

## VALUE CHAIN ANALYSIS OF DRY FISH MARKETING AT MASSIMPUR IN SYLHET OF BANGLADESH

S F Haque<sup>1</sup>, M M Iqbal<sup>\*1</sup>, M A R Hossain<sup>2</sup>, M A Hossain<sup>1</sup> and M A Rahman<sup>1</sup>

<sup>1</sup>Department of Fish Biology and Genetics, Sylhet Agricultural University, Sylhet-3100, Bangladesh

<sup>2</sup>Department of Fisheries Biology and Genetics, Bangladesh Agricultural University, Mymensingh, Bangladesh

### Abstract

The present study was conducted for six months from July to December, 2014 at Massimpur bazar dry fish market in Sylhet district of Bangladesh to evaluate the value chain of dried fishery products. Six hundreds *beparis* (wholesaler), seventeen *arotdars* (commission agent), 270 wholesalers and 90 retailer shops were found in the market. Among them a total of 70 dried fish traders were selected randomly and interviewed using a semi-structured questionnaire. The net profit of *bepari*, *arotdar*, wholesaler and retailer were 5.98 Tk.kg<sup>-1</sup>, 6.26Tk.kg<sup>-1</sup>, 7.30Tk.kg<sup>-1</sup>, 8.10 Tk.kg<sup>-1</sup>, respectively. Thirty five species of dried fish were found in the market during the study period. It was found that high priced fish demanded high marketing cost resulting higher marketing margin and profit compared to low-priced fish. The price of dried fish was depended on the size, availability, transport, labor and season. The most abundant species was Phaisa (*Harpadon nehereus*) (19.32%) followed by Shol (*Channa striatus*) (5.21%) and Gozar (*Channa marulis*) (4.78%). Five marketing channels were found that comprise asset of intermediaries including producers/processors, *beparies/mohajons* (wholesaler), *arotdars*, wholesalers and retailers. Involvement of more intermediaries in the marketing channel was the reason of increasing product price. Study revealed a number of constraints for wholesalers and retailers including rapid damage of dry fishes, lack of proper hygienic condition, high transaction costs, and lack of capitals, poor marketing infrastructure, transportation and storage facilities.

**Keywords:** Dried fish, marketing, wholesaler, retailer, consumer, northeast region of Bangladesh

### Introduction

Fish drying is the biggest fish processing activity in both value and volume in coastal region as well as all over Bangladesh. Bangladesh has exported 1278 metric ton of dried fish during 2012-2013 fiscal year (DoF, 2014). The product of dried fish is easily transportable, marketable and storable (Cutting 1962, Nowsad, 2007). Sun drying is a least expensive method of fish preservation and solar energy is used for the removal of moisture from the fish (Marine *et al.* 2014). Dried fish is a source of protein and plays a major contribution in providing nutrition for the poor as well as economically disadvantaged people in the country (Reza *et al.* 2005). The product of dried fish is easily transportable, marketable and storable (Nowsad, 2007) and have good potential in India, Sri Lanka, Hong Kong and Singapore (Patterson and Ranjitha, 2009). In Bangladesh most of the market samples become slightly off odour and some already loses the shelf-life where rancid odor and bitter taste are developed (Saha, 2003). The marketing system operates through a set of intermediaries performing useful commercial functions in a chain from the producers to the final consumers (Nayeem *et al.* 2010). According to Kleih *et al.* (2001) the fish market structure varies from area to area, but in general it can be of four types viz. primary, secondary, higher secondary, and final consuming market. Massimpur bazar was out of proper study due to its distance from city markets and poor transportation facilities. The research was taken with the aims of discovering overall physical facilities, marketing problems and economic status of fish traders.

### Materials and Methods

A six month long study was conducted from July to December 2014 in Massimpur bazar dry fish market, is one of the biggest dry fish market in Bangladesh. Surveys were done quarterly in each month and respected data were

---

\*Corresponding author: M M Iqbal, Department of Fish Biology and Genetics, Sylhet Agricultural University, Sylhet-3100, Bangladesh

recorded. Six hundreds *beparis*, seventeen *arotdars*, 270 wholesalers and 90 retailer shops were found in the market. Among them a total of 70 dried fish traders were selected randomly and interviewed using a semi-structured questionnaire. The respondents were asked about the overall marketing condition, sources, supply and demand of dried fish, price, peak season of marketing, storage condition, etc. Others information including cost, income and marketing channels of dried fish were recorded. The data were re-checked and summarized. Finally tabulated data were analyzed by using computer software of “SPSS 11.0” and “Microsoft Excel 2007” to estimate mean values and graphical statements.

