VALUE CHAIN ANALYSIS OF MAJOR FISH SPECIES IN JHENAIDAH DISTRICT, BANGLADESH.

**A Thesis Submitted to Department of Fisheries, University of Dhaka
in Partial Fulfillment of the Requirement for the Degree of
Master of Science (MS) in Fisheries**

Submitted By

Examination Roll No: Curzon-812   MS Session: 2015-2016

Registration Number: 2011-712-781   Registration session: 2011-2012

Department of Fisheries

University of Dhaka

Dhaka-1000, Bangladesh

February 2017

Dedicated
To

My parents
and

Honorable Supervisor

Declaration by Student

I hereby declare that the dissertation entitled "Value chain analysis of major fish species in Jhenaidah District, Bangladesh" submitted to the Department of Fisheries, University of Dhaka for the degree of Master of Science (MS) is based on self-investigation, carried out under the supervision ofDr. Md. Raknuzzaman**,** Department of Fisheries, University of Dhaka, Dhaka-1000, Bangladesh.

I also declare that this or any part of this work has not been submitted for any other degree anywhere. All sources of knowledge used have been duly acknowledged.

Name: Muhammad Mamunur Rashid

Examination Roll: 812   MS session: 2015-16

Registration Number: 2011-712-781 Registration session: 2011-12

Department of Fisheries, Faculty of Biological Sciences

University of Dhaka, Dhaka-1000, Bangladesh

Certificate

I certify that the research work embodied in this thesis entitled "Value chain analysis of major fish species in Jhenaidah District, Bangladesh."submitted by Muhammad Mamunur Rashid, roll number: 812, session:2015-16, registration number: 2011-712-781 has been carried out under my supervision.

This is further to certify that it is an original work and suitable for the partial fulfillment ofthe degree of Master of Science (MS) in Fisheries from the Department of Fisheries, University of Dhaka.

We wish every success in his life.

Name of Supervisor

Dr. Md. Raknuzzaman

Associate Professor

Department of Fisheries,Faculty of Biological Sciences

University of Dhaka,Dhaka-1000, Bangladesh

Acknowledgement

All praise and glory to the Almighty Allah, the most gracious and the most merciful, for successful completion of this research work.

I am deeply indebted to my supervisor Dr. Md.Raknuzzaman, Associate Professor, Department of Fisheries, University of Dhaka; for his continual supervision, stimulating suggestion, encouragement, guidance and inspiration helped me in all the time of research for and writing of this thesis, in the first place I would like to record my gratitude to him.

I am also indebted to my honorable teachers, Department of Fisheries, University of Dhaka for their generous guidance and valuable advices. Special thanks must go to my beloved friends for their continuous supports. I am also delighted to express my wholehearted feelings of thankfulness and gratefulness to all office staff of Department of Fisheries, University of Dhaka.

Author

Abstract

The present study is to analyse value chain of major fish species in Jhenaidah district, Bangladesh. The study has identified different marketing channels and intermediaries involved therein and their roles in fish marketing and the extent of value addition in terms of costs in successive stages of fish movement anddetermine marketing margins of the intermediaries. The longest supply chain involves six intermediaries for live Pangas (fish farmer, nikari, paiker, aratdar, retailer and consumer). Two supply chains identified for carps and tilapia involve five intermediaries (fish farmer, aratdar, paiker, retailer and consumer) and 4 intermediaries (fish farmer, aratdar, retailer and consumer) respectively. Supply chain of hilsha comprises of six intermediaries, namely fishermen, aratdar, paiker, aratdar, retailer and consumer for the distant domestic market. Two other identified channels for hilsha marketing involve respectively five intermediaries (fishermen, aratdar, paiker, retailer and consumer) and four intermediaries (fishermen, aratdar, retailer and consumer) for the local markets. The overseas hilsha marketing channel involves four intermediaries namely, fishermen, aratdar, LC paiker and overseas consumers. Domestic supply chains for shrimp marketing involve four intermediaries (shrimp farmer, aratdar, retailers and consumer) for local market and five intermediaries (shrimp farmers, aratdar, paiker, retailer and consumers) for distant markets. Three overseas supply chains are identified for shrimp marketing. The involved intermediaries are at most six, namely, shrimp farmer, aratdar, bepari, account holder, processing plant and overseas consumer.

Fish farmers and fishermen are the first link in the fish marketing channels. They are the supplier of fish to the market.Nikari(informer) is a middleman who does not have the ownership of the product but establishes a bridge between buyers and sellers and receive commission from farmer @0.50 Taka/kg in the study areas in case of major carps.

Grading is an important activity in fish marketing as different sizes of fish fetch different prices. Grading facilitates buying and selling of fish. Most fish are graded on the basis of size (weight).

The storage function is primarily concerned with making goods available at the desired time. It enables traders to obtain better prices for their products. Being a highly perishable commodity, fish requires extremely specialized storage facilities matching the seasonal demand.

Value is added when products pass different stages and move from one intermediary to another. The different cost components required for successive movement of fish are transportation, basket packaging, icing, wages and salaries, aratdar's commission, house rent, security, electricity, telephone, personal expenses, tips-donation, wastage, dadon cost, government taxation, subscription for cooperatives (for hilsha), export packaging (shrimp) .

Table of Contents

Table of Contents

List of Figures

List of Boxes

CHAPTER 1

INTRODUCTION

Introduction

1.1 Introduction

Large number of different types of water bodies both inland and marine makes Bangladesh one of the most suitable countries of the world for freshwater aquaculture. The freshwater inland aquaculture production in Bangladesh is the second highest in the world after China (FAO, 2009). The total annual fish production is estimated at 2.90 million tonnes in 2009-10 (Bangladesh fiscal year: 1 July-30 June), of which 1.35 million tonnes (46.62%) are obtained from inland aquaculture, 1.02 million tonnes (35.53%) from inland capture fisheries, and 0.52 million tonnes (17.85%) from marine fisheries (DoF, 2010).

The main production systems for freshwater aquaculture in Bangladesh are extensive and semi-intensive pond poly-culture of Indian major carps and exotic carps, which account for 80% of the total freshwater aquaculture production. The remaining 20% are mainly from catfish, tilapia, small indigenous fish and rice-fish farming (ADB, 2005). Presently, 1.4 million people are engaged full time and 12 million as part time in fisheries sector in the country for livelihood and trade. Another 3.08 million fish and shrimp farmers are cultivating fish both at subsistence and commercial level(Shah and Ahmed, 2006). In Bangladesh, fish farming is currently one of the most important sectors of the national economy. Within the overall agro-based economy of the country, the contribution of fish production has been considered to hold good promise for creating jobs, earning foreign currency and supplying protein. About 97% of the inland fish production is marketed internally for domestic consumption while the remaining 3% is exported (Hasan, 2001). A large number of people, many of whom living below the poverty line, find employment in the domestic fish marketing chain in the form of farmers, processors, traders, intermediaries, day laborers and transporters (Ahmed et al. 1993, Islam, 1996; DFID, 1997; Kleih, 2001a, 2001b).

Traditionally, people of Bangladesh like to eat fresh fish. However, chilled and dried fish are also marketed currently in large quantities in the towns and cities. Utilization and marketing distribution of fish is around 70 % fresh fish, 25% dried, and the other forms of locally processed fish include fermented products and frozen products(Islam et al. 2006).

The export market of value added products is highly competitive, involving changes in type of products, forms and packaging as well as consumer behavior. Export of fish, shrimp and other fishery products were considered as non-conventional items before the independence of the country. It has increased many-folds during the last decades and the country is earning foreign exchange to minimize the trade gap. In this case the dried coastal and marine fish, the marine finfish and organism even other than fish, could be on the top of the list of export earning items (Kamal, 1994). Bangladesh exported fish and fisheries products worth Taka 32,106 million in 2009-10 of which frozen fish and shrimp shared more than 90% of the total exports of the fishery products and attained 3.7% of total export earnings of Bangladesh (Bangladesh Bank, 2011). Since fish production in Bangladesh is increasing over the years, its disposal pattern is very important as growers, wholesalers, retailers and consumers- all are affected due to value addition in the marketing process. For the sustainability of these stakeholders, fish marketing studies are very necessary. Thus, the present study is conducted to examine the fish marketing system, supply chain and value addition to determine the pulling factors for enhancing production, processing and marketing of different species of fishes in Bangladesh.

1.2 BACKGROUND

Food and Agriculture Organization (FAO) of the United Nations is implementing a research project entitled a value-chain analysis of international fish trade and food security with an impact assessment of the small-scale sector with the financial support of NORAD. The objective of the project is to achieve a better understanding of the dynamics of relevant value-chains in international fish trade and arrive at policy recommendations. The project aims at analyzing the distribution of benefits in the value-chain and the linkages between the relative benefits obtained as well as the design of the chain. The project also aims at making comparisons between domestic, regional and international value-chains with the view to understand better how developing countries can increase the value derived from their fishery resources. Twelve countries (10 developing and 2 developed countries) are participating in this project including Bangladesh. This report is based on the cross section component of the value chain analysis of Jhenaidah District fish marketing.

1.2 OBJECTIVES OF THE STUDY

The study addresses the overall fish marketing system of Bangladesh with particular emphasis to the extent of value addition during the process of marketing of rohu, catla, pangas, tilapia, hilsha and shrimp. The specific objectives of the study are to:

i)identify different marketing channels and intermediaries involved therein and their roles in fish marketing,

ii)determine the extent of value addition in terms of costs in successive stages of fish movement, and

iii)determine marketing margins of the intermediaries.

CHAPTER 2

MATERIALS AND METHODS

2.1 Methodology

The study was conducted inMaheshpur, Kotchandpur, Kaliganj, Shailkupa,sub-districts under Jhenaidah district of south-west of Bangladesh. These areas have been identified as the most important sources for pangas*(Pangasiushypophthalmu*s*)*, rohu*(Labeorohita)*, catla*(CatlaCatla)*, tilapia *(Oreochromisnilotica)*, hilsha (*Tenualosailisha)* and shrimp/prawn (*Macrobrachiumrosenbergii, Penaeus*monodon, *and Litopenaeus*vannamei).

Primary data were collected from fish market agents of Maheshpur, Kotchandpur, Kaliganj, Shailkupa Bazar of Jhenaidah district for the study. Surveys were conducted for a period of six months from July 2016 to January 2017. These surveys involved the inspection of the study areas in terms of fish distribution and marketing systems. A combination of participatory, qualitative and quantitative methods was used for primary data collection. A total of 4 Focus Group Discussion (FGD) sessions were conducted with actors involved in fish distribution channel (1 FGD in each area). Table 1 shows the sample intermediaries from different study areas. In this study, purposive sampling technique was used for selecting the sample. Total sample size of the study was 100 (Table 1).

