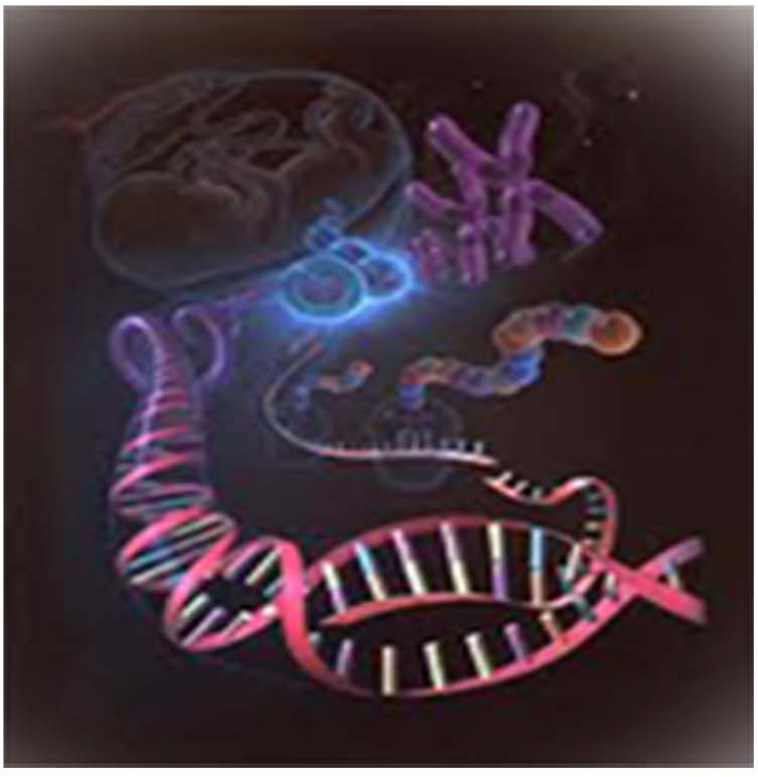
IJLBPR

ISSN 2250 - 3137
Vo1. I, No. 3, July 2012

International Journal of

Life Sciences Biotechnology and Pharma Research



International Journal of Life Sciences Biotechnology and Pharma Research
Hyderabad, INDIA

www.ijlbpr.com

Email : editorijlbpr@gmail.com or editor@ijlbpr.com

International Journal of Life Sciences Biotechnology and Pharma Research

ISSN 2250-3137 www.ijlbpr.com
Vol. 1, No. 3, July 2012

Research Paper

STATUS OF AN IDEAL DRY FISH MARKET OF BANGLADESH: A STUDY ON ASADGANJ DRY FISH MARKET, CHITTAGONG

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The marketing system and value chain of dried fish and the pulling factors enhancing its processing and marketing were studied at Asadganj dry fish market, Chittagong, Bangladesh from January 2011 to June 2011. The study area was purposively selected where activities related to commercial dry fish products were concentrated. Data was collected through survey questions. Several species of coastal and marine dried fish were commonly available in the market. Different stakeholders involved in marine dried 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 was 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. The price of dried marine fish depended on the size, availability, quality of the species, transport, labor and season. The major cause of price exploitation to the producers was dadan (non institutional money lending) that compelled the producers to go for 'conditional engagement' in the fish drying business. Bombay duck, having 24.88% was the highest quantity found in this market. Stakeholders of the market faced various problems like inadequate capital, natural calamities, lack of scientific knowledge and technology, price instability, lack of transport facilities, lack of inadequate storage facilities, lack of physical marketing facilities, lack of marketing information, etc.

Keywords: Dry fish, Value chain, Stakeholders

INTRODUCTION

Fish is an important component of the daily diet and the dried fish is an important source of protein in Bangladesh. Being a country of rivers and floodplains with a high potential of aquatic resources, fish plays a very important role in the

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daily life of many people in Bangladesh. 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 (Islam, 2006). The nutritional quality of dried fish remains intact, sometimes retains higher quality standards compared to fresh fish (as per unit weight). Special flavor is highly relished by different ethnic people. The product of dried fish is easily transportable, marketable and storable (Nowsad, 2007). Bangladesh has exported 622 metric ton of dried fish during 2009-2010 fiscal year whose market value was about 250 million taka (local currency) as foreign currency (DoF, 2011).

