



International Journal of Fisheries and Aquatic Studies

E-ISSN: 2347-5129

P-ISSN: 2394-0506

(ICV-Poland) Impact Value: 5.62

(GIF) Impact Factor: 0.549

IJFAS 2020; 8(3): 184-190

© 2020 IJFAS

www.fisheriesjournal.com

Received: 01-03-2020

Accepted: 03-04-2020

Md. Nahiduzzaman

Scientific Officer, Bangladesh
Fisheries Research Institute,
Bangladesh

Fawzia Adib Flowra

Professor, Dept. of Fisheries,
Rajshahi University, Bangladesh

Md. Nazmul Hossen

Scientific Officer, Bangladesh
Fisheries Research Institute,
Bangladesh

Md. Rabiul Awal

Scientific Officer, Bangladesh
Fisheries Research Institute,
Bangladesh

Md. Ashikur Rahman

Scientific Officer, Bangladesh
Fisheries Research Institute,
Bangladesh

Shirin Akter

Lecturer, Department of
Fisheries and Marine Biosciences,
Bangabandhu Sheikh Mujibur
Rahman Science & Technology
University, Bangladesh

Corresponding Author:

Md. Nahiduzzaman

Scientific Officer, Bangladesh
Fisheries Research Institute,
Bangladesh

Traditional fish drying method practiced by the farmers of *Chalan beel* (Singra upazila) and their socio- economic status

**Md. Nahiduzzaman, Fawzia Adib Flowra, Md. Nazmul Hossen,
Md. Rabiul Awal, Md. Ashikur Rahman and Shirin Akter**

Abstract

The study was carried out at different fish drying points of (*Chalan beel*) Singra upazila under Natore districts. It is observed that the traditional sun drying was followed and only one fish drying point was continued throughout the year and rest of among 7 fish drying points were seasonal. In the drying process, 21 fish species under 13 families were used for drying. Most of the fish were collected from the local fish-landing centre and transportation of raw fish from fish landing centre to fish drying point was mainly done by non-mechanized van, rickshaw, bicycle or by head load or shoulder load of the labours. Price of raw fishes varied according to their species, size, supply of fishes etc. Winter was the best season for fish drying. The hygienic condition of the commercial fish drying spots was very poor. The annual production ranged from 600 to 2300 mounds of dry fish each year. The highest length conversion ratio between raw and dry fish was 1: 0.86 for Chapila and the lowest was 1:0.50 for Chingri whereas the highest and lowest weight conversion ratio were 1:0.40 and 1: 0.16 for Silver Carp and Baspata respectively. The investigation found that the cost-benefit ratio of fish drying points of the study area varied between 0.42 and 0.56. For evaluating the socio-economic status of the farmers associated with fish drying activities the following criteria were taken into consideration: Annual Income, Occupational Status, Education level, Family Type and Size, Housing Condition, Use of Electricity, Land Holding Status, Sanitation and Drinking water and finally Health and Disease. Dry fish farmers were found to face various problems such as social, economic and technical problems, which were identified during the study. To overcome exiting problems, necessary suggestions have also made in this study.

Keywords: Fish drying, marketing, socioe-conomic, *Chalan beel*

Introduction

Dried fish is an important source of protein in Bangladesh. It is relished by many people coastal, central and North-eastern districts. However, the physical and organoleptic qualities of many traditional sun-dried products are unsatisfactory for human consumption [1]. In Bangladesh, sun drying is the most widely used method of fish preservation. This method is also considered as the least expensive method of preservation. Drying involves removal of water content from the fish body. In sun drying this process is carried out by exposing target fish directly under the sun. This is usually done in the open air using solar energy to evaporate water content in the fish. Natural air carries away the evaporated water from fish body. For export quite a good amount of catch are preserved specially in freeze and sun dried conditions. Among the export quantity of fish a good amount is occupied by the dried fish which are sold in a number of countries of the world. In 2006-2007 Bangladesh export 77 metric tons dry fish and 441 metric tons salted and dehydrated fish value of tk. 1.34 and 12.80 core respectively [2]. Composing with the foreign exchange earned from the salted and dehydrated fish, export of dry fish is very insignificant. But still it could be said that this fish product is important as it is listed in the export list. If necessary steps could be taken to set up modern drying factories, the products can be made and keep in hygienic ways then demand of this commodity will rise up and Bangladesh will earn more foreign currency.

