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Present Scenario of Landing and Distribution of Fish in Bangladesh

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Abstract: The present study was designed to know the landing and distribution pathways of fish and types and nature of stakeholders involved in fish distribution chain in Bangladesh. A total of 237 fish landing centers and 5440 markets were detected. The number of landing center and market were highest in Chittagong and Dhaka division respectively. Stakeholders in fish distribution, viz., arotdars, paikers and retailers were found to be 6219, 39506 and 122922, respectively. A 84.71% of the landing centers were found to be operated year round while 15.29% were seasonal. The major fish production zones and major gateways of the country where inland capture and culture and marine capture fish landed were identified. In any locality 62.83% of the landed fish were transported within 100 km area and 5.73% of fish were transported beyond 500 km. The quantity of fish harvested from river, beel, Kaptai lake floodplain, pond, baor, coastal area/sea and shrimp/prawn farm were 5.25, 4.41, 0.13, 35.03, 38.22, 0.23, 10.93 and 5.80%, respectively. The common constraints identified were lack of adequate infrastructure facilities in the landing center and market, unhygienic environment, influence of middlemen, money lending at high rate etc. For the betterment of fish landing and distribution, appropriate authority should pay proper attention so that both quality and fair price are ensured.

Key words: Landing center, distribution chain, fish retailer, fish source, Bangladesh

INTRODUCTION

Fish landing and distribution in Bangladesh is in complex condition due to the involvement of many stakeholders in the distributional channel. Typical distribution path is rather complex, although shorter distribution lines have also been seen due to establishment of big production zones and affluent outlets who have been found to deal among themselves comfortably. Generally, wet fishes reach to the consumers through commission agents to wholesalers to the retailers. Several negotiators are involved in this distributional channel to collect fish from the fishermen/fish farmers and make a linkage path between fishermen/farmers and wholesalers (Mahajon) or commission agents. Again, wet fish can enter the secondary or tertiary markets where it passes through more than one commission agent. Both commission agents and wholesaler locally known as "Mahajons" play principal roles in fish distribution (Nowsad, 2010).

Fish landing centers are the places where different types of fresh fish and fisheries items are hoarded from

different sources like river, beel, gher, pond, estuaries and sea. The harvested fishes are transferred from the landing centers to the consumer markets via different distributional channels (Ali *et al.*, 2004). Fish landing centers play a vital role in quick and smooth disposal of fresh fish as well the quality of fishery products. Fish are transferred to different parts of the country and also to the other countries through landing centers. The peoples involved in different tiers of fish distribution channel are also very important, those have been playing a very vital role in supply of quality fish in the country. The marine fish catching areas and landing centers of Bangladesh are located in the South and South-eastern parts of Bangladesh and freshwater fish are landed in river sides, haor areas, beels and Kaptai lake. The North-west part of Bangladesh e.g., Dinajpur, Rangpur, Rajshahi, area lack such catching area and landing centers which results frequent fish scarcity in those zone (Mansur, 2005). It is therefore important to know the distribution paths of the fish which influence the quality, supply and price of the products.

Delays in distribution and landing of fresh fish result qualitative losses. Some fish is landed at or near to the place where it is to be sold, for example close by a major city and in that case quality loss is not a major concern. In artisanal fishing, much fish is landed in distant or remote places. The fisheries items may be rotten while it is being taken to market, this unexpected delay of transportation results loss of quality. Studies shows about 28% fish were found to lose 60-70% of freshness quality before it reached the consumer in local fish markets (Nowsad, 2005, 2006). The landing centers and markets in Bangladesh leaves room for much improvement since huge problems exist to improve the distribution. Fish markets are totally insufficient in relation to fish quality and public health.

The linkage between producers and consumers is term as marketing which is operated through a set of mediators performing useful commercial functions in a chain (Nayeem *et al.*, 2010). In most countries, marketing system is operated by the private sector and there is little incentive in the private sector to improve the marketing chain. Reza *et al.* (2005) reported that in Bangladesh, fish and fishery products are marketed through many different channels and outlets. The fish market structure varies from area to area, but in general terms it can be four types viz. primary, secondary, higher secondary and final consuming markets (Kleih *et al.*, 2001). The marketing of fish, fresh water and marine, needs considerable time to reach landing centers and markets which cause the loss of biofactors and sometimes make fish inedible (BCAS, 2003; Nowsad, 2004).

