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Present status of harvesting, transportation and marketing of freshwater Small Indigenous Species of Fish (SIS) of Bangladesh

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Abstract

A survey conducted to evaluate the present status of harvesting, transportation and marketing of freshwater SIS of Bangladesh showed that among the 56 to 73 species of small indigenous fish species (SIS), mola (*Amblypharyngodon mola*), dhela (*Osteobrama cotio cotio*), puti (*Barbodes sarana*), tit puti (*Puntius ticto*), tengra (*Mystus vitatus*), chapila (*Gudusia chapra*), batashi (*Pseudotropius atherinoides*), buzuri tengra (*Mystus tengra*), katchki (*Corika soborna*), gol chanda (*Chanda ranga*), lamba chanda (*Chanda nama*), phul chela (*Chela phulo*) and lata (*Channa punctatus*) are the most common. But the abundance of the mola, puti, tengra, batashi and chapila are higher than the other SIS species. Puti was at the top of the list in percentage abundance (7-9%), followed by mola (7-8%), tengra 6-7% and chapila 5-6% in all the investigated areas.

Three levels of market or marketing systems were observed in the distribution channel of fish trade: primary, secondary/higher secondary and final consuming markets. Primary market is the catching point in the rural area. In secondary market, the collectors bring the fish from primary market to the landing ghats, usually to the nearest thana market or at a place well linked by rivers, road and rail transport. On purchasing the fish from the higher secondary market, the *paikars* sell the fish to the retailers who take it to the final consumer market. Different types of crafts and gears are used for catching the SIS in Bangladesh. Monofilament gill nets (20%), traps and line nets (25%) and seine nets (25%) are the dominant gears in respect of the total catch followed by lift net (10%) and cast net (20%). A total of 10 types of gear are listed according to their mode of operation which used for catching SIS. The processors in consumer market received higher marketing profit followed by primary market and secondary market, respectively.

Key words : SIS, Harvesting, Transportation, Marketing

Introduction

Bangladesh possesses a typical multi-species fisheries ecosystem. There are 260 species of indigenous species of finfish in the freshwater habitats. The majority of these fish

species (about 143 species) are small which grow to a length of about 25 cm or 9 inches and which are abundant in the various water bodies of Bangladesh. It is well known that the freshwater SIS provides food and nutrition, subsistence and supplemental income to the great majority of the people of this country, particularly the poor and disadvantaged groups of the people. The rural people have easy access to floodplains, reservoir and natural water bodies where SIS are abundantly caught by various traditional gears. Besides, the rural poor prefer SIS to cultured carp because they can afford to buy a small amount at a time and it is easier for them to distribute the fish among the family members.

In Bangladesh fish harvesting specially of SIS, is mostly seasonal and the peak season of harvest is late spring and early summer. Ahmed *et al.* (1977) estimated that quantitative losses accounted for 6% of the marine catch but only 2% in inland catch besides losses that occurred during different stages of handling and transportation. However, there is little or report available on the post-harvest losses of SIS and other freshwater fishes during various marketing chains. According to BOBP (1985), about 30% marine fish landed are marketed fresh (un-iced), about 40% iced, 20% sun dried and the remainder are frozen, salted, smoked or made into fish meal. Rail, road and water transports are used to carry fish to the distant places from landing point and it takes about 7-9 days after harvesting which is assumed to be more than normal shelf-life of some tropical species.

Materials and methods

An investigation was conducted on handling, transportation and marketing of SIS in ten landing centers of Mohangonj thana under the district of Netrokona and some fish markets of Netrokona, Kishorgonj and Mymensingh district including Mymensingh town and Bangladesh Agricultural University, Mymensingh The data were collected using prescribed questionnaire through interview with the fisherman, aratdar, whole seller, retail sellers and also consumers. The investigation was done twice in a month in each location from January to December'01. The people investigated for the study was directly involved in catching, transporting, whole selling, retailing of SIS.

