Study on Marketing and Value Chain of Some Commercially Important Coastal and Marine Aquatic Products of Bangladesh

Prof. Dr M. Serajul Islam
Department of Agricultural Economics, Bangladesh Agricultural University
Mymensingh-2202, Bangladesh

Prof. Dr Md. Akteruzzaman
Department of Agricultural Economics, Bangladesh Agricultural University
Mymensingh-2202, Bangladesh

Dr Nesar Ahmed
Associate Professor, Department of Fisheries Management Bangladesh
Agricultural University Mymensingh-2202, Bangladesh

Executive Summary

The marketing system and value chain of aquatic products, and the pulling factors enhancing its processing and marketing both at domestic and international markets were studied in some coastal areas of Bangladesh from 7 April 2005 to 6 April 2006. The study areas were purposively selected from Cox's Bazar, Chittagong, Patuakhali, Noakhali, Khulna, Satkhira and Bagherhat where activities related to commercial aquatic products are concentrated. Three types of market such as primary market, secondary market and consumer market were selected from the study areas. Three NGOs namely COAST, TARA and SUSHILON working in different coastal areas were selected and they extended their services to select the study areas and to collect data and information on aquatic product marketing. In total, twelve species of coastal and marine fish commonly available in the markets were selected for this marketing study. Primary data were collected by survey method wherein various market intermediaries were interviewed from the selected districts for eliciting information at various stages of coastal and marine fish marketing. Secondly, eleven different stakeholders involved in coastal and marine fish marketing were selected to address the pulling factors for enhancing marketing of aquatic products.

The study revealed that marketing margin as well as marketing profit both were relatively higher in consumer markets followed by primary and secondary markets where *beparies* and *aratdars* were involved. Results indicated that high priced fish demanded high marketing cost resulting higher marketing margin and profit compared to low-priced fish. In case of dry fish marketing, irrespective of species of fish marketed, marketing margin and profit were relatively higher compared to frozen fish marketing. Like frozen fish, high valued dry fish also claimed higher marketing cost leaving higher marketing margin as well as marketing profit for intermediaries. In export marketing, both for frozen and dried fish, marketing profit was found to depend mainly on demand in the world market.

For value chain analysis, the case of hilsa fish marketing was studied. Accordingly, supply chain and value addition, and fishermen share to sale price of hilsa at different levels of market were identified. In case of hilsa, fishermen received 89% of sales price in primary market, and 82% and 69% from secondary and consumer market, respectively. However, in the marketing system, intermediaries provided services and marketing facilities and accordingly, value of fish increased specially in secondary and consumers market. The supply chain and value addition were almost similar in case of marketing of the selected species of coastal and marine fish.

Through sub-sector analysis and market assessment, marketing constraints and pulling factors were identified and accordingly, discussions were made on potential impact of providing business development services (BDS) in improving coastal and marine fish marketing. The BDS might be provided through the formation of effective association of different actors involved in the marketing system. In that case, provision of forward selling with reasonable price, establishing standard weight and grading, and access to market information were considered as most essential to improve the marketing system of coastal and marine fish marketing.

Background of the Research

Bangladesh is considerably rich in extensive fisheries resources. Physical fisheries resources are of two types - inland fisheries and marine fisheries. The inland fisheries again includes capture fisheries and culture fisheries. Of these sources, capture fisheries is very important. In 2003-2004, 35, 43 and 22 percent of total catch were obtained from inland capture fisheries, culture fisheries and marine capture fisheries respectively (DoF, 2005).

As the catch from inland capture fisheries is declining gradually in Bangladesh, the costal and marine fish is considered to be an important source of protein. Bangladesh acquires a remarkable amount of foreign exchange every year by exporting coastal and marine fisheries products. Due to increase in demand and high price of fishes both in domestic and export market, Bangladesh has a great potentiality to gain huge foreign exchange by exporting costal and marine fishes.

Traditionally, people of Bangladesh like to eat fresh fish. Chilled and dried fish are also marketed now a day 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.

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 was considered as non-conventional items before the independence of the country. It has increased many-folds during the last decade 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 amounted Tk 257.20 million in 2004-05 of which frozen fish and shrimp shared more than 90 percent of the total exports of the fishery products (EPB, 2005). Considering fish production and distribution it was an urgent need to study on fish marketing. Thus, the present study was conducted to examine the marketing system, supply chain and value addition to determine the pulling factors for enhancing production, processing and marketing of coastal and marine aquatic products in Bangladesh.

Specific Objectives of the Research

- To examine the market structure and marketing system of frozen and dry fish, and intermediaries involved in aquatic product marketing.
- To determine THE marketing costs and margins, and profits of marketing intermediaries both in domestic and export marketing.
- To examine the value chain of aquatic species (or products) aiming to determine the value added to marketed fish in different steps of marketing channels
- To investigate the pulling factors for enhancing processing and marketing of aquatic products both at domestic and international market.

Materials and Methods

Identification of factors and variables in aquatic product marketing

In marketing of commercial aquatic products, two important variables which are usually measured are marketing cost and marketing margin. While marketing margin represents the difference between consumer and producer price, marketing cost consists of material and non-material costs involved in performing marketing functions by the intermediaries. These functions include storage, transportation, grading, processing and financing and the associated costs incurred in performing these functions are the relevant variables in the context of the present study. Besides, product price is an important variable which was examined to determine the variation of price of different species in different locations. In each level of market, efforts and activities are provided to add value to aquatic products. Actually, added value is the revenue and efforts are costs involved in promotion of marketed products, for which values are added from primary to consumer market and formed the value chain for marketed fish which were determined. For all the promotional activities of fish marketing, pulling factors were added.

