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Research Article
Fish Availability and Marketing System at Local Markets of a Coastal District, Southern Bangladesh

[1]Md. Yusuf Ali, [2]Shaharior Hossen, [3]S.M. Oasiqul Azad, [3]Md. Shahin Alom, [4]Md. Anwar Hossain Mondal, [4]Mir Mohammad Ali and [5]Mohammad Belal Hossain

[1]Department of Marine Fisheries and Oceanography, Patuakhali Science and Technology University, 8602 Patuakhali, Bangladesh
[2]Department of Fisheries Biology and Genetics, Patuakhali Science and Technology University, 8602 Patuakhali, Bangladesh
[3]Department of Fisheries Technology, Patuakhali Science and Technology University, 8602 Patuakhali, Bangladesh
[4]Department of Aquaculture, Patuakhali Science and Technology University, 8602 Patuakhali, Bangladesh
[5]Department of Fisheries and Marine Science, Noakhali Science and Technology University, Sonapur, 3814 Noakhali, Bangladesh

Abstract

Background and Objectives: Fish biodiversity is important for the future sustainability of aquatic resources in Bangladesh. However, stresses due to overfishing, climate change, habitat loss, eutrophication and pollution pose threats to fish biodiversity. This study was designed to investigate the availability of fish species, marketing channel and constraints associated with 5 fish market in order to provide suggestions for efficient management and fish marketing system in Patuakhali district. **Materials and Methods:** Primary data were collected by using questionnaire interviews, participatory rural appraisals (PRA) and cross-check interviews with key informants from Pirtala, Rajakhali, Angaria, Lebukhali and Pangasius fish markets for 1 year from August, 2015-July, 2016. **Results:** A total number of 103 fish species belonging 55 freshwater, 37 marine and estuarine and 11 crustacean species were available in these fish market. Highest number (89) of fish species was recorded during the rainy season and lowest number of fish species (26) was recorded in summer season in 5 markets. Among them highest amounts were ilish (32.2%) and lowest amounts were exotic carp (3%). Pirtala bazar fish market represented highest number (95) of fish species where Pangasia (71) represented small number of fish species. Majority farmer/fishermen (50%) were directly sells their fish to the Aratders. Pirtala bazar fish market showed highest price compare to the other fish markets. Likert scale technique was developed to identify inadequate ice facilities as main problem of fish market. **Conclusion:** Rui, catla, thai pangus, silver carp, ilish, bata, tilapia species were most available in the market whereas species such as kajuli, gutum, tara baim, pabda, sagor rita, rup chanda were rare and chital and foli were very rare in the market due to over fishing and habitat destruction of these species. Enforcement of regulatory measure to protect habitat and reduce over fishing, establishment of ice factory, improved electricity and water supply, construction of cold storage, modern communication system and permanent platform were recommended to mitigate the constraints associated with the fish market.

Key words: Fish availability, market, constraints, platform, communication system

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Corresponding Author: Yusuf Ali, Department of Marine Fisheries and Oceanography, Patuakhali Science and Technology University, 8602 Patuakhali, Bangladesh Tel: +8801736876416

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Bangladesh is a riverine country and fisheries sector plays a vital role in the socio-economic development of Bangladesh[1-3]. Fisheries sector is contributing 3.65% to GDP and 23.81% to the agricultural sector[4]. Fish also contribute about 60% of the nation's animal protein intake. About 11% of people directly or indirectly earn their livelihood through fisheries sector[4]. The country is enriched by aquatic diversity containing 260 species of freshwater finfish, 475 species of marine fish, 24 species of freshwater prawn, 36 species of shrimp[5], 10 species of pearl bearing bivalves of the family *Unionidae*, 11 freshwater and 5 marine water turtles, 15 species of crabs of which 4 freshwater 11 marine water species, 6 species of lobster, 7 species of squid or loligo and 2 species of cuttle fish or sepia[6]. IUCN Red List[7] sector revealed 54 threatened freshwater species in Bangladesh of which 12 are critically endangered, 28 are endangered and 14 are vulnerable. The total fish production was estimated at 3.68 million metric tons in 2014-15 of which 3.08 million metric tons (83.72%) and 0.51 million metric tons (13.98%) came from inland and marine waters, respectively[8].

The fish market was a vital aspect for sellers, consumers and other facilitating agencies. It was not only limited to selling of fish but also includes all the activities which exert considerable impacts on the exploitation, production, distribution, preservation and transportation of fish in addition to actual sale of fish by reducing middlemen[9]. Domestic market was huge, varied and complex and in terms of volume and as compared to export market, domestic market is great. About 97% of the production of fish was marketed internally for domestic consumption while remaining 3% is processing for exported[10]. Fishermen are one of the most vulnerable communities in Bangladesh. They used to live on fishing, staying on the bank of the river from longer period. Now a day, they are faring tremendous pressure to live on the ancestral professions. They were poor by any standard. Over the years, their economic condition has further deteriorated. Alam and Bashar[11] estimated the average per capita annual income of riverine fishermen families to be Tk. 2442/- which is about 70% lower than the per capita income of the country as a whole.