Drying of marine fish is very common in the entire coastal areas of Bangladesh and these dried fishes have demand both in domestic and international market though the people involved early in the production chain (fishing and drying) add relatively more value and make little profit. The reasons for this less value addition at small-scale producer level are presumed to be the poor product quality and lack of market access due to various institutional and non- institutional barriers e.g. high transportation cost/toll/taxation, price exploitative market players between producers and consumers etc. In the coastal belt, fish drying generally starts in October and ends in March. In some coastal villages, it starts sporadically in early September and lasts till the end of May (Nowsad, 2005).

Dried fish market of Asadganj, Chittagong is the largest dried fish market of Bangladesh. All kinds of dried fish from all dried fish processing area of Bangladesh like Sonadia, Kotubdia, Talipotti, Saint Martin, Teknaf, Rangabali, Kuakata, Banshkhali, Anowara, Moheshkhali, Cox's Bazar, Noakhali, Chandpur, Khulna, Sathkira etc. usually come to Asadganj dried fish market. These dried fish later supplied to different markets like Chittagong hill tracts, Sylhet, Dhaka, Comilla, Rangpur, Mymensingh, Rajsahi, Khulna, Bogora and all other parts of Bangladesh. It is also supplied to the foreign market such as Singapore, Hong Kong, Malaysia, United Kingdom, United States of America, United Arab Emirates etc. (Kleih *et al*., 2003). Considering these Asadganj dry fish market was favored and selected for the present study. Specific objectives of this study were 1) to examine the existing marketing system and estimate the cost, margin and profit of producers and traders involved in the marketing chain and 2) to assess hygienic condition and measure the quality of dry fish in the market.

MATERIALS AND METHODS

Target Groups

Target groups involved in dried fish are processor, bepari, aratdar, wholesalers, retailers and consumers who are directly involved in the marketing activity. The people those are involved in dried fish processing are called dried fish processor. Two categories of workers can be distinguished within the processing industry; i.e. the owners of drying enterprises, who usually take dadan/loan from aratdars in Chittagong, and the laborers. The later also include female workers and childs. A bepari is relatively large and professional trader who deals fish business. They bought dried marine fish from producers/ processors and sell it to the wholesalers, retailers in wholesale market. A person who deals fish business, invest money for fishing, fish purchase and selling both in domestic and foreign markets.

The aratdar is primarily commission agent who takes commission during transaction of dried fish. Wholesalers are those who buy fish from aratdar and sell fishes to retailers. Usually wholesalers buy fishes through open auction. Some whole sellers act as retailer also. Retailers are those who buy fishes 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.

Data Collection Method

Primary data were collected by face to face interview (Table 1) whereas secondary data were collected from various sources. The dried marine fish producer/processors were interviewed at their plants whereas the traders were interviewed at the market.

Data Processing and Analysis

Data collected in local unit were altered into standard unit in order to lessen miscalculation then it put into the table and transferred to computer. All calculations were calculated by using Microsoft Excel 2007, version 12.0.4518.1014.

RESULTS

Marketing System of Dry Fish in Asadganj

Almost all dried fish traded internally through private channels. The market structure varies from area to area. Different category of stake holders such as producers/processors, beparis, aratdars, wholesalers and retailers and their activities were found to complete the marketing chain (Figure 1). The sale is normally carried out through a commission agent (Aratdar) who conducts public auctions. They sell the dry fish to whole sellers and retailers (Nickaries).

Dried fish consumed at a distance from this market is transported by distributor (Paikers) to other markets, usually whole sales markets in district towns. Aratdars play a leading role in this market. They can play several brokerage functions at the same time. This includes commission agent whereby they obtain a percentage fee of the auctioning price (i.e., normally 3-4%), or wholesaler whereby they become the buyer and seller of the commodity. Four million (i.e., 4000000 Tk) is the very minimum amount of working capital required to become a small aratdar. Big aratdars who are based in major wholesale markets are estimated to have a working capital of up to 10 crore Tk (100 million), reflecting their substantial market power. For example, there are about 8 out of 30 aratdars that dominate the Asadganj dry fish market.