Respondents	Study Area and fish species						
	Maheshpur	Kaliganj	Kotchandpur	Shailokupa	J Sadar		
	Pangas/ tilapia/ rohu/ catla	Pangas/ tilapia/ rohu/ catla	Pangas/ tilapia/ rohu/ catla/ hilsha	Hilsha	Hilsha	Shrimp	Total
Farmer	7	3		3	3	4	20
Faria						1	1
Bepari				3		3	6
Aratdar	5	3	4	2	5	1	20
Paiker	6	4	3		3	2	17
Depot owner						3	3
Retailer	11	6	5	2	7	4	35
Total	29	16	12	10	18	18	100

Table 1. Distribution of samples from different areas

The interview schedules were prepared according to the need of the objectives of the study. In order to collect data, one set of interview schedule for all actors involved in value addition

process was prepared. The draft interview schedule was pre-tested amongst a few respondents by the researcher themselves. In this pre-testing much attention was given to elicit new information which was originally not designed to be asked and filled in the draft interview schedules. Thus, some parts of draft schedules were improved, rearranged and modified in the light of the actual experiences gained from the field tests. Then the final interview schedules were prepared based on the result of the pre-test. After the collection of data they were scrutinized and carefully edited to eliminate possible errors and inconsistencies contained in the schedules while recording them. The first step was to look into the data of each and every interview schedule to ensure consistency and reliability with the aims and objectives of the study. After completing the pre-tabulation task, they were transferred to an Excel sheet from the interview schedules. In this study tabular technique was followed to illustrate the whole scenarios of fish marketing. The sum, mean, averages, percentages, gross costs and margins etc. are the simple statistical measures employed to examine the value chain analysis of different species of fishes.
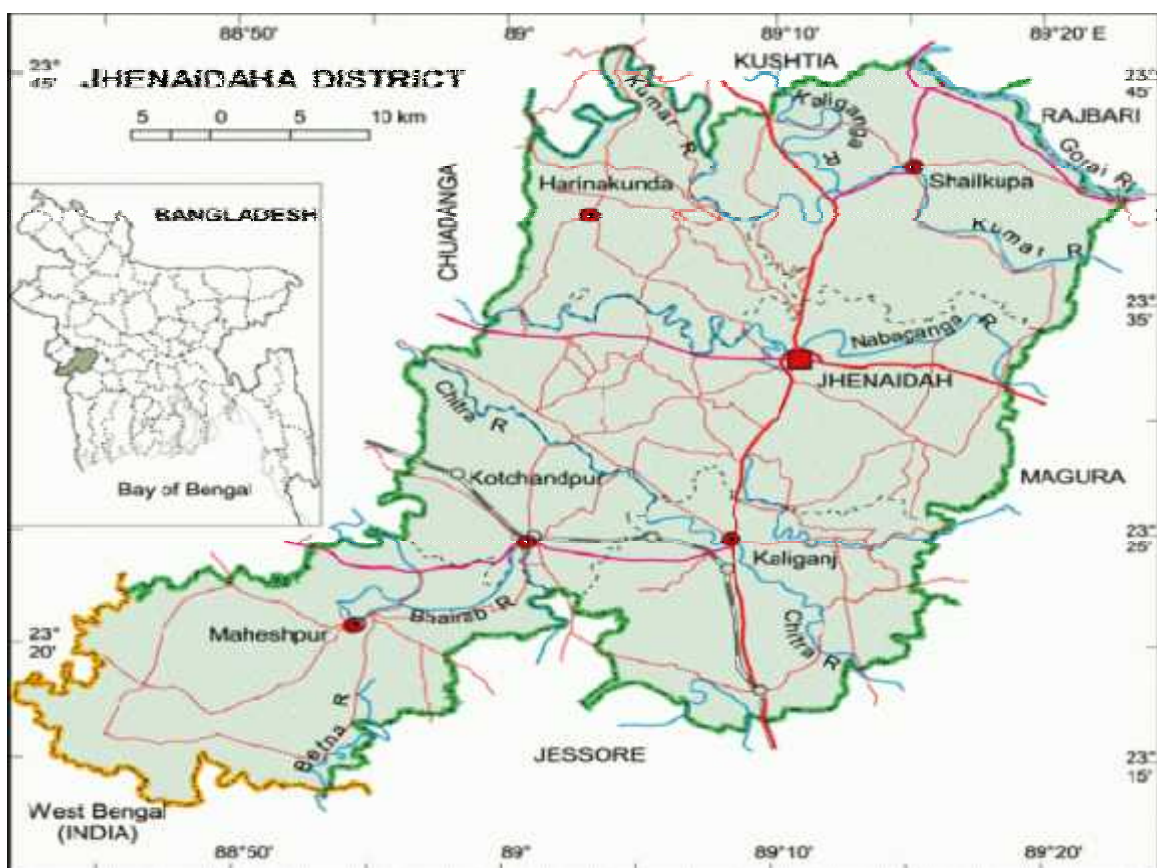
Figure 1: A map of Jhenaidah district.

2.2 Questionnaire survey:

To assess value chain analysis a survey was conducted in the Jhenaidah District. The sample size was 100.Questionnaire was conducted to determine the extent of value addition in terms of costs in successive stages of fish movement.

Figure2 :Surveying in Market a) Kaliganj Market b) Maheshpur Market

2.3 Data analysis:

Data were collected from each market and Then the data which were collected through the survey were tested with MS EXCELL software to determine the value chain analysis of major fish species in Jhenaidah District.

2.4 Identified Problems:

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 and delivery to final consumers (Porter, 1980; Kapilinsky and Morris, 2000).Value-chain analysis looks at every step a business goes through, from raw materials to the eventual end-user. The goal is to deliver maximum value for the least possible total cost (Investopedia, 2011). Market chain analysis aims to provide information on profitability for the various agents along the market chain (Ferris et al., 2001). Economic value chain analysis describes the range of activities required to bring a product to the final consumer and, in the case of international products,

the extent to which intermediaries/agents gain from participating in the chain (Jacinto, 2004). A traditional food industry value chain consists of the producer, processor, wholesaler, exporter, importer, retailer and consumer.

There are mainly three sets of reasons why value chain analysis is important (Kaplinsky and Morris, 2000). These are: i) with the growing division of labor and the global dispersion of the production of components, systematic competitiveness has become increasingly important, ii) efficiency in production is only a necessary condition for successfully penetrating global markets, and iii) entry into global markets which allows for sustained income growth - that is, making the best of globalization- requires an understanding of dynamic factors within the whole value chain.

Fish is a highly perishable commodity and its quality deteriorates very rapidly. Therefore, its quality cannot be kept unaffected for human consumption for a long time. Production and consumption areas are also widely separated. Consumers of this country normally like indigenous carps, shrimp, catfish and other small species as food fish. Production of cultured fish can be increased by making best utilization of the existing inland resources through modern and scientific methods of fish culture and fishing techniques. But the ultimate consumers have to depend on an effective marketing system to be able to purchase fish at reasonable prices. Similarly, successful and sustainable fish culture also depends on an effective distribution system.

Analysis of value chains requires detailed micro-level data, which are not available in Bangladesh and are often difficult to obtain in most countries. The present study takes the first steps to collect primary data and to identify the marketing channels and value addition of tilapia, pangas, rohu, catla, shrimp and hilsha in Bangladesh. This study analyzes how market intermediaries operate along seafood value chains, and demonstrates how the revenue from seafood trade is distributed over the entire seafood value chain. This report also provides information on aquaculture/fisheries products in Bangladesh to support the statistical report linking the value chain in fish supply. Finally, this study is expected to also provide some useful information to traders, fish farmers and policy makers to help them formulate programmes and policies related to the concerned fish production and marketing. A related, complementary study (Sapkota-Bastola et al. 2012) provides an in-depth analysis of the linkage between various segments in the seafood value chains in the country.

CHAPTER 3

RESULT AND DISCUSSION

3.1 Overview of fish marketing practices:

3.1.1 Buying and selling:

Fish marketing practices in Bangladesh is the combination of a series of functions or services that are performed by several institutions and market participants like marketing agents, brokers, wholesalers, retailer, exporter and manufacturer in order to transfer the products from farm-gate to the ultimate consumers both at home and abroad. Marketing system may be thought of as the connecting link between specialized producers and consumers (Kohls, 2005). An efficient marketing system is essential for earning fair profit for the fish farmers and traders. Marketing functions may be defined as major specialized activities performed in accomplishing the marketing process of concentration, equalization and dispersion (Kohls, 2005). In the study areas, the whole marketing of fish has been broken down into various functions such as buying and selling, transportation, grading, storaging, weighing, financing, market information and pricing.

The activities involved in the transfer of goods are completed through buying and selling functions. They do not take the ownership of the products. Tilapia fish farmers sell 85% of their fish to paikerthrough aratdar, 12% to paikerdirectly and the final 3% to retailer. Paikers sell 77% of their fishes to retailers and 23% to retailers through aratdars. Retailers sell the entire fish to ultimate consumers. Paikerof tilapia fish purchases 92% from farmers through aratdar and 8% directly from farmers. Retailer purchases 89 % from farmers through aratdar and 11% from farmers. Consumer purchases 100% of tilapia from the retailers in the study area (Table 2).

Table2. Percent of tilapia fish transacted by value chain actors

Value chain actor	Purchase from (%)				Sold to (%)				
	Farmer	Farmer via aratdar	Paiker	Retailer	Paiker	Paiker via aratdar	Retailer	Retailer via aratdar	Consumer
Farmer	-	-	-	-	12	85	3	-	-
Aratdar	Aratdars negotiate between buyers and sellers of fish and help them at their own business premises on receipt of Aratdari commission.								
Paiker	8	92	-	-	-	-	77	23	-
Retailer	11	89	-	-	-	-	-	-	100
Consumer	-	-	-	100	-	-	-	-	-

Source: Field survey, 2017.

Rohu fish farmers sell 89% of their fish to paikersthrough aratdar, 9% to paikers directly and 2% to retailers. Paikers sell 77% to retailers directly and 23% to retailers through aratdar. Retailers sell the entire fish to ultimate consumers. Rohu fish paikers purchase 92%

Table3. Percent of rohu fish transacted by value chain actors

Value chain actor	Purchase from (%)				Sold to (%)				
	Farmer	Farmer via aratdar	Paiker	Retailer	Paiker	Paiker via aratdar	Retailer	Retailer via aratdar	Consumer
Farmer	-	-	-	-	9	89	2		
Aratdar	Aratdars negotiate between buyers and sellers of fish and help them at their own business premises on receipt of Aratdari commission.								
Paiker	8	92	-	-	-	-	77	23	-
Retailer	5	95	-	-	-	-	-	-	100
Consumer	-	-	-	100	-	-	-	-	-

Source: Field survey, 2017.

fish from the farmers through aratdar and 8% directly from the farmers. Retailers purchase 95% from farmers through aratdar and 5% from farmers. Consumers purchase 100% of rohu fish from the retailers in the study area (Table 3).

Catla fish farmers sell 94% of their fish to paikersthrough aratdar, 5% to paikers directly and 1% to retailers. Paikers sell 88% to retailers directly and 12% to retailers through aratdar. Retailers sell the entire fish to ultimate consumers. Catla fish paikers purchase 89% fish from farmers through aratdar and 11% directly from farmers. Retailers purchase 96% from farmers through aratdar and 4% from farmers. Consumers purchase 100% of catla fish from the retailers in the study area (Table 4).

Table4. Percent of catla fish transacted by value chain actors

Value chain actor	Purchase from (%)				Sold to (%)				
	Farmer	Farmer via aratdar	Paiker	Retailer	Paiker	Paiker via aratdar	Retailer	Retailer via aratdar	Consumer
Farmer	-	-	-	-	5	94	1	-	-
Aratdar	Aratdars negotiate between buyers and sellers of fish and help them at their own business premises on receipt of Aratdari commission.								
Paiker	11	89	-	-	-	-	88	12	-
Retailer	4	96	-	-	-	-	-	-	100
Consumer	-	-	-	100	-	-	-	-	-

Source: Field survey, 2017.

Pangas fish farmers sell 43% of their fish to paikersthrough aratdar, 54% to paikers directly and 3% to retailers. Paikers sell 35% to retailers, 60% to retailers through aratdar and 5% to paikers via aratdar. Retailers sell the entire fish to ultimate consumers. Pangas fish paikers purchase 50% fish from farmers through aratdar and 50% directly from farmers. Retailers purchase 96% from farmers through aratdar and 4% from farmers. Consumers purchase 100% of pangas fish from the retailer in the study area (Table 5).

Table5. Percent of pangas fish transacted by value chain actors

Value chain actor	Purchase from (%)				Sold to (%)				
	Farmer	Farmer via aratdar	Paiker	Retailer	Paiker	Paiker via aratdar	Retailer	Retailer via aratdar	Consumer
Farmer	-	-	-	-	54	43	3	-	-
Aratdar	Aratdars negotiate between buyers and sellers of fish and help them at their own business premises on receipt of Aratdari commission.								
Paiker	50	50	-	-	-	5	35	60	-
Retailer	4	96	-	-	-	-	-	-	100
Consumer	-	-	-	100	-	-	-	-	-

Source: Field survey, 2017.