A large number of people, many of whom living below the poverty line, find the employment in the fisheries sector in the form of farmers, processor, traders, intermediaries, day labors and transporters[10,12,13]. Fisheries sector is important for socio-economic development, nutrition supplementation, employment generation, poverty alleviation and foreign exchange earning of Bangladesh[14]. Considering the above fact, the present study was therefore undertaken in different fish markets at Dumki upazila, Patuakhali district, Bangladesh to identify the available fish species and study the existing fish marketing systems.

MATERIALS AND METHODS

Study area: The study was carried out in 5 fish markets (Fig. 1) of Dumki Upazila, namely Pirtala, Rajakhali, Angaria, Lebukhali and Pangasia. As the Upazila is situated near 4 rivers Paira, Lohalia, Rajaganj and Burishwar and it's a tidal region of Bangladesh, many varieties of fish species from both inland (fresh and brackish) and marine water are available in this region.

Data collection methods: The study was carried out for the period of 1 year from August, 2015-July, 2016. Primary data were collected by using questionnaire interviews, participatory rural appraisals (PRA) and cross-check interviews with key informants. For questionnaire interviews, 100 fish traders (retailers) were selected in 5 markets (20 in each market) through simple random sampling method. Participatory rural appraisal is a group of methods to gather information on a participatory basis from rural communities. PRA tool focus group discussion (FGD) was conducted among fish retailers to get an overview on fish distribution, marketing systems and constrains of marketing. Cross-check interviews were conducted with key informants such as Upazila Fisheries Officer (UFO) and relevant GO and NGO officers and staffs.

Data processing and statistical analysis: Using Microsoft Excel 2010 software, data from different relevant sources were coded and recorded into a database system. Results from the data analyze, in combination with qualitative information collected through FGD and questionnaire interviews were compared with original data sheets to ensure the accuracy of data entered.

Likert scale with values of 4, 3, 2 and 1 was established to determine constraints associated with different fish markets of Dumki Upazila. In this way the retailer were enquired to rate their constraint as "very critical" "critical" "to some extent critical" and not "critical". The variable mean score of 2.5 was used to discover whether the factor in question was critical or not. The variables with mean score of 2.5 and above were considered critical while variable with less than 2.5 were not.

