultivate shrimp, firstly a suitable place has to be chosen. This business is largely depended on selecting place. If the environment of the farm is kept correctly, the possibility of disease is declined. The farming should have some necessary criteria such as pollution-free environment, flood-free area, infrastructure facilities etc.

Pond drying: Drying is another important procedure for shrimp cultivation to control and killing the wild species and increase the fertility of land.

Collecting seeds: It is another important procedure for shrimp culture. It can be collected from hatchery and other seed collectors.

Shrimp harvest: Before harvesting water is drained off and left just enough water for shrimp to survive. After four months of seed or if one shrimp is weight 25 gram, then shrimp can be harvested. Generally from July/August shrimp is collected in Cox'bazar district.

Taking care after collection: As transportation in Bangladesh is not well established, sufficient take care is necessary after collection of shrimp. After catching the shrimp, farmers wash them with ice-mixed water so that mud, soil and waste are removed. Then it is packed and sold them to the wholesalers.

5.2.2 Procurement stage:

When shrimp is ready to sell by the farmers, wholesalers check the size of the shrimp. If the size is below the standard level, shrimp is not sold or farmers get lower price. Wholesaler and the commission agent are responsible for preserving and transporting where farmers are responsible for harvesting.

Killing the shrimp: After receiving from farmers, shrimp is kept into container with ice and water. When soaked in water, it is more weighted. In this some wholesalers are accustomed to cheat by adding certain substance to increase weight.

Figure 15: Shrimp is in procurement stage

(Source: Own photo)

Preservation: Shrimp are preserved with ice. The proportion of shrimp to ice depends on the distance of processing industries with preserving area. If the distance is more, proportion of ice should be more.

Transportation: Filling the containers with shrimp and ice, it is sealed very cautiously. Then they are loaded into vehicles to processing plans as soon as possible. It is very difficult to reach in time because in Bangladesh the traffic jam is in terrible position and there a lot of miscreants on the road and they demand illegal money. If, for any reasons, the loaded shrimp cannot be sent in time into the processing plant, the quality of the shrimp could decline and therefore may be rejected by processors.

It is also mentionable that the wholesalers are responsible for all the activities such preservation, killing etc. The commission agents are responsible for sending the products to processors. The problems faced by the commission agents and wholesalers are lack of knowledge on preservation technique. Actually the technology applied to preserve the raw shrimp products is their own experience. If the commission agents are unable to fulfill the assurance of safety and sanitation, the order of shrimp would be rejected.

5.2.3 Processing stage

Processing companies are responsible for exporting the frozen shrimp. Processors have to do critical job to process the raw shrimp and they have to pass several stages to make ready them.

Buying raw shrimp: In processing company, the first step is to buy the shrimp from commission agent. In this stage the respective employee have to bargain with the commission. Some agents say that another company agrees to pay them the certain amount and so they demand more than them. In this stage the employee have to face difficulties.

Grading: Shrimp have to be evaluated by the employee of processing companies after buying. Grading means how many shrimp are needed per kg.

Semi-processing: At first shrimp are washed in the semi-processing stage. Then shrimp are transferred to tanks that are kept in the processing line. This stage generally include head off, devein and removing tail.

Processing: After semi-processing stage, shrimp are separated based on their quality and grading. Then it goes to transform from processing stage into the processed products. Processors frequently adopt two-floor warehousing facilities in the factory. The first layer preserves semi or un-processed shrimp in 5-10 kg packs, to be processed at -5° in a chiller room. The second layer in cold storage keeps fully processed shrimp that will be shipped to buyers after verification. The second layer is kept at a temperature of between –12° to –20° c.

Freezing: There are two types of freezing, technically termed block and IFQ (Individual Quick Frozen). In block freezing certain number of shrimp is frozen into a block. On the other hand, in IFQ technique, shrimp is frozen individually.

Package and preservation: When freezing is completed shrimp are packaged and kept in -20°c for preservation. Processors use locally manufactured cartons, plastic packets, and trays with customized labels. The packaging style varies according to requirements of the buyer and according to the price negotiated by the buyer. Shrimp earning higher prices usually command exclusive packaging; shrimp earning lower prices are frequently packed in single plastic packs or blocks and repackaged later by the importer or retailer. Usually buyers of block and unbranded products prefer simple packaging since disposal is expensive in developed countries. This

preference for lower quality packaging for unbranded products, however, can conflict with compliance standards.

Ice is used in several stages of packaging and storing. Prices for ice vary but usually hover at around 70 BDT per 100 kg; at times of scarcity the price can rise to as much as 700 BDT. As a result, some processors began producing ice in their own factories to meet their needs; in some cases they sell any excess ice produced.

On the day of export, frozen shrimp are tested for quality assurance by FIQC (Fish Inspection and Quality Control). Necessary documents are prepared for shipment. Frozen shrimp are transported by vehicles by ensuring the temperature -20°c.

In Bangladesh the main challenges of processing companies is food safety and sanitation standards imposed by importing countries. Men and women work in the processing plants, but their work is highly segmented and differentiated. Typically women are engaged in cleaning and de-heading the shrimp, while the men work more closely with machinery, block freezing, and Individually Quick Frozen (IQF) processes. There are also reports of children working in the processing plants.

5.3 ANALYZING OF COSTS AND EARNINGS

5.3.1 Farming stage

Table 6: Costs per unit of raw Black tiger shrimp at farming stage.