Sources of data

For marketing of commercially important coastal and marine aquatic products, a preliminary survey was made to get first hand information and then a marketing survey was conducted to have detailed information about marketing system of aquatic products. However, data were collected both from primary and secondary sources. Secondary data were collected from various offices and consulted with the documents of government and non-government agencies such as Bangladesh Frozen Food Exports Association (BFFEA), Bangladesh Export Promotion Bureau (BEPB), Bangladesh Fisheries Development Corporation (BFDC), Department of Fisheries (DoF), marketing cooperatives etc. Primary data were collected by survey method wherein various market intermediaries were interviewed for eliciting information at various stages of aquatic product marketing. Apart from these, informal interview with the primary producers, concerned traders and buyers were conducted for cross checking the marketing information.

Selection of the study areas

The study areas were purposively selected from Cox's Bazar, Chittagong, Khulna, Satkhira, Bagherhat, Patuakhali and Noakhali districts depending upon the production and marketing of commercial aquatic products. In these study areas, three types of market such as primary markets, secondary markets and consumer markets were selected. However, to include some commercial species study areas were extended to Teknaf of Cox's Bazar district and Shyamnagar and Paikgacha of Khulna district. Actually, the aquatic product markets were concentrated more in Cox's Bazar and Chittagong compared to other coastal areas of Bangladesh. In addition, Dhaka city markets were selected to examine the price variation in secondary and consumer markets compared to coastal areas of Bangladesh. This uniqueness and market potential of study areas were taken into consideration during the field visit. Three

NGOs namely COAST, TARA and SUSHILON worked with the project to select study areas and to collect data and information on fish marketing.

Selection of marketing intermediaries

The sampling design for marketing survey fall within the purview of stratified random sampling. In the whole marketing channel the intermediaries constituted the different strata from which the individual samples were selected randomly. Sampling frame was prepared at each stage of the marketing channel and reasonable size of sample was drawn for each level of market (Table 1).

Table 1 Selection of intermediaries involved in marketing channel a. Domestic market (frozen fish)

Aquatic product market	Intermediaries involved	Selected Number	Market location
Primary market (Landing center/ Local market)	*Bepari* (Supplier)	40	Cox's Bazar, Chittagong, Khulna, Satkhira, Bagherhat, Noakhali and Patuakhali
Secondary market	Intermediaries *aratdar* (Fish Brokers)	50	Cox's Bazar, Chittagong, Khulna, Satkhira, Bagherhat, Noakhali, Patuakhali and Dhaka
Consumer market	Retailers	55	Cox's Bazar, Chittagong, Khulna, Satkhira, Bagherhat, Noakhali, Patuakhali and Dhaka
Total		145	

b. Domestic market (Dry fish): Data collected mainly from Cox's Bazar, Teknaf and Chittagong

c. Export market

Location of Port of exit	Export oriented farm, Fish drying factories (Primary market) Sample Number	Exporting agencies, Processing plant, Farm, Companies ample Number	Total
Cox's Bazar	10	2	12
Chittagong	-	2	2
Dhaka	-	1	1
Total	10	5	15

Sampling design and data collection

The total number of samples was dependent on the number of intermediaries involved in the marketing channel. In primary markets (landing centers or local markets), local *paikers*, *beparies*, and *aratdars* were involved but in the secondary markets (extended markets), inter-district *paikers*, local *paikers* and *aratdars* were also involved. Retailers were involved in consumer markets. Therefore, from primary to final consumer market, there was a long chain and value addition, and complicated marketing channel for distribution of aquatic products. In each level of market, how small and poor fisheries participate in fish processing and marketing, and contribute to value addition to marketing channel were also being studied. However, considering the scale of involvement of different kinds of intermediaries, a total of 145 sample intermediaries were selected of which in primary market, secondary market and consumer market, the number of selected intermediaries were 40, 50 and 55, respectively. For primary market, landing centers in Cox's Bazar, Chittagong, Khulna, Satkhira, Bagherhat, Noakhali and Patuakhali were considered and for that of secondary and consumer market, the same districts were also being considered. In addition, Dhaka city markets were selected to know the prices of secondary markets and consumer markets of selected aquatic species and it was compared with other study areas. The required number of samples were drawn from these districts to examine the domestic marketing channel and value chain analysis of selected aquatic products. For export market, data and information were collected from 15 export oriented firms and agencies. For domestic and export market in total 12 major species (frozen and dry) of fish were considered to analyze the market structure, value addition and price formation in different levels of market.

Commercial species of coastal and marine aquatic products

There are lots of aquatic species but only those species which are commercially important were selected for the present study. Considering the scale of production and marketing, in total 12 species were selected. Again, considering the commercial importance and volume of respective species marketed, all the selected species were categorized into major species (hilsa, catfish, pamphlet, tuna and captured shrimp) and minor species (Bombay duck, coral, marine ell, phaisa and shark). It may be noted that, this categorization was thought to be very effective for making meaningful analysis and better presentation.

Analytical technique

The data and information so collected were reduced to tabular form using arithmetic mean, percentage and ratio. For aquatic product marketing, intermediaries involved in marketing channel were identified and marketing costs and margins, and profits of marketing intermediaries both in domestic and export marketing were determined by using tables and flow diagrams. Value chain analysis of the selected aquatic species and pulling factors enhancing processing and marketing, and overall market promotion of commercially important aquatic products were also being addressed using same analytical technique.

Results and Discussion

Coastal and marine fish marketing system and profitability of intermediaries

Coastal and marine fish contributes about 22% to total fish production in Bangladesh. The most common species of fish harvested and consumed are hilsa, catfish, pomfret, shrimp, ribbon and jew fish. Of these, hilsa alone contributes more than 40% to total marine fish marketed. Hilsa is the only species which was found to be marketed and consumed all over Bangladesh. But for other species, marketing system was not widened and most of them were distributed to district fish markets and consumed by small number of consumers. Except hilsa, other species of coastal and marine fish were scarcely available and not popular in rural areas of Bangladesh because of underdeveloped marketing system.