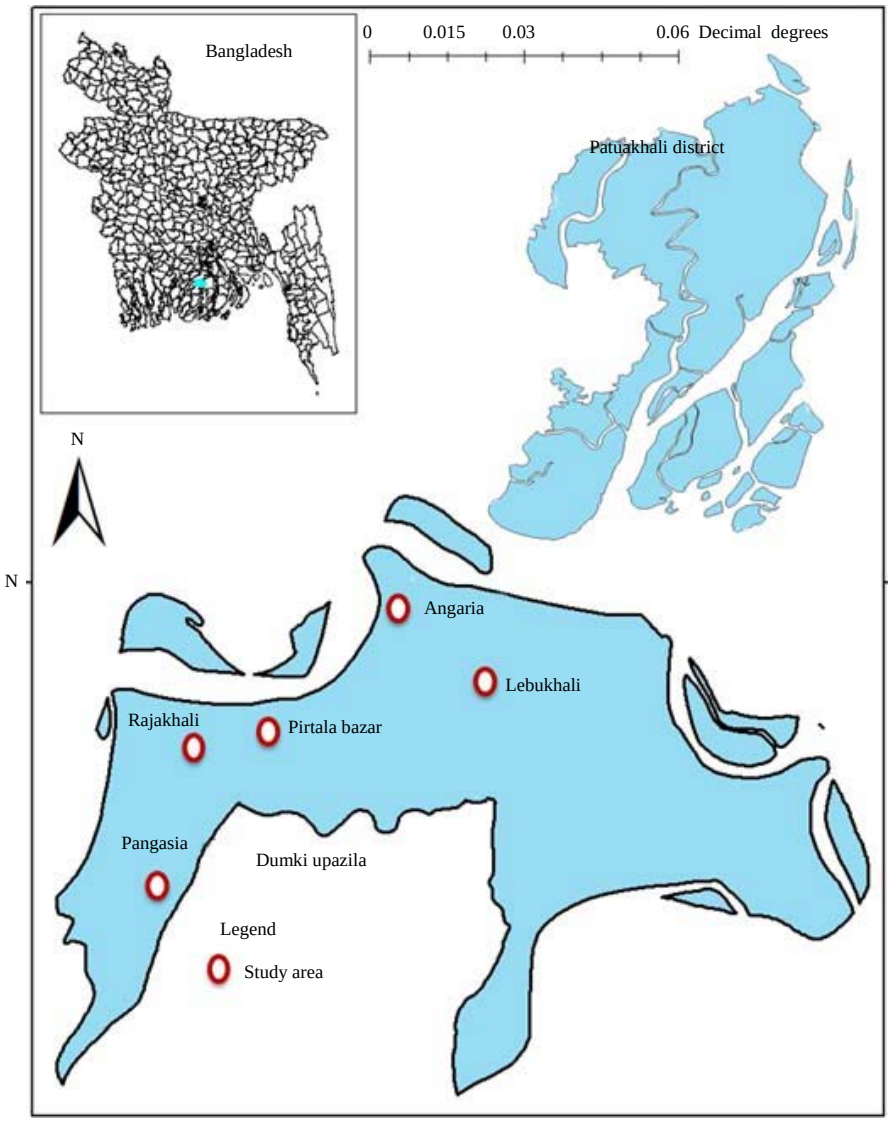

Fig. 1: Geographical location of the study area

RESULTS

Source of fishes in the market: In the fish market, freshwater fish species available from rivers, canals, ditches, rice fields and culture ponds, where marine and estuarine fish species available from coastal and marine water body. Present study revealed the dominant portion of fish species from culture ponds (42%) where 36% from marine and estuarine water bodies and least 22% from rivers, canals, ditches and rice fields (Fig. 2). Most of the fish (80%) were brought from different areas of the district (Mohipur, Alipur, Kuakata, Kalaia) and the remaining part (20%) from Satkhira, Jessor, Jhalakathi and Barisal region.

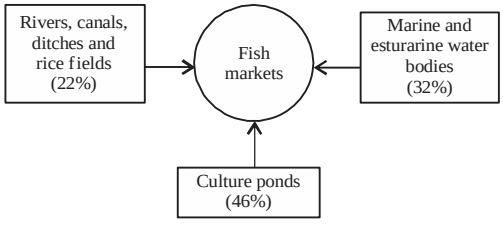

Fig. 2: Source of fishes in the market

Fish species availability in the markets: A total of 103 (Table 1, 2 and 3) fish species belonging 55 freshwater, 37 marine and estuarine and 11 crustacean species were available in the fish market. Among them highest number

Table 1: Available freshwater fish species in Dumki Upazila fish market

Local name	Common name	Scientific name	Availability
Koi	Climbing perch	*Anabus testudineus*	Common
Koi	Spiketail paradises fish	*Pseudosphromenus capanus*	Common
Kajuli	Gangetic ailia	*Ailia coila*	Rare
Shing	Stinging catfish	*Heteropneustes fossilis*	Common
Magur	Walking catfish	*Clarias batrachus*	Few
Bheda/mini	Gangetic leaffish	*Nandus nandus*	Few
Air	Giant river catfish	*Sperata seenghala*	Few
Boal	Fresh water shark	*Wallago attu*	Few
Bata	bata	*Labeo bata*	Common
Baila	Scribbled goby	*Awaous grammepomus*	Few
Chital	Clown knife fish	*Chitala chitala*	Vary rare
Foli	Bronze featherback	*Notopterus notopterus*	Vary rare
Gulsa tengra	Gangetic tengra	*Mystus bleekeri*	Rare
Tengra	Striped dwarf catfish	*Mystus vittatus*	Few
Gura tengra	Hummingbird catfish	*Rama chandramara*	Common
Shillong	Silond catfish	*Silonia silondia*	Few
Pangas	Pangas catfish	*Pangasius pangasius*	Few
Taki	Spotted snakehead	*Channa punctata*	Common
Chang	Walking snakehead	*Channa orientalis*	Common
Shol	Snakehead murrel	*Channa striata*	Few
Gusibaim	Barred spiny eel	*Macrognathus pancalus*	Few
Tarabaim	One-stripe spiny eel	*Macrognathus aral*	Rare
Baim/shalbaim	Zig-zag eel	*Mastacembelus armatus*	Few
Dorgi	gobi	*Apocryptes bato*	Rare
Kakila	Asian needlefish	*Xenentodon cancila*	Rare
Chewa	Bearded eel goby	*Teanioides cirratus*	Common
Pabda	Pabdah catfish	*Ompok pabda*	Rare
Bacha	-	*Eutropiichthys vacha*	Few
Bhadi punti/jatpunti	Pool barb	*Puntius sophore*	Common
Teri punti	Onespot barb	*Puntius terio*	Rare
Tit punti	Ticto barb	*Puntius ticto*	Few
Rani/bou mach	Bengal loach	*Botia dario*	Rare
Darkina	Flying barb	*Esomus danricus*	Few
Chela	Large razorbelly minnow	*Salmophasia bacaila*	Few
Mola	Mola carplet	*Amblypharyngodon mola*	Very rare
Dhela	-	*Osteobrama cotio*	Very rare
Gutum	Guntea loach	*Lepidocephalichthys guntea*	Rare
Lomba chanda	Elongate glass-perchlet	*Chanda nama*	Rare
Ranga chanda	Indian glassy fish	*Parambassis ranga*	Few
Kachki	Ganga river	*Corica saborna*	Common
Rui	Indian major carp	*Labeo rohita*	Common
Catol	Catla	*Gebelion catla*	Common
Mrigal	Mrigal carp	*Cirrhinus cirrhosus*	Common
Silver carp	Silver carp	*Hypophthalmichthys molitrix*	Common
Grass carp	Grass carp	*Ctenopharyngodon idella*	Common
Common carp	Common carp	*Cyprinus carpio*	Common
Minar carp	Mirror carp	*Cyprinus carpio var. specularis*	Common
Bighead carp	-	*Aristicthys nobitis*	Common
Black carp	-	*Mylopharyngodon pisceus*	Few
Kalibaus	Orange-fin labeo	*Labeo calbasu*	Few
Gonia	Kuria labeo	*Labeo gonius*	Few
Thai pangas	Striped catfish	*Pangasianodon hypophthalmus*	Common
Tilapia	Nile tilapia	*Oreochromis niloticus*	Common
Chinese punti	Olive barb	*Barbonymus gonionotus*	Common
African magur	African catfish	*Clarias garipinus*	Common