Cost components	**2009**		**2010**		**2011**	
Land rental	90	20%	100	21%	95	20%
Seed	135	30%	135	29%	140	29%
Labor cost	170	38%	175	37%	180	38%
Depreciation	25	5%	26	5%	25	5%
Fuel	15	3%	20	4%	20	4%
Other	19	4%	17	4%	20	4%
Cost per kg (Taka)	**445**	**100%**	**473**	**100%**	**480**	**100%**
Equivalent to US$	**6.36**		**6.39**		**6.40**	

Source: Average numbers from surveys from farmers

Table 2 shows all costs components incurred by farmers during the cultivation of Black tiger shrimp. Here, the fixed costs are labor wage, depreciation, land rent and others costs. On the other hand, the variable costs are seed costs, electricity costs and fuel costs. Expenses on inputs increased a little over three years shown in figure 14. In 2011 and 2010, there is a little difference in costs input because from interviewee it was known that in 2010 shrimp production was lower because of disease and natural calamity. So, the land rent was less than that of 2010. It is because, as the farmers earned smaller profit in 2010 they were discourage to lease the land. It is mentionable that the labor costs, seed costs and land rent are major components where seed costs are the largest. It is surprisingly notable that no feed user was not found while interviewing. Labor costs increased gradually although another costs did not. Fuel costs decreased a little because some farming areas were newly generalized with electricity and so fuel expensed reduced.

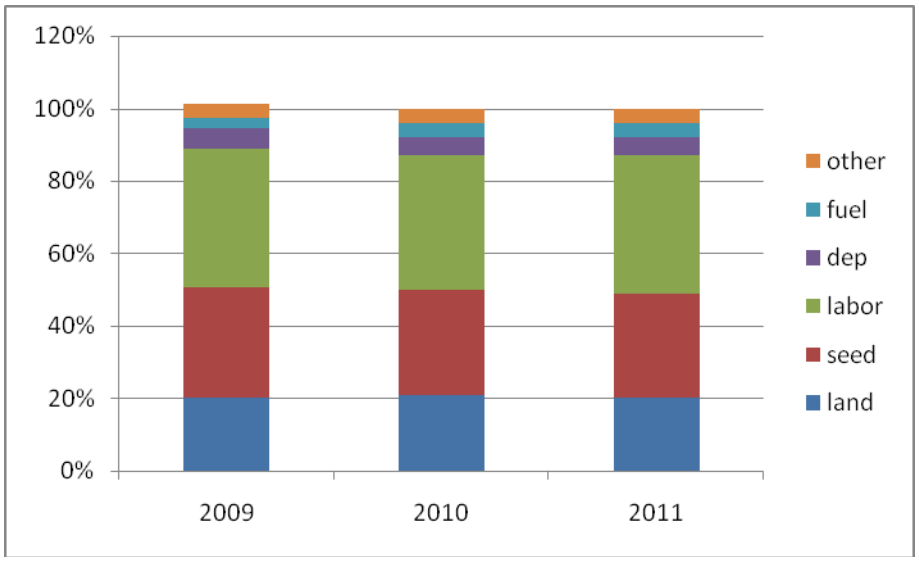

Figure 16: Share of cost components (farming stage)

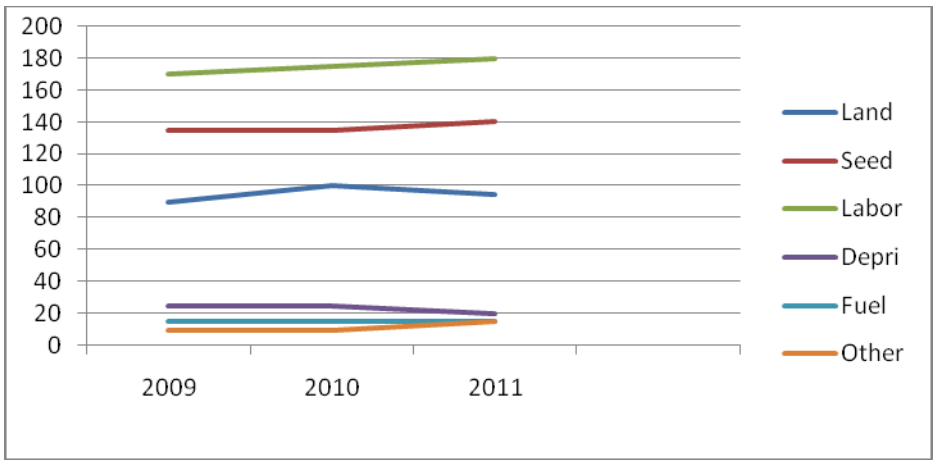

Figure 17: Changes in input expenses in farming stage

From table 3 it is observed that cost of per kg raw Black tiger shrimp were less than revenue per kg and that means profit was earned by shrimp farmers over the year 2009, 2010 and 2010. Here, in 2010 revenues and costs are almost same and the profits earned by farmers are not remarkable. From the interviewee, that was occurred due to shrimp disease and natural calamity the production was hampered. Many farmers incurred loss in 2010 and some farmers have got profit and in average, profit was earned by farmers. Another point is that some farmers lease the land 3 years and many of them incurred loss in 2010. But in average of three years, they could sustain their business.

Table 7: Revenue, Cost, and Profit per kg shrinp at farming stage.

Items	**2009**	**2010**	**2011**
Revenue	Tk.458(US$6.54)	475(US$ 6.60)	497(US$ 6.63)
Cost	Tk.445(US$ 6.36)	473(US$ 6.56)	480(US$ 6.40)
Profit	Tk.13(US$ 0.19)	Tk.2(US$ 0.03)	Tk.17(US$ 0.23)

Figure 15 shows the fluctuation of profit per kg Black tiger shrimp. Cost components in 2010 increased but the farmers did not get the price as the proportionally. It is due to economic recession worldwide and decreasing export remarkably.