Marketing system of coastal and marine fish

Marketing is the connecting link between the producers and consumers. Through marketing system, fish, being a perishable commodity, reaches the consumer in acceptable condition. The marketing system operates through a set of intermediaries performing useful commercial functions in a chain all the way from the producers to the final consumers. The commercial units comprising the fish marketing system can be grouped into three categories - fish suppliers (*beparies*), fish brokers (*aratdars*) and fish retailers.

Beparis (locally called '*Forsay*) obtained their supplies of fish directly from the fishermen as they come ashore with their catch. The *aratdars* who operate in small numbers in the district (or extended) markets and large numbers in big city e.g., Kawran Bazar, usually obtained their supplies from *beparies*. Fish retailers in turn obtained their supplies either from the *aratdars* or *bepareis*, or when convenient directly from the producers at the landing point. The entire marketing function of the fishing industry was found to be conducted through these categories of middlemen. In this chain of commercial relationships linking fish producers with fish consumers, the private sector was found to handle more than 95% of fish produced in the country.

Marketing channels

Marketing channel is the sequence of intermediaries through which harvested fish passes from producers to consumers. It may be noted that individual species, to some extent, has some specific marketing channel and supply chain but in the present study, common and general marketing channel was followed for all the selected species. Secondly, the channel may be short or long depending on kind and quality of fish marketed, available marketing services and the prevailing social and physical environment. In the present study the major species which covered more than 80% of marine fish marketed were selected to determine the marketing channel, marketing cost, marketing margin, and profit of intermediaries involved in marine fish marketing. In domestic and export marketing both frozen and dry fish were considered. Channels of distribution of frozen and dry fish show that, apart from producer, sellers of different categories participated in marketing channel of coastal and marine fish in study areas. Market participants included producer, *beparies*, *aratdars*, retailers, processing plant and export agencies.

Producers

In Cox's Bazar, Chittagong and Khulna, Satkhira, Bagherhat, Noakhali and Patuakhali, the fish producers were often found to sell their fish of the boats at the fishery *ghat* or fish landing station. In a few cases the producers who have more number of boats and large amount of catch were found to bring their fish to wholesale market (*arat*) at the town or district market. During the peak season, sometimes the producers were found to go to district markets to sell their fish in order to have good price. Most of the producers usually were found to sell their products to *beparies* at the landing station and to some extent, inter-district *aratdar* and processing plant and agencies.

Beparies

In coastal and marine fish marketing, *beparies* were found to be the professional fish traders and they purchased fish from producers and sell their consignment to the retailers through *aratdar*s or commission agents. Usually, they purchase fish from the producers in landing centre and bring their aquatic product to different district's *arat* center for sale. *Beparies* are well organized and they were found to handle about 65% and 54% of frozen and dry fish produced respectively. There were roughly 10 to 40 parties *beparies* in e very inter-district wholesale market and in each party there were at least 12 to 20 persons. They are professional businessmen and have wide experience in fish marketing. Most of the *bepries* temporarily employed labourers to involve in activities of fish marketing. *Beparies* who purchase fish from the fishery *ghat*/landing centre and sell it through the *aratdars* had to pay 3-5 % commission to *aratdar* for selling the products. Secondly, there were some rich *beparies* who own carrier boats and launch and purchase fish from the sea from the fishermen and brought their product to sell the same through the *aratdars*. Thirdly, there were a few local *beparies* who purchase fish from different wholesale markets and sell their products to the retailers with higher prices.

Aratdars

The *aratdar* is a commission agent who has a fixed establishment and helps the *beparies* to sell their products and usually charges a fixed commission of Tk 30 to 40 per thousand sales revenue. Since commission is charged on sales revenue, an *aratdar* tries to sell fish at higher prices. There are 20 to 35 *aratdars* in different inter-district markets. They provide short period storage facilities and also perform the function of grading. They make cash payment to *bepries* and supply fish to retailers, in most cases, on credit. *Aratdards* do not share any cost of *beparies* or retailers. They hire labourers and salaried persons for performing various functions such as loading, unloading, weighing, grading etc. Usually, they handle larger volume of fish than the *beparies*. The *aratdar*s often provide loan to *beparies* on the condition that the *beparies* have to sell fish through them. A *bepari* may take money from more than one *aratdar* and in this case he divides his products and sells through different *aratdar*s. The *beparies* and *aratdar*s reported that about 70% of coastal and marine aquatic products is sold by auction through *aratdar*. Some

*aratdar*s in landing station sometimes purchase exportable fish directly from the producers. The most important aspect of *aratdar*s' business is that, *aratdar*s do not purchase fish but they facilitate to sell the fish with the provision of taking commission.

Retailers

The retailers form the last link in the marine fish marketing chain. They buy fish from the *aratdar*s mostly on credit basis and some of them on cash payment and sell it to the consumers. The customer obtains her/his requirements for fish from the fish retailer who, in turn, obtains supplies from *aratdar*s and *beparies*. The economics of fish retailing sector, therefore, would have a direct bearing on the prevailing consumer price of fish. Given the price at which the retailer obtains supplies, the customer price of fish will be a function of the technical and economic efficiency in the fish retailing sector. The technical inefficiencies could result from waste and spoilage, which in turn are related to factors such as the available post-harvest technology, including ice and chilling facilities. Economic inefficiencies would result from pure monopoly profits, which are associated with monopsonistic and/or monopolistic condition in the retail market, or from failure to use all marketing inputs at their optimum level (Fernando 1987).