Information of the Major Species of Fish Used for Drying

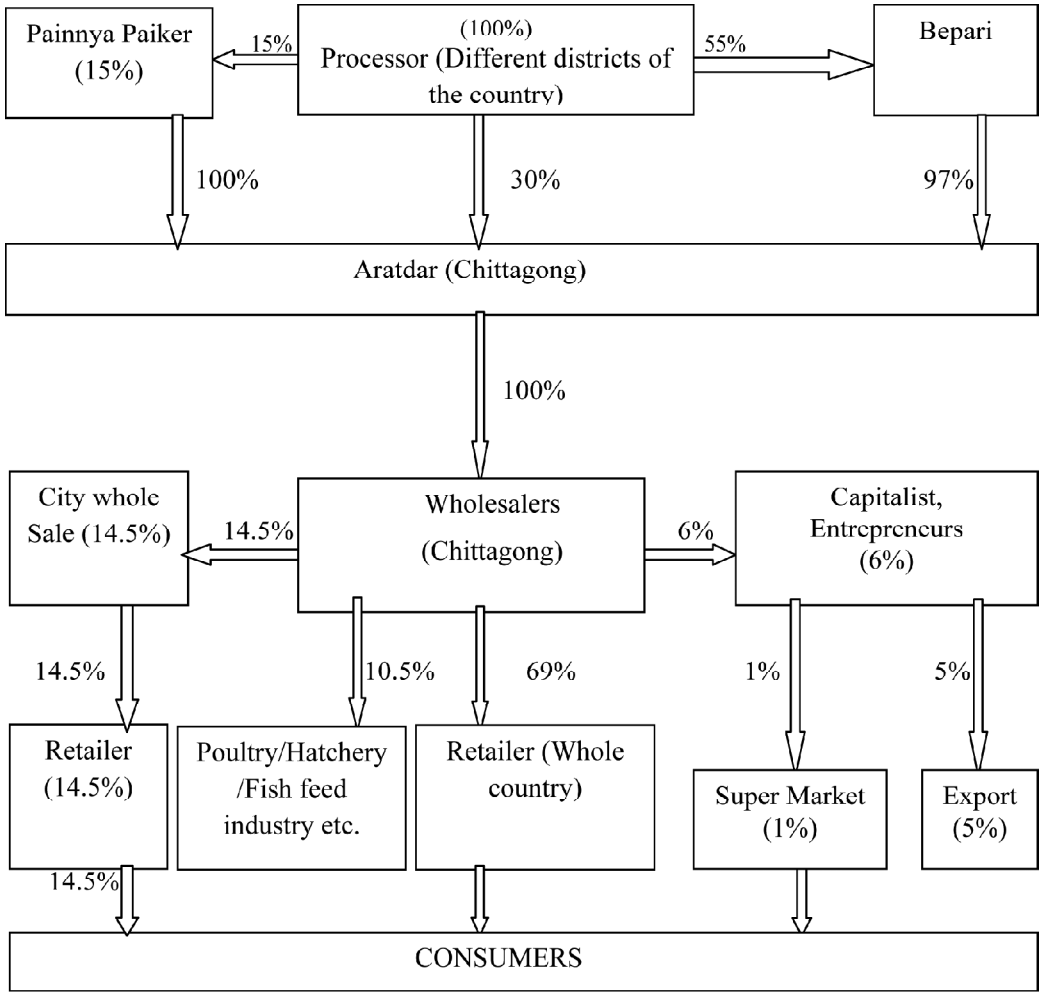
Loittya *(Harpadon nehereus)*

Length groups of 5-9 cm, 10-14 cm, 15-19 cm and 20-29 cm were found to be used for drying. The highest percentage belonged to15-19 cm group. Fishes used for drying were generally below the average size.