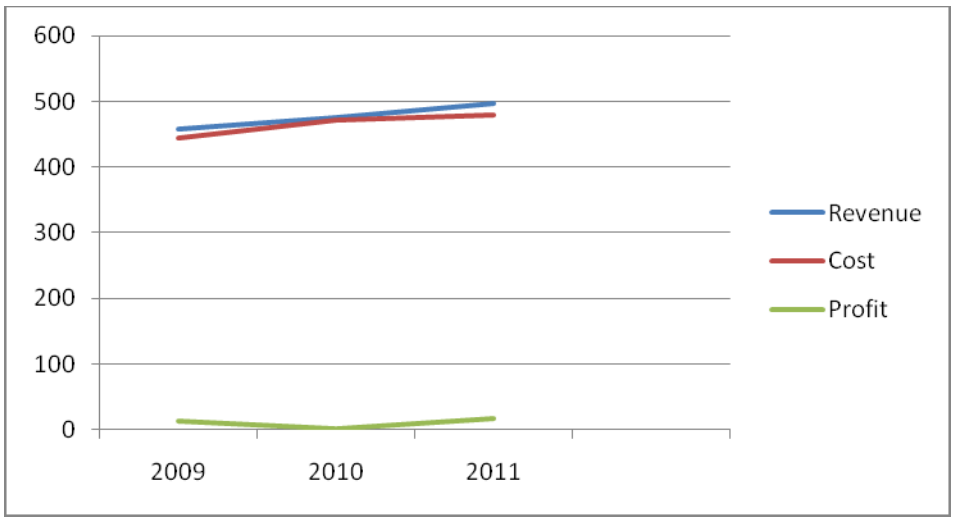

Figure 18: Changes of profit per kg in farming stage

It is seen from table 4 and figures 16 that in 2009 and 2011 black tiger shrimp farmers were profitable but in 2010 they were loser. From survey, it is observed that in 2010 the farmers did get the proper price against the costs and they had to incur loss. The main reasons for being loser are the disease and rough weather. According to some farmers there were syndicate (cartel) in the shrimp market and they were the price taker. So they were compelled to sell their raw shrimp to the wholesaler according to their price.

Table 8: Revenue, cost and profit per ha

Items	2009	2010	2011
Total revenue per ha	Tk55,000 (US$785)	Tk52,000 (US$722)	Tk39000 (US$520)
Total cost per ha	Tk50,000 (US$714)	Tk53,000 (US$736)	Tk35,000 (US$467)
Total profit per ha	Tk5,000 (US$71)	Tk-1,000 (US$14)	Tk4,000 (US$53)

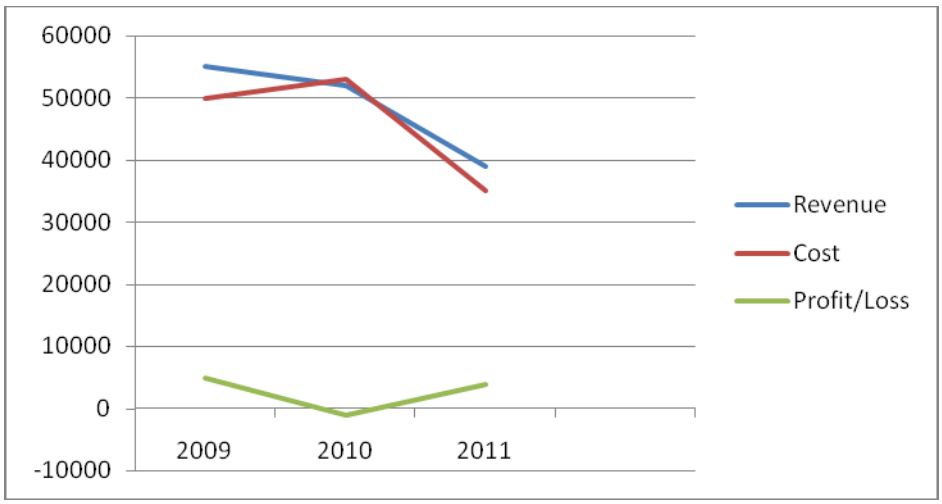

Figure 19: Fluctuation of Revenue, cost and profit per ha

5.3.2 PROCUREMENT STAGE

Table 9: Added costs at the procurement stage

Unit: Taka

Added costs	**2009**		**2010**		**2011**	
Transport	3.75	14%	4.25	15%	4.75	14%
Grading	7.75	30%	8.00	28%	8.75	27%
Ice	8.00	31%	9.00	31%	10.00	30%
Labor	4.50	17%	5.50	19%	7.00	21%
Other	2.00	8%	2.00	7%	2.50	8%
Total per kg	**26**	**100%**	**28.75**	**100%**	**33**	**100%**
Equivalent to US$	**0.43**		**0.40**		**0.44**	

Source: average numbers from survey from wholesaler

After finishing the farming stage, the raw shrimp was ready to sell to the next stage. The wholesaler, then purchase the products with adding some costs to transfer it to the further stage. In this stage variable costs comprise of the costs on transport, labor and ice and remaining are

fixed costs. The component '*Grading*' means how many Black tiger shrimp comprise per kg and the grading comprises 15, 20, 30, 40, and 50 shrimp per kg.