## Results and Discussion

### Dried fish producers

Local producers directly carried their dried fish to *arotders* of Massimpur bazar dry fish market. They also sold some quantities of dried fish to local agents/*foria* (fish hawker) who conversely sold them into the *arot* (wholesale market). Processors of other district also sold their products to *beparies/mohajons* of different districts. Finally, they sold them to the *arot*. The dry fish producers/processers sold major portion of their products directly to the *baparies* which is 78% and the rest of the 19% to the *arotders* and 3% to the local agent/*faria* (Fig.1). Similar observations were found by a number of researchers including Ahmed *et al.* (2007), Flowra *et al.* (2010), Faruque *et al.* (2012), Rahman *et al.* (2012) and Ali *et al.* (2014). Processors bought the fresh fish from nearest markets for drying and sometimes used salt to prevent insect infestation. But in some places, they used hazardous chemicals such as Basudin, Nogos and other agricultural pesticides (Reza *et al.* 2005).

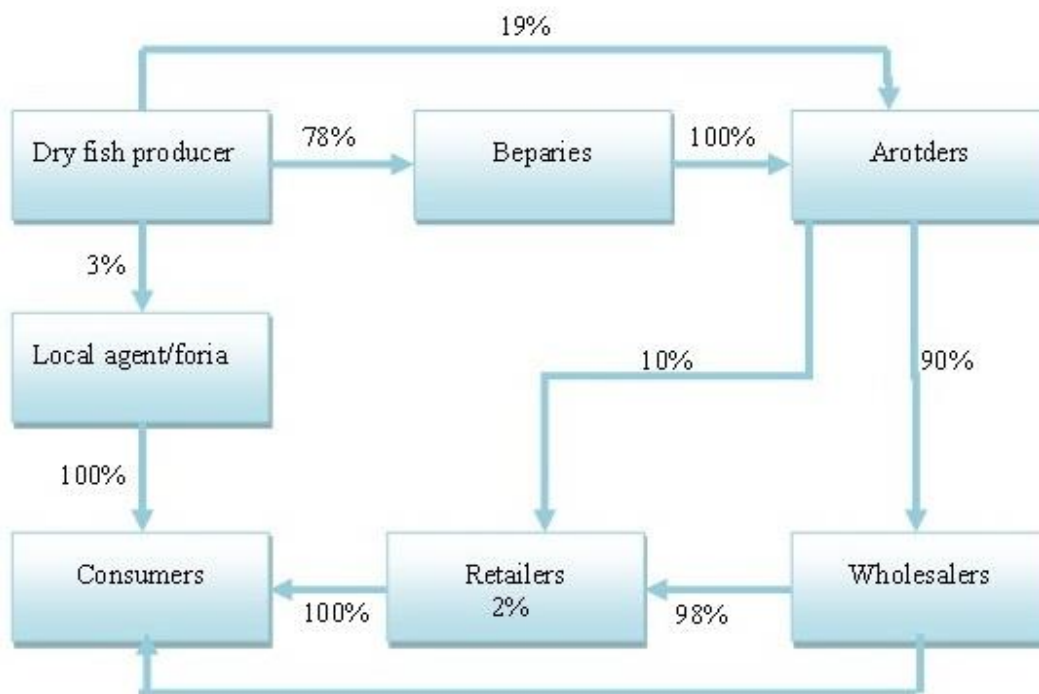


Fig. 1. Product flow of dried fish in Massimpur bazar dry fish market.

### Marketing channel of dry fish

Retailers made the product available to the consumers and they sell dry fish at different retail markets of Sylhet. During the study period there were 90 retailer shops found proximate to the Massimpur bazar dry fish market. They purchase dry fish from wholesalers of Massimpur bazar dry fish market and sold their total products to the consumers (Fig. 1). The retailers cum wholesalers of Massimpur dry fish market also sold dried fish to the

consumers. In every retail shops of Massimpur, there were 2 to 3 employers found for selling dried fish. They purchased their products directly from *arotder*. Similar findings were reported by Flowra *et al.* (2010) and Samad *et al.* (2009), Marine *et al.* (2014). Shamsuddoha (2007), Reza *et al.* (2005) and Monir *et al.* (2013) also found intermediaries like wholesalers, *Arotgars*, middlemen and retailers in Cox's Bazar.

### Dry fish Exporters

Dry fish also exported by some middlemen who bought dried fish directly from the wholesalers and exported to UK, USA, Canada, United Arab Emirate and other countries. Some wholesalers also exported dry fish directly. They usually exported 5000-6000 kg dry fish in every month. Hossain *et al.* (2013) stated that the volume and balance of dried fish imports and exports is poorly understood. Interviewees suggested that imports are increasing as a proportion of total consumption over time.

### Average profit and cost of different stakeholders

#### Profit and cost of *bepari*

By the end of study it was reported that *beparies* got highest gross profit from Pabda at 18.40 Tk.kg<sup>-1</sup>, and the lowest gross profit they got from Olua/amadiat 4.64 Tk.kg<sup>-1</sup>, but average gross profit was 9.08 Tk.kg<sup>-1</sup> (Table 1). The average cost of *bepari* is included transportation, loading and unloading, road toll and personal expenses rather than the dry fish. Among them transportation cost was the highest, and personal expenses was the lowest (Table 2). The net profit of *bepari* was found 5.98 Tk.kg<sup>-1</sup> in Massimpur dry fish market (Table 1).