Hilsha fish farmers sell 16% of fish to farias; 24% to beparisviaaratdars, 16% to paikersviaaratdarsand 12% to LC (Letter of Credit) paikers via aratdar and 32% to retailers. Farias sell 100% to retailers via aratdar. Bepari sells 80% to retailers and 20% to paikers via

aratdar.Paikers sell 100% of their fishes to retailers via aratdar. LC paikers sell 100% of their fishes to India. Retailers sell the entire fish to ultimate consumers. Hilsha fish farias purchase 100% fish from fishermen. Paiker, bepari, LCpaiker and retailer purchase 100% fish from fishermen through aratdar. Consumers purchase 100% of hilsha fish from the retailers in the study area (Table 6).

Table 6. Percent of hilsha fish transacted by value chain actors

Value chain actor	Purchase from (%)				Sold to (%)					
	Fisher men	Fisher men via aratdar	Paiker	Retailer	Faria	Bepari via aratdar	Paiker via Aratdar	LC Paiker via Aratdar	Retailer via aratdar	Consumer
Fishermen	-	-	-	-	16	24	16	12	32	-
Aratdar	Aratdars negotiate between buyers and sellers of fish and help them at their own business premises on receipt of Aratdari commission.									
Faria	100	-	-	-	-	-	-	-	100	-
Bepari	-	100	-	-	-	-	20	-	80	-
Paiker	-	100	-	-	-	-	-	-	100	-
LC paiker	-	100	-	-	Sold all fishes to India					
Retailer	-	100	-	-	-	-	-	-	-	100
Consumer	-	-	-	100	-	-	-	-	-	-

Source: Field survey, 2017.

Shrimp farmers sell 5% of their fishes to farias; 50% to beparis, 15% to paikersand 5% to retailers via aratdar and 25% to depot owners. Farias sell 60% to depot owners and 40% to retailers via aratdar. Depot owner and bepari each sell 100% of their shrimp to account holders. Paikers sell 100% of their fishes to retailers via aratdar. Retailers sell the entire shrimp to ultimate consumers. Shrimp farias purchase 100% fish from

Table 7. Percent of shrimp/prawn transacted by value chain actors

Value chain actor	Purchase from (%)						
	Farmer	Faria	Farmer via Aratdar	Bepari	Depot owner	AC Holder	Retailer
Faria	100	-	-	-	-	-	-
Depot owner	40	20	40	-	-	-	-
Paiker	-	-	100	-	-	-	-
Bepari	-	-	100	-	-	-	-
A/C Holder	30	-	-	50	20	-	-
Retailer	-	-	20	80	-	-	-
Consumer	-	-	-	-	-	-	100

Source: Field survey, 2017.

Table 7. Percent of shrimp/prawn transacted by value chain actors (Cont….)

Value chain actor	Faria	Retailer via Aratdar	Bepari via Aratdar	Paiker via Aratdar	Depot Owner	AC holder	Consumer
Farmer	5	5	50	15	25	-	-
Faria	-	40	-	-	60	-	-
Depot owner	-	-	-	-	-	100	-
Paiker	-	100	-	-	-	-	-
Bepari	-	-	-	-	-	100	-
A/C Holder	-	-	-	-	-	-	-
Retailer	-	-	-	-	-	-	100

Source: Field survey, 2017.

farmers. Depot owners purchase 40% shrimp from farmers directly, 20% from farias and 40% fromfarmers via aratdar.Paiker andbeparipurchase 100% fish from farmers through aratdar. Account holders purchase 30% shrimp from farmers, 50% from beparis and 20% from depot owners. Retailers purchase 80% from beparis and 20% from farmers via aratdar. Consumers purchase 100% of shrimp from the retailers in the study area (Table 7).

3.1.2 Grading

Grading is the basic function of sales transactions and is defined as the classification of products according to some standards or measures (Kohls and Uhl, 2005; p. 314). Grading is the sorting of produce into different market quality which facilitates exchange by simplifying buying and selling as it makes the sale by showing sample and description possible. It also simplifies the concentration process and makes easier and less costly the movement of goods through the marketing channel. Grading facilitates sale since different sizes of fish have different prices. In Bangladesh, all intermediaries grade fish on the basis of weight (Box 1). However, in the case of hilsha, location(source) is a factor of grading procedure since fishes from river (hilsha of river Padma) and from sea (called fishes from Nama's) are priced differently. Grading system of shrimp is different from other species. Here grading is based on number of pieces to make one kg. In case of golda, it starts from U-5 (under 5) meaning $\leq$

5 pieces of golda to make one kg, and bagda starts from 8/12 meaning that 8 to 12 pieces comprise one kg.

Box 1. Grading practices of different species of fishes

Species	Basis	Specification
Rohu	Weight	Large: 2.5 kg above, Medium: 1.0 kg to 2.5 kg, Small: Less than 1 kg
Catla	Weight	Large: 3.0 kg above, Medium: 1.5 kg to 3 kg, Small: Less than 1.5 kg
Tilapia	Weight	Large: 300 gm above, Medium: 150 gm to 300 gm, Small: Less than 150 gm
Pangas	Weight	Large: 1.5 kg above, Medium: 1 kg to 1.5 kg, Small: Less than 1 kg
Shrimp	Weight	Golda: U-5, 6/8, 8/12, 13/15, 16/20, 21/25, 26/30
		Bagda: 8/12, 13/15, 16/20, 21/25, 26/30, 31/40, 41/50
Hilsha	Weight	Large: Above 1 kg, Medium: 800gm to 1000 gm, Small: Less than 800 gm
	Location	Catching from river, Catching from sea

Source: Field survey, 2017.

3.1.3 Storage

The storage facilities help buyers and sellers to reduce the wide fluctuation of prices between peakand lean seasons. The storage function is primarily concerned with making goods available at the desired time and enables traders to receive better prices for their products. Because of high perishability, fish requires extremely specialized storage facilities matching the seasonal demand. Only the processing plants in the shrimp industry use proper storage systems for export to the world market. Other intermediaries use only ice to transport fishes from one place to another. Surprisingly, no refrigerated vans are used in Bangladesh to transport fish. Live pangas is transported from one place to another using water in the plastic drums. If the distance is long, water is then changed twice or thrice depending on the distance. Though all intermediaries use ice during marketing, their use of ice in fish is not scientific for which quality of fish gets affected. While retail selling, some use ice and some do not.

3.1.4 Transportation

Transportation is a basic function of making goods available at proper place and it creates place utility. Perishable goods must be moved as early as possible from the producing centre

Figure3. Mode of transport used by farmers and intermediaries for movement of major carps, pangas and tilapia

Fish farmer	Rickshaw/Van: Three wheel non-mechanized man-driven carrier Nasimon: Locally made mechanized small lorry/van Pickup: Small lorry
Paiker	Bus: Passenger bus (Bottom cargo holder) Truck: Cargo carrier (Non-refrigerated) Pickup: Small lorry
Retailer	Head load: Container carry on head Rickshaw/Van: Three wheel non-mechanized carrier Bus: Passenger bus (Bottom cargo holder/roof top) Truck: Cargo carrier (Non-refrigerated) Nasimon: Locally made mechanized small lorry/van Pickup: Small lorry

Source: Field survey, 2017.

Figure4. Mode of transport used by farmers and intermediaries for movement of shrimp

Fish farmer	Head load: Container carry on head Rickshaw/Van: Three wheel non-mechanized man-driven carrier
Depot owner	Rickshaw/Van: Three wheel non-mechanized man-driven carrier Truck: Cargo carrier (Non-refrigerated)
Paiker	Truck: Cargo carrier (Non-refrigerated) Pickup: Small lorry
Bepari	Truck: Cargo carrier (Non-refrigerated) Pickup: Small lorry
Account holder	Truck: Cargo carrier (Non-refrigerated) Pickup: Small lorry
Processing plant	Refrigerated van
Retailer	Head load: Container carry on head Rickshaw/Van: Three wheel non-mechanized man-driven carrier Bus: Passenger bus (Bottom cargo holder/roof top) Truck: Cargo carrier (Non-refrigerated) Nasimon: Locally made mechanized small

Source: Field survey, 2017.

to the consumer center. So transportation is essential for highly perishable commodities like fish. Adequate and efficient transportation is a cornerstone for the modern marketing system (Kohls and Uhl, 2005, p.319). In the study areas, the fish farmers and intermediaries use various modes of transports such as van, rickshaw, truck, passenger bus, pickup, Nasimon(locally made pick-up type van for transporting passengers and goods), head load etc, to transfer product from the producing areas to the consumption centre. Figures 3, 4 and 5 show different modes of transport used by the intermediaries to transport fish from one place to another.

3.1.5 Financing

The financing function is the advancing of money by someone to carry on the business. For effective operation, financing is of crucial importance in the whole marketing system of fish. The source of finance for the value chain actors in the study areas are shown in Tables 8, 9 and 10. Table 8 shows that most of the fish farmers, aratdars, paikers and retailers of major carps, pangas and tilapia are self-financed. Other sources of finance for farmers are banks, friends and relatives, and dadon. A minor portion of Aratdar's sources of finance are banks and friends and relatives. Paikerstake loan from banks, NGO and friends and relatives. In addition to the use of their own fund, retailers also borrow from NGOs and friends and relatives.

Figure 5. Mode of transport used by the farmers and intermediaries for movement ofhilsha fish

Source: Field survey, 2017.

Table8. Sources of finance of major carps, pangas and tilapia fish farmers and intermediaries

Sources of finance	Market participants (%)			
	Farmer	Aratdar	Paiker	Retailer
Own fund	86	96	82	76
Bank	9	3	11	0
NGO	-	0	5	16
Friend and relatives	4	1	2	8
Dadon from Aratdar	1	0	0	0
Total	100	100	100	100

Source: Field survey, 2017.

Table 9 shows that most of the fish aratdar, bepari, paiker and retailer of hilsha are self-financed. Other sources of their finance are banks, NGOs, friends and relatives and dadon. It is worth mentioning that finance of hilshafishermen come totally from aratdar/mahajon(who provides dadon). This dadonof the aratdars /mohajansmakes fishermen very vulnerable as it is tied up with conditions. Fishermen receiving dadonfrom aratdars/mohajans are bound to sell their produce to them, sometimes at predetermined prices which in most cases are lower than the prevailing market prices. Moreover, they also deprive the fishers while weighing the produce. About one-fourth of the LC paikersbusiness is run by bank loans.

Table 9. Sources of finance of hilsha fish farmers and intermediaries

Sources of finance	Market participants (%)					
	Fishermen	Aratdar	Bepari	Paiker	LC Paiker	Retailer
Own fund	3	90	95	80	74	99
Bank	0	9	5	10	24	0
NGO	0	0		0	2	1
Friend and relatives	0	1		0		
Dadon from Aratdar	97			10		
Total	100	100			100	100

Source: Field survey, 2017.

Table 10 shows that in the case of shrimp, most of the farmers, aratdar, bepari and retailers are self-financed.Depot owners use a combination of own funds, bank loans, NGO and aratdars for shrimp marketing. Only 20% of depot owners procure loans from banks while 5% and 3% received from NGOs and dadon giving aratdars respectively. However, a majority of depot owners use their own fund for the business. 34% of the paikers takedadon

Table 10. Sources of finance of shrimp farmers and intermediaries

Sources of finance	Market participants (%)							
	Farmer	Depot	Aratdar	Paiker	Bepari	A/C holder	Process ing plant	Retailer
Own fund	78	72	100	64	91	70	43	100
Bank	0	20		0	0	30	57	
NGO	7	5		2	0			
Friend and relatives	1	0		0	0			
Dadon from Aratdar	14	3		34	9			

Source: Field survey, 2017.

fromaratdar besides their own funds to run their businesses. Account holders partly and processing plant owners mostly depend on bank loans to accelerate the business operations.