The legendary *Chalan beel* is an important wetland in the North-West region of Bangladesh and it lies between 24.35^o to 24.70^o North latitude and 89.10^o to 89.35^o East longitudes. The total area covered being slightly above 150 square miles (375 sq.km.) during the flood period from July to November of the year. During the dry winter and summer, the water area

decreases down to 20.6-30.9 sq. km. miles (52-78 sq. km.). This is the central zone of *Chalan beel* proper and covers an area belonging to Singra, Gurudashpur and Boraigram thanas of Natore and Chatmohar Thana of Pabna district and Tarash, Raygong and Ullapara thana of the Sirajgonj, Manda of Nowgaon district. Most of this area has an average inundation depth of more than 2 meters during the rainy season and the depth of the central zone is more than 4 meters during the highest water level [3]. At present only 33 sq.miles (85 sq.km) are under water all the year round. Most areas of *Chalan beel* is flooded land and consist of numerous small beel and chanals. Several rivers and their tributes formed a dense water network over the entire beel area. During the rainy season, the entire *Chalan beel* fills with water and create a breeding ground for many native fish species. The people living around this beel include both professional fishermen and general members of the public who also harvest a huge amount of fishers at this time. The traditional method of preserving fishes through sun drying is an old practice in areas adjacent to the beel [4].

Many researchers have been undertaken in Bangladesh on issues related to fish diversity on *Chalan beel*. *Chalan beel* is potential for fisheries resources. So processing of fish by

traditional sun drying also gives great offers for the drying process. This also gives them economic development and their socio-economic status in the society. This research work related to the traditional fish drying activities and socio-economic condition of dry fish farmer at Singra in Natore districts. There is a great potential of dry fish product in the north-eastern district such as Rangpur, Nilphamary. So the research work will present status of fish drying activities of the north-western districts of Bangladesh and helpful for developing knowledge and to make some recommendation to improve the existing condition. This study is also helpful for future researcher to conduct further research work. The investigation aimed on fish drying activities of the community through field investigation as well as the marketing of dry fish and also socio-economic condition of the drying professionals of Singra upzila under Natore district.

Materials and Methods

Study Period and Areas: The research work was conducted for six months from July 2008 to December 2008. To carry out the present study, different fish drying spots were visited in *Chalan beel* at Singra upazila under Natore district.



Fig 1: Map showing the seven fish drying point of Singra upazila under Natore district

Study Methods: Frequent field visits and interviews of the fish farmers (n=40) were made to collect necessary data on fish drying and their socio-economic conditions. Fish drying process was observed in the drying spot of the study areas.

Results

Fish drying activities

Fish drying yard: In the study area fish farmers carried out

sun drying for two purposes viz. business and household consumption. Sun drying for business purpose is generally carried out on elevated bamboo rack made of splits and poles, sometimes on fishing net directly on earth whereas sun drying for household consumptions performed in small scale by using bamboo basket and small earthen pots (locally called sara) by hanging.

Table 1: Location, area, number, and manpower engaged of fish drying points and nature of activities of *Chalan beel* area at Singra

Location	Area (decimal)	Number of fish drying points	Nature of activities		Number of manpower engaged
			Whole year	Seasonal	
Dakhin Domdoma	33	3	0	3	7-8
Zolar bata	38	3	0	3	8-9
Ningoi	69	4	2	2	12-15
Baria	18	1	0	1	5-6
Chougram	15	1	0	1	4-5
Kalam Nazarpur	16	1	0	1	3-4
Dahia	19	2	0	2	4-5

Species used in drying process: Different types of fishes were being used for sun drying in the study areas. A total of

twenty one (21) species of fishes were identified used for drying (Table 2).