Table 1: Sample Sizes Used for Study in Asadganj Dry Fish Market

Study Area	No. of Processors	No. of Beparis	No. of Aratdars	No. of Wholesalers	No. of Retailers
Asadganj	7	9	8	14	8

Figure 1: Supply and Product Flow of Marine Dried Fish in Asadganj Dry Fish Market



***Poa* (*Panna microdon*)**

The highest percentage belonged to 16-18 cm group and 13-18 cm group was the second highest that were found to be sued for drying. 100% fishes used for drying were below the average size. 16-18 cm group constituted the major proportion in November catch.

***Parse* (*Liza persia*)**

Majority (54.54%) belonged to11-13 cm group in khola. No fishes were above 18 cm. 100% fishes were used for drying were below the average size.

Phasa* (*Setipinna phasa)

Three size groups viz. 6-10 cm, 11-15 cm, 16-20 cm and 21-29 cm were found to be used for drying. The highest percentage belonged to 11-15 cm group while 21-25 cm group was the lowest. 90% of the fishes used for drying were below the average size.

***Taposi* (*Polynemus paradiseus*)**

Four size groups (7-9 cm, 10-12 cm, 13-18 cm and 16-19 cm) were found to be used for drying. The highest percentage belonged to 7-9 cm

followed by 10-12 cm size group. 100% of the fishes used for drying were below the average size. A remarkable proportion of the February catch belonged to 7-9 cm size group.

***Chhuri* (*Lepturacanthus savala*)**

Five size groups (10-19 cm, 20-29 cm, 30-39 cm, 41-49 cm and 50-59 cm) were observed to be used for drying during the study. The highest percentage belonged to 30-39 cm size group followed by 40-49 cm group. 100% of the fishes used for drying were below the average size. The highest catch was in October and was dominated by 40-49 cm size group.

***Boiragi* (*Coilia dussumieri*)**

Five size groups (8-10 cm, 11-13 cm, 14-16 cm; 17-19 cm and 20-22 cm) were recorded to be seed for drying. The highest percentage belonged to 8-10 cm and in 11-13 cm size group while the lowest was 20-22cm size group. 78% of the fishes used for drying were below the average size.

***Fatra* (*Raconda russeliana*)**

Two size groups (10-14 cm and 15-19 cm) were considered for drying. 76.22% of the fish used for drying belonged to15-19 cm size group. All fishes used for drying were found in below the average size. The mentionable catch was in November and January and was dominated by 15-19 cm size group.

***Rupchanda* (*Pampus chinensis*)**

Two size groups (12-17 cm and 18-22 cm) were considered for drying. 100% of the fishes used for drying were below the average size. The highest catch was obtained in October and February and was dominated by18-22 cm size group.

***Pama* (*Otolithes pama*)**

Three length groups (10-14 cm, 15-19 cm and 20-24 cm) groups were considered for drying. The highest proportion belonged to 10-14 cm length group. 100% of the fishes used for drying were found to be below the average size. The highest population was found in December.

Species which are dried more in this area are shark (hungar), and sting ray (shapla pata). Both are rarely consumed fresh. The latter are also exported and used for shoe-making. Other species dried include: bombay duck, suna bein (i.e. Golden), datina bol. Species which are less available nowadays for drying include: churi (ribbon fish), pomfret, poma, fashia, etc. According to the processors, there was a 50% reduction of fish over the last seven to eight years. Reasons for declining supplies include: industrial trawling, bagda fry collection, catching of juvenile fish with ESBN etc.

Traders

Asadganj wholesale market is the hub of the dried fish industry in Bangladesh. It consists of 30 Aratdars and about 250 wholesalers. It is estimated that 20000 to 40000 tons of dried fish move through Asadganj wholesale market per annum. The aratdars are primarily commission agents (3% commission per transaction), whereas the second category buys the dried fish, stores it and sells it to the markets. There appears to be a traditional obligation whereby the wholesalers have to buy through aratdars (dadan providers). Regarding capital endowment and market share, 8 aratdars and 10-15 wholesalers dominate Asadganj dry fish market. Dried fish traders at Asadganj are also money lenders to the dried fish producers and fishermen cum dried fish producers at Cox's Bazar and Dublar Char of Khulna respectively. The dried fish producers and fishermen cum dried fish producers are under the control of the wholesalers at Asadganj and

they are bound to sell the dried fish to the wholesalers at a profit of Tk. 4 or 5 per kg. In Asadganj most of the fish traders use some kind of insecticides, especially Dizen to increase the shelf life of dried fish products during storage. There is a demand of a harmless powder for protection of the dried fish from insect pest, which is impractical and also demand of cold storage for storage of dried fish to avoid the use of insecticides during storage. An insignificant portion of the dried fish is traded locally. There are different categories of dried fish traders (small, medium and large). The large traders sell dried fish to the retailers and wholesalers in the other parts of the country and others sell in the local market. The traders are interested in solar-dried fish.