3.1.6 Market Information

Market information is a facilitative function required for efficiently operating marketing system. In the study area, visiting the markets and use of telephone/mobile phones are the most common sources of collecting market information for all value chain actors(Table 11)

.

Table 11. Sources of market information for farmers and intermediaries

Sources of market information	Market participants (%)								
	Farmer	Depot owner	Aratdar	Paiker	Retailer	LC paiker	Bepari	A/C holder	Process-ing plant
Collecting information from the market	80		58	73	92	40	71	80	50
Fellow traders	51		45	43	25	20	29	20	0
Email/Internet	0		0	0	0	80	0	0	100
Telephone/ Mobile	60	100	90	87	55	100	100	100	100

Source: Field survey, 2017.

shows that fellow traders are also a common source of market information for all types of value chain actors except processing plants. These and LC paikers mainly depend on email/internet to gather market information.

3.1.7 Packaging

Packaging may be defined as the general group of activities in product planning which involves designing and producing the container or wrapper for a product (Stanton, 1991). Packaging is essential for proper transportation of fish. 'Basket' made of bamboo, rope and polythene is used by farmers, paikers and retailers of major carps, pangas and tilapia fish. Plastic drums are usually used when fish is transported in live form. Currently, 'plastic crate' is commonly used by all types of intermediaries in Bangladesh. Steel and wooden boxes are used in hilsha fish marketing by paikers, beparis and LC paikers. 'Box' made of cork sheet is widely used by A/C holders and processing plant owners in shrimp marketing and by LC paikers in hilsha fish marketing. Different sizes of packaging materials along with their capacities are shown in Box 2.

Box 2. Packaging practices of fish marketing in Bangladesh

Packaging practices	Using materials	Capacity	Used by
Basket	Bamboo, Rope and Polythene	40 kg / 20 kg	Farmer, Paiker and Retailer / Retailer
Drum	Plastic	40 kg / 20 kg	Farmer, Paiker / Retailer
Crate	Plastic, Polythene	40 kg	Depot owner (shrimp), Paiker, Bepari, Account holder (Shrimp), Retailer
Steel box	Steel sheet	250 kg	Paiker, Bepari (hilsha)
Wooden box	Wood, Polythene	160 kg	Bepari, Paiker, LC paiker (hilsa)
Box	Cork sheet	40 and 20 kg	LC Paiker (hilsha), Account holder, Processing plant (shrimp)

Source: Field survey, 2017.

3.1.8 Pricing

In the study areas, all intermediaries are involved in buying and selling of fish. Depot owners, bepari and AC holders of shrimpmarketing chain follow prefixed prices set by the

Table12. Pricing methods followed in selling fishes in Bangladesh

Pricing methods	Market participants (%)								
	Farmer	Depot owner	Arat-dar	Paiker	Retailer	LC paiker	Bepari	A/C holder	Process-ing plant
Open bargaining	29	0	10	53	100	20	30	0	99
Auction	60	0	99	37	0	40	0	0	0
Based on going market prices	29	0	0	30	0	80	70	0	15
Prefixed prices	0	100	0	0	0	0	100	100	0
Cost-plus method	0	0	0	0	0	0	0	0	0

Source: Field survey, 2017.

processing plant. Farmer, aratdar, paiker, LC paiker, and processing plants practice open bargaining, auction and going market prices method for fixing price of their products in varying degree. Cent percent of the retailers follow open bargain for selling their fish to consumers (Table 12).

3.2 Fish Marketing Channels

Marketing channels are the alternative routes of product flows from producers to consumers (Kohls and Uhl, 2005; p. 501). Value chain may be long or short for a particular commodity depending on the qualities of products, size and nature of consumers and producers and the prevailing social and physical environment. Dominant supply chains of major carps (rohu and catla), pangas and tilapia in the study areas are shown below: Three major value chains are identified for major Indian carps, pangas and tilapia. These are:

Value chain – I   Fish Farmer – Nikeri– Paiker – Aratdar – Retailer – Consumer
(For live Pangas)
Value chain - II   Fish Farmer – Aratdar – Paiker - Retailer – Consumer
Value chain - III   Fish Farmer – Aratdar – Retailer – Consumer

Figure6. Value chains of major carps, pangas and tilapia in Bangladesh
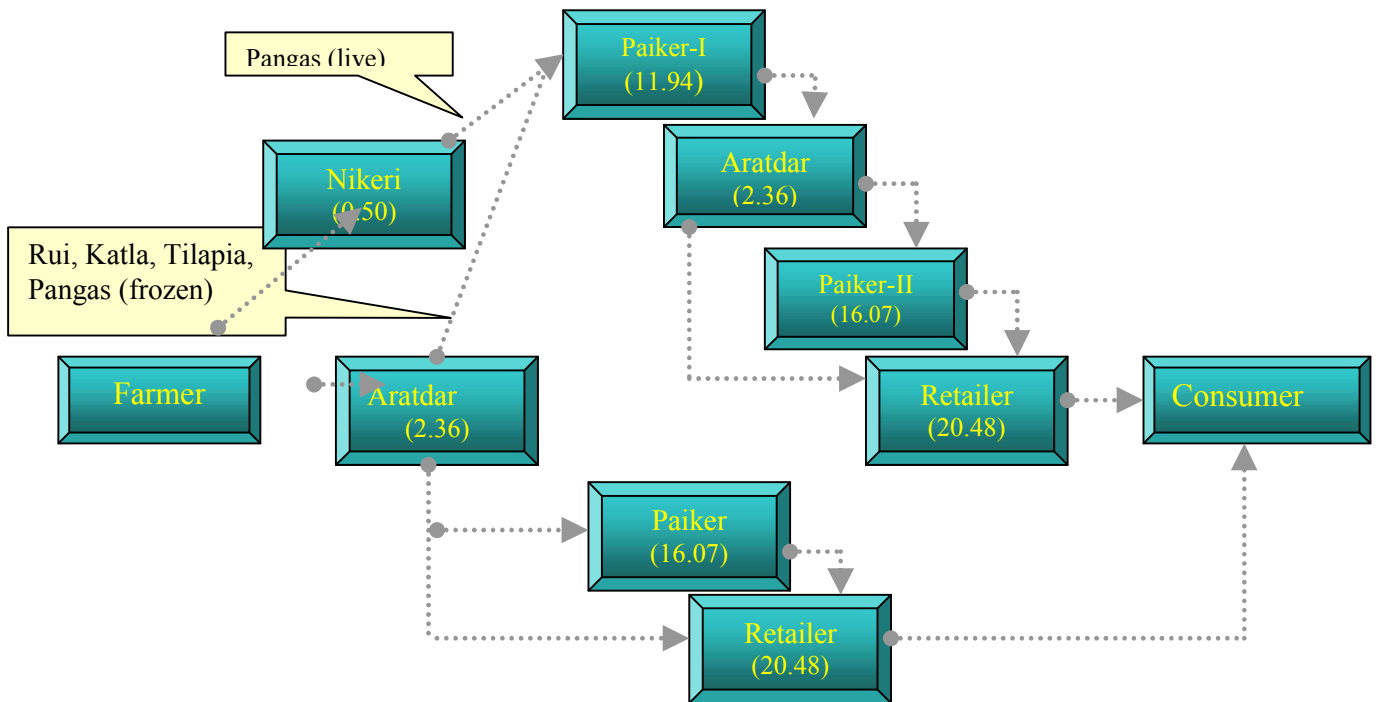
Source: Field survey, 2017**.**

Note: Figures in the parentheses indicate the average gross marketing margin/ added value (Taka/kg) by value chain actors.

Figure7. Value chains of hilsha in Bangladesh

Source: Field survey, 2017.

Note: Figures in the parentheses indicate the average gross marketing margin/ added value (Tk/kg) by value chain actors.

Major Value chains of hilsha in the study areas are as follows:

Domestic market

Value chain – I   Fishermen – Aratdar– Paiker – Aratdar– Retailer – Consumer
                                            (Distant market)

Value chain - II   Fishermen – Aratdar– Paiker – Retailer – Consumer
                                            (Local market)

Value chain - III   Fishermen   –   Aratdar–   Retailer   –   Consumer
                        (Local market)

Overseas market

Value chain - IV   Fishermen – Aratdar – LC Paiker– Consumer

Figure8. Value chain of shrimp in Bangladesh
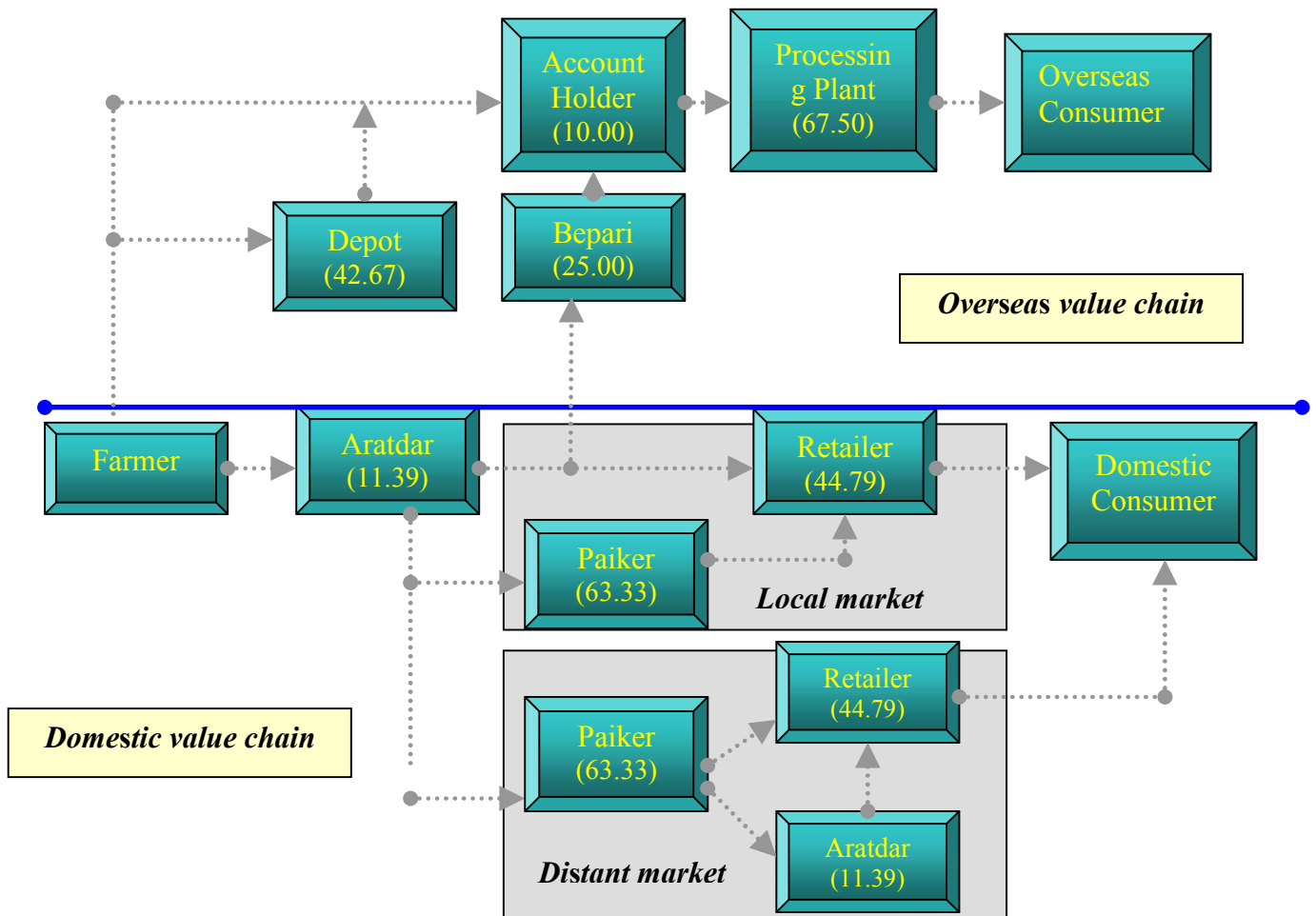
Source: Field survey, 2017.