**Table 1. Average gross profit of *bepari* found in the study area**

Sl No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Sl No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Average gross profit (Tk.kg <sup>-1</sup> )
01	Phasha ( <i>Setipinna phasa</i> )	7.98	19	Gonia ( <i>L. gonius</i> )	13.14	9.08
02	Punti ( <i>Puntius sp.</i> )	11.6	20	Ayre ( <i>S. senghala</i> )	10.92	
03	Bata ( <i>L. bata</i> )	6.12	21	Mola ( <i>A. mola</i> )	5.13	
04	Loitta ( <i>H. neherus</i> )	7.14	22	Bheda ( <i>N. nandus</i> )	5.72	
05	Bamash ( <i>O. bengalense</i> )	8.74	23	Pabda ( <i>Ompok sp.</i> )	18.4	
06	Rup Chanda ( <i>S. sinensis</i> )	15.5	24	Churi ( <i>T. muticus</i> )	8.16	
07	GolsaTengra ( <i>Mystus sp.</i> )	11.02	25	Rita ( <i>Rita rita</i> )	7.68	
08	Khalissha ( <i>Colisa. sp</i> )	7.5	26	Bacha ( <i>E. bacha</i> )	9.62	
09	Boal ( <i>W. atto</i> )	6.72	27	Bele ( <i>G. giuris</i> )	7.22	
10	Bhetki ( <i>L. calcarifer</i> )	10.54	28	Tara Baim ( <i>M. aculeatus</i> )	11.25	
11	Olua/Amadi ( <i>D. margaritifera</i> )	4.64	29	Chela ( <i>Chela spp.</i> )	9.6	
12	Potka ( <i>Tetrdon sp.</i> )	6.12	30	Shol ( <i>C. striatus</i> )	15.4	
13	Katchki ( <i>C. suborna</i> )	6.2	31	Taki ( <i>C. punctatus</i> )	11.4	
14	Gozar ( <i>C. marulis</i> )	13.12	32	Icha	6.25	
15	Gagla ( <i>A. gagorus</i> )	6.9	33	Tengra ( <i>Mystus sp.</i> )	7.5	
16	Hilsa ( <i>T. ilisha</i> )	11.52	34	Baim ( <i>M. armatus</i> )	9	
17	Batashi ( <i>N. atherinoides</i> )	6.86	35	Chanda ( <i>Chanda sp.</i> )	6.9	
18	Chapila ( <i>G. chapra</i> )	6.24				

1USD=78 BD Taka (Approximately) throughout the study period.

**Table 2. Average cost of *bepari* found in the study area**

Cost items		Cost (Tk.kg <sup>-1</sup> )	Percentage (%)
Transportation		1.95	62.90
Loading and unloading		0.60	19.35
Road toll		0.25	8.06
Personal expenses		0.3	9.67
<b>Total cost</b>	<b>(Tk.kg<sup>-1</sup>)</b>	<b>3.10</b>	<b>100</b>
<b>Gross profit</b>	<b>(Tk.kg<sup>-1</sup>)</b>	<b>9.08</b>	
<b>Net profit</b>	<b>(Tk.kg<sup>-1</sup>)</b>	<b>5.98</b>	

**Profit and cost of *aratder***

*Arotder*s are found to get highest gross profit from Rup Chanda 37.20 Tk.kg<sup>-1</sup>, and the lowest gross profit from Olua/Amadi 1.808 Tk.kg<sup>-1</sup>, but the average gross profit of *arotder* was 7.66 Tk.kg<sup>-1</sup> (Table 3). The average cost of *arotder*s included market toll, loading and unloading cost and personal expenses excluding raw product (Table 4). Among them market toll was the highest and personal expenses was the lowest (Table 4). The net profit of *arotder*s was found 6.26 Tk.kg<sup>-1</sup> in the study area (Table 4).