Table 2: List of dried fish species used in the drying process

S. No	Local name	English name	Family name	Scientific name
1	Punti	Barb	Cyprinidae	<i>Puntius sp.</i>
2	Raikhor	Reba carp		<i>Cirrhinus reba</i>
3	Phul Chela	Minnnow		<i>Salmostoma phulo</i>
4	Silver carp	Exotic carp		<i>Hypophthalmichthys molitrix</i>
5	Darkina	Minnnows		<i>Esomus danricus</i>
6	Mola	Minnnows		<i>Amylpharyngodon mola</i>
7	Taki	Snakehead	Channidae	<i>Channa punctatus</i>
8	Shoal	Snakehead		<i>Channa striatus</i>
9	Guchi	Spiny eel	Mastacembelidae	<i>Mastacembelus pancalus</i>
10	Tara baim	Spiny eel		<i>Macrogathus aculeatus</i>
11	Gutum puiya	Loach	Cobitidae	<i>Lepidocephalus guntea</i>
12	Bou mach	Loach		<i>Botia dario</i>
13	Icha chingri	Freshwater prawn	Palaemonidae	<i>Macrobrachium sp.</i>
14	Chanda	Perch-let	Ambassidae	<i>Chanda nama</i>
15	Kholisha	Goramy	Anabantidae	<i>Colisha faciatus</i>
16	Tengra	Catfish	Bagridae	<i>Mystus sp.</i>
17	Kakila	Needlefish	Belonidae	<i>Xenentodon cancila</i>
18	Chapila	Shad	Clupeidae	<i>Gudusia chapra</i>
19	Bele	Goby	Gobiidae	<i>Glossogobius giuris</i>
20	Baspata	Gangetic ailia	Schilbeidae	<i>Ailia coila</i>
21	Boal	Catfish	Siluridae	<i>Wallago attu</i>

In the study area fish drying was done from September to January. During this season sufficient sunlight was available

throughout the day. Peak drying was observed in the month of November, December and January (Table 3).

Table 3: Monthly activities of fish drying process in the study area.

Activity	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Fish drying	1	1	0	0	2	5	5	5	4	3	3	2

Traditional fish drying process: The traditional fish drying process was observed at all the fish drying point at Singra. Fish drying was completed in few steps. The following steps are normally followed in traditional fish drying.

Collection of raw fish: Most of the fishes for drying purposes were collected from local fish landing centre while small amount from the middleman or broker. Transportation of raw fish from landing centre to fish drying points was mainly done by non-mechanized van or rickshaw, bicycle or by head load or shoulder load.

Sorting: Sorting is necessary before drying. The purpose of sorting depends on the sorting of small and large fish, sorting out weeds, other particles, shorting fresh and rotten fish species.

Washing: A primary washing is done after sorting. Final washing is done after scaling and degutting. In case of washing beel water was used that was not hygienic.

Scaling and degutting: Only for large fish like, boal (*Wallago attu*), silver carp (*H. molitrix*) and taki (*Channa punctata*) gutting and filleting were practiced.

Salting: It was found that, fish farmers in the studied areas used salt for mixing with raw fishes before drying but they did not maintain any fixed ratio of salt and fish. They generally mixed 1 Kg salt for 20 Kg of fishes. All the fish farmers used non-brand commercial salt for this purpose.

Sun drying: All the fishes are dried under sun. The process of drying varies according to the fish size and also to some extent, on the choice of the consumers. Smaller fish was dried totally on raised platforms after mixing of salt and the larger are hanged on bamboo poles. In the study areas, drying duration of small fish was recorded 2-6 days and large fish 4-8 days respectively, at normal weather conditions like sunlight, temperature, wind flow and raining status etc.

Packaging: After sorting, the dried fishes were packed into plastic and jute bag for easy handling. Sometimes bamboo baskets were also used for this purpose. The size varied with the quantity of the product to be stored.

Storage: A well storage is system prerequisite for quality product and also for shelf life. Storage of dried fish is found to be performed in a tent made of thin plastic sheet and bamboo splits. This tent is usually made in the place of fish drying. Packed dried fishes were kept into these tents for temporary storage until marketing or selling to the local vendors. If any infestation was found during storage the stored product was again sun dried for 1-2 days and restored.