Results and discussion

The study revealed that 143 species of small indigenous fish in which mola (*Amblypharyngodon mola*), puti (*Barbodes sarana*), tengra (*Mystus vitatus*), chapila (*Gudusia chapra*), batashi *(Pseudotropius atherinoides)*, Kholisha (*C. fasciata*), Kakila (*Xenentodon cancila*), gol chanda (*Chanda ranga*), bela (*Glossogobius giuris*), gutum (*Lepidocephalus guntea*), gochi baim (*Mastacembelus pancalus)* and lata *(Channa punctatus)* are common in fresh fish market. On the other hand, both natural and manmade catastrophes, degradation of aquatic environments and reduction of many wetlands and water areas of Bangladesh have resulted in the disappearance of many suitable habitats for floodplain, riverine and brackish water SIS. Many of these valuable SIS have been threatened or endangered (Mazid and kohinoor 2003). Some endangered

SIS are: lamba chanda (*Chanda nama*), dhela *(Osteobrama cotio cotio)*, tit puti *(Puntius ticto)*, veda (*Nandus nandus*), pabda (*Ompok pabda*), shorputi (*Barbodes sarana*), golsa (*Mystus cabasius*), Pahari gothom(*Somileptes gongota)*) etc.

The annual percentage of SIS catch in Mymensingh, Netrokona and Kishoregonj area during the study period from January to December'01 was calculated and presented in Table 1. The table shows that the abundance of the mola, puti, tengra, batashi and chapila were higher than the other SIS species. Puti was at top of the list in percentage (7-9%), followed by mola (7-8%), tengra 6-7% and chapila 5-6% in all the investigated areas. The other species, such as kholisha, lamba chanda, gol chanda and batashi, were in the range of 2-3%,2-3%, 2-3% and 2-3.5% respectively. On the other hand, the abundance and volume of dhela landed was poor comprising only 0.2% to 0.4% of the total catch in all study areas. The number of species in others could not quantify during survey.

Table 1. SIS catch (%) in Mymensingh, Kishoregonj and Netrokona area

Species caught		Area basis percentage of total SIS catch		
Scientific name	Local name	Mymensingh	Kishoreganj	Netrokona
Amblypharyngodon mola	Mola	8.0	7.0	8.0
Osteobrama cotio cotio	Dhela	0.3	0.4	0.2
Barbodes sarana	Puti	9.0	8.5	7.5
Puntius ticto	Tit puti	6.0	7.0	7.0
Gudusia chapra	Chapila	6.5	6.0	5.0
Mystus vitatus	Tengra	7.0	7.5	6.0
Chanda ranga	Gol chanda	2.0	2.5	3.0
Chanda nama	Lamba chanda	2.0	3.0	2.5
Pseudotropius atherinoides	Batashi	2.0	2.0	3.5
C. fasciata	Colisha	3.0	2.5	2.0
Ompok pabda	Pabda	2.5	3.0	3.0
Others		51.70	50.60	52.30
Total		100.00	100.00	100.00

Harvesting of SIS

Different types of crafts and gears are used for catching the SIS in Bangladesh. Monofilament gill nets, traps, line nets and seine nets are the dominant gears accounting 20%, 25% and 25% the total catch followed by lift net (10%) and cast net (20%) (Table 2). A total of 10 types of net are listed. These include cast nets (locally called khepla jal and chapra jal), dragnets (called badaijal and shiktijal) made of synthetic fibre or nylon thread mosquito nets and also "current jal" (Dutta 1983, Hossain and Afroze 1991). A brief description of fishing methods used in inland waters of Bangladesh along with the structural designs of various types of fishing gears are described by Chakraborty *et al.* (1995). These gears have been classified into nine major categories according to their mode of operation. They are classified into following types: 1. Dragged net, 2. seine nets, 3. Bag nets or scoop nets, 4. Falling gear, 5. Lift net or dip net, 6. Drift or gill net, 7.