Involvement of marketing cost in different levels of markets

Marketing cost in domestic marketing

Marketing costs represent the cost of performing various marketing functions which are needed to transfer a commodity from the place of production to the ultimate consumers. In coastal and marine fish marketing nature and types of costs at different stages in marketing process are not identical due to dissimilarities of marketing functions at various stages. Through marketing channel usually frozen and dry fish of different sizes are marketed in different levels of market. In each of frozen and dry fish markets, only some marketed species of fish were selected for this study and both in domestic and export markets, costs of marketing of frozen and dry fish at different levels of market were determined. In domestic marketing, ten species as shown in Tables 2 and 3 are mostly consumed as frozen.

Table 2 Profitability and marketing margin (Tk/kg) of different frozen fish in domestic marketing

Particulars of marketing	Hilsa	Cat fish	Pomfret	Tuna (Maittya)	Captured shrimp	Average
Primary Market						
Purchase price (PP)	101.25	30.71	183.75	66.25	45.00	85.39
Marketing cost (MC)	5.51	5.06	6.24	4.98	5.50	5.46
Sales price (SP)	113.75	42.14	208.00	82.50	55.00	100.28
Marketing margin (MM=SP-PP)	12.50	11.43	24.26	16.25	10.00	14.89
Marketing profit (MP=MM-MC)	6.99	6.37	18.01	11.27	4.50	9.43
Secondary Market						
Purchase price (PP)	117.14	42.50	208.40	82.50	55.00	101.11
Marketing cost (MC)	4.20	2.75	3.01	2.64	3.75	3.27
Sales price (SP)	123.86	48.75	215.50	88.00	61.50	107.52
Marketing margin (MM=SP-PP)	6.72	6.25	7.10	5.50	6.50	6.41
Marketing profit (MP=MM-MC)	2.52	3.50	4.09	2.86	2.75	3.14
Consumer Market						
Purchase price (PP)	127.14	55.63	212.10	97.00	70.00	110.98
Marketing cost (MC)	5.09	3.55	6.48	4.64	5.82	5.12
Sales price (SP)	146.43	65.63	233.67	114.33	86.67	129.63
Marketing margin (MM=SP-PP)	19.29	10.00	21.57	17.33	16.67	18.65
Marketing profit (MP=MM-MC)	14.20	6.45	15.09	12.69	10.85	13.53
Total marketing margin and profit						
Total marketing margin[1]	45.18	34.92	49.92	48.08	41.67	44.24
Total marketing profit	23.71	16.32	37.19	26.82	18.10	26.10

[1] Total marketing margin and profit covered mostly the variable cost for fish assembling, processing and distribution

These were selected to estimate the marketing cost and marketing margin and profit of intermediaries involved in marketing channel while in case of dry fish marketing, only five species were selected (Table 4).

Table 3 Profitability and marketing margin (Tk/kg) of different minor frozen fish (less available) in domestic marketing

Particulars of marketing	Bombay duck	Coral fish/ Sea bass	Marine eel	Phaisa (Mullet)	Shark	Average
Primary Market						
Purchase price (PP)	16.25	95.00	36.25	40.00	23.67	42.23
Marketing cost (MC)	4.45	6.67	5.28	4.53	3.78	4.94
Sales price (SP)	26.25	111.43	48.75	52.00	35.33	53.75
Marketing margin (MM=SP-PP)	10.00	16.43	12.50	12.00	11.66	11.52
Marketing profit (MP=MM-MC)	5.55	9.76	7.22	7.43	7.88	6.58
Secondary Market						
Purchase price (PP)	27.00	111.43	51.00	52.00	34.57	55.20
Marketing cost (MC)	2.68	3.94	2.86	2.23	2.51	2.84
Sales price (SP)	34.00	117.50	59.00	58.00	42.00	62.10
Marketing margin (MM=SP-PP)	7.00	6.07	8.00	6.00	7.43	6.90
Marketing profit (MP=MM-MC)	4.32	2.13	5.14	3.77	4.92	4.06
Consumer Market						
Purchase price (PP)	38.00	117.50	59.00	60.00	42.00	63.30
Marketing cost (MC)	3.60	6.20	3.66	3.98	3.64	3.55
Sales price (SP)	51.00	128.54	70.00	74.14	53.00	75.34
Marketing margin (MM=SP-PP)	13.00	11.04	11.00	14.14	11.00	12.04
Marketing profit (MP=MM-MC)	9.40	4.84	7.38	10.16	7.36	8.49
Total marketing margin and profit						
Total marketing margin	34.75	33.54	33.75	34.14	29.33	33.11
Total marketing profit	19.27	16.73	19.74	21.36	20.16	19.13

Table 4 Profitability and marketing margin (Tk/kg) of different major dry fish in domestic marketing

Particulars of marketing	Jew fish	Ribbon fish	Pomfret	Tuna (Maittya)	Captured shrimp	Average
Primary Market						
Purchase price (PP)	67.50	85.00	432.50	175.00	170.00	186.00
Marketing cost (MC)	9.25	8.00	12.75	6.90	14.35	10.25
Sales price (SP)	90.00	115.00	470.00	200.00	197.50	214.50
Marketing margin (MM=SP-PP)	22.50	30.00	37.50	25.00	27.50	28.50
Marketing profit (MP=MM-MC)	13.25	22.00	24.75	18.10	13.15	18.25
Secondary Market						
Purchase price (PP)	90.00	115.00	470.00	200.00	197.50	214.50
Marketing cost (MC)	2.00	2.00	4.50	2.15	4.75	3.08
Sales price (SP)	97.50	121.25	485.00	210.00	210.00	224.75
Marketing margin (MM=SP-PP)	7.50	6.25	15.00	10.00	12.50	10.25
Marketing profit (MP=MM-MC)	5.50	4.25	11.50	7.85	7.75	7.17
Consumer Market						
Purchase price (PP)	97.50	121.25	485.00	210.00	210.00	224.75
Marketing cost (MC)	5.50	5.25	6.15	4.70	6.45	5.61
Sales price (SP)	125.00	142.50	525.00	240.00	235.00	253.50
Marketing margin (MM=SP-PP)	27.50	21.25	40.00	30.00	25.00	28.75
Marketing profit (MP=MM-MC)	22.00	16.00	33.85	25.30	18.55	23.14
Total marketing margin and profit						
Total marketing margin[1]	57.50	57.50	92.50	65.00	65.00	67.50
Total marketing profit	40.75	42.25	70.10	51.25	39.45	48.56