**Table 3. Average gross profit of *arotder* in the study area**

Sl. No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Sl. No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Average gross profit (Tk.kg <sup>-1</sup> )
01	Phasha ( <i>Setipinna phasa</i> )	5.12	19	Chapila ( <i>G. chapra</i> )	3.64	
02	Punti ( <i>Puntius</i> sp.)	10.44	20	Gonia ( <i>L. goni</i> )	15.549	
03	Bata ( <i>L. bata</i> )	2.07	21	Ayre ( <i>S. senghala</i> )	20.7	
04	Loitta ( <i>H. neherus</i> )	3.825	22	Mola ( <i>A. mola</i> )	2.261	
05	Bamash ( <i>O. bengalense</i> )	6.27	23	Bheda ( <i>N. nandus</i> )	2.75	
06	Rup Chanda ( <i>S. sinensis</i> )	37.2	24	Pabda ( <i>Ompok</i> sp.)	17.28	
07	GolsaTengra ( <i>Mystus</i> sp.)	9.976	25	Churi ( <i>T. lepturus</i> )	6.12	
08	Khalisha ( <i>Colisa</i> Sp.)	5.1	26	Rita ( <i>R. rita</i> )	5.12	
09	Chanda ( <i>Chanda</i> sp.)	2.99	27	Bacha ( <i>E. vacha</i> )	6.47	
10	Boal ( <i>W. atto</i> )	4.676	28	Bele ( <i>G. giuris</i> )	6.878	7.66
11	Bhetki ( <i>L. calcarifer</i> )	13.02	29	Tara Baim ( <i>Macrogathus</i> sp.)	9.12	
12	Olua, Amadi ( <i>D. margaritifera</i> )	1.808	30	Chela ( <i>S. acinaces</i> )	7.28	
13	Potka ( <i>Tetrdon</i> sp.)	2.07	31	Shol ( <i>C. striatus</i> )	19.14	
14	Katchki ( <i>C. suborna</i> )	2.34	32	Taki ( <i>C. punctatus</i> )	6.878	
15	Gozar ( <i>C. marulis</i> )	18.7	33	Icha	3.62	
16	Gagla ( <i>A. gagorus</i> )	2.99	34	Tengra ( <i>Mystus</i> sp.)	5.1	
17	Hilsa ( <i>T. ilisha</i> )	9.12	35	Baim ( <i>M. armatus</i> )	8.19	
18	Batashi ( <i>N. atherinoides</i> )	3.307				

**Profit and cost of wholesaler**

The highest gross profit of wholesaler was 42.85 Tk.kg<sup>-1</sup> from Rup Chanda and the lowest gross profit from Olua/amadi 1.89 Tk.kg<sup>-1</sup> (Table 5), with an average value of 8.74 Tk.kg<sup>-1</sup> (Table 5). The average cost of wholesaler included market toll, loading and unloading cost, electricity bill and personal expenses excluding the raw dry fish. Among them market toll was the highest and electricity bill was the lowest (Table 6). The net profit of wholesaler of Massimpur dry fish market was 7.30 Tk.kg<sup>-1</sup> (Table 6).

**Table 4. Average cost of arotder in the study area**

Cost items	Cost (Tk.kg <sup>-1</sup> )	Percentage (%)
Market toll	0.65	46.43
Loading and unloading	0.45	32.14
Personal expenses	0.3	21.43
Total cost (Tk.kg <sup>-1</sup> )	1.40	100
Gross profit (Tk.kg <sup>-1</sup> )	7.66	
Net profit (Tk.kg <sup>-1</sup> )	6.26	

**Table 5. Average gross profit of wholesaler in the study area**

Sl No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Sl No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Average gross profit (Tk.kg <sup>-1</sup> )
01	Phasha ( <i>S. phasa</i> )	5.2	19	Gonia ( <i>L. gonius</i> )	16.55	
02	Punti ( <i>Puntius</i> sp.)	10.74	20	Ayre ( <i>S. senghala</i> )	22.09	
03	Bata ( <i>L. bata</i> )	2.13	21	Mola ( <i>A. mola</i> )	2.4	
04	Loitta ( <i>H. neherus</i> )	3.93	22	Bheda ( <i>N. nandus</i> )	2.87	
05	Bamash ( <i>O. bengalense</i> )	6.52	23	Pabda ( <i>Ompok</i> sp.)	18.38	
06	Rup Chanda ( <i>S. sinensis</i> )	42.85	24	Churi ( <i>T. lepturus</i> )	6.51	
07	GolsaTengra ( <i>Mystus</i> sp.)	10.38	25	Rita ( <i>R. rita</i> )	5.42	
08	Khalisha ( <i>Colisa</i> sp.)	5.24	26	Bacha ( <i>E. vacha</i> )	6.7	
09	Boal ( <i>W. atto</i> )	4.896	27	Bele ( <i>G. giuris</i> )	7.03	
10	Bhetki ( <i>L. calcarifer</i> )	13.93	28	Tara Baim ( <i>Macragnathus</i> sp.)	9.29	8.74
11	Olua, Amadi ( <i>D. margaritifera</i> )	1.89	29	Chela ( <i>S. acinaces</i> )	7.41	
12	Potka ( <i>Tetrdon</i> sp.)	2.26	30	Shol ( <i>C. striatus</i> )	21.33	
13	Katchki ( <i>C. suborna</i> )	2.45	31	Taki ( <i>C. punctatus</i> )	6.96	
14	Gozar ( <i>C. marulis</i> )	19.98	32	Icha	3.7	
15	Gagla ( <i>A. gagorus</i> )	3.23	33	Tengra ( <i>Mystus</i> sp.)	5.3	
16	Hilsa ( <i>T. ilisha</i> )	9.68	34	Baim ( <i>M. armatus</i> )	8.43	
17	Batashi ( <i>N. atherinoides</i> )	3.47	35	Chanda ( <i>C. nama</i> )	3.07	
18	Chapila ( <i>G. chapra</i> )	3.82				