Due to high population growth there is an ever ending gap between supply and demand of fish and fishery products in Bangladesh. The government of Bangladesh combined with NGOs is trying to increase the fish production by taking many steps and programme. But lessening the gap requires increasing production and also the improvement in all aspects of marketing and distribution (ICLARM, 1991). Little steps have been taken to improve fish marketing system which is the major part of fisheries sector.

Keeping the views in mind, it is important to elucidate a complete figure on the nature of landing centers and distribution pathways, markets and major stakes in the country for recommending policies for smooth distribution of quality fish throughout each corner of the country. The present study was designed to know the distribution pathways of fish, types and nature of stakeholders involved in fish distribution chain and to recommend policies for uniform availability, adequate quality and smooth distribution of fish and fisheries products throughout the country.

MATERIALS AND METHODS

The present study was conducted for a period of 16 months from February 2011 to May 2012 to obtain data on wet fish landing and distribution throughout the entire country.

Collection of data: The study was based on collection of primary and secondary data. Before collecting the primary data, a draft questionnaire was developed which was pre-tested with a few Upazilla Fisheries Officers (UFOs). In the pre-testing, much attention was given to any new information in the draft questionnaire in order to reach the objectives of the study. According to the experience gained in pre-testing, the final questionnaire was improved, rearranged and modified. The final questionnaire included the questions on the stakeholder numbers and role, features of fish landing centers and markets, sources and destinations of fish, problems related to fish markets and landing centers etc. The questionnaires were sent to all UFOs of the country through postal mail attaching with return tickets and address. After filling the questionnaire they sent it back to us. A set of instructions were given with the questionnaire to help the UFOs to give the exact answers. An exploratory study was also conducted by rapid rural appraisal involved the fish farmers and fishers, aratdars, wholesalers, traders and retailers of different fish landing and market sites to collect information on fish distribution, marketing and fish transportation with constraints and coping strategies. The data were verified through concerned District Fisheries Officers (DFOs) and Upazilla Fisheries Officers (UFOs) through telephone interview. The validated information based on their knowledge, experience, skills and observations were cross-checked through secondary information pool of GO/NGO bodies, like DOF (Department of Fisheries) annual reports, BBS (Bangladesh Bureau of Statistics), fisheries week souvenirs etc. For further validation and double checking significant number of landing centers and markets were visited to collect and verify data through participatory appraisals.

Data analysis: After data collection, the data were processed and edited for analysis. The collected data were scrutinized and summarized carefully before the actual tabulation. After completing the data collection, processed data were transferred to a preliminary data sheet of a computer and compare with computer spread sheets of MS Excel to ensure the accuracy of the data entry. After data entry, all the collected information were accumulated and analyzed by MS-Excel and then presented in textual, tabular and graphical forms.

RESULTS AND DISCUSSION

In the present study the landing and distribution of wet fish throughout the country were studied emphasizing on fish landing and market facilities, fish distribution channel and stakeholders in the distribution chain with problems faced by the stakes related to fish landing and marketing.

Fish Landing centers, markets and stakeholders: The number of the fish landing centers in Dhaka, Rajshahi, Khulna, Rangpur, Chittagong, Barishal and Sylhet division were 50, 16, 12, 2, 76, 65 and 16, respectively (Table 1). The number of landing centers was high in Chittagong division. It is obvious because, out of the seven divisions discussed Chittagong is blessed with huge capture and culture fisheries specially for marine fishery. The great Kaptai lake fishery is situated in Chittagong division. Because of its position in the coastal belt, fish were landed here and there anywhere suitable along the seashore and river shore. Many shrimp and prawn hatcheries are also built in this division. So all marine catches and cultured shrimp were landed in this division and distributed to the main city and market of the other adjacent districts as well as to the capital and northern and north-western districts of the country. On the other hand, the term 'landing center' was often merged with wholesale markets (Ahmed and Rahman, 2005). Landing centre receives fish from different harvesting sources, while wholesale fish markets either initiate the distribution of landed fish or receive daily delivery of fish distributed from other zones. In southern coastal zone and middle part of the country, particularly in the divisions like Chittagong, Khulna, Barishal and Dhaka, wholesale fish markets tend to be side by side with landing spots. But in Northern areas, like the division of Rajshahi and Rangpur much of the fish traded come from the South and Middle part and the wholesale markets are independent of local small scale landing. Therefore, the number of landing centers is less in Rangpur division.