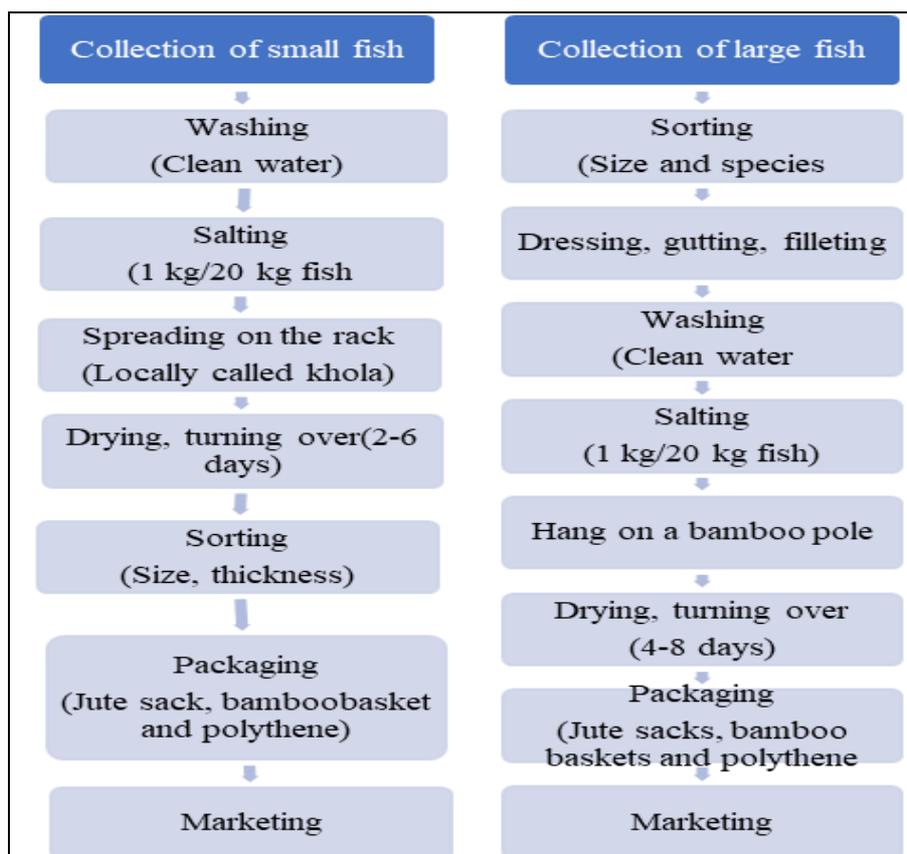


Fig 2: Flowchart of drying process of small and large fishes

Marketing: The marketing links between the producer and consumers are few intermediaries. The wholesalers or aratdars play the central role in the marketing channel.

Total length and weight of some raw and dry fishes was recorded and their conversion ratio was determined in following table.

Table 4: Total length and weight and their conversion ratio of some fishes at raw and dry condition

Sl. No.	Local Name	Length (cm)		Ratio Raw fish: Dry fish	Weight (g)		Ratio Raw fish: Dry fish
		Raw fish	Dry fish		Raw fish	Dry fish	
1	Punti	5.08	3.81	1: 0.75	1000	350	1: 0.35
2	Raikhor	7.62	5.08	1:0.67	1000	350	1: 0.35
3	Phul chela	10.16	7.62	1:0.75	1000	335	1:0.34
4	Taki	20.32	15.24	1:0.75	1000	340	1: 0.34
5	Shoal	45.72	35.56	1:0.78	1000	360	1: 0.36
6	Icha, chingri	2.54	1.27	1:0.50	1000	334	1 : 0.33
7	Kholisha	3.81	2.54	1:0.67	1000	250	1: 0.25
8	Tengra	5.08	3.81	1:0.75	1000	250	1: 0.25
9	Guchi	12.70	10.16	1:0.80	1000	250	1:0.25
10	Boal	63.50	50.80	1:0.80	1000	350	1:0.35
11	Baspata	5.08	3.81	1:0.75	1000	160	1:0.16
12	Bele	6.35	4.45	1:0.70	1000	340	1:0.34

13	Chanda	3.18	2.29	1:0.72	1000	250	1:0.25
14	Mola	5.08	3.81	1:0.75	1000	350	1: 0.35
15	Kakila	17.78	12.70	1:0.71	1000	250	1: 0.25
16	Baim	35.56	27.94	1:0.79	1000	350	1: 0.35
17	Silver carp	30.48	21.59	1:0.71	1000	400	1: 0.40
18	Darkina	3.81	2.54	1:0.67	1000	250	1: 0.25
19	Gutum puiya	6.35	4.70	1:0.74	1000	250	1 : 0.25
20	Chapila	13.97	12.07	1:0.86	1000	370	1: 0.37
21	Bou mach	6.35	4.83	1: 0.76	1000	260	1: 0.26

The interview of the study area informed that the annual production ranged from 600 to 1500 mounds of dry fish each year.