**Table 6. Average cost of wholesaler in the study area**

Cost items	Cost (Tk.kg <sup>-1</sup> )	Percentage (%)
Market toll	0.75	52.08
Loading and unloading	0.25	17.36
Personal expenses	0.30	20.83
Electricity Bill	0.14	9.72
Total cost (Tk.kg <sup>-1</sup> )	1.44	100
Gross profit (Tk.kg <sup>-1</sup> )	8.74	
Net profit (Tk.kg <sup>-1</sup> )	7.30	

### Profit and cost of retailer

The highest gross profit of retailers are from Rup Chanda 50.12 Tk.kg<sup>-1</sup> and the lowest from Potka 2.00 Tk.kg<sup>-1</sup>, but the average gross profit was 9.34 Tk.kg<sup>-1</sup> (Table 7). The average cost of retailer included transportation, market toll, electricity bill and personal expenses exclusive raw dry fish products. Among them market toll was the highest, and electricity bill was the lowest (Table 6). The net profit of retailer was 8.10 Tk.kg<sup>-1</sup> (Table 8).

**Table 7. Average gross profit of retailer in the study area**

Sl No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Sl No.	Species	Gross profit (Tk.kg <sup>-1</sup> )	Average gross profit (Tk.kg <sup>-1</sup> )
01	Phasha ( <i>S. phasa</i> )	5.4	19	Chapila ( <i>G. chapra</i> )	4.02	
02	Punti ( <i>Puntius</i> sp.)	11.2	20	Gonia ( <i>L. goni</i> )	17.1	
03	Bata ( <i>L. bata</i> )	2.2	21	Ayre ( <i>S. senghala</i> )	23.1	
04	Loitta ( <i>H. neherus</i> )	3.98	22	Mola ( <i>A. mola</i> )	2.8	
05	Bamash ( <i>O. bengalense</i> )	7.8	23	Bheda ( <i>N. nandus</i> )	2.98	
06	Rup Chanda ( <i>S. sinensis</i> )	50.12	24	Pabda ( <i>Ompok</i> sp.)	19.2	
07	GolsaTengra ( <i>Mystus</i> sp.)	11.2	25	Churi ( <i>T. lepturus</i> )	6.92	
08	Khalisha ( <i>Colisa</i> sp.)	5.4	26	Rita ( <i>R. rita</i> )	5.98	
09	Chanda ( <i>C. nama</i> )	3.2	27	Bacha ( <i>E. vacha</i> )	7.1	
10	Boal ( <i>W. atto</i> )	4.98	28	Bele ( <i>G. giuris</i> )	7.35	9.34
11	Bhetki ( <i>L. calcarifer</i> )	14.2	29	Tara Baim ( <i>Macragnathus</i> sp.)	9.9	
12	Olua, Amadi ( <i>D. margaritifera</i> )	2.5	30	Chela ( <i>S. acinaces</i> )	7.85	
13	Potka ( <i>Tetrdon</i> sp.)	2	31	Shol ( <i>C. striatus</i> )	22.56	
14	Katchki ( <i>C. suborna</i> )	2.6	32	Taki ( <i>C. punctatus</i> )	7.4	
15	Gozar ( <i>C. marulis</i> )	20.9	33	Icha	3.9	
16	Gagla ( <i>A. gagorus</i> )	3.5	34	Tengra ( <i>Mystus</i> sp.)	5.5	
17	Hilsa ( <i>T. ilisha</i> )	9.8	35	Baim ( <i>M. armatus</i> )	8.9	
18	Batashi ( <i>N. atherinoides</i> )	3.56				

**Table 8. Average cost of retailer in the study area**

Cost items	Cost (Tk.kg <sup>-1</sup> )	Percentage (%)
Transportation	0.30	24.19
Market toll	0.43	34.67
Electricity Bill	0.21	16.93
Personal expenses	0.30	24.19
Total cost (Tk.kg <sup>-1</sup> )	1.24	100
Gross profit (Tk.kg <sup>-1</sup> )		9.34
Net profit (Tk.kg <sup>-1</sup> )		8.10

### Price fluctuations of dry fish of retailer

The price variation of dry fish of retailer was shown in Table 9. The highest and the lowest priced dry fish were Rup Chanda and Mola, respectively throughout the study period. The higher price of dry fish was obtained during the late monsoon (July-August), while the lower price was found in the post monsoon (November-December). The price of dried fish was depended on the size of dry fish, availability of dry fish, transportation cost, labor and season.