On the other hand, a total of 5440 fish markets were detected from these divisions. Highest number of 2099 fish markets was identified in Dhaka division. The number

of market in Dhaka division was higher because of huge number consumers in and around the capital and adjacent districts that govern fish markets along with high profitability of fish.

Beside the fishers and farmers, stakeholders in fish distribution were categorized into three groups in this study viz. arottdar, paiker and retailer. The total number of arottdar, paiker and retailer, as recorded by the UFOs, were found to be 6219, 39506 and 122922, respectively. Many researchers categorized stakeholders in fish value chain differently, but their role in market structure was found to be almost similar all over the country. Rahman *et al.* (2009) found four types of stakeholders in the market of Khulna as local traders, agents/suppliers, wholesalers and retailers. Islam *et al.* (2006) also found similar type of stakeholders that correspond well with present study.

Arattdar is a person who deals fish business, invests money for fishing, conducts auction as commission agents and controls selling fish in both domestic and foreign markets. Arattdars play an important role in the fish market. When fish come to the wholesale markets arattdars take the responsibility and control each sale. They sell the fish through an auctioning system and get a commission depending on the fish species. Two types of arattdars were found in fish value chain viz. (1) Arattdar-1, who accumulates fish from local traders, fishers, foria and paiker and after auction transport to the secondary market, (2) Arattdar-2 usually stays in big cities who receives fish from the wholesalers and through second time auctioning, sell those to the retailers (Nowsad, 2010). Invariably they had own store house, good relation with the fishermen and thus earn very good profit. The number of arattdars were the highest in Dhaka, as maximum as 1899, while lower in Rangpur 215. A good number of arattdars were also involved in Rajshahi, Barishal and Chittagong division. These indicate the higher trade flow and economic activity of these areas. Several major inland culture and capture zones lie on Dhaka, like haor fishery of Kishorganj and Netrokona and aquaculture of greater Mymensingh. On the other hand maximum gathering of affluent/well of consumers in and around capital attracts fish traders to rush most of the harvest towards Dhaka. In Rajshahi division, Chalan beel is one of the country's biggest inland fishing zones, esteems the higher trade flow.

Paikers or wholesalers are those who buy fish from arattdar through open auction and sell fishes to retailers. They play a significant role in fish landing centers and markets. They also collect fish from fishermen and suppliers and sell them in wholesale market through commission agents. Sometimes these paikers are found to purchase fish from local arat and transport fish to district

Table 1: No. of fish landing centers, markets and stakeholders

Division	No. of landing center	No. of fish market	No. of arottdar	No. of paiker	No. of retailer
Dhaka	50	2099	1899	12704	42499
Rajshahi	16	969	1283	6399	23313
Khulna	12	465	570	5556	17793
Rangpur	02	496	215	2600	7558
Chittagong	76	809	821	5768	17134
Barishal	65	267	1095	2490	6070
Sylhet	16	335	336	3989	8555
Total	237	5440	6219	39506	122922

cities and municipal areas to sell those to secondary arat. Aratdars provide loan facility to wholesalers/transporters to attract them and ensure fish selling through their arat. Likewise the number of fish markets and aratdars, paikers were also maximum in Dhaka division and minimum in Rangpur.

Retailers are those who buy fish from wholesalers and sell them to ultimate consumers. The function of retailers is to procure supplies and display them in forms and at times which is convenient for consumers. They are the last link of intermediaries in the channel of domestic fish marketing before the consumer. They buy fish from wholesale markets (Aratdar 1 or Arader 2) and sell these to the consumers in open market place. Sometime retailers intend to sell fish from door to door as fish vendors (hawkers). Usually retailers buy fish from arat (wholesale market) on credit and pay the value after selling. The retailers who trade a large volume of fish in big cities employ helper and cutter. Helpers help the retailers to sell the fish and cutter cut the fish during sale on demand of the buyers. In this study retailers involved in fish markets were counted by the UFOs. The number of retailers were highest in Dhaka, followed by Rajshahi, Khulna, Chittagong, Sylhet, Rangpur and Barishal. This also corresponds well and compatible with the other stakes in different divisions. Similar influence and involvement of stakeholders were found by Nowsad (2010), Rahman *et al.* (2009) and Islam *et al.* (2006). The numbers of fish landing centers, markets and stakeholders are shown in Table 1.