Note: Figures in the parentheses indicates the average gross marketing margin/ added value (Tk/kg) by value chain actors. Local and distant paiker added value issame and higher for measuring average value of them otherwise it will be different.

Shrimp is sold in both domestic and overseas market. Major supply chains of shrimp in the study areas are shown below:

Overseas Value chain

Value chain – I   Fish Farmer – Aratdar– Bepari– Account Holder – Processing plant– Consumer

Value chain - II   Fish Farmer – Depot owner– Account Holder – Processing plant– Consumer

Value chain - III   Fish Farmer – Account Holder – Processing plant– Consumer

Domestic value chain

Value chain - IV   Fishermen – Aratdar– Retailer – Consumer (Local market)

Value chain – V   Fish Farmer – Aratdar – Paiker– Retailer – Consumer (Distant market)

Value chains presented in figures 5, and 6 indicate that there are overseas as well as domestic chains. Species such as hilsha and shrimp do have both types of value chains (domestic and overseas). The foregoing discussions also indicate the existence of some intermediaries like aratdars, who do operate at both ends, namely, at the secondary markets of the upazila/district level in the production end where beparies/wholesalers buy and sell, as well as in terminal market at the consumption end where berpari/wholesalers/retailers operate. This happens when the marketing channel is usually long, comprising of inter districts.

3.3 Characteristics of Market Participants

In the chain of fish marketing of the study areas, the product moves from farmers to consumers through market intermediaries such as nikeri, paiker, aratdar, depot owner, A/C holder, processing plant and retailer.

Fish farmers and fishermen are the first link in the fish marketing channels. The fish Farmers (producers) of major carps, tilapia and shrimp usually sell their fish to the local aratdar. Fish farmers of pangas sell their major share of total fish to paikerwhile farmers of shrimp sell their fish to A/C holders and depot owners. The fishermen of hilsha are bound to sell their fish to aratdar/mahajon mainly due to receiving dadon from them, but few small scale hilsha fish catcher sell their fish to aratdar directly or via faria. Lack of own boat and net and very low capital are identified as major weakness for hilsha fish catchers in the country.

Nikeri(informer) is a middleman who does not have/take the ownership of the product but establishes a bridge between buyer and seller and receives commission form farmers. This was 0.50 Taka/kg in the study areas in case of major carps, pangas and tilapia marketing systems in Bangladesh. Sometimes fish feed dealer also act as a nikeri in the study areas.

Faria, another type of intermediary, is found in the hilsha marketing system. They purchase a small quantity of fish form distant fishermen far away from the market and carry it to the terminal point and sell it to aratdar or retailer in the study areas.

Paiker or bepari is conceptually same but used interchangeably in different fish marketing system in Bangladesh who transacts large volume of product. Another type of paiker is seen in hilsha marketing system called L/C paiker. They purchase fish from fishermen through aratdarand sell (export) their entire product to overseas market, especially the Indian markets. They purchase only >800 gm size hilsha fish from the market. All of these paikars have license from Bangladesh authority. Some paikers/beparis receive money in advance from the aratdar on condition that they would sell their fish through them.

The aratdars are at the centre of the entire marketing system and their role goes far beyond what one would normally expect of a commission agent, including financing of suppliers and buyers, and often dealing on their own account (Coulter and Disney, 1987). When fish arrives at the wholesale markets, aratdars take the responsibility and control of each sale. They sell the fish through an auctioning system and get a commission of 3% to 4% depending on fish species. Most of the time aratdarsrecruit koyal (person who organizes auction by uttering and offering different prices for buyers for sale). Koyals have a significant role on pricing the fish. There are two types of aratdars: aratdar-1 (in cases where distance between production and consumption point is very low) who collects fish from local wholesalers or directly from local fishermen and sell it to paiker, bepari, and retailers. aratdar- 2 generally operates in large cities or trading zones and receives fish from the paiker(wholesalers) and through second time auctioning, selling to retailers. Aratdars advances short-term credit to bepari, paikers and retailer up to a week's duration. In the case of hilsha fish marketing, aratdars/mahajons provide loans to fishermen for up to a month or longer duration   Loans given are interest free, but commit the beneficiaries to use the aratder's(loan provider's) services when selling fish. Generally, the aratdars are self-financed. They hire necessary salaried persons or laborers depending upon their volume of business.

Shrimp depot owners are permanent shopkeepers having their own premises and staffs in markets. They are the intermediary between farmers and commission agents. Their shops (establishments) are called 'depot'. This group of traders mostly offers dadon - cash as loans to farmers, in return for buying the shrimp at a pre-fixed price, which may be well below the market level. Adulteration, if any, in shrimp/prawn like filthing, injecting water etc. is performed on the depots or sub-depots. But recently in the shrimp industry depot owners are in back foot position because of increasing beparis group who purchase shrimp from farmers

via aratdars at reasonable prices and sell the shrimp to A/C holders. Farmers prefer to sell their shrimp to beparis instead of depot owners in the study areas because they receive better prices from beparis.

A/C holders act as the commission agent and constitute the major profit making actors in the shrimp value chain with the least risk. They take 10 Taka/kg as commission from the processing plant. A/C holders finance paikersand farmers and provide credit to the processing plants, receiving payment only after the processor has shipped to his/her overseas customers. So, in turn the A/C holders do also influence the processing plants. They are very influential in the value chain and determine prices. Due to their influence in the market, the farmers, bepari or depot owners cannot sell the shrimp directly to the processing plants.

Shrimp processing industries buy most of their shrimp through the A/C holders, who may in turn buy from farmer, bepari and depot owners. Processing plant owners are inclined with four or five A/C holders to collect their entire quantity of shrimp. Shrimp is processed and packed as per foreign buyer's requirement at the processing plant and sent to the airport for overseas shipment. Processing plant owners makes all the payment through A/C holder.

Retailers, the last intermediaries of fish marketing channel, do not have any permanent establishment but they have fixed places in the market centre or are wandering with hari(aluminium pot) on head from door to door. Usually retailers buy fish from aratdar and sell directly to ultimate consumers. Mostly they purchase fish on cash. Sometimes they also purchase on credit for short term periods. If the size of fish is too large then buyers want the fish to cut into pieces as cutters have sufficient instruments to cut the large fish. Retailers may cut the whole fish for consumers or uses the services of cutters to remove scales and cut into pieces. Depending on the convenience, extra money is charged for removing scales or cut into pieces. In spite of being self-financed, the retailers often borrow money from non-institutional sources at the time of need.

3.4 Value Addition Costs by Different Actors

The cost incurred to transport the product from producers to consumers is ordinarily known as marketing cost. In other words, the cost of marketing represents the cost of performing various marketing functions (Kohls and Uhl, 2005; p.96). Marketing costs are incurred when commodities are shipped from the farm to the final market. Intermediary-wise marketing costs are discussed below:

Table13. Total marketing cost of different intermediaries involved in major carps, pangas and tilapia marketing (Taka per maund)

Cost items	Farmer	Aratdar	Inter-district paiker	Local Paiker	Retailer	Total
Transportation	39.6	-	162	114.49	70.35	386.44 (40.54)
Baskets	-	1.66	-	26.38	15.07	43.11 (4.52)
Icing	-	-	-	48.15	29.31	77.46 (8.13)
Wage and salaries	-	22.75	16.35	6.88	-	45.98 (4.82)
Aratdar's commission	88.08	-	78.22	90.33	-	256.63 (26.92)
House rent	-	5.37	0.21	0.80	19.84	26.22 (2.75)
Security	-	0.10	-	-	1.89	1.99 (0.21)
Electricity	-	0.30	0.14	-	7.20	7.64 (0.80)
Telephone bill	3.85	3.26	2.02	11.05	16.10	36.28 (3.81)
Personal expenses	2.22	6.52	4.53	7.23	20.69	41.19 (4.32)
Tips and donation	4	0.70	0.52	-	1.02	6.24 (0.65)
Wastage	-	-	14.74	-	-	14.74 (1.55)
Others	-	0.26	4.71	-	4.25	9.22 (0.97)
Total	137.75	40.92	283.44	305.31	185.71	953.13 (100.00)

Source: Field survey, 2017.
*Figures in the parentheses indicate percentages of total cost.1 maund = 40**kg**

Total marketing cost of fish includes all costs incurred by different intermediaries like inter district paikers, local paikers, aratdars, retailers and farmers who perform some marketing functions in the study areas. Products get value added during their movement across items. Share of transportation cost is the highest (40.54%) followed by aratdar'scommission (26.92%), icing (8.23%), wages and salaries (4.81%) and tips & donations (4.32%) for major carps, pangas and tilapia fish marketing (Table 13). Total value added cost per maund is Taka

953.13 from production point to consumption point. Amongst them, local paiker's value added cost is the highest while aratdar's value added cost is the lowest. Aratdars negotiate between buyers and sellers of fish and assist them in buying and selling at their own business premises on receipt of commission.

Table14. Total marketing cost of different intermediaries involved in hilsha marketing (permaund**)**

Cost items	Aratdar	Inter-district bepari	LC paiker	Local Paiker	Retailer	Total
Govt. tax	204.03	-	-	-	-	204.03 (5.50)
Dadon cost	136.02	-	-	-	-	136.02 (3.67)
Transportation	-	180.26	192.38	123.20	103.29	599.13 (16.16)
Baskets	-	88.50	88.57	62.65	46.20	285.92 (7.71)
Icing	-	64.71	91.43	42.83	67.07	266.04 (7.18)
Wages	106.59	37.27	11.44	18.43	-	173.73 (4.69)
Salaries	38.19	-	3.05	-	-	41.24 (1.11)
House rent	18.64	0.52	0.48	-	25.64	45.28 (1.22)
Electricity	4.41	-	0.52	-	27.24	32.17 (0.87)
Telephone bill	29.06	5.80	1.44	2.65	22.83	61.78 (1.67)
Personal expenses	38.24	8.54	1.74	3.75	30.56	82.83 (2.23)
Storage	2.43	-	-	-	-	2.43 (0.07)
Tips and donation	5.58	4.27	0.29	0.80	-	10.94 (0.30)
Coop subscription	3.82	-	-	-	-	3.82 (0.10)
Aratdar 'scommission	-	581.86	586.39	585.47	-	1753.72 (47.31)
Others	0.47	-	-	-	7.46	7.93 (0.21)
Total	587.50	971.73	977.73	839.77	330.29	3707.02 (100.00)

Source: Field survey, 2017.
*Figures in the parentheses indicate percentages of total cost. 1 maund = 40kg

The highest component of marketing cost per maund of fish sold by farmers is the Aratdar*'s*commission (Taka 88.08). Aratdar*'s* highest cost component is salaries and wages (Taka 22.75). Transportation is the highest cost per maund for inter district paikers, local paikers and retailers in the study areas.

In hilsha marketing system, the highest value added cost per maund of fish sold is incurred by LC paiker (Taka 977.73) followed by inter district bepari(Taka 971.73), local paiker (Taka 839.77), aratdar(Taka 587.50) and retailer (Taka 330.29). Aratdar's major cost component is government tax for using landing station (Taka 204.03) because, in hilsha marketing system, fish landing station is maintained by the Bangladesh Fisheries Development Corporation (BFDC) and fishes transacted in the landing station. Aratdar*i*commission is the highest cost item for inter district Beparis, LC paikers and local paikers. Transportation cost constituted the highest component for retailers (Taka 103.29). Aratdar*'s* commission is the highest cost of hilsha fish marketing (47.31%) in Bangladesh. (Table14).