**Table 9. Month wise price fluctuation (retailer price)**

Sl No.	Species	Jul. (Tk.kg <sup>-1</sup> )	Aug. (Tk.kg <sup>-1</sup> )	Sep. (Tk.kg <sup>-1</sup> )	Oct. (Tk.kg <sup>-1</sup> )	Nov. (Tk.kg <sup>-1</sup> )	Dec. (Tk.kg <sup>-1</sup> )
01.	Phaisa ( <i>S. phasa</i> )	525	515	510	500	490	490
02.	Shol ( <i>C. striatus</i> )	880	870	870	865	860	850
03.	Gozar ( <i>C. marulis</i> )	995	985	970	960	960	950
04.	Baim ( <i>M. armatus</i> )	485	475	470	460	460	450
05.	Loitta ( <i>H. neherus</i> )	350	340	335	330	330	320
06.	Tengra ( <i>Mystus sp.</i> )	380	370	365	360	360	350
07.	ChepaPunti ( <i>Puntius sp.</i> )	645	635	620	615	610	600
08.	Chapila ( <i>G. chapra</i> )	370	365	360	350	345	345
09.	Icha (small FW)	349	344	340	330	325	320
10.	Icha (small Sea)	375	365	360	350	355	350
11.	Mola/Mixed SIS	265	260	255	250	250	250
12.	Ilish ( <i>T. ilisha</i> )	576	572	570	560	550	550
13.	Pata Baim ( <i>Macrogathus sp.</i> )	980	975	960	950	950	950
14.	Tengra ( <i>Mystus sp.</i> )	385	380	370	375	370	375
15.	Taki ( <i>C. punctatus</i> )	535	530	520	515	500	510
16.	Chanda ( <i>G. chapra</i> )	275	275	270	260	250	260
17.	Pabda ( <i>Ompok sp.</i> )	935	930	920	910	900	910
18.	Ayre ( <i>S. senghala</i> )	930	925	920	910	900	900
19.	Churi ( <i>T. lepturus</i> )	475	469	465	460	440	450
20.	Bata ( <i>L. bata</i> )	280	275	270	265	265	260
21.	Rup Chanda ( <i>S. sinensis</i> )	1650	1630	1620	1610	1600	1590
22.	Gonia ( <i>L. goniis</i> )	815	810	800	800	790	780
23.	Bhetki ( <i>L. calcarifer</i> )	680	670	660	660	650	640
24.	GolsaTengra ( <i>Mystus sp.</i> )	635	630	620	610	600	600
25.	Batashi ( <i>N. atherinoides</i> )	320	320	310	300	300	300
26.	Khalisha ( <i>Colisa. sp</i> )	290	285	275	270	270	260
27.	Olua, Amadi ( <i>D. margaritifera</i> )	275	270	265	260	260	260
28.	Potka ( <i>Tetrdon sp.</i> )	270	260	260	250	250	250
29.	Boal ( <i>W. atto</i> )	280	275	270	265	250	260
30.	Bacha ( <i>E. vacha</i> )	470	465	460	460	450	450
31.	Bele ( <i>G. giuris</i> )	275	270	270	250	255	260
32.	Chela ( <i>S. acinaces</i> )	450	445	440	440	430	430
33.	Katchki ( <i>C. suborna</i> )	320	320	315	300	300	300
34.	Bheda ( <i>N. nandus</i> )	275	270	265	260	265	260
35.	Gagla ( <i>A. gagorus</i> )	400	390	385	390	380	380
36.	Rita ( <i>R. rita</i> )	420	415	410	400	400	400

#### Analysis of price fluctuation of different dry fish traders

The price of dry fish was fluctuated with species to species. Among 35 dry fish species traded in the study area, the highest and lowest prices were for Rup Chanda (*Stromateus sinensis*) and Olua/Amadi (*Demicoilia margaritifera*), respectively (Fig. 2). This statement was true for all 4 stake holders in the study area. It was also found that higher priced dry fish cost was also higher and the marketing margin and profit was also higher compared to lower priced dry fish.

#### Species availability

There were 35 dry fish species found in Massimpur dry fish market during the study period. Among them 29 species were freshwater species. The highest available species was Shol comprising 5.21% followed by Gozar (*Channa marulis*) (4.78%) and Chepa (4.19%) of the total fresh water biomass in the study area (Table 10). The least available species was Bheda (*Nandus nandus*) comprised of 0.95% followed by Khalisha (0.73%) and Bele (*Glossogobius giuris*) (0.34%) (Table 10). Only six marine water dry fish species were reported among them highest

available marine species was Phaisa (*Setipinna phasa*) (19.32%) followed by Loittya (*Harpadon nehereus*) (4.53%) and Bhetki (*Lates calcarifer*) (4.45%). The least abundant dry fish species was found Churi having 2.98% (Table 11).

