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Assessment of Value Chain for Commercially Important Fish Marketing Approach in Bangladesh

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Abstract

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 there in 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.A combination of participatory, qualitative and quantitative methods is used for primary data collection. Total sample size of the study is 200 comprising of 35 Farmers, 75 brokers and marketing agents, 5 depot owner, 2 processing plants and 73 retailers. 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, Parker, 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.

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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.

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).

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. 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.

The report is organized in 5 sections. Following introduction in the first section and problem statement in the second section, the third section presents methodology followed in the study. Results and discussions are discussed in section 4. Concluding remarks and future fisheries value chains are provided in section 5.

Methodology

The study was conducted in i) Trishal, Bhaluka and Muktagaca sub-districts under Mymensingh district of north-central Bangladesh, ii) Dupchacia sub-district under Bogra district of northern Bangladesh, iii) Dumuria sub-district under Khulna district of southern Bangladesh, iv) Sadar sub-districts of Chandpur district of south-central Bangladesh and v) Jatrabari area of Dhaka district. These areas have been identified as the most important sources for pangas (Pangasius hypophthalmus), rohu (Labeo rohita), catla (Catla Catla), tilapia (Oreochromis nilotica), hilsha (Tenualosa ilisha) and shrimp/prawn (Macrobrachium rosenbergii, Penaeus monodon, and Litopenaeus vannamei).

Primary data were collected from fish market agents of Trishal, Valuka, Muktagaca and Mechua Bazar of Mymensingh district, Dupchacia and Fate Ali Bazar of Bogra district, Kharnia, Dumuria, Rupsha, 5-No. ghat and Moylapota Bazar of Khulna district, Station, Pal Bazar and Biponibag of Chandpur district and Jatrabari, Shanir Akhra, Ajompur and Abdullahpur Bazar of Dhaka district for the study. Surveys were conducted for a period of three months from November 2010 to January 2011. 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 200.

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.

Table 1. Distribution of samples from different areas

Respondents	Study Area and fish species						
	Mymensingh	Bogra	Dhaka	Chandpur	Khulna		
	Pangas/ tilapia/ rohu/ catla	Pangas/ tilapia/ rohu/ catla	Pangas/ tilapia/ rohu/catla/ hilsha	Hilsha	Hilsha	Shrimp	Total
Farmer	10	5		5	5	10	35
Faria						2	2
Bepari				5		3	8
Aratdar	10	5	10	5	5	5	40
Paiker	15	4	3		10	3	35
Depot owner						5	5
Processing plant						2	2
Retailer	21	15	12	5	9	11	73
Total	56	29	25	20	29	41	200

Results and Discussion

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. *Aratdars* do the functions of negotiation between buyers and sellers of fish and help them at their own business premises on receipt of commission. They do not take the ownership of the products. Tilapia fish farmers sell 85% of their fish to *paiker* through *aratdar*, 12% to *paiker* directly 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. *Paiker* of 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).

Table 2. 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	-	-	-	-	-

Rohu fish farmers sell 89% of their fish to *paikers* through *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%

Table 3. 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	-	-	-	-	-

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 *paikers* through *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).

Table 4. 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	-	-	-	-	-

Pangas fish farmers sell 43% of their fish to *paikers* through *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).

Table 5. 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	-	-	-	-	-

Hilsha fish farmers sell 16% of fish to farias; 24% to beparis via

aratdars, 16% to *paikers* via *aratdars* and 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, LC *paiker* 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	-	-	-	-	-	-

Shrimp farmers sell 5% of their fishes to farias; 50% to beparis, 15% to *paikers* and 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*. Account holders each sell 100% shrimp to processing plant owners and world market (export) respectively. 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	-	-
Processing plant	-	-	-	-	-	-	-
Retailer	-	-	20	80	-	-	-
Consumer	-	-	-	-	-	-	100

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

Value chain actor	Sold to (%)							
	Faria	Retailer via *Aratdar*	*Bepari* via *Aratdar*	*Paiker* via *Aratdar*	Depot owner	AC holder	Proces-sing plant	Consu-mer
Farmer	5	5	50	15	25	-	-	-
Faria	-	40	-	-	60	-	-	-
Depot owner	-	-	-	-	-	100	-	-
Paiker	-	100	-	-	-	-	-	-
Bepari	-	-	-	-	-	100	-	-
A/C Holder	-	-	-	-	-	-	100	-
Processing plant	-	World market	-	-	-	-	-	-
Retailer	-	-	-	-	-	-	-	100

Farmers Depot owners purchase 40% shrimp from farmers directly, 20% from *farias* and 40% from farmers via *aratdar*. *Paiker* and *bepari* purchase 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).