(89) of fish species was recorded during the rainy season and lowest number of fish species (26) was recorded in summer season in 5 markets (Fig. 3).

Marketwise fish availability: Present study recorded highest number of fish species from Pirtala bazar (95) followed by Lebukhali (87), Rajakhali (87), Angaria (77) and Pangasia

Table 2: Marine and estuarine species in Dumki Upazila fish market

Local name	Common name	Scientific name	Availability
Lottia	Bombay duck	*Harpadon nehereus*	Common
Lal poa	Silver jew	*Johnius argentatus*	Few
Sada poa	Silver jew	*Otolithes argentatus*	Few
Poa	Pama croaker	*Otolithoides pama*	Common
Bhangan	Mullet	*Mugil cephalus*	Common
Borguni	Jarbua terapon	*Terapon jarbua*	Few
Med	Giant sea catfish	*Katengus typus*	Few
Maitya	Jack and pompanos	*Cybium guttatum*	Common
Nuna baila	Bumblebee goby	*Brachygobius nunus*	Few
Nuna tengra	Long whiskers catfish	*Mystus gulio*	Few
Phasa	Gangetic hairfin anchovy	*Setipinna phasa*	Common
Potka	Green pufferfish	*Tetraodon flaviatilis*	Rare
Kakila	Asian needlefish	*Xenentodon cancila*	Rare
Chapila	Indian river shad	*Gudusia chapra*	Common
Churi	Ribbon fish	*Trichiurus haumela*	Few
Churi	Smallhead hairtail	*Eupleurogrammus muticus*	Few
Churi	Savalani hairtail	*Lepturacanthus savala*	Few
Ilish	Hilsa shad	*Tenuolosa ilisha*	Common
Chandan ilish	Toli shad	*Tenualosa toli*	Common
Baghair	Goonch	*Bagarius bagarius*	Rare
Bishtara /Chitra	Spotted scat	*Scatophagaus argus*	Rare
Bhetki/Coral	Barramundi	*Lates calcarifer*	Common
Bom maitta	Tuna	*Euthynnus affinis*	Rare
Rupchanda	Chinese pomfret	*Pampus chinensis*	Rare
Falichanda	Silver pomfret	*Pampus argenteus*	Rare
Rupsha	Skipjack tuna	*Katsuwonus pelamis*	Few
Tulardadi	Lady fish	*Sillaginopsispanijus*	Common
Tapasi	Paradise threadfin	*Polynemus paradiseus*	Few
Mullet	Flathead grey mullet	*Mugil cephalus*	Few
Ghagra	Ghagra catfish	*Arius gagora*	Few
Khorsula	Corsula	*Rhinomugil corsula*	Few
Lakhua	Indian salmon	*Polynemus indicus*	Few
Kawa	Hardtail	*Megalapsis cordyla*	Common
Ruppan	Japanese threadfin bream	*Nemipterus Japonicus*	Rare
Samudra koi	Atlantic tripletail	*Lobotes surinamensis*	Rare
Sagor rita	Whale catfish	*Rita rita*	Rare
Saplapata	Pale-edged stingray	*Dasyatis zugei*	Few