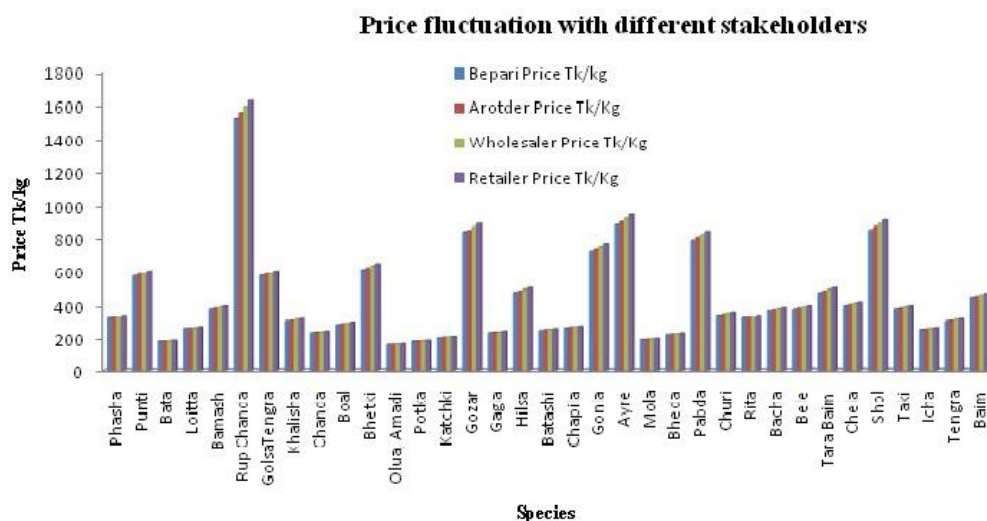


Fig. 2. Analysis of Price fluctuation of different stages of dry fish market chain.

Table 10. Percentages of freshwater dry fish species in the study area

Sl. No	Species	Common name	Availability percentage (%)
01.	Shol ( <i>C. striatus</i> )	Great snakehead	5.21
02.	Gozar ( <i>C. marulis</i> )	Snakehead murrel	4.78
03.	Chepapunti ( <i>Puntius</i> sp.)	Barbs	4.19
04.	Icha	Small prawn	4.10
05.	Mola ( <i>A. mola</i> )	Molacarplet	3.91
06.	Chanda ( <i>C. nama</i> )	Elongate Glass-perchlet	3.00
07.	Boal ( <i>W. atto</i> )	Freshwater shark	3.30
08.	Ilish ( <i>T. ilisha</i> )	Hilsa	3.12
09.	Katchki ( <i>C. suborna</i> )	Ganges river sprat	3.02
10.	Ayre ( <i>S. senghala</i> )	Long-whiskered catfish	2.95
11.	Tengra ( <i>Mystus</i> sp.)	Tengra catfish	2.40
12.	Baim ( <i>M. armatus</i> )	Zig-zag eel	2.23
12.	Patabaim ( <i>Macrognathus</i> sp.)	Spiny eel	2.21
13.	Pabda ( <i>Ompok</i> sp.)	Pabdah catfish	2.25
14.	Taki ( <i>C. punctatus</i> )	Spotted snakehead	2.20
15.	Chela ( <i>S. acinaces</i> )	Silver razorbelly minnow	2.02
16.	Batashi ( <i>N. atherinoides</i> )	Indian potasi	1.90
17.	Rita ( <i>R. rita</i> )	Rita	1.40
18.	Bacha ( <i>E. vacha</i> )	River catfish	1.56
19.	Bata ( <i>L. bata</i> )	Bata	1.40
20.	Gonia ( <i>L. gonius</i> )	Kurialabeo	1.29
21.	Potka ( <i>Tetrdon</i> sp.)	Green puffer fish	1.10
22.	Olua, Amadi ( <i>D. margaritifera</i> )	Goldspottedanchovy	1.07
24.	GolsaTengra ( <i>Mystus</i> sp.)	Day'smystus	1.05
25.	Gagla ( <i>A. gagorus</i> )	Gagora catfish	1.01
26.	Bamash ( <i>O. bengalense</i> )	Bengal eel	0.98
27.	Bheda ( <i>N. nandus</i> )	Mud perch	0.95
28.	Khalisha ( <i>Colisa</i> sp.)	Dwarf gourami	0.73
29.	Bele ( <i>G. giuris</i> )	Scribbled goby	0.34



To improve the marketing chain of the dried fish it is necessary to shorten the marketing channel. Involvement of more intermediaries in the marketing channel is the reason of increasing product price. A number of constraints were reported by wholesalers and retailers of Massimpur bazar dry fish market. The reported problems were rapid damage of dry fishes, inadequate capital, price instability, lack of proper hygienic condition, lack of transport facilities, lack of inadequate storage etc.