Seasonality of fish landing: Landing centers were found to be two types on the basis of the season of the operation. The landing centers which were operated throughout the whole year are termed as “year round landing center” and those were operated only for a certain period of the year is denominated as “seasonal landing center”. Most of the landing centers were year round, accounted a 82, 90, 70, 100, 71, 100 and 80% in Dhaka, Rajshahi, Khulna, Rangpur, Chittagong, Barishal and Sylhet, respectively. On the other hand, 18, 10, 30, 29 and 20% landing centers were found to be seasonal in Dhaka, Rajshahi, Khulna, Chittagong and Sylhet, respectively (Table 2). There were no seasonal landing centers in Rangpur and Barishal. In seasonal landing centers, the landing of fish is done mainly during the winter. Year round landing centers are found in the area, where vast quantity of fish are captured and cultured throughout the whole year. On the other hand, seasonal landing centers are mainly found in the areas where fish are only captured in low lying areas due to squeezing of water body in winter. These seasonal landing centers were identified mainly in the haor and floodplain areas where the huge

Table 2: Seasonality of fish landing center

Division	Year round (%)	Seasonal (%)
Dhaka	82	18
Rajshahi	90	10
Khulna	70	30
Rangpur	100	00
Chittagong	71	29
Barishal	100	00
Sylhet	80	20
Total	84.71	15.29

glut catches are captured in winter season. These seasonal landing centers were year round landing center in the past. But due to effect of climate change perennial water bodies were squeezed of to narrow pit. So, fish capture and landing are also disturbed. Fish landing centers were found to be shifted and their modes of operation were changed based on the availability of fish. These were found to be happened frequently in coastal and riverine landing. Sonadia of Cox’s Bazar once a large landing center has been seized of all landing activities now due to bad communication facilities. Time of fish landing in coastal fishing has also been changed due to shifting of fish stock.

Domestic fish distribution chain: Fish distribution channel is a route along which harvested fish from the ponds or open waters is shipped to consumers. Fish distribution channel in Bangladesh is almost entirely conducted, financed and regulated by traditional, hardworking and skilled middlemen. The market chain from farmers/fishermen to consumers passes through a number of intermediaries: broker, commission agents/aratdars, foria, wholesaler, transporter, processor, vendor and retailer (Fig. 1). The demand of fish is high in markets but supply is limited and a strong network has developed with brokers and traders intervening between farmers at one end and the consumers at the other end. With a few exceptions, farmers never directly communicate with consumers, market communication normally being made through middlemen. The middlemen usually buy fish from the farmers but do not seem to have formal agreements. Actually farmers would not like to bring their fish to wholesalers, because small catches, lack of market information, poor road and transport facilities, lack of money for fish transportation, negligible experience and technical knowledge on trading etc. The fisherman often sells fish to a mobile collector or assembler, who may be known as a jogandar or a foria. The assembler uses a collector boat or a truck to collect the fish. When buying in estuaries or rivers, he may buy through a local agent (broker) who typically earns a 1% commission for his services. Normally the fisherman receives credit known as ‘dadon’ from these guys, also called mahajon, for which he is bound to sell his catch to