Table 3: Crustacean species in Dumki upazila fish market

Local name	Common name	Scientific name	Availability
Golda chingri	Giant fresh water prawn	*Macrobrachium rosenbargii*	Few
Dimua chingri	Dimua river prawn	*Macrobrachium villosimanus*	common
Kunchu/gura chingri	Kuncho river prawn	*Macrobrachium lamaerrei*	Common
Chatka chingri	Monsoon river prawn	*Macrobrachium malcolmsonii*	Common
Harina chingri	Brown shrimp	*Metapenaeus monoceros*	Rare
Chamua chingri	Brown shrimp	*Metapenaeu spinulatus*	Few
Bagda chingri	Giant tiger shrimp	*Penaeus monodon*	Few
Sada/Bagtara chingri	Green tiger shrimp	*Penaeus semisulcatus*	Few
Chapta chingri	White shrimp	*Penaeus indicus*	Few
Shela kakra	Mud crab	*Scylla serrata*	Few
Sataru kakra	Swimmer crab	*Neptunus sanguinolenta*	Rare

(71), respectively. Pirtala bazar represented highest number of freshwater (51), marine water (35) fish and crustacean (9) species. The numeric value of freshwater, marine and crustacean species from 5 fish market of Dumki Upazila are shown in Fig. 4.

Fish species composition in the markets: From the study, it was observed that single species Hilsa showed dominancy (23-48%) all of the markets following carps, snake head, shrimp, catfish, tilapia and other species. Present study represented 12, 8, 11, 2 and 13% marine and estuarine fish

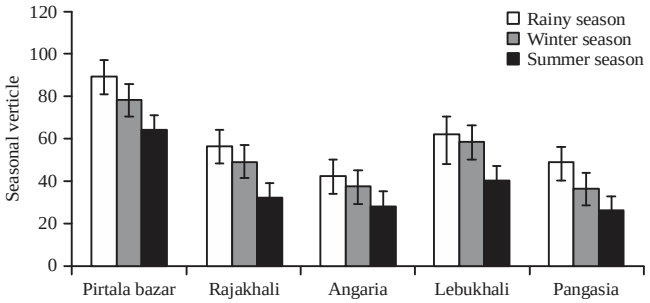

Fig. 3: Seasonal variation of fish species in 5 different markets of Dumki Upazila Mean+SEM

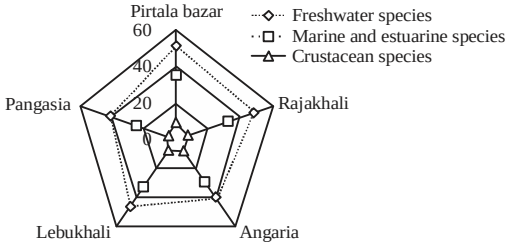

Fig. 4: Freshwater, marine and estuarine and crustacean fish species available in 5 different markets of Dumki Upazila, Patuakhali

species from Pirtala, Rajakhali, Angaria, Lebukhali and Pangasia fish market. The percent value of all categories fish species in the 5 fish market of Dumki upazila are presented in Fig. 5.

Marketing channel of fish: Marketing channel (Fig. 6) includes the involvement of some intermediaries or middlemen through which transformation of fish take place from producer to consumer. Farmers/fishermen are the primary producers in the fish marketing systems. With a few exceptions, farmers/fishermen never directly communicate with the consumers. The local paikers (faria) carried the fish (about 50%) from fish farmers to the markets by their own or hired transport and sell them to retailers with the help of aratdars. The fish farmers carried their catches (about 23%) to retailers with the help of aratdars (commission agents). The present study also reveals that the farmers partially sell their fish to the Aratdars (about 15%) with the help of Aratdars and the wholesalers sell it to the retailers. Farmer/fishermen also sell (7%) directly to the wholesaler. In a very rare case, farmers carry the fishes (5%) to the markets and sell them to the retailers. From the survey, it was found that about 10% retailers used their own money for fish trading while the rest 90% received as loans from aratdars with or without any interest.

Fish price: Fish price depended on size, season, availability and quality. Price of the some native species depended on its live or death condition especially shing, magur, koi, shol, Gozar, taki and pangus etc (Table 4).

Constraint associated with fish market: Various types of problem were associated with the fish market of Dumki Upazila. The main problem was documented as inadequate ice facilities through all fish market. The Likert scale technique was used to analyze Table 5. Table exposed inadequate ice facilities, inadequate water supply system, poor platform facilities and lack of electricity as critical problem where poor transport, drainage and sanitation system were identified as not critical.