3.5 Marketing Margin

According to Kohls and Uhl (2005), marketing margin in a sense is the price of all utility adding activities and functions that are performed by the intermediaries. A marketing margin is the percentage of the final weighted average selling price taken by each stage of the marketing chain. The margin must cover the costs involved in transferring produce from one stage to the next and provide a reasonable return to those doing the marketing activities. (Crawford,1997). It is also termed as price spread as it represents the difference between the buying and selling price. Total marketing margin is the difference between the price received by the fish Farmers and the price paid by the final consumers. Marketing margins of fish are calculated separately for different intermediaries. Gross marketing margin of each type of intermediaries is calculated by deducting the purchase price of fish from their sale prices while net margin or profit component is calculated by deducting the marketing cost from gross marketing margins.

In the case of major carps, pangas and tilapia marketing system, Tables 16, 17, 18 and 19 show that aratdars' net marketing margin is the highest for catla (Taka 81.70 per maund) followed by rohu, tilapia and pangas. The average net marketing margin is Taka 53.67 for aratdars(Table 16). Aratdars earn more profit per maund from high priced fish compared to

low priced fish. Inter district paiker for pangas purchase fish directly from farmer with the help of nikeri. The net marketing margin is Taka 194.06 per maund for inter district paiker in the study areas (Table 17). Paiker's net marketing margin is the highest for catla (Taka 494.69 per maund) followed by rohu, tilapia and pangas. The average net marketing margin is Taka 337.41 for paikers(Table 18). The net margin is the highest for high priced fish like catla and the lowest for comparatively low price fish like pangas. That means profit increases with the increase of price of fishes. The retailers purchase fish in the wholesale market from aratdars and sell directly to ultimate consumers. The highest profit or net margin per

Table15. Marketing margin of Aratdar of major carp, pangas and tilapia marketing (Tk /Maund)

Species	Purchase price	Sales price	Gross margin	Marketing cost	Net margin
Tilapia			71.21	40.92	30.29
Pangus			65.34	40.92	24.42
Rohu			119.19	40.92	78.27
Catla			122.62	40.92	81.70
Average			94.59	40.92	53.67

Source: Field survey, 2017.

maundis obtained by retailers from Catla (Taka 807.97) while the lowest profit or net margin is obtained from Pangas (Taka 485.70) (Table 19). Unlike other intermediaries, retailers earn the highest profit from high value fish such as rohu and the lowest from low value fish like pangas.

Table16. Marketing margin of Inter districtPaiker of pangas marketing (Tk /Maund**)**

Species	Purchase price	Sales price	Gross margin	Marketing cost	Net margin
Tilapia					
Pangus	2155	2632.5	477.50	283.44	194.06
Rohu					
Catla					
Average	2155	2632.5	477.50	283.43	194.06

Source: Field survey, 2017.

Table17. Marketing margin of Paiker of major carp, pangas and tilapia marketing
(Tk /Maund)

Species	Purchase price	Sales price	Gross margin	Marketing cost	Net margin
Tilapia	2511.43	3129.23	617.80	305.31	312.50
Pangus	2010	2540	530.00	305.31	224.69
Rohu	4100	4723.08	623.08	305.31	317.77
Catla	4822.22	5622.22	800.00	305.31	494.69
Average	3360.91	4003.63	642.72	305.31	337.41

Source: Field survey, 2017.

Table18. Marketing margin of Retailerof major carp, pangas and tilapia marketing
(Taka /Maund)

Species	Purchase price	Sales price	Gross margin	Marketing cost	Net margin
Tilapia	2888.57	3650.00	761.43	185.71	575.72
Pangus	2312.59	2984.00	671.41	185.71	485.70
Rohu	4922.11	5915.79	993.68	185.71	807.97
Catla	6000.00	6850.00	850.00	185.71	664.29
Average	4030.82	4849.95	819.13	185.71	633.42

Source: Field survey, 2017.

Average net marketing margins of all intermediaries for major carp, pangas and tilapia are presented in Table 20. Farmer average marketing cost is Taka 137.75 per maund for all fishes. Amongst all intermediaries, profit of retailers is the highest of Taka 633.42 per maund of fish. Profit of intermediaries varies due to variation in their costs, purchase price and sales price (Table 19).

Table19. Average net marketing margin of different intermediaries for major carp, pangas and tilapia fish marketing (Tk/maund)

Intermediaries	Purchase price	Sale price	Gross marketing margin	Marketing cost	Net marketing margin
Farmer	-	3394.53	3394.53	137.75	3256.78
Aratdar	-	-	94.59	40.92	53.67
Inter district Paiker	2155.00	2632.50	477.50	283.44	194.06
Paiker	3360.91	4003.63	642.72	305.31	337.41
Retailer	4030.82	4849.95	819.13	185.71	633.42

Source: Field survey, 2017.

Note: Aratdar Gross margin = Average received Aratdar'scommission. Gross margin = Sale price – purchase price.   Net margin = gross margin – marketing costs

Average net marketing margins of all intermediaries for hilsha are shown in Table 21. Amongst all intermediaries, profit of retailers is the highest (Taka 1222.65 per maund) followed by LC Paiker(Taka 902.27), Paiker (Taka 520.23), Aratdar (Taka 296.65) and inter district Bepari(Taka 228.27) of fish. Profit of intermediaries varies due to variation in their costs, purchase price and sales price (Table 20).

Table20. Average net marketing margin of different intermediaries for hilsha fish marketing (Tk/maund)

Intermediaries	Purchase price	Sale price	Gross marketing margin	Marketing cost in	Net marketing margin
Aratdar	-	-	884.15	587.50	296.65
Inter district Bepari	13360.00	14560.00	1200.00	971.73	228.27
LC Paikar	14080.00	15960.00	1880.00	977.73	902.27
Paiker	13520.00	14880.00	1360.00	839.77	520.23
Retailer	14600	16152.94	1552.94	330.29	1222.65

Source: Field survey, 2017.

Note: Aratdar Gross margin = Average received Aratdar's commission. Gross margin = Sale price – purchase price. Net margin = gross margin – marketing costs

Average net marketing margins of all intermediaries for Shrimp are given in Table 21. Farmer average marketing cost is Taka 1193.35 per maund. Among all intermediaries, profit of the processing plant is the highest of Taka 1649.74 per maund followed by retailers (Taka 1523.95), paiker (Taka 1416.86), depot owner (Taka 1005.72) and bepari (Taka 720.33). aratdars and A/C holders earn apparently less profit than other intermediaries in shrimp marketing system because they only charge the fixed amount of commission against their volume of business. However, aratdars and A/C holders perform a large volume of business everyday so their total profit is not less than that of other intermediaries except for processing plant owners. Processing plant owners create very high value addition for export buyers so definitely they gain more profit than other intermediaries in shrimp marketing system in Bangladesh.

Table21. Average net marketing margin of different intermediaries for shrimp
Marketing (Tk/maund)

Intermediaries	Purchase price	Sale price	Gross marketing margin	Marketing cost in	Net marketing margin
Farmer	-	21560.00	21560.00	1193.35	20366.65
Aratdar	-	-	455.65	254.48	201.17
Depot owner	21760.00	23466.80	1706.80	701.08	1005.72
Paiker	17866.67	20400.00	2533.33	1116.47	1416.86
Bepari	23800.00	24800.00	1000.00	279.67	720.33
Account Holder	-	-	400.00	173.16	226.84
Retailer	24844.44	26636.11	1791.67	267.72	1523.95

Source: Field survey, 2017.
 Note: Aratdar Gross margin = Average received Aratdar's commission. Gross margin = Sale price –   purchase price. Net margin = gross margin – marketing costs

3.6 Distribution of Value Addition Cost and Net Profit

Table 22 shows the percentages of total value addition cost and total net profit by different intermediaries for different fish marketing system in Bangladesh. For major carp, pangas and tilapia, major cost is borne by paikers (32.03% of total cost) and major net profit is earned by retailers (51.98% of total net profit). For hilsha and shrimp, major cost is borne by the inter district beparis, LC paikers, paikers and fishermen but major net profit is earned by retailers and processing plant owners. Farmers, in shrimp marketing, bear the major marketing cost (23.70% of total cost) because they have to pay aratdar's commission which ultimately increases their marketing cost.

Table22 Percentage distribution of value addition cost and profit by intermediaries and marketing system

Intermediaries	Major carp, pangas and tilapia		Hilsha		Shrimp	
	% of total cost	% of total profit	% of total cost	% of total profit	% of total cost	% of total profit
Farmer	14.45	-	-	-	23.70	-
Aratdar	4.29	4.40	15.85	9.36	5.05	2.98
Depot owner	-	-	-	-	13.92	14.91
Inter district bepari	-	-	26.21	7.20	-	-
Bepari	-	-	-	-	5.55	10.68
Inter district paiker	29.74	15.93	-	-	-	-
LC paiker	-	-	26.38	28.46	-	-
Paikar	32.04	27.69	22.65	16.41	22.17	21.01
Account Holder	-	-	-	-	3.44	3.36
Retailer	19.45	51.98	8.91	38.57	5.32	22.60

Source: Field survey, 2017.

Note: Percentages of total value addition cost/net profit calculated =

$$\frac{\text{Marketing cost/ Net marketing margin}}{\text{Tota marekting cost/ net marekting margin}} \times 100$$

3.7 Intermediaries Share to Consumers' Taka

In 1998 the USDA reported that the farm-to-retail price spread, which represents the difference between the amount farmers receive for the goods they produce and the retail price consumers pay for food in food stores, had been increasing every year for the past 30 years (United States Department of Agriculture, 1999). Thus, food price comprises of both farm prices paid to producers and charges for marketing services such as processing and distributing.

Farmers'/fishermen's share of different species of fishes is reasonable in the study areas except for hilsha fish. The major share (46%) of consumer Taka goes to mahajon in hilsha marketing system of Bangladesh. For other species farmers' share is 67%, 72% and 76% for major carp-pangas-tilapia, shrimp (overseas value chain) and shrimp (domestic value chain) respectively. The price spread is the highest in shrimp (overseas value chain) for its

worldmarket demand and the lowest in major carp-pangas and tilapia for the shortest supply chain and lower unit price than shrimp.

Table23. Share (%) of intermediaries to consumer's Taka by distribution channel

Intermediaries	Carp, pangas and tilapia (Jhenaidah district value chain)	Hilsha (domestic value chain)	Shrimp	
			Overseas value chain	Domestic value chain
Farmer	67	31	72	76
Mahajon	-	46	-	-
Aratdar	3	4	4	4
Paiker	13	8	-	10
Bepari	-	-	4	-
Account Holder	-	-	10	-
Retailer	17	11	-	7
Price spread (Tk/kg)[*]	**39.83**	**93.20**	**177.50**	**156.74**

Source: Field survey, 2017.
[*]Equals Farmer's net price/margin received minus retailer's sale price in per kg terms

3.8 Discussion

Fish farmers and fishermen are the first link in the fish marketing channels. They are the supplier of fish to the market. Nikeri(informer) is a middleman who does not have the ownership of the product but establishes a bridge between buyers and sellers and receive commission from farmer @0.50 Taka/kg in the study areas in case of major carps. Faria, another type of intermediary, is found in hilsha marketing system who purchases a small quantity of fish form fishermen far away from the market and carry it to the terminal point and sell it to aratdar or retailer in the study areas. Paiker or bepari handles large volume of fish. They purchase fish from fish farmers at farm or through aratdar in the local market and sell them to the retailers through aratdaror commission agent in secondary market. LC paiker (licensed trader/exporter) purchase hilsha fish from fishermen through aratdarand sell (export) their entire product to overseas market. Aratdars negotiate sales of fish on behalf of the producers/ seller. Aratdars arrange selling of fish through an auctioning system and receive a commission. Aratdars often act as a supplier of dadan. Shrimp depot owners are the permanent shopkeepers having their own premises and staffs in markets and act as the middle functionary between farmers and commission agents. Their shops (establishments) are called 'Depot'. This group of traders mostly offers dadon - cash as loans to farmers, in return for buying the shrimp at a pre-fixed price, which may be well below the market level. Account holders act as the commission agent and constitute the major profit making actors in the shrimp value chain. They finance paikersand farmers and give credit to the processing plants. Retailers, the last intermediaries of fish marketing channel, do not have any permanent establishment but they have fixed places to sit in the market places or wandering with hari (aluminium pot) on head from door to door.