Hook for line fishing, 8. Wounding gear, and 9. Fish traps. A number of different types of boats are used to haul fishermen, their gear and catch. These include country boats (kari dingi, konai dingi, jaila dingi, bhedi dingi, bhedi nauka, kosa nauka, dexco etc.), crafts made of tree trunks (donga), earthen crafts (chari) and rafts made of various fibrous plants including parts of banana trees (Dutta 1983, Hossain and Afroze 1991).

The fishing methods depend on the hydrobiological and physiographical conditions of the fisheries. Types of fishing method in use are conditioned by three factors: 1. Physiography of the water body, 2. The nature of fish stock, and 3. The characteristics of raw materials from which gears are fabricated . BCAS in 1989 recorded that 13 types of fishing gears are used in 4 beels of Netrokona and Sunamganj districts. BCAS also reported in 1991 that in Halti beel the fishermen use approximately 30 different types of fishing gears. Each category of fishing device varies from place to place to some extent and the same device can possess a different name or size in different regions. In addition to using nets, traps and gears, fishing is done by draining the tip water area and with the use of hook and line. Rahman *et al.* (1992) recorded 20 species of fish in the catchers of punti jal (2.5-3.18cm, mesh) in Chanda beel. On the other hand, it is shown in the Table 3. that different types of hooks and traps are also used to catch SIS in Bangladesh. The major traps used to catch SIS are Darki, Doiar, Chai, Kakila bana, Kalsi pata, Chunga, Thusi/Baim mara etc. and the major hooks are Barsa sip/Nol barshi, Tana barshi, Sip/Barshi etc.

Table 2. Description of major gears used for harvesting of SIS

Group name	Local name of gear	Mesh size (mm)	Major SIS caught	Main fishing period
Gill nets	Koi jai, punti jal, fash jal, current jal	20 – 90	Koi, tengra, colisa, bacha etc	July – December
Seine nets	Ber jal, Jogot ber jal	10 – 30	All types of SIS	June – December
Cast net	Jhaki jal/ khepla jal/chapra jal	10 – 20	Tilapia, puti, chapila, etc	October – January
Lift net	Dharma jal, Veshal jal	10 –20	Mola, dhela, puti, chapila, tengra etc.	August – December
Push net	Thella jal	10 –20	Puti, lata, koi, prawn, etc	November – January

Table 3. Description of major traps and hooks used for catching of SIS

Group name	Local name	Length (m)	Breadth (m)	Major species caught
	Darki/Doiar/Chai/Charo	0.5-1.5	0.5 –1.0	Shrimp and all types of SIS
	Baire/Dheal	1.5-2.0	1.0-2.0	All types of big & small fishes
	Kakila bana	20.0 –30.0	1.5-2.0	Mainly kakila fishing
	Kalsi pata	-	-	Shing, magur, baim etc.
	Chunga	0.5	-	Shing, magur, baim etc.
Traps	Thusi/Baim-mara	1.5-2.5	1.0-2.0	Baim, shing etc.
	Sip/ Barshi	-	1-2 nos.	Puti, tilapia, tengra etc.

	Borsa sip/Nol barshi	-	1 no.	Cat fish, shol, taki etc.
	Tana barshi	-	1 no.	shrimp etc.
Hooks	Daun	200-250	100-500 nos.	Shol, taki etc.

Marketing systems of fresh SIS

Most of the fresh SIS are consumed locally. Marketing is entirely in the hand of private sector where the supply is inadequate compared to market demand. There is little incentive in the private sectors to improve the marketing chain although the government policy is to improve the quality of the fish landed and marketed for domestic and export purposes and to improve the landing, wholesale and retail market facilities.

However, there is little information about the quality aspects of fresh SIS and the dried products in different stages of marketing chains since no elaborate survey has been conducted in our country in the past, particularly on SIS. The present study reports the marketing system of fresh SIS in Mymensingh, Netrokona and Kishorgong region of Bangladesh.