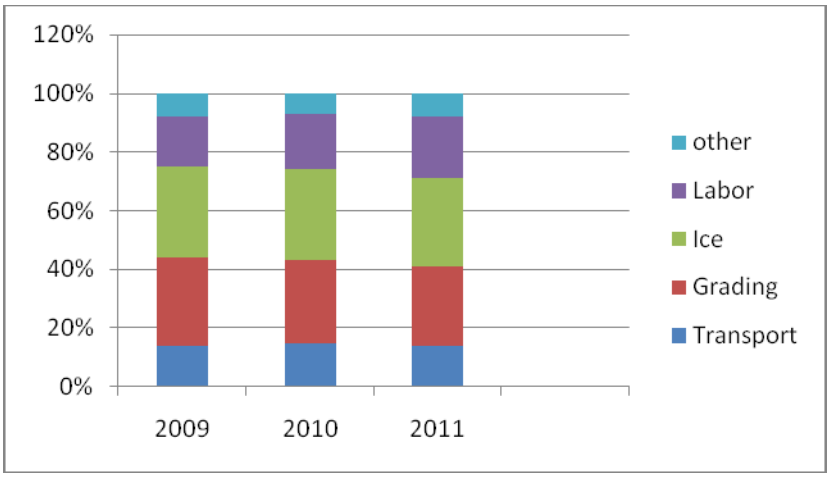

Figure 20: Share of added cost components of wholesalers

Added costs at the procurement stage are around 33 taka in 2009 to 2011 in which ice cost accounted for the largest share that are shown in table 5 and figure 17. However the grading cost is almost near about the ice cost. Ice cost is largely depended on electricity and electricity problem is the major problem in Bangladesh. So ice cost is the top most expense for the wholesaler.

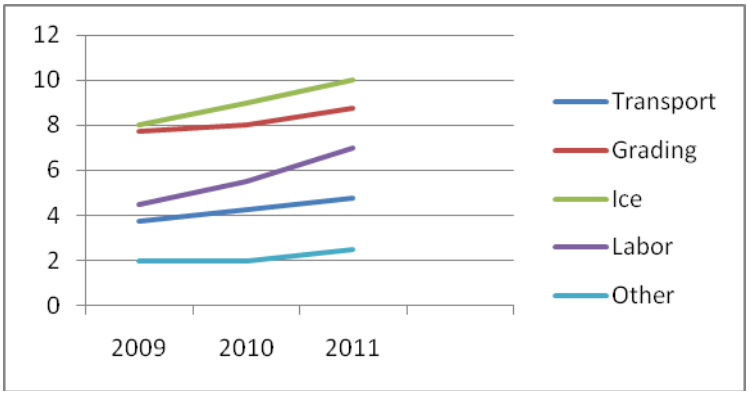

Figure 21: Increase in added cost component of wholesaler

From figure 18, it is shown that almost all the cost components exhibited an upward trend. Among them transport cost increased significantly and it largely depend macro-economic policy taken by the government and it is mainly for increased fuel price.

Table 10: Total cost of per kg shrimp of wholesaler

Unit: Taka

Items	2009	2010	2011
Purchasing price	458	475	497
Added costs	26	28.75	33
Total cost per kg	484	503.75	530
Equivalent to US$	6.91	6.99	7.07

In table 6, it can be found that total cost per kg shrimp of wholesaler consists of purchasing price and added cost. The wholesalers pay the added costs and sell to commission agent so that shrimp can be reached to processing plants.

Table 11: Selling price, Total cost and profit per kg of wholesaler

Unit: Taka

Items	2009	2010	2011
Selling price	520	515	560
Total cost per kg	484	503.75	530
Total profit	36	11.25	30
Equivalent to US$	0.51	0.16	0.40

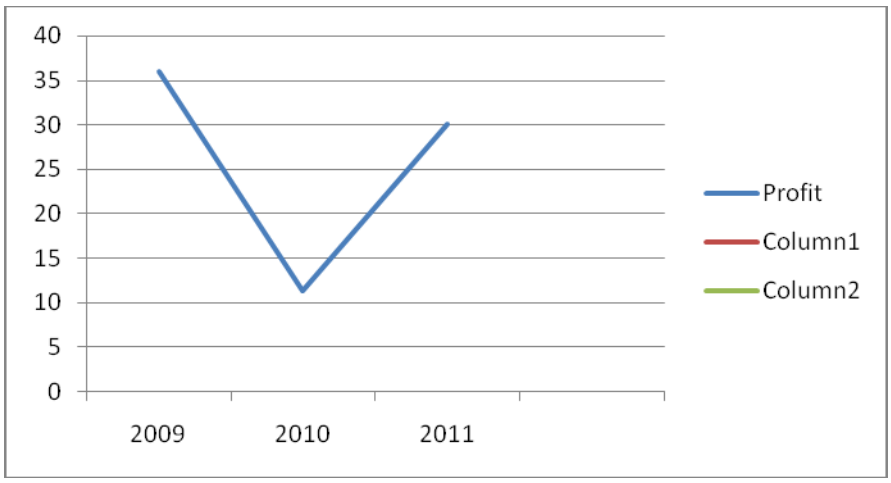

Figure 22: Changes of profit per kg in three years

Table 7 demonstrates the selling price, cost and profit per kg of Black tiger shrimp wholesaler. It is noticed that in 2009 and 2010 the wholesalers had normal profit but in 2010, there was a little profit. While interviewing the wholesaler, it was known to me that the reason for less profit is the next stage of wholesaler made cartel and the wholesalers were compelled to sell their product in less price. In 2010, many wholesalers had to incur loss because of being cartel made by the commission agent. According to my perception it is possible because of not implementing rules and regulation and corruption has free access in this country. So in 2009 and 2011the costs of wholesaler are in normal rhythm but in 2010 it fell down that is shown in figure 19.