Transportation System

Dried fish wholesale markets consist of a series of go-down/stores within which sacks or piles of dried fish are held for periods of time. To the front of the stores are sitting areas where traders meet prospective purchasers and samples of fish are on display. Fish are sorted/graded and repacked either inside or nearby the market. There may be an animal feed mill nearby. Some long established wholesale markets are in areas, which are difficult for modern road transport to reach (e.g. trucks) and are easily congested. In some rural areas road transport is still seen as a problem, particularly if roads are narrow and poorly maintained making access difficult for trucks. Large numbers of ferry crossings delay fish distribution. A proportion of marine landings are sundried for either domestic human consumption or animal feed. Jewfish are salted and dried in various locations for export from Cox's Bazaar to Hong Kong and Singapore. Fish for domestic consumption are sundried in Cox's Bazaar and on various islands (Dubla, Moheshkali, Sonadia) and remote coastal areas such as Kuakata between September and April– the non monsoon period. Fish are sun dried on racks and frames or mats lay on the ground. Dried fish are stored in the drying yards for days or weeks before being transported in sacks by road or boat to Asadganj dried fish market. Here the fish are sorted and stored in go-downs owned by the numerous aratadars and paikers who have a major influence over the trade. From the go-downs the dried fish are transported by lorry to wholesale markets throughout the country. A significant proportion of dried fish sold in Bangladesh now arrives from India (churi, nalia, dhancha, loittya, kachki). Some of these fish bypasses the traditional centre for dried fish marketing, Asadganj market and instead is supplied direct to various districts.

Producers carried their 20.1% products by boats/mechanical boats and 79.9% carried by trucks. 10% beparis used boats/mechanical boats and 90% used mainly trucks. 30% wholesalers used rickshaws/vans for transportation. 95% marine dried fish carried by head loads/shoulder loads, from aratdars of Asadganj to retail shop of Asadganj.

Price of Dried Marine Fish at Asadganj Dry Fish Market

The price of dried marine fish depend on the size, availability, quality of the species, transport, labour and season (Figure 2). During peak season price was lower than lean season. During the study period the price of Lakkha ranged from 1800-2200 Tk./kg, where during November price was lower than April and June. The price of Rupchanda ranged from 1300-2350 Tk./kg, Loittya 250-400Tk./kg, Churi (small size) 300-700 Tk./kg, Churi (large size) 800-1000Tk./kg, Fatra 350-450Tk./kg, Surma/Maitya 900-1250 Tk./kg, Leizza

poa 200-400 Tk./kg, Lal Icha(shrimp) 400-1000 Tk./kg, Bata 400-500 Tk./kg, Mola 160-200 Tk./kg, Punti 300-350 Tk./kg, Chewa 40-60 Tk./kg.

Species Availability

The study area was well-known for marine fish. The species quantity of market was 63. Bombay duck was the highest in quantity having 24.88% in the market. Availability of species was varied from season to season. More variety occurred in winter season than summer season and others. White grunter, Indian salmon, Bombay duct, Jewled shad, Ribbon fish, Four thread tassel fish, Smooth back herring, Silver belly, Sea catfish, Shark, Bennett's stingray, Groupers, Indian piker, Spanish mackerel, Gangetic puffer were found here (Figure 3).