Table 5: Total production of different fish drying points at the study areas

Sl. No.	Name of fish drying point	Total production (mounds)
1	Dakhin Domdoma	800
2	Zolar bata	750
3	Ningoil	1500
4	Baria	650
5	Chougram	700
6	Kalam Nazarpur	600
7	Dahia	550

Cost-benefit ratio: The result of Cost-benefit ratio of different fish drying points is provided in table 6. The investigation found that the cost-benefit ratio of the fish drying point of the study area varied between 0.42 and 0.56. The highest (0.56) ratio identified in Zolar bata fish drying

point. Cost-benefit ratio of the drying point depended on total cost. This investigation clearly indicates that fish drying point working all the year round had always better cost-benefit ratio (Table 6).

Table 6: Cost benefit ration of different dry fish

Items	Name of fish drying points						
	Dakhin domdoma	Zolar bata	Ningoil	Baria	Chaugram	Kalam nazarpur	Dahia
Fish drying yard building cost	25000	23000	40000	22000	24000	21000	19500
Cost of raw fishes (Tk)	3250000	2950000	5950000	2520000	2720000	2310000	2110000
Yearly production (mounds)	800	750	1500	650	700	600	550
Price of product sold (Tk)	3520000	3150000	6300000	2730000	2940000	2520000	2310000
Gross profit	245000	177000	310000	188000	196000	189000	180500
Marketing	32760	29260	40000	26500	23500	21500	19500
Labour cost	11200	9300	19000	11000	12500	11500	10200
Chemicals	1500	900	2200	2200	1200	1150	1050
Salt	9500	8400	14000	7000	6500	6400	6000
Packaging	8000	6500	12300	9300	10300	11300	9300
Miscellaneous	10000	9000	14000	9000	9500	9000	8500
Total cost	72960	63360	101500	65000	63500	60850	54550
Net benefit	172040	113640	208500	123000	132500	128150	125950
Cost-Benefit ratio	0.42	0.56	0.49	0.53	0.48	0.47	0.43

Socio-economic conditions of the people of Singra related to fish drying activities

Annual income of fish drying professionals: Most of the professionals (52.50%) income groups were Tk.20000-30000 annually followed by (22.50%), (15.00%), (7.50%), and (2.50%) were in income group Tk. 30000-40000, Tk. 40000-50000, Tk. 50000-60000 and more than Tk 60000 per year respectively.

Occupational status in relation to subsidiary business:

From the data, it was found that most of the sampled person's main profession was fish drying. Most of the fish drying professional's income was low and the profession was seasonal one. So in off season they were involved in other subsidiary occupations such as agriculture (35%), labor (27.50%), and small business (7.5%) and (30%) were unemployed also (Fig. 4). Women are usually confined to on drying activities such as sorting, gutting, scaling etc. where the work will not conflict with other household duties.