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 ? 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 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	Location	Large: Above 1 kg, Medium: 800gm to 1000 gm, Small: Less than 800 gm Catching from river, Catching from sea

The storage facilities help buyers and sellers to reduce the wide fluctuation of prices between peak and 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.

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.

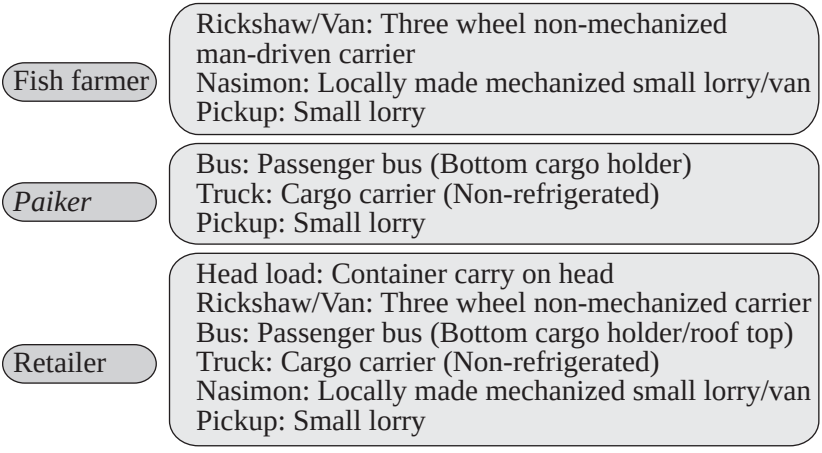

Figure 1. Mode of transport used by farmers and intermediaries for movement of major carps, pangas and tilapia

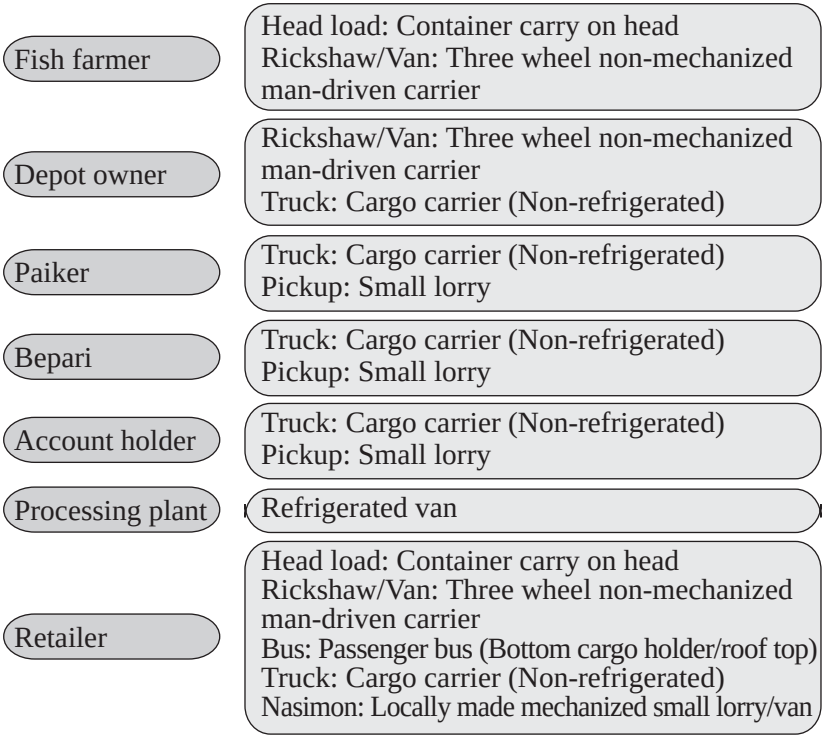

Figure 2. Mode of transport used by farmers and intermediaries for movement of shrimp

to the consumer centre. 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 1, 2 and 3 show different modes of transport used by the intermediaries to transport fish from one place to another.