Figure 2: Monthly Variation of Regular Price of Selected Dried Fish in Wholesale Marketplace at Asadganj Dry Fish Market

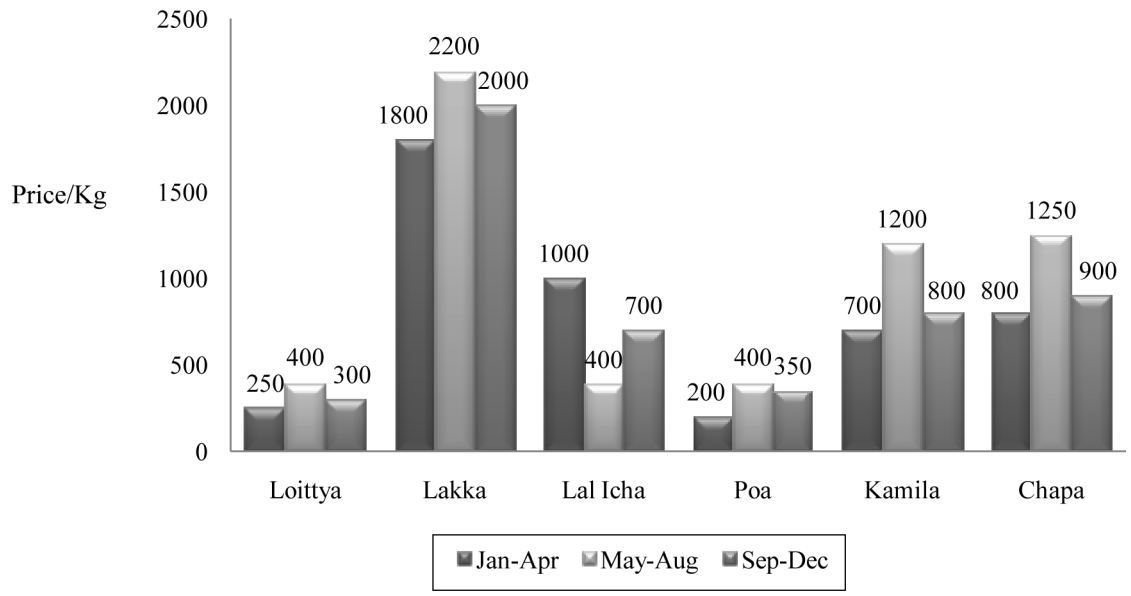
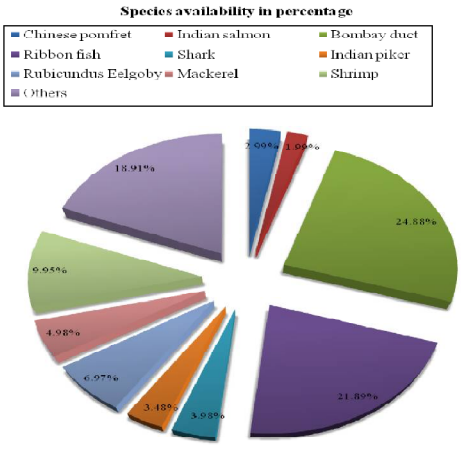


Figure 3: Availability of Dried Fish Species in Asadganj



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 14% of total marketing costs. 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 15.65, 3.90 and 7.35 respectively.

Marketing Costs

Fish marketing costs include expenses such as rental of the market place, ice, electricity, transport, and labor etc. The costs of fish marketing depend on the species, volume of fish, market distance, market infrastructure, mode of transportation, form of marketed fish (i.e. fresh or iced), and labor required. The highest average marketing cost per kilogram of fish was found in the consumer market (105.88 Tk per kg) followed by the secondary (53.38 Tk kg) and primary markets (38.05 Tk kg). Along with the average daily income of different fish marketing actors in Asadganj are shown in Table 2. The price of fish depends on species, quality, size and weight, season, market structure, supply and demand, and consumption behavior of consumers (i.e. taste). Fish prices are known to follow a seasonal pattern. When supplies are scarce fish prices increase. Demand behavior may also contribute to inter seasonal price fluctuations. There are many factors affecting the price of fish through demand and supply. On the supply side, the prices are affected by the seasonality of production and weather conditions which cause the seasonality of the market supply, i.e. the quantity of the product available on the market. In the study area, prices are generally lower between August and December, rising during the following four to five months. Prices also vary from market to market. Prices in town markets tend to be higher than in coastal markets due to a larger concentration of consumers and superior family incomes. Moreover, market prices differ according to species and size. For the same species price depends closely on the size of the fish, with larger fish fetching significantly higher prices per kilogram. The present study found that higher value fish such as Pomfret, Tuna and Coral fish can only be afforded by wealthier consumers. On the other hand, lower income groups depend on cheaper fish such as Bombay duck, Marine Eel, Jaw fish, and Marine Catfish etc.