Farmers (producers) sell 5-12% of rohu, catla, and tilapia directly to paikers and 85-95% is passed on to aratdar and subsequently purchased by paiker . Only a small portion is sold directly to retailers. For pangas, farmers sell 54% to paiker directly, 46% indirectly to paikervia aratdar and only 3% to retailers. Hilsha shows a different picture where fishers sell 16% to faria directly. Most intermediaries purchase fish from aratdars. In the study, 24% goes to faria, 16% to paikar, 12% to LC paiker and 32 % to retailers via aratdars. For shrimp, major portion (65%) is sold to bepariand paiker through aratdar. Depot owner is also an important party for the farmers to sell shrimp. Paikars and retailers transact (buy and sell) most of the traded fish through aratdars. Thus aratdar is the most important intermediary in

the fish marketing chains and is only involved in negotiating sales on behalf of the sellers on a commission basis. In general, farmer/fisher, aratdar, paiker, and retailers are the important intermediaries playing notable role in the marketing of fish. Account holders are intermediaries and operate in the shrimp supply chain. They act as the commission agent and constitute the major profit making actor in the shrimp value chain. Account holders play a significant role in shrimp marketing.

Grading is an important activity in fish marketing as different sizes of fish fetch different prices. Grading facilitates buying and selling of fish. Most fish are graded on the basis of size (weight). However, in the case of hilsha, location (source of capture/catch) is also a factor in the grading procedure. Hilsha harvested from river (river Padma) and from sea (called fishes from Nama's) are often differentiated in terms of their prices. Usually, hilsha caught from Padma river fetch higher price. Fish are graded into three categories namely, small, medium and large depending on size (weight). However, weights across species vary depending on species graded. Shrimp has a different grading system than fish. Here grading is based on number of pieces forming one kg.

The storage function is primarily concerned with making goods available at the desired time. It enables traders to obtain better prices for their products. Being a highly perishable commodity, fish requires extremely specialized storage facilities matching the seasonal demand. In the shrimp industry, only the processing plants use proper storage systems in order to be able to export to the world market. Other intermediaries use only ice to transport fishes from one place to another. Surprisingly, no refrigerated van is used in Bangladesh to transport fish. Live pangas is transported from one place to another place using water in the plastic drums.

Fish farmers and intermediaries use various modes of transportation such as van, rickshaw, truck, passenger bus, pickup, Nasimon(locally made pick-up type van for transporting passengers and goods), head load etc, to transfer products from the producing areas to the consumption centres. Ice is used while transporting the fish as most carriers are non-refrigerated. Rohu, catla, hilsha and other assorted fish often are sold in the urban areas with refrigerated vans to a very limited scale by the DoF, BFDC and some private firms.

Most of the fish farmers/ fishermen, aratdars, paikers and are self-financed. Other sources of finance for the farmers are banks, friends and relatives, and dadon. Aratdars and paikarsalso borrow from banks, NGOs, and friends and relatives. However, finance of hilsha fishermen come totally from aratdar/mahajon(who provides dadon). Fishermen receiving dadonfrom aratdars/mohajans are bound to sell their produce to them, sometimes at predetermined prices, which in most cases are lower than prevailing market prices. Farmer, aratdar, bepari and retailer involved in shrimp transaction are self-financed.Depot owners use a combination of own fund, bank, NGO and aratdars for shrimp financing. Paikers use dadon from aratdars besides their own fund to run their business. Account holders partly and processing plant owners mostly depend on bank loans to accelerate the business operations.

Physically visiting the markets and use of telephone/mobile phone are the common sources of collecting market information for all value chain actors. Fellow traders are also a source of market information for the value chain actors except processing plants. Processing plant and LC paikersmainly depend on email/internet to obtain market information.

'Bamboo, tied with rope and polythene is used by farmers, paikers and retailers of major carps, pangas and tilapia fish for packaging. Agents also use plastic drum to transport fish (mostly pangas) in live form. Now a day's 'plastic crate' is commonly used by all types of intermediaries in Bangladesh. 'Steel and wooden' box are used in hilsha fish marketing by paikers, beparis and LC paikers. 'Box' made of cork sheet is widely used by Account holders and processing plant owners in shrimp marketing and LC paikers in hilsha fish marketing.

Depot owner, bepari and account holder of shrimp marketing chain follow prefixed prices set by the processing plants. Farmer, aratdar, paiker, LC paiker, and processing plants practice open bargaining, auction and going market prices method for fixing price of their products in varying degree. Retailers follow open bargain for selling their fish to consumers.

Value is added when products pass different stages and move from one intermediary to another. The different cost components required for successive movement of fish are transportation, basket packaging, icing, wages and salaries, aratdar's commission, house rent, security, electricity, telephone, personal expenses, tips-donation, wastage, dadon cost, government taxation, subscription for cooperatives (for hilsha), export packaging (shrimp). Total value added cost per maund (40 kg) is Taka 953.13 for carps, pangas and tilapia; Taka 3707 for hilsha and Taka 5036 for shrimp. For carpspangas and tilapia. The top three cost

components are transportation, aratdar's commission, and icing. For hilsha, the cost items are aratdar's commission, transportation, and basket (packaging). For shrimp, the top three cost additions are aratdar's commission, transportation, and salaries for shrimp.

Net marketing margins per maund of carp, pangas and tilapia for farmers, aratdars, inter-district paikers, paikers and retailers are Tk3257, Taka 54, Taka 194, Taka 337 and Taka 633 respectively. The net margins of hilsha are Taka 297 for aratdars, Taka 228 for inter-district paikers, Taka 902 for LC paiker, Taka 520 for paiker and Taka 1223 for retailers. Farmer's net marketing margin per maund of shrimp is Taka 20366 followed by processing plant (Taka 1650), retailer (Taka 1524), paiker (Taka 1417), depot owners (Taka 1006), bepari (Taka 720) and aratdar (Taka 201). Retailers enjoy the lion's share of the total marketing margin.

For major carp, pangas and tilapia, major cost and profit are borne by paikers (32.03 % of the total cost) and retailers (51.98 % of the total net profit). For hilsha and shrimp marketing, major costs are incurred by inter district beparis, LC paikers, paikers and fishermen but major net profits are reaped by retailers and processing plant owners. Farmers in shrimp marketing bear the major marketing cost (23.70 % of total cost) because they have to pay the aratdar's commission.

Farmers' share of the consumers prices for different fishes seem to be reasonable except for hilsha fish. Farmer received 67%, 72% and 76% share of the consumer's Taka for major carp-pangas-tilapia, shrimp (overseas value chain) and shrimp(domestic value chain) respectively. However, for hilsha, the major share (46%) of consumer Taka goes to mahajon,and fishermen receive only 31%. Price spread per kg ranges from Taka 39.83 to Taka 177.50.

The study reveals that the value chain of major carps, pangas, tilapia, hilsha and shrimp are long and very complex. Fish flows to a number of channels from the producing centers. Fish sold in a particular market may originate through more than one channel. There are involvements of many intermediaries in the channel. Involvement of some intermediaries seems to be redundant whose presence just adds a cost to the consumer and a loss to the fisher. Fish purchased by consumers in Bangladesh mostly consists of the primary product and does include limited marketing services. Non-existence of good road and transport networks with the landing (assembling) centers deprive small-scale artisanal riverine fishers to get fair price due to their inability to sell directly to the assembling points/landing centers Contact fish farming arranged by some super stores tend to reduce the existence of number of

intermediaries making the channel shorter. Bulk of the fish sold in the markets is unprocessed.Beparies and paikers bear the most cost of marketing while retailers enjoy the lion's share of the profit. Farmers receive relatively higher share (approximately 70%) of the retail value for all species under study except for hilsha.

Though fish marketing in Bangladesh is beset with a number of problems, there have been a number of positive changes that are expected to improve fish marketing environment in the country. These positive drivers include, i) the shift from subsistence to commercial fish farming, ii) emergence of super-markets, and iii) a changing social attitude towards fish marketing, as it is increasingly considered as a less dishonorable job as was thought in the past. Although private bodies control the most of fish marketing, for better fish marketing, government should also play active role in providing physical facilities like refrigerated storage, refrigerated vans, good market places with related facilities like water, ice, electricity, drainage facilities and sitting arrangements etc. Development of road networks is greatly needed, which is a responsibility of the government. Monitoring needs to be done to ensure that market regulations are be strictly followed.

CHAPTER 4

CONCLUSION AND RECOMMENDATION

4.1 Conclusion and Recommendation:

Fish marketing system in Bangladesh has historically been organized by the private sector. The government provides support in the form of roads and infrastructures, but does not play active role in properly regulating market behavior and market performance. Price is determined by direct bargaining between the sellers and buyers.

Marketing of fresh fish in Bangladesh is characterized by involvement of many intermediaries. Value chain of major carps, pangas, tilapia, hilsha and shrimp are long and very complex. Though demand for fish is high in Bangladesh, markets are localized in some areas and fish producers (farmers and fishers) have limited ability to reach better alternative markets. Involvement of some intermediaries seems to be redundant whose presence just adds a cost to the consumer and a loss to the fisher. Moreover, the superfluous involvement of intermediaries keeps fishers and markets separated not allowing them to be market responsive.

Transport facilities are poor in general, preventing producers from sending their fish to higher markets. Lack of transport and equipment is an important constraint particularly for riverine capture fisheries. Assembling points for fish caught from riverine sources are located at distant places. Riverine fish are captured in innumerable points, many of which are not accessible to road networks. Non-existence of good road and transport networks with the landing (assembling) centers deprive small-scale artisanal riverine fishers to get fair price due to their inability to sell directly to the assembling points/landing centers. It takes long time for the fishers to take the produce to the assembling centers, which may cause spoilage of the fish. Moreover, fishers may not be able to spend so long time to do the job as they have other family business to attend. For the part-timer fishers, time is very important as they might be spending the rest of time to work for others to earn wage. Absence of road networks, transports and assembling points has created opportunities for some intermediaries who bridge the gap and make some money, which is a loss to the fishers and an additional cost to the consumers. Product quality is also affected due to the absence of roads and transport network. There is neither any effort for organized cooperative marketing facilities nor there is any mechanism for the small-scale fishermen to quickly sell their produce to an organized outlet. However, this transportation constraint is not so acute for aquaculture products. There is quite good network of assembling points for farmed fish. In recent years, there has been some improvement in road and transport network. And fish marketing chains are getting

shorter in areas with better road and communication network (ADB 2005; Faruque 2007; Dey et al. 2010). The relatively well-to-do fish farmers have the ability to arrange transport and contact wholesalers, and can sell their product without notable problem.

Except for shrimp, form of fish does not change while it passes through the value chains in Bangladesh. Bulk of the fish sold in the markets is unprocessed. Enough private initiatives is absent to establish fish processing factories due mainly to the fear of under capacity (shortage of fish for processing in the factory) utilization and unwillingness of the consumers to accept processed fish. The main form of processing is for big fish to cut into pieces at the retailing stage due to inability of consumers to afford the whole one or due to the difficulty of the retailers to sell the whole one. When a whole fish is cut into pieces, some value addition immediately takes place. This happens only at the last level of the value chain, i.e., with the retailer who sales fish to the consumers. Other than this, dry fish and to some extent chapa(fish in fermented form), is the common form of processing. Fish sausage, fish ball, fish nuggets are seldom seen being sold in markets. No canning is done and no fish processing in the form of fillet are done except in few big super stores. Changes in the per unit value of fish primarily take place due to their movement through supply chains, which are mainly transport and associated costs. Overall, fish purchased by consumers in Bangladesh mostly consist of the primary product and does include limited marketing services.