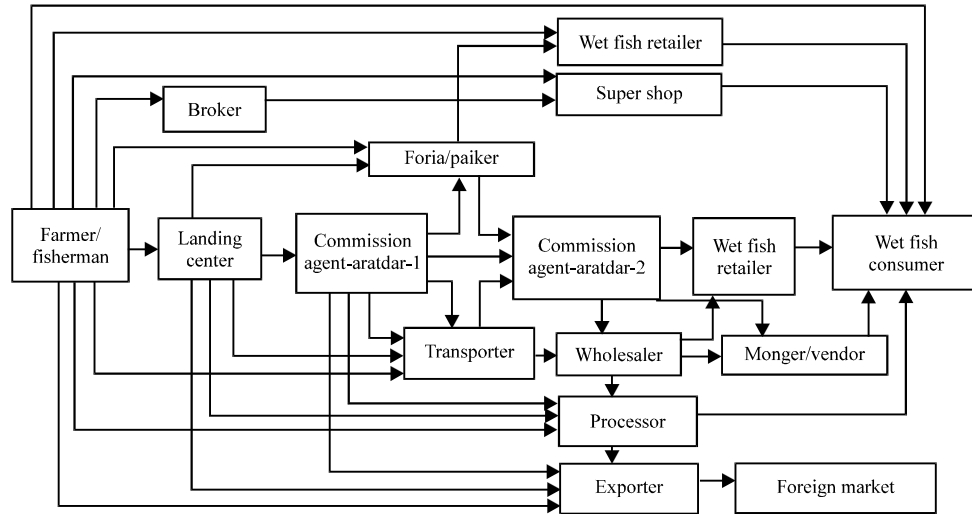


Fig. 1: Fish distribution channel

the mahajon. The mahajon sells the fish in a wholesale market to local retailers (nickaries), local wholesalers (paikers), or transporters who transport the fish to other districts (beparis or chalanis). The sale is normally carried out through the medium of a commission agent (aratdar-1) who conducts public auctions. In some markets, fish is weighed during auctioning but more often it is not. Ilish is typically sold by the count of 80 fish, this measure being known as a ‘pon’. The aratdar also extends seasonal advances to his suppliers and short-term credit to the buyers. His basic remuneration is his sales commission, which is charged to sellers at rates normally between 3 and 6%. Here they sell to local retailers (nickaries) and wholesalers (paikers) through higher category aratdars (here we call aratdar-2) who render similar services to the first level aratdars (aratdar-1) referred to above. After purchasing fish at the higher secondary markets, local wholesalers (paikers) sell to retailers (nickaries) of upazilla markets and of village markets (hats) and finally reach the consumer. Fish markets studied by Coulter and Disney (1987) also found almost similar results to this.

Major fish production zones: Much of the fish catch, particularly from inland waters, was found to be sold and consumed locally by the consumers within the same district. However, there were areas which consumed less than they produce and therefore had a surplus which was distributed to other areas of the country. Nowsad (2010) divided Bangladesh into six fishery zones viz. (1) Dhaka-Mymensingh- Sylhet zone for culture and capture fishery, (2) Greater Jessore zone for culture fishery (3) Khulna-Bagerhat-Sathkhira for shrimp and prawn fishery

Table 3: Major fish production zones of the country

Division	Major fish production zones	Nature of production
Dhaka	Mymensingh, Netrokona and Kishorganj	Culture and capture (Pond, haor)
Rajshahi	Natore	Capture (Beel fishery)
Khulna	Khulna and Greater Jessore	Aquaculture including prawn and shrimp
Chittagong	Kaptai lake	Culture fishery
	Chittagong	Marine capture fishery
	Cox’s Bazar	Marine capture fishery
	Chandpur	Riverine capture fishery
Barishal	Daudkandi of Comilla	Floodplain fishery
	Barguna	Marine capture fishery (Hilsa fishery)
	Bhola	Riverine/easuarine capture fishery
Sylhet	Barishal	Riverine/ eastuarine capture fishery
	Sunamganj	Capture fishery (Haor fishery)

(4) Pabna-Rajshahi and North Bengal for inland culture and capture fishery, (5) Comilla-Chandpur-Barishal-Barguna for floodplain and hilsa fishery and (6) Chittagong-Cox’s Bazar for marine capture fishery. In this study, the major fish production zones where inland capture and culture and marine capture fish landed were identified as Khulna, Jessore, Kishorganj, Mymensingh, Netrokona, Natore, Chittagong, Cox’s Bazar, Rangamati, Chandpur, Daudkandi of Comilla, Barishal, Barguna, Sunamganj and Sylhet (Table 3).

Major routes of fish transportation: The landed fish were distributed to other districts through the major gateways following some main distribution routes (Table 4). The major gateways were identified as Shwarighat, Karwanbazar, Jatrabari and Gabtoli of Dhaka, Trishal of Mymensingh, Mohonganj of Netrokona, Rajshahi city, Barobazar of Jessore, Bogra city, Rangpur city, Dinajpur city, Fishery ghat of Chittagong, Chittagong city, Homna

of Comilla, Comilla city, Patharghata of Barguna, Hijla of Barishal, Barishal city and Sylhet city. Most of the surplus fish were distributed to capital Dhaka, from the major fish landing areas through the main distribution routes. Most of the fish were found to be distributed to the district cities and municipal areas due to the maximum number of consumers and high price of fish.