Marketing of frozen fish

Three types of intermediaries viz., *beparies*, *aratdars* and retailers were found involved in coastal and marine fish marketing. These three categories of intermediaries perform different marketing operations and functions and accordingly, there is a large variation in marketing cost incurred by the intermediaries. After purchasing fish from landing station *beparies* carry it by trucks to inter-district markets and they perform the marketing functions of assembling, icing and loading and unloading. They also pay the market tolls, electricity and rent for *arat* houses. *Beparies* sell their fish to the retailers through *aratdars* and they have to pay 3 to 4% commission to *aratdar* from their sales revenue. It may be noted here that payment of commission makes the marketing cost higher for *beparies* than for retailers. However, marketing costs for each kg of frozen fish were estimated to be Tk 5.30, 1.85 and 2.90 for *beparies*, *aratdars* and retailers respectively. In lieu for taking commission, *aratdars* simply help *beparies* to sell their products and collect buyers (retailers) to purchase it without taking any risk of loss or damage of fish. Accordingly, *aratdar's* marketing cost was lower (Tk 1.85/kg) compared to that of *beparies* and retailers.

There is small variation of marketing cost at different locations of primary market. Both for major and minor species, cost of marketing was almost similar in all the locations for each of respective intermediaries but there was small variation of marketing cost among the species studied. *Beparies* in Cox's Bazar incurred lower cost for major (Tk 5.46/kg) and minor species (Tk 4.94/kg) compared to other study areas. In the secondary market, average marketing cost and sales price for individual species were lower compared to consumer market. Even in case of individual species, small variation was observed for marketing cost and as well as sales price both in secondary market and consumer market. However, for frozen fish, consumers market and secondary market were competitive compared to primary market.

Marketing of dry fish

In dry fish marketing, owners of fish drying factories were found to purchase fish from fish landing centers or suppliers and brought fish to their own processing/drying plants. They had to perform different activities in processing plants to make ready for sell. Item wise costs of drying factories included loading and unloading, transportation, wage and salaries of staff and use of processing materials. Owners of drying fish factories also pay commission to *aratdars* when they sell fish through *arat* and it claims about 12% of total marketing cost. In comparison to frozen fish marketing, intermediaries involved in dry fish marketing incur more costs since the fish to be marketed are dried up and processed to sell it in good and hygienic condition. In the present study, estimated cost per kg of dried fish for *beparies*, *aratdar* and retailers was Tk 10.65, 2.90 and 5.35 respectively.

Marketing cost in export marketing of frozen fish

There are 129 processing plants (DoF, 2005) and 20 drying factories in Bangladesh. Most of the plants are situated in Khulna, Cox's Bazar and Chittagong. These processing plants process both marine and fresh water fish for export. In case of coastal and marine fish they collect fish from the

beparies or suppliers. Some of the owners of processing plants own mechanized boat or trawler from where they can collect fish for their plants. Marketing cost increases if they have insufficient supply of fish for their plant. In that case processing plants have to gather fish from other sources and even sometimes they collect fish from other plants. When required quantity of processed fish are stocked, the processors usually export fish abroad. In case of marine shrimp, both processing and packaging in most of the cases, are done in harvesting trawler.

Bangladesh exports frozen and dried fish, and salted and dehydrated fish. In the present study both frozen fish and dried fish were selected for fish marketing analysis. For each of frozen and dried fish marketing, seven species, as shown in Table 5 were selected because these species covered major proportion of fish marketed. The processing plant (or agencies) incurred cost Tk 42.50 and 63.68 per kg of frozen and dry fish respectively for processing and marketing. Fish drying factory or plant incurred higher cost because more efforts and materials are needed for marketing of dried fish compared to frozen fish. However, both for frozen and dried fish marketing, wage and salaries of employees, packaging, freight and transportation were the main items of marketing cost for export marketing.

Table 5 Marketing margin and profitability (Tk/kg) of processing plant/ agencies in exporting frozen/dry fish

Particulars of marketing	Selected species for export marketing				
	Hilsa	Cat fish	Pomfret	Coral/Bhetki	Average cost
Export Market (Frozen fish)					
Purchase price (PP)	90.00	40.00	240.00	107.50	119.38
Marketing cost (MC)	43.75	25.00	65.00	40.50	43.56
Sales price (SP)	227.50	130.00	495.00	195.00	261.88
Marketing margin (MM=SP-PP)	137.50	90.00	255.00	87.50	142.50
Marketing profit (MP=MM-MC)	93.75	65.00	190.00	47.00	98.94
Export Market (Dry fish)	Jew fish (Poya)	Ribbon fish	Pomfret	Tuna (Maittya)	Average cost
Purchase price (PP[1])	350.00	157.50	265.00	270.00	260.63
Marketing cost (MC)	110.00	42.00	45.00	60.00	64.25
Sales price (SP)	552.50	292.50	425.00	390.00	415.00
Marketing margin (MM=SP-PP)	202.50	135.00	160.00	120.00	154.37
Marketing profit (MP=MM-MC)	92.50	93.00	115.00	60.00	90.12

[1]On an average 3.5 kg = 1 kg dried fish. Accordingly, purchase price considered the value of 3.5 kg fish for 1 kg dried fish

Marketing margin and profitability of intermediaries

Marketing margin and marketing cost are usually used to estimate the profitability of intermediaries involved in marine fish marketing. Marketing margin at a particular stage of transaction is the difference between sales price and purchase price while marketing profit is the difference between the marketing margin and marketing cost for each species of fish marketed. Total marketing margin is the difference between the price received by the producer and the price paid by consumer. Marketing margin is the price for adding activities and functions performed by intermediaries (Kohls and Uhl (1980).