**Table 11. Percentage of sea water dry fish species found in the study area**

Sl No.	Species	Common name	Availability percentage (%)
01.	Phaisa ( <i>S. phasa</i> )	Anchovy	19.32
02.	Loitta ( <i>H. neherus</i> )	Bombay duck	4.53
03.	Bhetki ( <i>L. calcarifer</i> )	Giant Perch	3.98
04.	Chapila ( <i>G. chapra</i> )	Indian River Shad	2.54
05.	Rup Chanda ( <i>S. sinensis</i> )	Chinese Pomfret	2.01
06.	Churi ( <i>T. lepturus</i> )	Ribbon fish	1.95

To improve the marketing chain of the dried fish it is necessary to shorten the marketing channel. Involvement of more intermediaries in the marketing channel is the reason of increasing product price. Proper marketing strategies and appropriate monitoring should be done to ensure premium quality fishery product and healthy economy of producer.

## References

- Ahmed M, Islam N and Shamsuddoha. 2007. Value chain analysis in the dry fish production and marketing of post-harvest fishery products (PHFP) in the Coastal Belt of Bangladesh. *Journal of Bangladesh Fisheries Research Forum*. pp. 87-112.
- Ali M M, Rahman M M, Hossain M Y, Rahman M Z, Hossen M A, Naser S M A, Islam R, Subba B, Masood Z and Hoque M A. 2014. Fish marketing system in southern Bangladesh: Recommendations for efficient marketing. *Our Nature*. 12(1):28-36.
- Cutting C L. 1962. The influence of drying, salting and smoking on the nutritive value of fish. In. *Fish in Nutrition*, Edition by Heen E Kreuzer R. Fishing News (books) Limited, London.
- DoF. (Department of Fisheries) 2014. National Fish Week. Compendium (In Bengali). Department of Fisheries, Ministry of fisheries and Livestock, Bangladesh. 144p.
- Faruque M O, Nazrul K M S, Tonny U S, Islam K R, Dey S C and Mona S J. 2012. Status of an Ideal Dry Fish Market of Bangladesh: A Study on Asadganj Dry Fish Market, Chittagong. *International Journal of Life Sciences Biotechnology and Pharma Research*. 1(3):214-225.
- Flowra F A, Sen S C, Galib S M, Kamal M M and Islam S M. 2010. Dry Fish Marketing in Rajshahi And Thakurgaon, Bangladesh. *International Journal of Biological Research*. 1(5): 13-16.
- Hossain, Mostafa A R, Benjamin B and Thilsted S H. 2013. *Worldfish*, Dhaka, Bangladesh. Preliminary rapid appraisal of dried fish value chains in Bangladesh. pp. 23-30.
- Kleih U, Alam K and Dastidar R. 2001. "Report of workshop on poverty alleviation and livelihood security among the coastal fishing communities – market and credit access issues", National Resources Institute (NRI) Reports No. 2613 94.
- Marine S S, Hossain M A, Rashid A, Islam M A, Bari S M. 2014. Marketing strategies for dry fish in sylhet district of Bangladesh. *Bangladesh Res. Pub. J.* 10(2):151-169.
- Monir M S, Haque M R and Rahman S. 2013. Dry Fish Marketing in Nilphamari District of Bangladesh. *Journal of Science and Technology*. 11:32-36.
- Nayeem M A, Pervin K, Reza M S, Khan M N A, Islam M N and Kamal M. 2010. "Marketing System of Traditional Dried and Semi-Fermented Fish Product (ChepaShutki) and Socio-Economic Condition of the Retailers in Local Markets of Mymensingh Region", *Bangladesh Research Publication Journal*. 4(1): 69-75.
- Nowsad A K M. 2007. Participatory Training of Trainers: A New Approach Applied in Fish Processing. 328p.
- Patterson J and Ranjitha G. 2009. Qualities of Commercially and Experimentally Sun Dried Fin Fish, *Scomberoides*. *African Journal of Food Science*. 3(10):299-302.

- Rahman M M, Hossain M A, Fatematuzzhura, Tasnoova S, Ahamed F, Hossain M Y and Ohtomi J. 2012. Fresh Fish Marketing Status in the Northwestern Bangladesh: Recommendations for Sustainable Management. *Our Nature*. 10(1):128-136.
- Reza M S, Bepary M A J, Azimuddin K M, Nurullah M and Kamal M. 2005. Studies on the traditional drying activities of commercially important marine fishes of Bangladesh. *Pakistan Journal of Biological Science*. 8(9):1303-1310.
- Saha M K. 2003. A study on fish production technology in North-west Bangladesh. MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh. 71p.
- Samad M A, Galib S M and Flowra, F A. 2009. Fish Drying in Chalan Beel areas. *Bangladesh Journal of Scientific and Industrial Research*. 44(4):461-466.
- Shamsuddoha M. 2007. "Supply and Value Chain Analysis in the Marketing of Marine Dried Fish in Bangladesh and Non-Tariff Measures (NTMs) In International Trading", Paper presented at EAAE Pro-poor development in low income countries: Food, agriculture, trade, and environment 25-27 October 2007 – Montpellier, France.