Marketing Potential Through Innovative Packaging and Grading

Dry fish is one of the favorite items in the day to day meal of the Bangladeshi people in general and Chittagong people in particular. People prefer dry fish both as a paste (locally called *vorta*) as well as with vegetables irrespective of their income status. The producer can take advantage of this by augmenting the dry fish in innovative packaging. The low income group usually buys the generic ones available at the general fish market. But for the high income group, the producer can sell high graded dry fish in innovative and attractive packages under a specific brand name. The considering factors for such packaging

is obviously the status, perception and individual need of high income groups. For example, in case of dry shrimp, the producer can grade the fish based on size viz. big, medium and small. Then all the three sizes can be included in three cubes of one package. Such package then can be sold under a brand name at different shopping mall like Well Mart, Khulshi Mart, Agora, Shop and Save etc. Even the producer can go for contract with Aarong or others of the kind to sell the packaged dry fish in their store under their brand name.

Hygienic Condition

Hygiene at dried fish processing sites was poor with human faces and fish carcasses strewn nearby. Apart from the public health issue, such conditions will promote and maintain a background population of blowflies, which infest fish during drying, especially in the warmer months when rain makes drying difficult. Areas of shrub vegetation nearby drying areas provide ideal shade for blowfly during periods of sun and heat.

Use of Insecticides

Evidence of the use of insecticides by dried fish processors and traders to combat insect infestation of drying and dried fish came to the attention of the Bangladesh authorities and media in the mid 1980s. In the early 1990s specific research (Ward, 1992, Cox, 1992) showed that insecticides are used in a regular manner.

DISCUSSION

Marketing chain of dried fish from processors to consumer passes through a number of intermediaries such as beparies, aratdars, wholesalers and retailers in Asadganj. Ahmed (1983) reported the variation in market structure from area to area. There are four types of market viz. primary market, secondary market, higher secondary market and final consuming market. The fish marketing system is traditional, complex, and less competitive but plays a vital role in connecting the fishermen and consumers, thus contributing significantly in the 'value adding' process which otherwise would have been unused or underused and consequently in the earnings of the fisher folk reported by Chowdhury (2004). Rahman (2003) also found similar findings as the present study in two different markets of Gazipur district. This might be

Table 2: The Average Daily Income of Fish Marketing Actors

Market actors	Daily Income	
	Tk/day	US$/day
Fishermen	1000	14.28
Aratdars (commission agents)	4000	57.14
Beparies (suppliers)	2500	35.71
Wholesalers	3500	50.00
Retailers	300	4.29
Women and Child (small trader, retailer)	200	2.86
Day laborers	120	1.71
Children	60	0.85

occurred due to geographical variation and involvement of different categories of stakeholders.

There were 30 aratdars and 250 wholesalers at Asadganj dried fish market. The aratdars are primarily commission agents (3% commission per transaction), whereas the second category buys the dried fish, stores it and sell it to the markets. Amin (2010) found that commission agent/aratdars received Tk. 5-6 for per kg dried marine fish in Asadganj dry fish market. Agents or suppliers of Gazipur district typically earned 1-5% commission for their services Rahman (2003). Kleih *et al.* (2003) also found 24 aratdars and 200 wholesalers in Asadganj dry fish market and aratdars took 2% commission per transaction.

Most of the processors seem to be fairly young, i.e. between 25-30 years of age; they appear quite dynamic and switched on regarding business matters. Amin (2010) observed that 60% of producers/processors were in the age category of 18-35 years, 26% were 36-50 years and 13% above 50 years. Kleih *et al.* (2003) found that most of the processors were in the age category of 25-30 years in Kuakata. This is because dried fish marketing is a laborious job. They can give more service at this stage.