However, marketing cost and marketing margin of respective categories of intermediaries are the main determinants of the profitability in marketing of coastal and marine fish. Secondly, marketing margin of a particular level of market is greatly influenced by the supply of and demand for fish marketed. At each level of market, most of the intermediaries act as buyers and as well as sellers. Accordingly, their market margins depend on market condition in time of buying and selling.

Domestic marketing

Marketing margins and profitability of different intermediaries, both for frozen and dry fish, were estimated separately and are shown in Tables 2 and 3. Results were presented for individual species and average of all selected species and finally, total marketing margin and marketing profit were estimated for easy understanding and presentation (Tables 2-5).

In respect of market margin and profitability of intermediaries involved at different levels of market, there is variation in market scenario between frozen fish and dry fish marketing. Tables 2-4 show that like individual species, marketing margin as well as marketing profit both were relatively higher in consumer market followed by primary and secondary markets where *beparies* and *aratdars* are involved. It is evident from the above mentioned tables that high priced fish demanded high marketing cost resulting higher marketing margin and profit compared to low priced fish. It was reported that processing and transportation costs were higher for high valued species compared to the low valued ones. Considering all major species in frozen fish market the average marketing margins for each kg of fish were Tk 14.89, 6.41 and 18.65 in primary, secondary and consumer market, respectively and the corresponding values for marketing profits for three different markets were Tk 9.43, 3.14 and 13.53, respectively. Adding up the average values of marketing margin and profits at different levels of market, total marketing margin and profit were Tk 44.24 and 26.10 per kg respectively. The market scenario is almost similar for minor species.

In dry fish marketing, irrespective of species of fish marketed, marketing margin and profit were almost twice the amount of the frozen fish market. Like frozen fish, high valued dry fish also claimed higher marketing cost leaving higher marketing margin as well as marketing profit for intermediaries. It may be noted here that unlike frozen fish marketing, processors (or assemblers)

in primary market received higher marketing profit followed by retailers and *aratdars* in consumer market and secondary market, respectively. However, considering all the selected species, total marketing margin and profit per kg were Tk 67.50 and 48.56, respectively.

In the marketing system, although intermediaries provide services and marketing facilities and incur cost for them, but still marketing margin and profit in different levels of market were rather higher. From Tables 2-4, it can be seen that if purchase price of primary market and sales of price of consumer market are considered, fishermen received 58-65 percent and 75 percent of total final price (sales revenue) respectively for frozen and dry fish in domestic marketing.

Export marketing

Owners of processing plants and export agencies export fish to different countries of the world. In export marketing, marketing profit depends mainly on demand for exportable fish in the world market. Table 5 show marketing margin and profitability of processing plant/agencies in exporting frozen and dry fish. Table 5 shows that frozen fish exporters earned net profit of Tk 98.94 per kg while in case of dried fish, exporters obtained marketing profit of Tk 90.13 per kg by exporting four different species of fish. Marketing margin per kg was found to very with species viz. Tk 47.00 for frozen coral, Tk 190.00 for frozen pomfret while in case of dry fish, it varied from Tk 120/kg for tuna to Tk 115.00 for pomfret.

In dried fish export marketing, jew fish is the most important species followed by tuna, ribbon fish and pomfret. Although there was big difference of purchase price between jew fish and ribbonfish but their marketing profits were almost similar that is Tk 93.50 for jew fish and 93.00 for tuna fish respectively. By exporting the tuna, exporters earned profit of only Tk 60.00/kg which was the lowest among the species exported. Moreover, it can be noticed from Table 4 that usually the high valued species of fish are exported which also claimed higher cost for its processing and marketing. But again, marketing margin and marketing profit were very high which goes to the intermediaries and fishermen received only 45 and 60 percent of the total final price (sales revenue) for frozen and dry fish, respectively in the export market.

Value chain analysis of aquatic and marine fish products

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, delivery to final consumers (Kaplinsky and Morris, 2000). In reality, value chain tends to be extended with a whole range of activities within each link and links between different value chains. Despite the inherent complexity, value chain analysis can deepen inquiry into the disjuncture between high level of economic integration into national and global product markets and the extent to which countries and people actually gain from such integration (Jacinto, 2004). Value chain analysis, in this context, is an innovative tool that developing countries should consider. The value chain approach analyses, at the sector level, each link in the ‘chain of activity’ - from the time when the

product or service is only an idea to the time when it is disposed of after use (Porter, 1980). A value chain for any product or service extends from research and development, through raw materials supply and production, through delivery to international buyers, and beyond that to disposal and recycling.

Development of value-added fishery products and marketing systems to foster their participation in the national and global economy if they so choose, taking into account the optimal balance between production for local food security and for the market. The price of a fish comprises cost and profits that can be analyzed to estimate value added for the purpose of comparing economic contributions and productivities between sectors of each fishery and among fisheries. Each level from fishing through retailing adds value to the product. Due to declines in stocks, fish processors are reshaping their production, moving to value-added products. Value is added by reducing costs and careful selection and handling of raw materials, assurance of reliable supply, meticulous packaging and presentation, careful transportation, and prompt delivery. These usually require investments in market research and in building relationships throughout the marketing chain.