Table 12: Selling price of commission agent

Items	**2009**	**2010**	**2011**
Purchasing price	520	515	560
Costs	2	2	2
Commission	4	4	4
Selling price	526	521	566

Then the next step is commission agent who have little role to make change the chain. They only take commission from processor. I interviewed only three commission agent and their voice is

almost same. They just receive six taka from the processing company have only 2 taka expenses per kg Black tiger shrimp. Although this job seems to be very easy but in practical it is not. They have to create reliability to the processors and it needs time. Another surprising character has to be had to the commission agents that they have to have power that can link with law and enforcement agency so that the products can smoothly be sent to processing plan which about 100 to 150 km from the cox'bazar district. If they do not have that quality it is quite impossible to run this business.

5.3.3. PROCESSING STAGE

Costs and earnings at the processing stage are presented in the same format like farming and procurement stage that shown in table 10. Costs are purchasing cost, fixed overhead, variable overhead and shipment costs. It is interestingly observed that the processors get 58 taka subsidy from government and for that their cost have been lessened remarkably. In three years the subsidized price is same in Bangladeshi currency, taka. As the Bangladeshi currency was devaluated in following two years the value in USD amount was changed.

Table 13: Cost, export price and profit at processing stage

Unit: Taka

Items		**2009**		**2010**		**2011**	
Purchasing price		526	85%	521	84%	566	84%
Fixed overhead	Material	10	2%	12	2%	12	2%
	Land rent	9	2%	10	2%	10	2%
	Labor cost	7	1%	8	1%	9	1%
	electricity	4	1%	5	1%	6	1%
Variable overhead	Administrative cost	25	4%	27	4%	30	4%
	Transport	15	2%	17	3%	18	3%
	Others	8	1%	6	1%	8	1%

Shipment	15	2%	15	2%	15	2%
Total costs	619	100%	621	100%	674	100%
(-)Government subsidy	58		58		58	
Equivalent to US$	0.83		0.81		0.77	
Grand total costs	561		563		613	
Profit	10		-7		15	
Equivalent to US$	0.14		0.10		0.20	
Export price	571		556		628	

Figure 20 exhibits the share of cost components per kg shrimp at processing stage. It is noticeably noticed that the lion share of costs is purchasing raw shrimp cost. Other components are almost same in three years

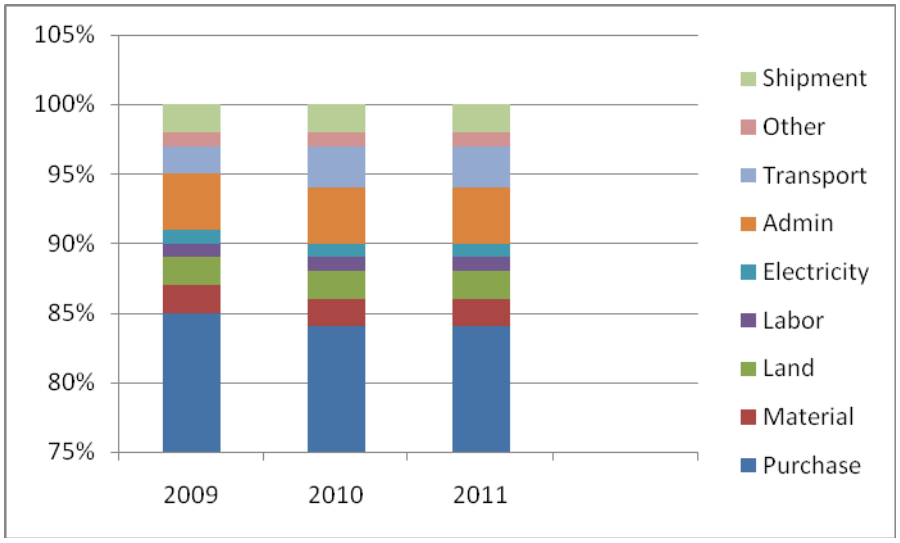

Figure 23: Share of cost components at processing stage

Export price, cost and profit at processing stage of 2009, 2010 and 2011 are showed in figure 21.

In 2009 and 2010 the processing companies enjoyed profit but in 2010 they incurred loss. According interviewee of processing companies, the only reason for incurring loss is economic recession worldwide. As economic recession was occurred worldwide, the foreign buyers imported the shrimp in least prices. The processor had to expense almost same like the expense

of 2009. In 2011the markets were developed noticeably after overcoming the economic recession and as a result the processing companies gained profit again.