DISCUSSION

Fish market is the place where people gathered for buying and selling of fish. The availability of fish in the market depends on the demand and supply of fish in the market, transport and communication facilities and season of capture and culture of fish. A total number of 103 fish species were recorded during the study period in the 5 fish markets of Dumki Upazila. Al-Hasan *et al.*[15], recorded 64 fish species from three fish market of Barisal district which was lower than the present study. This might be due to a considerable number of marine fish species were found in the 5 markets during the study period. Fish market was dominated by the Hilsa fishes (23-48%) followed by carps, snake head, shrimp, catfish, tilapia and other species. Hilsa was dominated in the studied market because all of the markets are located in the Southern coastal belt and the surrounding Paira river is famous for Hilsa. Al-Hasan *et al.*[15] also represented Hilsa fishes (43%) as dominated species from the market of Barisal district. It was observed that rui, catla, thai pangus, silver carp, mirror carp, ilish, bata, tilapia, tengra, taki, koi, kachki, lottia, coral, poa, bhangan, phasa, chapila, chewa, prawn and shrimp species

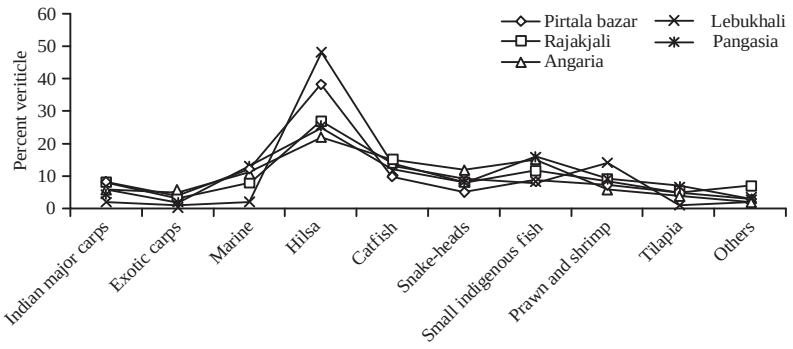

Fig. 5: Percent composition of fish species in different fish market of Dumki Upazila, Patuakhali

Table 4: Price of most valuable fish species in different fish market of Dumki upazila

	Price (BDT kg^{-1})				
Most available fish species	Pirtala bazar	Rajakhali	Angaria	Lebukhali	Pangasia
Ilish (*Tenualosa ilisha*) (Large size)	1000-1200	800-1000	800-1000	900-1200	800-1100
Ilish (*Tenualosa ilisha*) (medium size)	500- 700	450-650	500-650	500-650	500-650
Ilish (*Tenualosa ilisha*) (small size)	120-350	100-300	100-300	110-300	100-300
Shing (*Heteropneustes fossilis*)	650-800	550-700	500-650	600-900	450-600
Boal (*Wallago attu*)	250-700	200-650	200-600	200-700	200-600
Baila (*Awaous grammepomus*)	400-650	400-600	400-600	400-650	400-650
Taki (*Channa punctata*)	200-300	180-250	180-250	200-250	180-260
Shol (*Channa striata*)	400-600	350-550	350-600	400-600	350-600
Rui (*Labeo rohita*)	180-300	180-250	180-250	180-280	180-250
Catol (*Gebelion catla*)	300-550	300-480	300-480	300-500	300-450
Silver carp (*Hypophthalmichthys molitrix*)	160-350	150-320	150-300	160-280	130-300
Common carp (*Cyprinus carpio*)	180-350	170-350	180-360	160-340	160-350
Tilapia (*Oreochromis niloticus*)	150-250	140-250	150-250	130-250	120-250
Thai pangas (*Pangasianodon hypophthalmus*)	150-180	140-180	140-180	140-180	130-170
poa (*Otolithoides pama)*	350-500	300-500	400-600	350-550	300-500
Kawa (*Megalapsis cordyla)*	120-160	120-150	120-150	130-160	120-150
Chewa *(Teanioides cirratus)*	120-160	100-150	120-150	110-160	100-140
Sada poa (*Otolithes argentatus)*	350-500	300-500	400-600	350-550	300-500
Chapila (*Gudusia chapra*)	80-120	70-120	80-120	80-120	60-120
Kunchu/gura chingri (*Macrobrachium lamaerrei)*	180-220	170-220	160-210	180-230	150-200
Golda chingri (*Macrobrachium rosenbargii)*	700-1250	650-1200	650-1200	700-1200	650-1200