With the elements of value chain analysis, hilsa fish marketing systems is presented in Table 6 because it contributes about 70% to marine fish production. Table 6 depicts clearly value addition and marketing profit prices at each level of market. In case of hilsa, fishermen received 89 % of sales price in primary market, and 82% and 69 % from secondary and consumer market, respectively. However, in the marketing system, intermediaries provide services and marketing facilities and accordingly value of fish increased specially in secondary market and consumer market. The supply chain and value addition, to some extent, was almost similar for each species of coastal and marine fish marketing.

In hilsa fish marketing, marketing costs and margins are unduly high. The price received by the fishermen is very less as compared to the price paid by the consumers. The net share of the fishermen and the price paid by the consumers was found to very widely. The fishermen's share in the consumers' price was about 69 percent. The fishermen's net share got reduced with the rise in middlemen in the marketing channel. The intermediaries were found to avail the opportunity and exploited both the fishermen at the landing centre and consumers at the retail point. The intermediaries were found to dictate the price for fish in the absence of intervention by the government in the trade and they appropriate a margin, which is unduly high. The numbers of middlemen in the marketing channel play a crucial role in discriminating the net share of the fisherman.

Table 6 Supply chain and value addition, and fishermen share to sales price of hilsa at different levels

Markets	Particulars of marketing	Tk/kg	Fishermen share to sales price %
Primary market (assembling market)	Purchase price (PP)	101.25	89
	Marketing costs (MC)	5.51	
	Sales price (SP)	113.75	
	Marketing margin (MM=SP-PP)	12.50	
	Marketing profit (MP=MM-MC)	6.99	
Secondary market	Purchase price (pp)	117.14	82
	Marketing costs (MC)	4.20	
	Sales price (SP)	123.86	
	Marketing margin (MM=SP-PP)	6.72	
	Marketing profit (MP=MM-MC)	2.25	
Consumer market	Purchase price (pp)	127.14	69
	Marketing costs (MC)	5.09	
	Sales price (SP)	146.43	
	Marketing margin (MM=SP-PP)	19.29	
	Marketing profit (MP=MM-MC)	14.20	

Source: Derived from Table 1

Pulling factors enhancing processing and marketing of aquatic products

It was found that to some extent, major 11 critical constraints were faced by various actors in the supply chain of aquatic product marketing in the study areas. The sub-sector analyses and market assessment provided the opportunities for business development services of marine aquatic product markets of Bangladesh corresponding to their related constraints. The existing service providers for business development services (BDS) of marine aquatic product market were also investigated. The potential impacts of the corresponding service provisions to the respective interventions were examined.

Sub-sector constraints

The sub-sector analyses and market assessment provide valuable insights into the sub sector and revealed certain critical constraints that are faced by various actors in the value chain. Apart from the

Table 7 List of actors of sub-sector product market in three study areas

Actors	Khulna	Cox's Bazar	Patuakhali
Faria	9	6	8
Aratdar	7	9	9
Wholesaler	8	11	5
Retailer	4	8	6
Account holder, depot	3	-	2
Account less, depot	5	-	2
Key informant	5	4	5
Service provider	16	8	9
Boat owner	2	5	2
Supplier/Hatchery	1	-	1
Processor/Exporter	5	3	1
Total	65	54	50

constraints, the analyses and assessment also showed the dynamics of the sub-sector, its behavior, customs and practices, as well as potentials and opportunities. Before going into the constraints, an understanding of the dynamic interrelationships of the sub-sector might be useful which was discussed in Section 5.1. These can be understood through the sub sector maps. The major constraints that were identified in the three survey areas are listed below without any priority. On the other hand, some were very area specific. However, the area specific constraints and opportunities are shown in Table 8.

Results of the study indicated that 92 percent actors in primary market had no bargaining power due to receiving loan from the actors of the secondary market (such as: wholesaler, depot owner etc.). On the other hand, 88 percent respondent reported the problem of inability to release credit, sales money and fraudulent practice in measuring weight and grade by the different actors in supply chain in the international as well as in the local markets. Seventy eight percent respondents mentioned the problem of price fluctuation both in the international market as well as

in the local markets. Seventy six percent of the respondents reported the problem of getting institutional credit for the actors of the primary market to expand their aquatic product business. Risk and uncertainty in transporting aquatic products was the crucial problem as reported by 72 percent respondents. Sixty eight percent respondents faced the problem of limited capacity of boat. The poor quality of products and inadequate security of the collectors from wild life and water pirates were complained by 64 percent respondent. Sixty percent of the exporter or depot owners complained that the quick changes of the sanitation rules and regulations by foreign buyers made them anxious.

Table 8 Constraints of aquatic product market in south and southwest region of Bangladesh

Constraints	Reported by % of sample actors
1. Inability to release credit sells money	88
2. Price fluctuation	78
3. Lack of adequate knowledge and information on the price of aquatic products	68
4. Lack of bargaining power of the actors in primary market	92
5. Fraudulent practice in measuring weight and grade	88
6. Lack of maintaining product quality in aquatic product	64
7. Risk and uncertainty in transporting aquatic products	72
8. Maintaining the sanitation rules and regulations of foreign buyers	60
9. Lack of institutional credit for the actors of the primary market	76
10. Policy of capacity restriction on boat of forest department for natural harvest in the Sundarban	68
11. Inadequate security measures for the collectors from piracy.	64

Opportunities in aquatic product market

The sub-sector analyses and market assessment provided the opportunities for business development services of marine aquatic product markets of Bangladesh corresponding to their related constraints. The existing service providers for business development services (BDS) of marine aquatic product market were also investigated (Table 9).