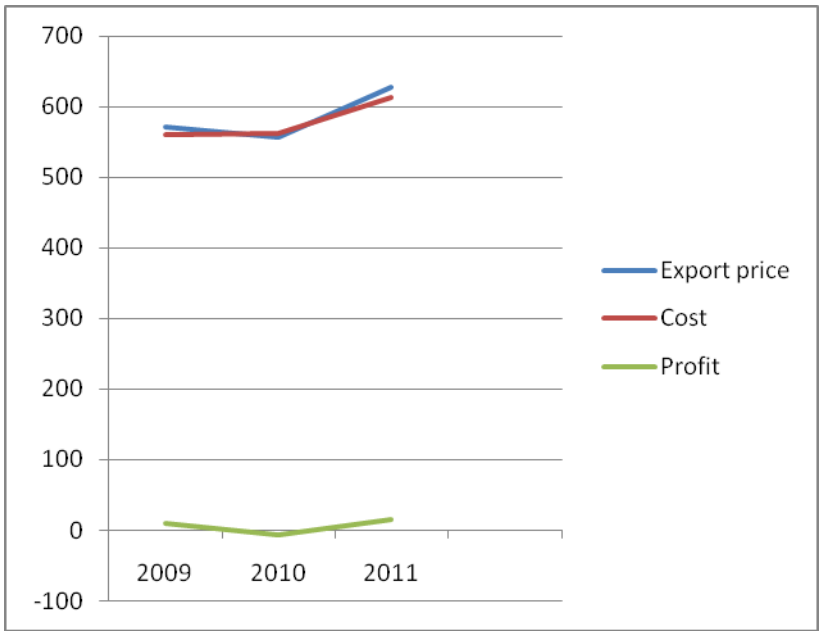

Figure 24: Change of Export price, cost and profit

5.3.4 DISTRIBUTION OF REVENUE, COST AND PROFIT

Analyses have been made in the previous chapter to provide a feature of the activities of farmers, wholesalers, commission agent and processors. Those analyses revealed that almost all the actors of this Black tiger value chain were rewarded with positive profit for their business across the three years. In this section analysis would be done to show how much award was got by every actor in the value chain.

Table 14: Profit, added cost and margin per kg shrimp.

Actors	Purchasing Price	Total cost	Selling Price	Profit		Added cost		Margin	
				Abs value	%	Abs value	%	Abs value	%
2009									
Farmer	-----	445	458	13	21%	445	87%	458	80%
Wholesaler	458	484	520	36	57%	26	5%	62	11%
C. agent	520	522	526	4	6%	2	1%	6	1%
Processor	526	561	571	10	16%	35	7%	45	8%
Total				**63**	**100%**	**508**	**100%**	**571**	**100%**
2010									
Farmer	-----	473	475	2	19%	473	86%	475	86%
Wholesaler	475	503.75	515	11.25	110%	28.75	5%	40	7%
C. agent	515	517	521	4	39%	2	1%	6	1%
Processor	521	563	556	**-7**	-68%	42	8%	35	6%
Total				**10.25**	**100%**	**545.75**	**100**	**556**	**100%**
2011									
Farmer	---	480	497	17	26%	480	85%	497	79%
Wholesaler	497	530	560	30	45%	33	6%	63	10%
C. agent	560	562	566	4	6%	2	1%	6	1%
Processor	566	613	628	15	23%	47	8%	62	10%
Total				**66**	**100%**	**562**	**100%**	**628**	

Source: Own calculation

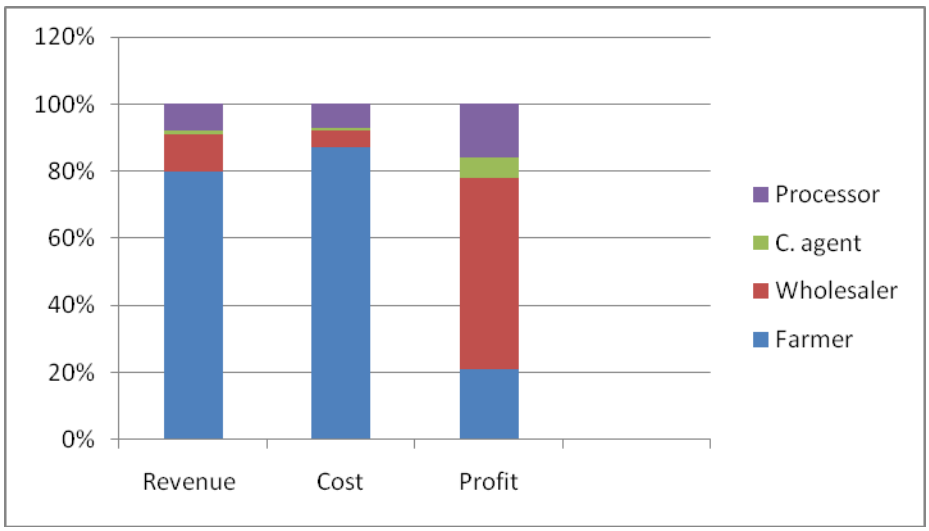

Figure 25: Share of profit, added cost and margin in 2009

In 2009, the farmers absorbed 80% of revenue, 87% of cost and 21% of profit from per kg shrimp produced and exported to foreign market. Although the farmers contributed the larger share to revenue and cost, they did not do so in profit. The wholesaler, on the other hand absorbed 57% of profit but their absorption of revenue and cost is only 11% and 5% respectively. The processor contributed 8% revenue, 7% cost and 16% profit from per kg shrimp.