When fish moves through value chains, every intermediary adds some extra costs with the purchase price as part of their involvement or profit. But farmers receive relatively higher share (approximately 70%) of the retail value for all species under study except for hilsha. In case of hilsha marketing, mahajon/aratders bear all sorts of cost of catching hilsha from deep sea and rivers, and they absorb a major share of consumer Taka. Mahajon/aratder seems to exercise substantial market power in the hilsha value chain in Bangladesh. Hilsha fishing is organised by non-sea going people who are the suppliers of boat, net and cost of trips during the fishing days at sea.   Many of the fishers work on a daily payment basis. The fishers without capital (boat, nets, money for fishing trip etc) do not have any ownership of the fish caught. Decision to sell is taken by the organizers or the suppliers of capital. As a result, fishers get lower share of the consumer's price as mahajons (organizers/suppliers of capital) get a higher portion/ share of the consumer's Taka. This scenario is probably not going to change in the very near future; these small fishers are unlikely to be able to own boats, nets

and money to make trips in the sea and rivers of their own. Dominance of mahajans, money lenders (dadon providers) in capture fishing (such as hilsha fishing) is so firmly established that it is difficult to introduce any new arrangement. The fishers also do not want to create any bad relationship with them as they are socially, culturally and economically tied up with them. They do not want to take the risk of being deprived of the fishing opportunities.

Commercial aquaculture seems to have brought some improvement in the value chain. Since commercial fish farmers are relatively well-off farmers, they are not dependent much on others for credit, inputs, and farming and marketing decisions. And by virtue of their richness, they remain aware of the market price. Therefore, the farm gate price they receive reflects the market price. As a result, they get relatively higher share of the consumer's price. With the growth in commercial aquaculture, a new marketing pattern is emerging that increasingly involves direct participation by farmers (Faruque 2007; Dey et al, 2010). After their harvest, some farmers directly approach aratdars at the wholesale markets. The farmers bear the cost of transporting fish to the aratdars, who then arrange opening bidding by the paikers/retailers.

Another emerging new phenomenon in fish marketing in Bangladesh is the availability of fish in super markets. New super markets are not only confined in the capital city, its network is being expanded in many other districts of Bangladesh. The fish in the super markets are usually of better quality in terms of freshness. Fishes are kept chemical-free. Proper icing and refrigerated boxes are maintained for fish being sold. Live fish are also sold at these super stores. Many super stores have arrangements with contract growers and suppliers at the production points, which directly carry fish from the producers/arats to the super stores. This arrangement has perhaps made the marketing channel shorter and thus reduced the number of intermediaries. But the shares of the by-passed intermediaries are now enjoyed by the super stores. They are, however, serving well-to-do section of the consumers, and prices charged by the super stores are much higher than those in the wet markets. By virtue of serving the well to do section of the consumers and by eliminating intermediaries at the primary end of the value chains, supermarkets enjoy even higher share of the consumer price than retailers of wet markets.

The super stores are increasingly becoming important retailers. With the expansion of super store networks, changes in the value chain and value addition may come in future from the

introduction of fish sausages, nuggets, balls and fillets. These new products would provide form utility, and would add value in marketing process. Again, super stores are the places where these things will be available and therefore, they would probably be the main beneficiaries of the value additions.

Though fish marketing in Bangladesh is beset with a number of problems, there have been a number of positive changes that are expected to improve fish marketing environment in the country. These positive drivers includes, i) the shift from subsistence to commercial fish farming, ii) emergence of super-markets, and iii) a changing social attitude towards fish marketing, as it is less considered as a dishonourable job as it was in the past. But the government in Bangladesh needs to ensure that the proper infrastructure and necessary social capital are available for effective participation of all the market intermediaries of the seafood value chain. For better fish marketing, side by side with the private sector, government should also play active role in providing physical facilities like refrigerated storage, refrigerated vans, good market places with related facilities like water, ice, electricity, drainage facilities and sitting arrangements etc. Development of road networks is greatly needed, which is a responsibility of the government. Market regulations needs to be strictly followed. Monitoring to ensure fish quality needs to be strengthened. Similarly, it is also the responsibility of the government to see that consignment can reach the destination without requiring to pay unnecessary tolls and subscriptions. The development of good road and transport networks can reduce superfluous involvement of intermediaries, which could be beneficial for both the fishers/farmers and consumers. Assembling centres with refrigerated storage facilities may be developed so that the perishability of fish is checked, which would enable the assembling centres to make bulk sell/transfer to the next destination. This could reduce postharvest loss and provide better price for the fishers/farmers.

REFERENCES

ADB 2005.An evaluation of small-scale freshwater rural aquaculture development for poverty reduction. Operations Evaluation Department, Asian Development Bank, Manila, Philippines.

Ahmed, M., Rab, M.A. and Bimbao, M.A.P. 1993. Household socio-economic resource use and marketing in two thanas of Bangladesh. ICLARM Technical Report 04, p. 34.

Bangladesh Bank, 2011. Annual Report of Central Bank of Bangladesh 2009-2010, http://www.bangladesh-bank.org/, Accessed date: 22.03.2011.

Crawford, I.M. 997. Agricultural and food marketing management.Food and Agricultural Organization of the United Nations, Rome, pp.261-262.

Dey, M. M., M.F. Alam, and M. L.Bose. 2010. Demand for aquaculture development: perspectives from Bangladesh for improved planning. Reviews in Aquaculture 2: 1-17.

DOF 2011.Fishery statistical yearbook of Bangladesh 2008-2009.Fisheries Resources Survey System, Department of Fisheries, Dhaka, Bangladesh.

Faruque G. 2007. An Exploration of Impacts of Aquaculture Production and Marketing of Rural Livelihoods in Three Regions in Bangladesh (PhD thesis). University of Stirling, UK.

Ferris R.S.B., Collinson C., Wanda K., Jagwe J. and Wright P. 2001. Evaluating the marketing opportunities for shea nut and shea nut processed products in Uganda. A report prepared for USAID. P.77.

Hasan, M.R. 2001.Demand-led research and management of wild freshwater fish in Bangladesh.Support of University Fisheries Education and Research (SUFER), Dhaka, p.76.

Islam, M. S. 1996. Manual on socio-economic analysis in aquaculture research. Fisheries Research Institute, Mymensingh.

Islam, M. S., Akteruzzaman, M., and Ahmed, N. 2006.Study on marketing and value chain of some commercially important coastal and marine aquatic products of Bangladesh. Research Report, Bangladesh Fisheries Research Forum, Dhaka, Bangladesh.

Investopedia. 2011. http://www.investopedia.com/terms/v/valuechain.asp, Access date: May 16, 2011.

Jacinto E.R. 2004.A research framework on value chain analysis in small scale fisheries. Paper presented to the 10th Biennial Conference of the International Association for Study of Common Property, Oaxaca, México, 9–13 August 2004, p.27.

Kamal, M. 1994.Status and prospect of value addition of marine fisheries by catch and their marketing.Sinha, V. R. P., Mazid, M. A. and Kamal, M. (eds.). Proc. Workshop on Sustainable Development of Marine Fisheries Resource in Bangladesh.Bangladesh Fisheries Research Institute, Mymensingh, Bangladesh.

Kaplinsky, R., and Morris, M. 2000. A Handbook for Value Chain Research, International Development research Center (IDRC), Canada.

Kleih, U. 2001a. Fish distribution from coastal communities – market and credit issues. Workshop at the CARITAS auditorium, Chittagong, on Poverty Alleviation and Livelihood Security among the Coastal Fishing Communities, 27-28 March, 2001.

Kleih, U. 2001b. Poverty Alleviation and Livelihood Security among the Coastal Fishing Communities-Market and Credit.Access Issues, 27-28 March, 2001, Chittagong, Bangladesh.

Kohls, R.L and Uhl, J.N 2005.Marketing of agricultural products.9th edition. Macmillan publishing co., Inc., New York.

Porter, M.E. (1980). Value Chain Analysis.Oxford Press Ltd. London.

Sapkota-Bastola, P, M.M. Dey, M.F. Alam, K. Singh. 2012. Price transmission relationships along the seafood value chains in Bangladesh: An analysis of both aquaculture and capture fisheries species.. A report submitted to Food and Agriculture Organization for the project entitled A Value-chain Analysis of International Fish Trade and Food Security with an Impact Assessment of the Small-scale Sector.

Shah, M. S., Ahmed, M. K. 2006.Socio-economy and livelihoods of stakeholders at different levels of production, processing and marketing and value chain of freshwater Prawn

(*Macrobrachiumrosenbergii*) in greater Khulna and Noakhali areas of Bangladesh. Research Report, Bangladesh Fisheries Research Forum, Dhaka, Bangladesh.

United States Department of Agriculture. Agriculture Fact Book 1998.Chapter 1.Online.Retrieved June 7, 1999. http://www.usda.gov/news/pubs/fbook98/chart1.htm.

APPENDICES

Questions for Survey in Jhenaidah District.

QUESTIONNAIRE OF FISH fish farmers

1. How much was your fish production per year ? .... kg/ha

2. What do you usually culture ?

3. How much fish do you sold per year ? .... kg

4. Where do sell your fish ?

5. Who are the buyers ?

6. How many types of fish buyer are involved in fish marketing activities?

7. How much price do you receive against each species of fish ?

8. How do you fixed the price ?

9. How do you harvest your fish and what types of transport do you use ?

10. Are other people employed for harvesting and marketing / transporting ?

11. Is demand for fish increasing/decreasing ?........................ %

12. How have things changed during last five years (Production/ Prices) ?

Production:.................... % increase / decrease Price:............................ % increase/ decrease

13. What are the problems of fish marketing ?

14. What is your the most important problem for fish marketing ?

QUESTIONNAIRE OF FISH TRADER (RETAILER)

1. Where do fish come from?(Please mention.............)

2. Who supply? (Please mention.............)

3. Mode of transport.....(Please mention.............

4. How much is your daily income (net profit) from fish trading?

5. In your opinion, what are the problems of fish trading?

6. What is the most important problem of fish marketing?

Questions of wholesalers

1. What volume of fish is sold per day?

2. What are the sales prices?

3. Who are the customers?

4. How is the fish transported and who pays for it?

5. From where does the fish come?

6. Who are the suppliers (middlemen or producers)? How many different supplier; are

involved?

7. How are the payments settled?

8. Is there any difficulty to find enough quality of fish?

9. What are the costs of operation (transport, travel, labors, refreshment etc)?
10. How much is paid in rent for the stall/ shop?
11. Are any people employed in your business?
12. Is demand for fish increasing/ decreasing?
13. How the market is structured (producers- middlemen-wholesalers-retailers)?
14. How many fish holesalers are there?
15. How many retailers are related with you?
16. Have you improved your socio-economic conditions by fish trading?   1 = yes   2 = no

a. If yes, what are these ....
b. If no, why not ....

Questionnaire for consumers

1. Name and address ....
....
2. Age : ....
3. Which carp fish do you like best? Bangladeshi carp : 1 Exotic carp : 2 Why (price /
taste)? ....
4. How much you pay for fish in a week?
 Bangladeshi carp   : (Tk./kg)   Exotic carp :   (Tk/kg)
5. How many kg of fish do you buy weekly? ....
6. Do you spend more many for meat than fish? Yes : 1 No : 2 yes
Why (price/ taste)? : ....
 7. How fish price change during last five years? .... Increase/decrease
 8. How taste of fish change during last five years? .... Increase /decrease
 9. Do you face any problem during fish buying from market1'
Yes :1 No   : 2
 If yes, what are these?   :...