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. Paikers take 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.

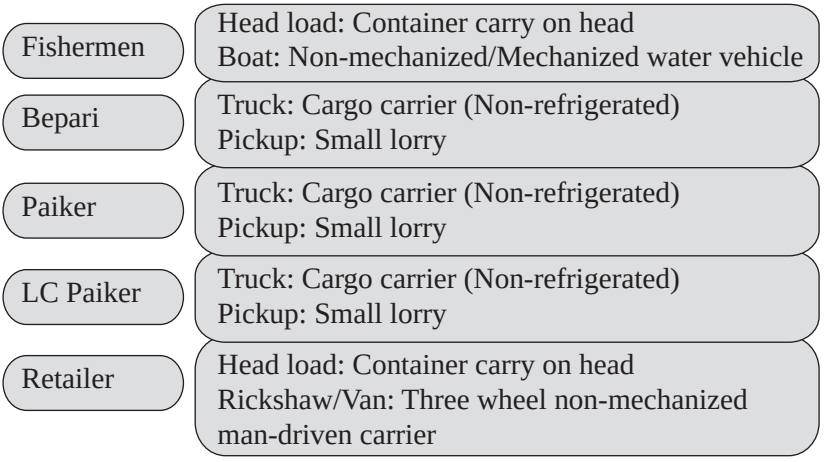

Figure 3. Mode of transport used by the farmers and intermediaries for movement of hilsha fish

Table 8. Sources of finance of major carps, pangas and tilapia fish farmers and intermediaries

Sources of finance	Market participants (%)			Retailer
	Farmer	*Aratdar*	*Paiker*	
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

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 hilsha fishermen come totally from *aratdar/mahajon* (who provides *dadan*). This dadon of the *aratdars /mohajans* makes fishermen very vulnerable as it is tied up with conditions. Fishermen receiving dadon from *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 *paikers* business 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

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 take dadon.

Table 10. Sources of finance of shrimp farmers and intermediaries

Sources of finance	Market participants (%)							
	Farmer	Depot	*Aratdar*	*Paiker*	*Bepari*	A/C holder	Proces-sing 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			

from *aratdar* 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.

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

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

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) LC Paiker (hilsha), Account holder,
Box	Cork sheet	40 and 20 kg	Processing plant (shrimp)

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

Table 12. Pricing methods followed in selling fishes in Bangladesh

Pricing methods	Market participants (%)								
	Farmer	Depot owner	*Aratdar*	*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

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 (For live Pangas)	Fish Farmer - *Nikari* - *Paiker* - Aratdar - Retailer - Consumer
Value chain - II	Fish Farmer - *Aratdar* - *Paiker* - Retailer - Consumer
Value chain - III	Fish Farmer - *Aratdar* - Retailer - Consumer