Distance of fish transported from the district: Fish is found in almost every district in Bangladesh. It was found that both captured and cultured fish were transported to big cities and metropolitan areas from the production zones of the country. The transported fish were categorized into five groups according to distance transported viz., <50, 51-100, 101-200, 201-500 and >500 km. It was found that 62.83% of the fish were transported only upto 100 km (Table 5). Only 5.73% of fish were transported to more than 500 km. Fish in Rangpur division were transported only upto 200 km. It was found that fish from most of the districts were transported only

up to 100 km due feeding up local consumers. It indicates that these districts are deficit in fish production where commercial productions are exclusively lacking.

Quantity of fish landed: The data on quantity of fish landed obtained by the questionnaire survey were verified by governmental statistics (FSYB, 2010). The compiled results are presented here. The quantity of fish landed/day in Dhaka, Rajshahi, Khulna, Rangpur, Chittagong, Barishal and Sylhet division were 1455.93, 799.64, 989.02, 425.19, 2425.68, 821.32 and 484.23 metric ton, respectively (Fig. 2). Highest amount of fish was landed in Chittagong division and lowest amount of fish was landed in Rangpur division.

Source of harvested fish: The main sources of fish in Bangladesh were found to be the river, beel, floodplain, pond, baor, coastal area/sea and shrimp/prawn farm. The quantity of fish harvested from these sources was different in different regions. It was found that the quantity of fish harvested from river, beel, Kaptai lake floodplain, pond, baor, coastal area/sea and shrimp/prawn farm were 5.25, 4.41, 0.13, 35.03, 38.22, 0.23, 10.93 and 5.80%, respectively. The detailed result of the source of harvested fish in different divisions is shown in Table 6. The highest quantity of fish was harvested from the culture pond. Significant amount of fish were also harvested from the floodplain areas. This result corresponded well with the government statistics (FSYB, 2010). Out of the total fish production 94.5% were from inland capture and culture fisheries and about 5.5% were from marine capture fisheries (DOF, 2011). Culture fisheries were dominating in the inland production, accounting about 58% of the total catch.

Table 4: Major gateways for receiving fish from landing center

Division	Major gateways for receiving fish	Distribution area
Dhaka	Showarighat, Karwan bazar, Jatrabari and Gabtoli of Dhaka	Dhaka city, Narayanganj, Gazipur, Manikganj, Munshiganj, etc.
	Mohonganj of Netrokona	Mymensingh, Dhaka, Narayanganj, etc.
	Trishal of Mymensingh	Dhaka and adjacent districts
Rajshahi	Rajshahi city	Greater Rajshahi and northern districts
	Bogra city	Bogra, Rangpur and Dinajpur
Khulna districts	Khulna city	Dhaka, Chittagong, Comilla and northern
	Barobazar of Jessore	Dhaka, Chittagong, Comilla and northern districts
Rangpur	Rangpur city	Greater Rangpur and Dinajpur
	Dinajpur city	Greater Dinajpur, Nilphamari and Lalmonirhat
Chittagong	Fishery ghat of Chittagong	Chittagong city, adjacent districts, Dhaka, Comilla, North Bengal and foreign export
	Homna of Comilla	Dhaka, adjacent districts
Barishal	Patharghata of Barguna	Dhaka, Khulna, Barishal
	Hijla of Barishal	Dhaka, adjacent districts
Sylhet	Sylhet city	Sylhet city and other districts of Sylhet division

Table 5: Distance (%) covered by the distributed fish

Division	<50 km	51-100 km	101-200 km	201-500 km	>500 km
Dhaka	44.74	34.21	10.53	7.89	2.63
Rajshahi	32.00	32.00	28.00	8.00	0.00
Khulna	33.33	20.00	16.67	16.67	13.33
Rangpur	53.33	33.33	13.34	0.00	0.00
Chittagong	32.35	26.47	23.53	11.76	5.89
Barishal	24.00	24.00	24.00	16.00	12.00
Sylhet	25.00	25.00	25.00	18.75	6.25
Total	34.97	27.86	20.15	11.29	5.73