On average the processors, aratdars, wholesalers have about four years schooling; nobody has more than seven years school education. About 20% of them have no schooling at all. Shamsuddoha (2007) reported that most of the coastal belt people involved in fishing related activities and do not know how to write, some of the people can put their signature only, a few S.S.C and H.S.C holders were found in different chars. These occur because the economic condition of Bangladesh is very poor. They go to the occupation in early stage due to lack of consciousness also.

The processors have own drying houses earned 100000 Tk to 200000 Tk per processor per season. Kleih *et al.* (2003) also found similar findings where producers/ processors can earn 100000 to 200000 Tk per season and laborers earn 3000 Tk. per month. The income is not satisfactory because of more intermediaries' involvement.

The dried fish of Asadganj dry fish market are transported to long distance wholesale markets throughout the country by lorry, boat, bus, pickup, truck and head loading, pushcarts or rickshaws between wholesale and retail shop. Kleih *et al.* (2003) also found similar findings. Ahmed and Sturrock (2006) found that a large number of people, many of whom live below the poverty line, find employment in coastal fish marketing as fishermen, assemblers, processors, traders, intermediary transporters and day laborers, including women and children. This difference occur in transportation system at long distance wholesale markets and between wholesale due to easy and lower transport cost in between wholesale and retail shop.

In the present study the price of dried marine fish depended on the size, availability, quality of the species, transport, labour and season. During peak season price was lower than lean season. Kleih *et al.* (2003) conducted a study during 2001-2002 found that the price of Bombay duck ranged from 65-100 Tk./kg, Shark 65-90 Tk./kg, Shapla pata 28-55 Tk./kg, Suna bain 50-80 Tk./kg. The variation of prices might be varied due to seasonal

variation and availability of fishes. This type of variations might be the reason of differences in processing cost, labor cost and price of fish in different areas.

Ahmed and Sturrock (2006) reported that facilities at fish markets are minimal with poor hygiene and sanitation and there are no standard practices for handling, washing, sorting, grading, cleaning and icing of fish. These occur because greater part of the people of Bangladesh is illiterate. They have lack of consciousness about health infection.

In Asadganj most of the fish traders use some kind of insecticides, especially Dizen to increase the shelf life of dried fish products during storage. Alam (1996) also found the evidence of very high concentration of DDT and DDE residue present in dried fish samples collected from Dhaka Newmarket.This is due to the lack of awareness about harmful and destructive role of insecticide in human body. Often they use insecticide to protect fish from insect and to get more profit.

Stakeholders of Asadganj faced various problems such as political disturbances, influence of muscleman, inadequate capital, natural calamities, lack of scientific knowledge and technology, price instability, lack of transport facilities, lack of inadequate storage facilities, lack of physical marketing facilities and lack of marketing information etc. Ahmed *et al.* (2007) also reported that traders of tilapia marketing faced the problems of poor road and transport facilities, higher transport costs, insufficient supply of ice, unhygienic conditions, lack of credit facilities, poor infrastructure of markets, political disturbances such as strikes and road blocks, etc. Shamsuddoha (2007) also found in Moheshkhali particularly in the ghats of river considerably high transportation cost, high transportation toll. This might be occurring due to lacking of law enforcement by government and lacking of consciousness about market.

CONCLUSION

Marine dried fish marketing plays an important role in the economy of Bangladesh, contributing to increased food production, diversification of the economy and increased employment opportunities. However, concerns arise about the long-term sustainability of marine dried fish marketing due to poor road and transport facilities, poor supplies of equipment, lack of money and credit facilities, poor institutional support and inadequate extension services. It is therefore necessary to provide institutional and organizational support, government support, extension services and more research along with knowledge of dried fish marketing.

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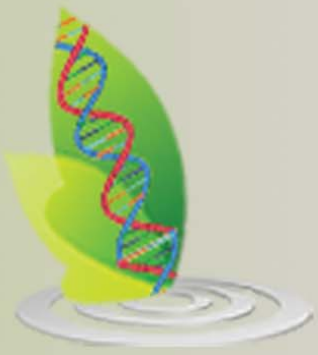

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