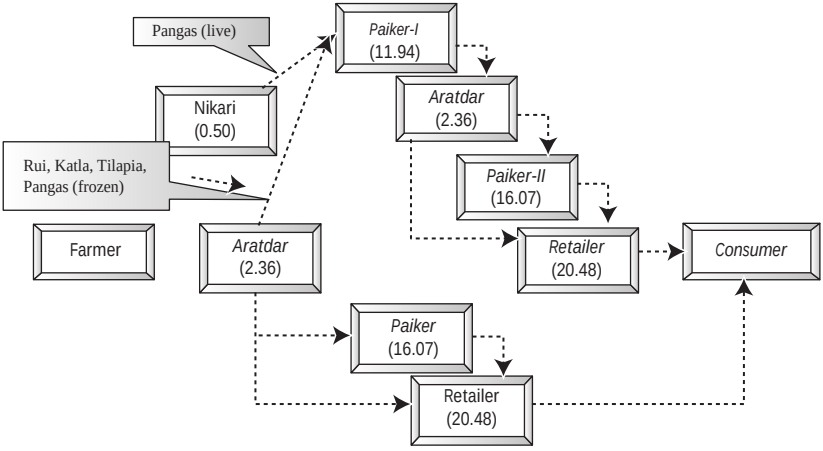

Figure 4. Value chains of major carps, pangas and tilapia in Bangladesh

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

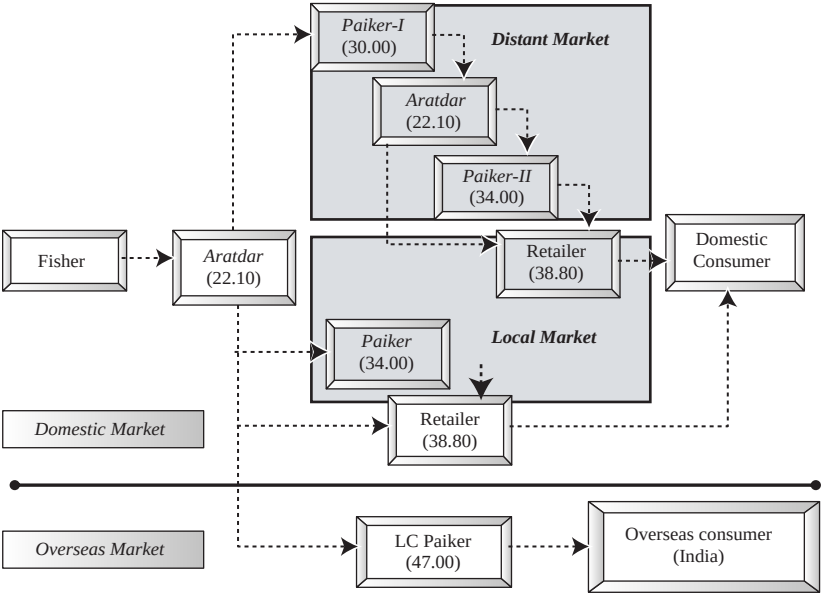

Figure 5. Value chains of hilsha in Bangladesh

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

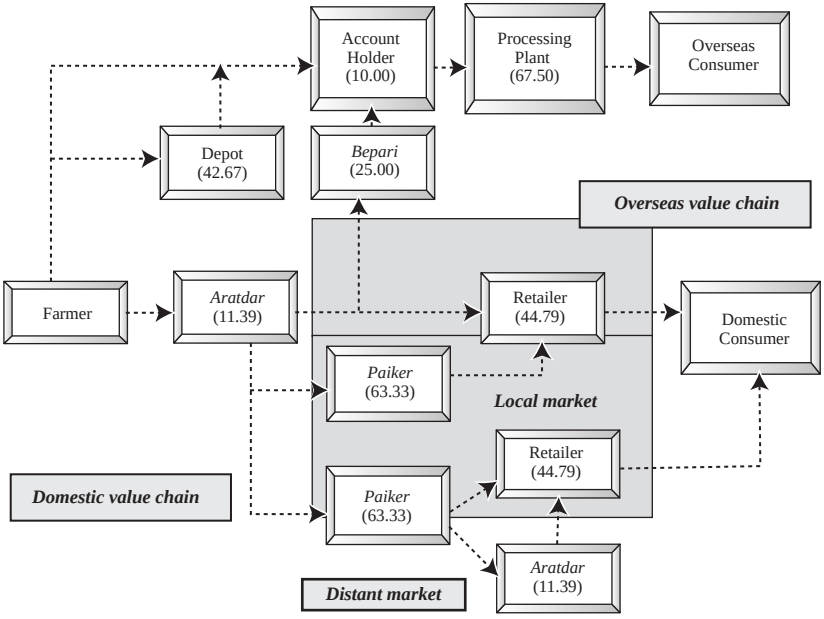

Figure 6. Value chain of shrimp in Bangladesh

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.

Table 13 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.

Table 13 : 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
Processing plant	-	-	-	-	20.85	24.46
Retailer	19.45	51.98	8.91	38.57	5.32	22.60

Conclusions

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 net work. And fish marketing chains are getting shorter in areas with better road and communication net work (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.

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 centers with refrigerated storage facilities may be developed so that the perishability of fish is checked, which would enable the assembling centers to make bulk sell/transfer to the next destination. This could reduce post harvest loss and provide better price for the fishers/farmers.

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