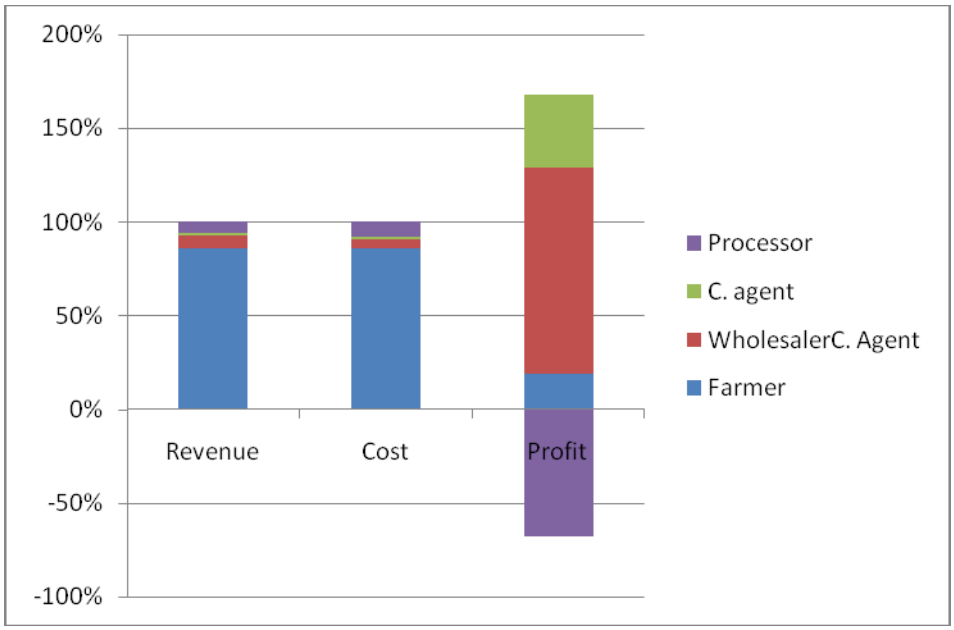

Figure 26: Share of profit, added cost and margin in 2010

In 2010, a sorrowful incident happened to the processors. They contributed to 6% in revenue and 8% in cost but they incurred 68% loss whether other actors enjoyed profit. It is due to decreased export price that mentioned earlier. Farmers overwhelmed the other 2 actors with the absorption of 86% in both revenue and cost as usual and so the wholesaler is the beneficiary.

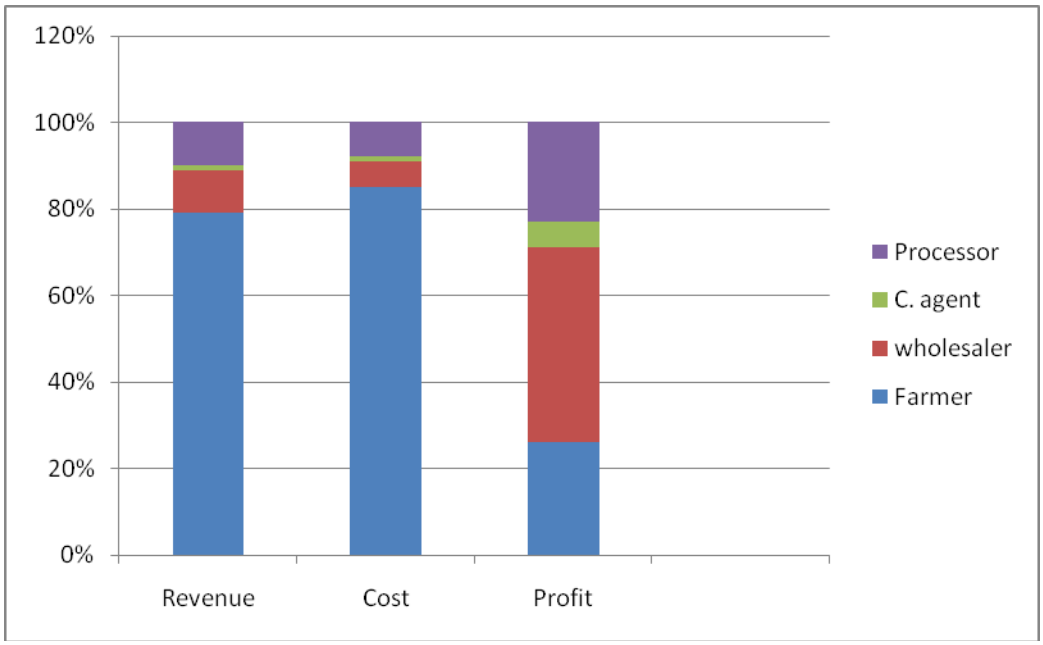

Figure 27: Share of profit, added cost and margin in 2011

The year of 2011 continued to observe almost same as the previous two years. Farmers suffered from a slight decrease in their share of revenue 86% to 79% and their share of cost is unchanged but the share of profit increased from 19% to 26%. The wholesaler's share of revenue is 10%, share of cost is 6% and profit share is 45%. So the wholesalers are always gainer comparatively with other actors. The shares of processors are 10% to revenue, 8% that are not largely different than the previous years but the profit share was dramatically changed from negative portion 23%. It was possible for overcoming economic recession and for having good price of shrimp from foreign markets.

To conclude the analyses of three years varied slightly. Farmers always retained the largest shares of revenue and cost against the smaller shares of profit. The commission agent has not changed remarkably as usual. The wholesalers are the most remarkable beneficiary that share of

profit was always large against the revenue and cost share. In other word, it can be said that all the actors were rewarded almost equally for their corresponding efforts.

6. CONCLUSION

6.1 CONCLUSION

The value chain analysis of Black tiger shrimp in Cox'sbazar district has four key actors which are directly engaged to produce shrimp and contributed to economical value. The actors are farmers, wholesalers, commission agents and processors. Though the added value of farmers is the highest, they are the weakest and most vulnerable actors. In addition, shrimp culture largely depends on whether condition and other actors in the value chain.

Cox'sbazar, one of the most suitable areas for culturing Black tiger shrimp has been chosen as research area. The research surveyed twenty six shrimp farmers, of which only fourteen farmers were interested to offer data on costs and earnings. Sixteen wholesalers were interviewed but only nine offered data on costs and earnings. Finally one out of three processors was willing to provide data on costs and earnings.