Table 6: Source of harvested fish*

Division	River (%)	Beel (%)	Kaptai (%)	Floodplain lake (%)	Pond (%)	Baor (%)	Coastal area/ sea (%)	Shrimp/ prawn farm (%)	Total (%)
Dhaka	3.52	5.48	-	59.86	31.01	0.11	-	0.02	100
Rajshahi	2.42	3.64	-	38.91	55.03	-	-	-	100
Khulna	1.99	0.74	-	20.70	34.05	1.42	5.96	35.14	100
Rangpur	0.93	1.95	-	41.23	55.89	-	-	-	100
Chittagong	4.72	0.06	0.94	21.77	26.74	-	42.36	3.41	100
Barishal	21.46	0.01	-	10.88	37.44	-	28.17	2.04	100
Sylhet	1.74	18.99	-	51.88	27.40	-	-	-	100
Total	5.25	4.41	0.13	35.03	38.22	0.23	10.93	5.80	100

*Based on data obtained from present study and from (FSYB, 2010)

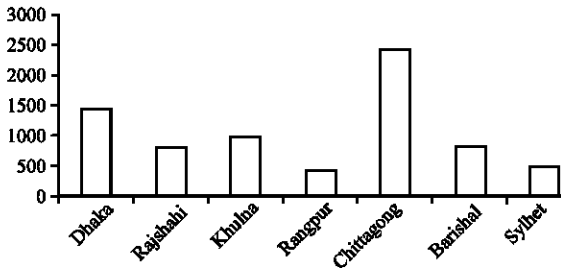


Fig. 2: Quantity of fish landed/day in different divisions

Table 7: Commonalities and divergence of major constrains of fish markets

Common	Division	Divergence
Insufficient cold storage facility	Dhaka	No supply of clean water Lack of fish processing and preservation facility Transportation problem of fish to markets
	Rajshahi	No shed in most of the market Lack of technical knowledge on handling/processing Lack of skilled man power Insufficient place for the retailer in the market Lack of fish processing and preservation facility
Insufficient ice factory Lack of modern infrastructure facilities in the market	Khulna	Low market value of fish Floor and wall were not cemented Transportation problem of fish to markets
	Rangpur	Lack of fish processing and preservation facility No shed in most of the market Transportation problem of fish to markets No drainage facility, sanitation status not good. No permanent structure in the market Insufficient place for the retailer in the market
Unhygienic environment	Chittagong	lack of balance measurement Low market value of fish
	Barishal	Lack of preservation facility lack of electricity facility No supply of clean water Bad road communication
	Sylhet	Lack of fish processing and preservation facility No permanent fish preservation system No permanent or temporary shed in the fish market

Constraints of the existing fish landing centers and markets: Although the problems affecting the fish landing centers and markets were found to be slightly different in different divisions but some common problems were found to be the main barrier of good landing and distribution of fish. The common constraints identified were lack of modern infrastructure facilities in the fish landing and market, insufficient cold storage facility,

insufficient ice factory, unhygienic environment and influence of middlemen. Subasinghe (1995) found that the quality of fish markets in most domestic markets in the Asian region is far from satisfactory. He identified that poor onboard practices, poor infrastructure, handling and storage facilities are the major causes for the low quality of fish in the landing centers and domestic markets. Similar fish landing and distribution problems were found by Parween *et al.* (1996) and Rokeya *et al.* (1997). The divergent problems on the basis of divisions and the common problems related fish market and marketing are shown in Table 7.

CONCLUSION

The present study aimed to know the feature of fish landing centers and major fish markets, types and nature of intermediaries involved, distribution and marketing with trend of succession and depletion associated with the constraints and threats of major stakeholders in the fish distribution channel along with solution options.

Therefore in summing up, the following conclusions and recommendations are made:

- Fish landing centers are shifting and mode of operations are changing based on the availability of fish
- Surplus fish are distributed from the production zones through some specific routes and gateways throughout the country
- Landing and distribution of fish are practiced with inadequate facilities and ill-control of the intermediaries
- Appropriate authority should pay proper attention for infrastructure improvement and market development, so that the smooth distribution can take place from the production zone ensuring fair price in the market
- Follow-up research is required to both validate and update the fish landing and distribution data

REFERENCES

- Ahmed, N. and M.M. Rahman, 2005. A study on fish marketing systems in Gazipur, Bangladesh. Pak. J. Biol. Sci., 8: 287-292.
- Ali, M.Y., G.M. Salim, M.A. Mannan, M.M. Rahman, W. Sabbir and A. Murshidak, 2004. Fish species availability observed in the fish landing centers of Khulna district in Bangladesh. J. Biol. Sci., 4: 575-580.
- BCAS, 2003. Landing center monitoring report. Empowerment of coastal fishing communities for livelihood security (BGD/97/017), FAO, Dhaka, pp: 102.