Main three levels of market or marketing systems are observed in the distribution channel of fish trade (Fig. 1). These are primary, secondary/higher secondary and final consuming markets.
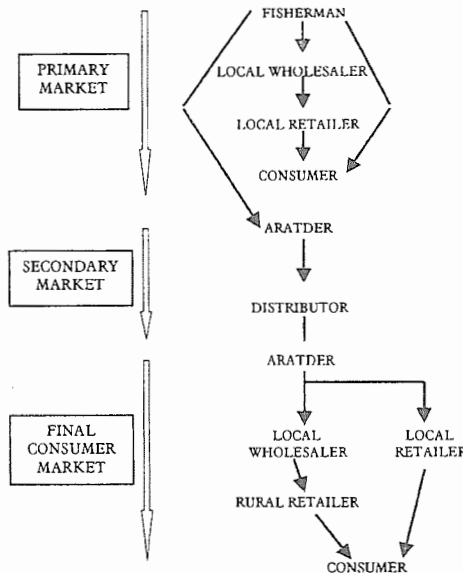

Fig. 1. Flow chart for marketing channel of fresh SIS.

Primary market : This is the marketing place at the catching point, in the rural area. Fish collectors/assemblers, commonly known as *aratdar/mahajans* procure fish from the catchers, with the help of local brokers called dalal who get a profit margin or commission from the mahajans. Part of the catch is also locally sold by the

catcher/farmer or by local retailers. Sometimes fishermen/fish traders bypass these channels and sell fish directly to the secondary markets or to the consumer.

Secondary market : The collectors bring the fish from primary market to the landing ghats, usually to the nearest thana market or at a place well linked by rivers, road and rail transport. The mahajans sell the fish here to distributors known as *beparies*, generally with the help of *aratdars*, the commission agents.

Consumers : The *beparies* transport the fish to the nearest city/town markets by road, rail or boat. These are the main distributing markets and here the *beparies* sell the fish to another set of distributors known as *paikars*, again with the help of *aratdars*.

Final consuming market : On purchasing the fish from the higher secondary market, the *paikars* sell the fish to the retailers. There are two channels of retailing: the urban retailers sell the fish in the urban markets in permanent stalls or set out with the fish on their heads or in tricycle (rickshawa) vans, to sell them from door to door. Other retailers take the fish to suburban places or to the villages around the city/town.

In Bangladesh, fish is marketed through many different channels and outlets. The marketing system operates through a series of intermediaries. Available report suggests that both freshwater and marine fishes are marketed through various marketing chains: primary, secondary, the higher secondary and consuming market (Coulter and Disney, 1987). There is lack of marketing infrastructure for both wholesale and retail market. For the most part, the transportation and storage facilities are poor. The involvement of large percentage of the middlemen and commission agents reduce benefit to the fish producers (Ahmed *et. al.* 1993, Mazid 1994). Due to high population growth there is an ever-increasing gap between supply and demand of fish and fisheries products in Bangladesh. Narrowing the gap requires not only increasing production but also improvements at all aspects of marketing and distribution systems (ICLARM 1991, SAARC 1994). There is no specific marketing chain for SIS in Bangladesh. The length and component of marketing channel vary from season to season and from one place to another. The general pattern is as follows: after buying fish from fish farmer and fishermen, middlemen (locally known as *foria*) bring and sell them to the wholesaler through auction with a high bid. The retailers then bring the fish to particular market where they usually sell the fish to the consumers. Fish farmers/fishermen can sell fish directly to the wholesaler or even to the consumers (Khanam *el al*, 2003). A large number of people living below the poverty line, find employment in the domestic fish marketing chain in the form of processors, traders, intermediaries, day laborers and transporters. The lack of access to livelihood assets for the poorer section of the community portrays a bottleneck in the livelihood systems of fish farming and marketing communities (Ahmed and Hossain 2000).