The value chain of Black tiger shrimp was divided into the stages of farming, procurement, processing, and export and retail sale. During farming, farmers incur several expenses like seed, labor and other costs. All the costs increased in three years. The farmer could sustain because of increasing price of shrimp as well as increasing their total revenue. In addition, the farmers lease the lands for 3 or 4 years and it was advantage to them for not increasing the value of land. The farmers achieve profit of 21% to 26% per kg shrimp. It is not sustainable because sometime markets are not stable and so they have to depend on other three actors in the chain. At the procurement stage, the wholesaler and commission agents need to use ice, transport, cool-storage and others. At the processing stage, fixed overhead, variable overhead and purchasing cost are needed. Like farmers, others three actors wholesaler, commission agent and processors also gained positive profit. This study also analyzes the distribution of revenue, cost and profit along the chain.

6.2 LIMITATION

This study has been emphasized only on four actors; farmer, wholesaler, commission agent and processor. Many more actors are also involved in this chain but those are not studied in this paper because of limited time and resources. The farmers sell some shrimp to local market and after exporting the shrimp to the foreign markets the product goes through many actors which could not be examined.

While interviewing, many interviewee did not want to provide actual data especially on cost and earning data. They thought that data would hamper their business or I was from government official who would impute more tax with their income.

The thesis zone is Cox'bazar district. Cox'bazar district is famous for Black tiger shrimp culture and so farmer, wholesaler and commission agent run business in that area but there are a little processing company whose corporate head office at Chittagong district, the close neighboring district of Cox'sbazar that is known as commercial capital of Bangladesh. So, data of processing companies have been collected from Chittagong district. It is mentionable that the shrimp produced from in Cox'sbazar district is processed in Chittagong district for exporting.

The research zone Cox'sbazar is not the actual shrimp zone of Bangladesh because the water salinity of this area is 25 to 32, where growth of shrimp is lower. On the other hand, Khulna and Bagerhat, the other districts of Bangladesh is the main shrimp zone of this country which water salinity is 10 to 15, where growth of shrimp is better. Though, in previous study, intensive, semi-intensive and extensive category of shrimp culture was found, in Cox'sbazar district only extensive method has been found.

Finally, for sustainable development of Black tiger shrimp in this district, more research should be studied. For culturing through intensive and semi intensive method, further research should be done in future.

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APPENDIX

Questionnaire for shrimp farmers in Cox'sbazar District, Bangladesh

1. How many hectares are you farming? ……
2. Are you farming under
   ☐ Intensive mode ☐ Semi-Intensive mode ☐ Extensive mode
3. How long is your culturing duration? ……
4. When does it begin and end? …….
5. From where do you buy your seeds? …….
6. Why do choose those seed suppliers? ……
   ☐ For lower price ☐ Higher quality
   ☐ Near your farm ☐ Other reasons
7. To whom do you sell your shrimp?
   ☐ Processor ☐ Local market
   ☐ Middle men ☐ Others
8. How much (%) do you sell to each buyer?
   ☐ Processor ☐ Local market
   ☐ Middle men ☐ Others
9. What problem do you face while doing shrimp farming?
   ……
10. Do you apply for loan from bank?
    ☐ Yes ☐ No
11. Do you learn culturing techniques and disease prevention before starting your business?
    ☐ Yes ☐ No
    If yes, from where do you learn? …….
12. Is there any scientific paper which can benefits shrimp farmers?
    ☐ Yes ☐ No
13. Do you have any support from processor?
    ☐ Yes ☐ No
14. Do local government/NGO offer any aid programs to farmers?
    ☐ Yes ☐ No
    If yes who are they? ……..
15. Do you look for market information related to your business?
    ☐ Yes ☐ No

    If yes, where can you find the information that you need?

    ☐ Print media ☐ Electronic media ☐ Other farmers ☐ Other source

16. Do you have to comply with any regulations during your shrimp farming?
    ……

17. Costs and earnings

Area ……. Hectare

Items	Unit	2009			2010			2011		
		Price	Quantity	Total	Price	Quantity	Total	Price	Quantity	Total

	2009	2010	2011
Harvest			
Farm-gate price			

18. Why do you sell your harvest to middlemen?

……

Questionnaire for wholesaler in Cox'sbazar District, Bangladesh

1. How long have you been doing this kind of business? …….
2. While doing your business, what problems do you face?

   …….
3. What are the regulations that you have to comply with?

   ……..
4. Where do you sell your products?

   □ Processor □ Another agent

   How much (%) do you sell each type of buyers?

   □ Processor □ Another agent
5. Costs and earnings

Purchasing price of shrimp	2009	2010	2011

Selling price of shrimp	2009	2010	2011

Added costs	Amount		
	2009	2010	2011
Ice			
Labor			

6. Why do you think farmers prefer to sell their harvest to you than to processor?

……

Questionnaire for commission agents in Cox'sbazar District, Bangladesh

a) From how many wholesalers do you control?
b) What kind of problem do you face?
c) How much do you earn?

Questionnaire for processor in Cox'bazar district, Bangladesh

1. Who are your shrimp suppliers?
   ☐ Farmers ☐ Middlemen
   How much (%) do you buy from each type of suppliers?
2. Why do you buy more shrimp from middlemen than from farmers
   ……
3. To whom do you sell your products?
   ☐ Exporters ☐ Supermarkets ☐Others
4. What are the steps of processing raw shrimp into final products ready to export?

1.
2.
3.
4.

5. Do you face any kinds of problems during your activities?
   ……..
6. What kinds of regulations that you have to follow in your work?

Regulations	Issued by

7. Do you know where your products are export?

…….