Table 9 Opportunities need for aquatic product market in south and southwest region in Bangladesh

Provision or Opportunities for Business Development Services (BDS)	Reported by % of sample stakeholders	Existing service providers
1. Improvement of credit recovery	64	The association at present provided the service
2. Provision of developing forward selling system and price assurance	72	Large depot, Exporter
3 Access to information	60	IT, Telecommunication
4. Satisfactory supply of institutional credit without collateral	88	Local money lender, Commercial banks
5. Establishing standard weight and grading system for protecting fraudulent practice	92	DoF
6. Ensuring supply of quality inputs properly and timely	64	PDB, REB, Ice factory, Basket maker, Transportation chain.
7. Maintaining proper law and order situation for transporting aquatic product	76	Police, Coast gourd
8. Gradual improvement of sanitation and phytosanitation	60	DoF, BFFEA
9. Introducing special credit programme	72	Commercial bank, Local money lender
10. Withdrawn of capacity restriction of boats up to economy of scale size	76	Forest Department. DoE
11. Ensuring security measures for the collectors from piracy	88	Coast guard, Police, DoF

Ninety two percent of the actors in aquatic product market opined for establishment of standard weight and grading system by the government market administration for protecting fraudulent practice. The supply of institutional credit without collateral was required and reported by 88 percent of the primary market actors. Seventy six percent of the actors asked for ensuring security measures for transporting aquatic products. Provision of mechanism for improvement of credit recovery for the different market actors involved in aquatic product market and ensuring supply of quality inputs properly and timely were more important as reported by 64% of the respondents. Access to information by establishing information center through IT facilities,

gradual improvement of sanitation and phytosanitation by the support of foreign buyers and government was reported by 60% of the respondents.

Potential impact on aquatic product market sub-sector for business development

The potential impacts after providing BDS on aquatic product market are as follows:

- Formation of effective association to act as a mediator between two parties.
- Awareness and capacity building on credit system.
- Introduction of legal procedure and their implication, timeframe and related cost involvement.
- Legal procedure for adoption and maintenance of fixed price.
- Formation of a reserve fund through deducting fixed price from the additional price for paying compensating in case of low price.
- Establishment of GO-NGOs information linkage for forecasting world price and domestic price.
- Establishing special credit programme for market participants by government financial institutions.
- Introduction of microfinance activities for the market participant by the NGOs.
- Strengthening existing association of *Bapari/Farias* for getting fair price collectively.
- Inspection of weight, measurement and grading system.
- Awareness and capacity building on standard weights and grading system.
- Ensure electricity supply in the aquatic product processing areas.
- Provide water supply with proper drainage system in processing areas by local government bodies.
- Ensuring night patrolling during aquatic product transportation to overcome unnecessary harassment.
- Getting the opportunities of coincidence of product transportation from one place to another i.e. return trip should be ensured after unloading the product in destination by establishing a mediator company.
- Introduction of loan with easy terms conditions by the financial institutions.
- More investment for drainage and sewerage systems by public health engineering organization in aquatic product processing areas.
- Developing skill for the workers in the field of sanitation contamination, handling and cleaning equipment used in aquatic product processing.
- Providing loan facility for the actors of the aquatic product markets.
- Giving facility to the actors for capital formation.

- Develop quality of the product and upgrade marketing value of the product.
- Improve boat facility to collect aquatic products.
- Introduce social security system like insurance for collectors, fishermen, traders etc.
- Introduce patrolling in coastal waters by forest security guards and coast guard to prevent robbery.
- Provide gunman in every boat.

Conclusion and Recommendations

Conclusion

- With regard to marketing system and price formation, it seemed that the fish landing in the primary markets and fish retailing in the secondary markets are less competitive and accordingly, marketing profit is very high specially in case of dry fish marketing in the domestic market and for both frozen and dry fish in the export market.
- In marketing system intermediaries received higher marketing profit, which on the other hand, deprive the fishermen because they could have received higher sales revenue if they could sell the catch in fair (real) price in the primary markets in landing stations.
- There was variation in profits earned by various types of assemblers due to imposing *aratdar's* commission on selling fish in the secondary markets. Marketing cost and marketing margins also influenced the marketing profits.
- Concerning the distribution of coastal and marine fish, marketing system is yet to be developed in Bangladesh and as a result, fish harvested are mostly available in coastal region and in some other towns and cities.

Recommendations

- Primary markets should be free from the control of *aratdars* to make the market competitive so that fishermen could receive fair price to increase their sales revenue.
- Policy should be aimed at rationalizing or eliminating *aratdars* commission through state monitored restructure of the marketing arrangement. It would help reduce the market price of fish where commissioning system is involved.
- Only hilsa as a popular fish is available all over Bangladesh. However, hilsa marketing system should be developed to make it available with other coastal and marine fish at each of the district markets and if possible, at some village markets so that people from all corners can consume coastal and marine fish which are cheap but nutritionally rich and good for health.

References

DoF. 2005. Fishery Statistical Yearbook of Bangladesh, Fisheries Resource Survey System, Department of Fisheries, Gob, Marshy Brabant, 1 Park Avenue, Dhaka, Bangladesh.

EPB. 2005. Export Promotion Bureau, 122-124 Motijheel C. A., Dhaka, Bangaldesh.

Fernando, F. 1987. Costs and profitability of small-scale fishing operation in Srilanka. In: Panayoto, T. (ed.) Small-scale fisheries in Asia: Socioeconomic analysis and policy. IDRC - 229e Canada.

Jacinto, E.R. 2004. A research framework on value chain analysis in small-scale fisheries. Tambuyog Development Center, the Philippines.

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

Kaplinsky, R. and M. Morris. 2000. A handbook for value chain research. International Development Research Center (IDRC). Ottawa, Canada.

Kohls and Uhl. 1980. Marketing of agricultural products. MacMillan Publishing Co., Inc., New York, USA.

Porter, M.E. 1980. Value chain analysis. Oxford Press Ltd., London, UK.`