Market price of SIS and cost benefit ratio

The prices of fishes increase step by step and it is at the highest level when it reaches to the consumer. It is inevitable because at every step the people involved are getting profit from it and that is why the price at the catching area is low but at the consumer market is high. The highest price found during the study period were for chapila, batashi, mola, tengra and dhela(range Tk. 80-100/kg) at consumer market (Table 4). In whole sale market, puti was selling at Tk. 30-35/kg but in consumer market at Tk. 50-70/kg. On the other hand, in whole sale market the price of chapila, batashi, mola, tengra and dhela was Tk. 40-60/kg. Here it is clearly observed that the price from whole sale to consumer market almost doubled. Price of SIS, in many cases, were higher than that of the large fishes (large catfishes, exotic and Indian major carps and hilsa); however, the price (Tk 10-300/kg) depended on several factors like day-to-day supply, demand and freshness of fish. SIS having the lowest average price were lata, chanda, puti and titputi. The price of these species was found to range between Tk. 40 to 60/kg. Among all the SIS, pabda (*Ompok pabda*) fetched the highest price enjoying the highest consumer demand (Khanam *et al.* 2003). In the present marketing system the grower received less than 50% of the price paid by consumers. There was little seasonal variation (Parween 1982).

Table 4. Market price of SIS in the marketing chain

Marketing chain	Regions	Species	Price (Tk./kg)
Whole sale Market	Mymensingh	Puti	30-35
		Chapila, Batashi, Tengra, Mola, Dhela	40-60
	Kishorganj	Puti	25-35
		Chapila, Batashi, Tengra, Mola, Dhela	30-55
	Netrokona	Puti	30-40
		Chapila, Batashi, Tengra, Mola, Dhela	35-60
Retail Market	Mymensingh	Puti	40-45
		Chapila, Batashi, Tengra, Mola, Dhela	50-70
	Kishorganj	Puti	30-40
		Chapila, Batashi, Tengra, Mola, Dhela	45-60
	Netrokona	Puti	40-45
		Chapila, Batashi, Tengra, Mola, Dhela	45-65
Consumer Market	Mymensingh	Puti	50-70
		Chapila, Batashi, Tengra, Mola, Dhela	80-100
	Kishorganj	Puti	45-60
		Chapila, Batashi, Tengra, Mola, Dhela	60-80
	Netrokona	Puti	50-60
		Chapila, Batashi, Tengra, Mola, Dhela	75-90

Fish marketing in Bangladesh is entirely in the hand of the private sectors. There is little or no incentive to improve the quality of fish marketed because the demand of the fish is always higher than the supply. As a result, any quality of fish is sold in the market although the traders face serious problems including heavy losses, wastage and poor quality. After harvest all the fishes including SIS pass through a numbering channel and intermediaries and are transported by road, train, bus, and boat/launch mainly packaged

to bamboo basket. The loading and unloading during different stages of transportation, long exposure at high temperature, improper use of ice, rough and unhygienic method of handling, contamination and lack of knowledge on quality aspects are the main contributing factors of the quality loss.

Cost-benefit of the SIS in domestic market

Marketing margin and marketing cost were evaluated to estimate the profitability of intermediaries involved in marketing of SIS of Bangladesh. Studies were conducted on the marketing margin and marketing profits made by the whole sellers, retailers and consumers in the Mymensingh, Kishorgonj and Netrokona region.

Marketing margins and profitability of different intermediaries for fresh SIS were estimated. Table 5 shows the amount of marketing margin and marketing profit made by the traders at different steps of marketing. Results are presented for individual species and average of all selected species and finally, total marketing margin and marketing profit were estimated.