Table 5: Constraint associated with fish markets of Dumki Upazila, Patuakhali

		To Sum					
Constraints	Very critical	Critical	Extent critical	Not critical	Scores	Points	Remarks
Lack of electricity	37	23	30	10	287	2.87	Critical
Poor transport system	7	30	40	23	221	2.21	Not critical
Poor drainage system	25	45	25	5	274	2.74	Not critical
Poor platform facilities	33	27	24	16	277	2.77	Critical
Inadequate ice facilities	55	30	15	00	340	3.40	Critical
Inadequate water supply system	27	333	26	14	273	2.73	Critical
Poor sanitation system	15	32	23	30	230	2.30	Not critical

were most available in the market because those species has the highest demand in the market which showed similarity with Ali *et al.*[16] findings. Species such as kajuli, gutum, chitra, tara baim, titputi, pabda, air, magur, baghair, sagor rita, rup chanda, foli chanda and samudra koi were rare and chital, foli, mola, dhela were very rare in the market due to inadequate supply and habitat destruction of these species. Nurullah *et al.*[17] found that 143 species of small indigenous fish in which Mola, Puti, Tengra, Chapila, Batasi, Kholisha, Kakila, Golchanda, Gutum, were common in fish market. Most of the fishes were distributed from the Patuakhali district. Azam *et al.*[18] also represented 55% fish species were

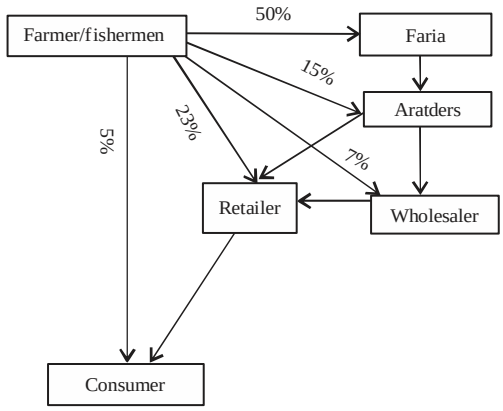

Fig. 6: Marketing channel of fish market in Dumki Upazila, Patuakhali

distributed from the local areas of Sylhet district. Present study recorded highest number (89) of fish species during the rainy season and lowest number of fish species (26) in summer season. Al-Hasan *et al.*[15] also recorded highest species in rainy season. Consumer and retailer ensured that various types of SIS and native species is available in the rainy season due to available water in cannel, beel, lake and river. Beside freshwater fish species huge amount of marine (37) and crustacean (11) species were available in the studied market due to good transportation system from Mohipur and Kuakata fish landing center. Highest number of species (95) was recorded from Pirtala bazar because of accessible consumer. Remind that Pirtala bazar fish market is located beside the Patuakhali Science and Technology University. Retailer ensured that they can sell any kinds and size of fish in this market due to consumer of University. Market price was comparatively high in the Pirtala fish market Due to presence of higher class consumer. Price of Golda chingri (*Macrobrachium rosenbargii*) (650-1200 TK) and Large size Ilish (800-1200) were always high in all of the market of Dumki upazila. Ali *et al.*[16] also recorded highest price for Golda chingri from Southern Bangladesh. Al-Hasan *et al.*[15], recorded highest price for hilsa from three market of Barisal district.

Fish marketing channel in 5 fish market completely managed, supported, financed and controlled with rules by traditional, diligent and skillful middlemen. Tradition and the strength held by separate channel members affected the action of distribution system and the fish farmers/fishermen are very sensitive to this as they never directly communicate with consumers. Study revealed that about 50% fish carried by the local paikers (faria) from fish farmers to the markets by their own or hired transport and sell them to retailers with the help of aratdars. In the pirtala bazar fish market, the consumers have to pay higher price due to the participation of too many intermediaries in the marketing channel but the actual fishers do not get perfect price for their products and the profit go to the intermediary's pocket. On the other hand retailers claimed that they get lower price as a result of exploitation by intermediaries, poor supply of ice, unhygienic market place. Present study identified inadequate ice facilities as the main problem from 5 fish market of Dumki upazila by Likert scale technique. Several problems of fishermen and intermediaries such as poor transportation, lower price of fish, lack of storage facilities, lack of weighing system, assessment of market taxes, lack of marketing facilities etc were reported by other researchers[18-22].

CONCLUSION AND RECOMMENDATION

A total number of 103 fish species belonging to 55 freshwater, 37 marine and estuarine and 11 crustacean species were available in these fish market. Highest number (89) of fish species was recorded during the rainy season and lowest number of fish species (26) was recorded in summer season in 5 markets. Among them highest amounts were ilish (32.2%) and lowest amounts were exotic carp (3%). Majority farmer/fishermen (50%) were directly sells their fish to the Aratders.

On the basis of findings of the study the following recommendations have been made for the improvement of existing marketing of fishes:

- Ensure electricity by the authority
- Establishment of ice factories for sufficient supply for fish preservation
- Establishment of improve drainage and transportation system
- Ensure pure water and sanitation facility
- Different NGOs can provide easy access credit in the crisis moment of retailer

SIGNIFICANCE STATEMENT

This study uncovered the fish biodiversity of the study area (Local Markets of a Coastal District, Southern Bangladesh) and also highlighted the reasons behind the loss of biodiversity.