- Coulter, J.P. and J.G. Disney, 1987. The Handling, Processing and Marketing of Fish in Bangladesh. Overseas Development Natural Resources Institute, Bangladesh.
- DOF, 2011. Fish fortnight compendium 2011. Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh, pp: 136.
- FSYB, 2010. Fisheries statistical yearbook of Bangladesh 2008-2009. Peoples Republic of Bangladesh, Dhaka, pp: 48.
- ICLARM, 1991. Socio-economic impacts of fish culture extension programme. Annual program Report, ICLARM, Dhaka.
- Islam, M.S., M. Akteruzzaman and N. Ahmed, 2006. Study on Marketing and Value chain of some commercially important coastal and marine aquatic products of Bangladesh. Bangladesh Fisheries Research Forum (BFRF), Bangladesh, pp: 24.
- Kleih, U., K. Alam and R. Dastidar, 2001. Report of workshop on poverty alleviation and livelihood security among the coastal fishing communities market and credit access issues. Natural Resources Institute (NRI) Reports No. 2613: 94.
- Mansur, M.A., 2005. Fisheries of current millennium souvenir. Fisheries Graduate Association of Bangladesh (FAB), pp: 25-29.
- Nayeem, M.A., K. Pervin, M.S. Reza, M.N.A. Khan, M.N. Islam and M. Kamal, 2010. Marketing system of traditional dried and semi-fermented fish product (*Chepa shutki*) and socio-economic condition of the retailers in local markets of Mymensingh Region. Bangladesh Res. Pub. J., 4: 69-75.
- Nowasad, A.K.M.A., 2004. Landing center monitoring. Report on a survey research done in collaboration with Bangladesh Center for Advanced Studies and Center for Natural resources Studies, ECFC Field Rep. 2004, Pages: 189.
- Nowasad, A.K.M.A., 2005. Low cost processing of fish in coastal Bangladesh. BGD/97/017 Field Doc: 05/2005, Food and Agriculture Organization of the United Nations, Dhaka, pp:88.
- Nowasad, A.K.M.A., 2006. End of assignment report, Empowerment of coastal fishing communities for livelihood security project. Food and Agriculture Organization of the United Nations, Dhaka, pp: 70.
- Nowasad, A.K.M.A., 2010. Post-harvest loss reduction in fisheries in Bangladesh: A way forward to food security. Final Report PR #5/08. Food and Agriculture Organization (FAO) of the United Nations, Dhaka, pp: 171. http://www.nfpensp.org/agridrupal/sites/default/files/Nowasad_Alam-PR5-08.pdf
- Parween, S., S.K. Dutta and M.A. Hossain, 1996. Post-harvest management of smaller prawns: Present status, problems and better management strategies. Proceedings of the National Workshop on Small Indigenous Fish Species (SIS) Culture in Bangladesh, December 12, 1996, Rajshahi, Bangladesh.
- Rahman, M.M., M.M. Hossain, S.M. Rahman and M.H. Alam, 2009. Fish marketing system in Khulna, Bangladesh. J. Innov. Dev. Strategy, 3: 27-31.
- Reza, M.S., M.A.J. Bapary, K.M. Azimuddin, M. Nurullah and M. Kamal, 2005. Studies on the traditional drying activities of commercially important marine fishes of Bangladesh. Pak. J. Biol. Sci., 8: 1303-1310.
- Rokeya, J.A., S.S. Ahmed, A.S. Bhuiyan and M.S. Alam, 1997. Marketing system of native and exotic major carps of Rajshahi District. Bangladesh J. Fish, 20: 99-103.
- Subasinghe, S., 1995. Investment requirements for fish marketing/ utilization and related infrastructure in Asia. Report of the Regional Consultation of Institutional Credit for Sustainable Fish Marketing, Philippines, pp: 67-85.