Table 5. Marketing margin and marketing profit of fresh SIS in domestic market

Marketing steps	Tk/kg						
	Puti	Chapila	Tengra	Mola	Dhela	Average	Average profit
FISHERMEN							
Sale price (SP)	25.0	30.0	34.0	40.0	45.0	34.8	-
PRIMARY MARKET (COLLECTOR/ PROCESSOR)							
Purchase price (PP)	30.0	40.0	45.0	50.0	55.0	53.0	12.2
Marketing cost (MC)	5.0	5.0	5.0	7.0	7.0	5.8	
Sale price(SP)	45.0	60.0	60.0	70.0	75.0	62.0	
Marketing margin (MM) (MM=SP-PP)	15.0	20.0	15.0	20.0	20.0	18.0	
Marketing profit (MP) (MP=MM-MC)	10.0	15.0	10.0	13.0	13.0	12.2	
SECONDARY MARKERT (WHOLE SALE/ARATDAR)							
Purchase price (PP)	45.0	60.0	60.0	70.0	75.0	62	6.0
Marketing cost (MC)	3.0	3.0	3.0	4.0	4.0	3.4	
Sale price (SP)	52.0	70.0	70.0	80.0	95.0	74.08	
Marketing margin (MM) (MM=SP-PP)	7.0	10.0	10.0	10.0	10.0	9.4	
Marketing profit (MP) (MP=MM-MC)	4.0	7.0	7.0	6.0	6.0	6.0	
CONSUMER MARKET (RETAILER)							
Purchase price (PP)	52.0	70.0	70.0	80.0	95.0	74.08	19.30
Marketing cost (MC)	2.0	2.0	2.0	3.5	4.0	2.7	
Sale price (SP)	65.0	90.0	92.0	110.0	120.0	95.4	
Marketing margin (MM) (MM=SP-PP)	13.0	20.0	22.0	30.0	25.0	22.0	
Marketing profit (MP) (MP=MM-MC)	11.0	18.0	20.0	26.50	21.0	19.30	

TOTAL MARKETING MARGIN AND PROFIT							
Total marketing margin	35.0	50.0	47.0	60.0	55.0	49.40	-
Total marketing profit	25.0	40.0	37.7	45.5	40.0	37.50	-

For this study the maximum and minimum values of fresh SIS were used. For an example the price was maximum 45Tk/kg for dhela and 25Tk/kg for puti, respectively, at fishermen level or landing station. In primary market, the maximum price was 40Tk/kg for puti and 65Tk/kg for dhela. The maximum amount of 15Tk/kg profit was made for chapila and the minimum amount of 10Tk/kg profit was made for both puti and tengra. The Table also shows the average amount of profit made by selling SIS. The profits were 190Tk/kg at consumer market, 12Tk/kg at primary market level and 6Tk/kg at secondary market level. The study revealed that at fishermen level the price of puti, chapila, tengra, mola and dhela was Tk. 25, 30, 34, 40 and 45/kg respectively, whereas at primary market was Tk.45, 60, 60, 70 and 75/kg respectively. At primary market level the marketing profit of puti, chapila, tengra, mola and dhela is Tk. 10, 15, 10, 13 and 13/kg respectively and the average profit is Tk.12.20/kg. At secondary level of market the marketing profit of puti, chapila, tengra, mola and dhela was Tk. 4, 7, 7, 6 and 6/kg respectively and the average profit was Tk. 6/kg. At consumer market level the marketing profit of puti, chapila, tengra, mola and dhela was Tk. 11, 18, 20, 27 and 21/kg respectively and the average profit was Tk. 19/kg. At this level of market the profit was highest with an average of Tk.19/kg among all the levels of market. Consumer market received higher marketing profit followed by primary market and secondary market, respectively. In fresh fish marketing, irrespective of species of fish marketed, marketing margin and profit were almost doubled. High value of fresh fish claimed higher marketing cost leaving higher marketing margin as well as marketing profit for intermediaries. The processors in primary market received higher marketing profit followed by retailers and aratdars in consumer market and secondary market, respectively (Reza 2002).

It is a normal phenomenon because at every step the people involved are getting profit from it and that is why the price at the catching area is low but at the consumers area is high or sometimes even double. As fishermen lack access to credit, means of fish preservation and market information, they have poor bargaining power. Hence, widespread exploitation of fishers and extraction of rent by traders and middle agents are evident (World Bank 1991).

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