REFERENCES

1. Ali, M.M., M.B. Hossain, M.A. Rahman and A. Habib, 2014. Diversity of fish Fauna in the Chitra river of Southwestern Bangladesh: Present status, threats and recommendations for conservation. Asian J. Applied Sci., 7: 635-643.
2. Ali, M.M., M.B. Hossain, M.H. Minar, S. Rahman and M.S. Islam, 2014. Socio-economic aspects of the fishermen of Lohalia River, Bangladesh. Middle-East J. Scient. Res., 19: 191-195.
3. Ali, M.M., M.B. Hossain, M. Al-Masud and M.A.W. Alam, 2015. Fish species availability and fishing gears used in the Ramnabad River, Southern Bangladesh. Asian J. Agric. Res., 9: 12-22.
4. DOF., 2016. Matsha Pakkah Shankalan. Directorate of Fisheries, Department of Fisheries, Dhaka, Bangladesh, pp: 148.
5. Hasan, H., M.M. Rahman, M.R. Sharker, M.M. Ali and S. Hossen, 2016. Fish diversity and traditional fishing activities of the river Padma at Rajshahi, Bangladesh. World J. Fish Mar. Sci., 8: 151-157.
6. DOF., 2012. Matsha Pakkah Shankalan. Directorate of Fisheries, Department of Fisheries, Dhaka, Bangladesh.
7. IUCN Bangladesh, 2000. Red Book of Threatened Fishes of Bangladesh. IUCN-The World Conservation Union, Bangladesh, Pages: 116.
8. Afroz, K.B., 2007. A study on availability and marketing of fishes in three different markets in Mymensingh town. M.S. Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh.
9. Agarwal, S.C., 1990. Fishery Management. Ashish Publishing House, New Delhi, India, pp: 334.
10. Ahmed, M., A. Rab and M.P. Bimbao, 1993. Household socioeconomics, resource use and fish marketing in two thanas in Bangladesh. ICLARM Technical Report 40, pp: 82.
11. Alam, M.F. and M.A. Bashar, 1995. Structure of cost and profitability of small scale riverine fishing in Bangladesh. J. Res. Prog., 9: 235-241.
12. Islam, M.S., 1996. Manual on Socio-Economic Analysis in Aquaculture Research. Fisheries Research Institute, Mymensingh, Bangladesh.
13. DFID., 2000. Introduction to sustainable livelihood and its relation to project work. DFID., Dhaka, Bangladesh.
14. Hasan, M.R., M.A. Miah, M.A. Dowla, M.I. Miah and S.A. Nahid, 2011. Socio-economic condition of fishermen of the Jamuna river in Dewangonj upazila under Jamalpur distict. J. Bangladesh Soc. Agric. Sci. Technol., 8: 159-168.
15. Al-Hasan, A., M. Shahjahan, M.M. Hossain and M.M. Haque, 2014. Fish availability and marketing system at three markets in Barisal, Bangladesh. Int. J. Innov. Applied Stud., 7: 765-773.
16. Ali, M.M., M.M. Rahman, M.Y. Hossain M.Z. Rahman and M.A. Hossen *et al*., 2014. Fish marketing system in Southern Bangladesh: Recommendations for efficient marketing. Our Nat., 12: 28-36.
17. Nurullah, M., M. Kamal, M.A. Wahab, M.N. Islam and L. Yasmin *et al*., 2001. Present status of harvesting, transportation and marketing freshwater Small Indigenous Species of Fish (SIS) of Bangladesh. Bangladesh J. Fish. Res., 9: 159-168.
18. Azam, M., M.B. Rahman, M. Ruma, S.M.O. Azad, M.S. Alom, M.Y. Ali and S.M.M. Islam, 2016. Marketing system of some fish species in the North-Eastern region of Bangladesh: An empirical study. J. Entomol. Zool. Stud., 4: 923-927.
19. Khan, M.A.R., 1995. Fish marketing in some selected areas of Bangladesh. M.S. Thesis, Department of Co-operation and Marketing, Bangladesh Agricultural University, Mymensingh, Bangladesh.
20. 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.
21. Mia, M.G.F., 1996. A study of production and marketing of culture fishes by the selected pond owners in Mymensingh District. M.S. Thesis, Department of Co-operation and Marketing, Bangladesh Agricultural University, Mymensingh, Bangladesh.
22. Quddus, M.A., 1991. Seasonal price movements of commercially important fishes in selected markets of Mymensingh district. Bangladesh J. Fish., 14: 63-68.