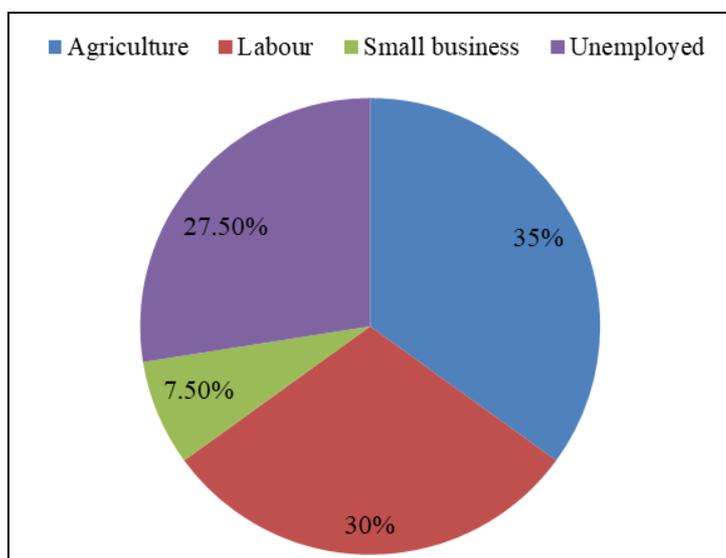


Fig 4: Occupation of the sampled drying professionals

Educational status: Earning and education are linked with one's social status and earning potential. Literacy level can play a vital role in efficient management and operational of drying activities. Among the 40 interviewed populations, illiterate (22.5%), can sign only (47.5%), primary (15%), secondary (10%) and above SSC was (5%).

Family type and size: The highest percentage of family type (72.5%), was found as nuclear and the rest of the family type (27.5%) was found as joint family. The highest percentage of family size (77.50%) was medium size family 4-6 members and the lowest percentage of family size (2.50%) was larger family (> 10 members).

Housing condition: The majority of the houses of the villages were closely constructed temporary huts. They were made of mud and bamboo fencing. Most of the houses were kacha (77.5%) and the rest were semi-paka (15.0%) and paka (7.5%).

Use of electricity: It was observed in the study area that majority households (70%) were used electricity and rest of the study population did not use electricity.

Land holding status: From the present survey, it was found that (12.5%) families were landless, (30.00%) were 1-5 bigha, (22.5%) were 6-10 bigha, (25 %) were 11-15 bigha, (10%) were above 15 bigha.

Drinking water facilities: The study showed that household of (100%) used tube-well water for drinking and among them, (96%) used owned tube-well, and remaining (4%) used tube-wells belonging to others.

Sanitation status: From the study, it was found that (67.50%) families were defecated in semi-paka, (17.50%) in kacha, (10%) in sanitary latrine and (5%) in pit.

Health and diseases: Information was collected on the nature of treatment of the people. It was found that 2 (5%) respondents received treatment from the qualified doctor, 9 (22.5%) from trained doctor, 15 (37.5%) from quack, 6 (15%) from homeopathy, 6 (15%) herbal, 1 (2.5%) from others and 1 (2.5%) fish drying professionals did not get any treatment.

Discussions

Present investigation in the study area, it was observed that fishes were mainly dried on the bank of *Chalan beel* and both side of the Natore – Bogura highway. They choose these areas because it gets a wide open area and sufficient sunlight and wind which was suitable for drying activities. For fish drying use only the sunlight as the heating source. No oven or heating instruments were used at all in this studied fish drying area. The bamboo marked territory is called khola. Winter was the best season for fish drying. Peak fish drying is observed November-January^[5]. Reported that the traditional drying of fish depends on solar energy the dry fish producing period extends only from october to march. Collect raw fishes from local fish market and transportation by non-mechanized van, bicycle or by head load or shoulder load to the labors^[6]. Reported this types transportation of raw fish for drying. Fish drying is completed in few steps such as washing, sorting, dressing, washing, salting, drying on sun etc. This type traditional sun drying of fish was reported by^[7] salt is an important step for proper fish drying. The result of this investigation revealed that salting gives extra weight and desired flavor as observed by^[8]. The rate of mixing salt was found as 1Kg salt for 20 Kg of fishes. These findings are more or less Similar to^[4]. Salt is essential for proper fish drying. Drying duration extremely varied with weather conditions drying duration recorded to be varied from 2-8 days depending on the size of the raw fishes. The hygienic conditions of the commercial fish drying spots are very poor. From the survey, it was found that the total length and weight conversion ratio of raw fish and dehydrated dry fishes (1:0.40). The result of this investigation revealed that salting gives extra weight and desired flavor as observed by^[8] Johnson and Esser (1991). The interviewee of the study area informed that the range annual production ranged from 600 to 2300 mounds of dry fish each year. This result was more or less similar to the findings of^[6] Azam (2002). Cost-benefit ratio of the fish drying point was found to range between 0.42 and 0.56. The highest (0.56) cost-benefit ratio was identified in Zolar Bata fish drying point. This finding was more or less similar to the findings of^[6] Azam (2002). The investigation found that after complete of drying all the dried fish stored at tent Jute sacks, bamboo baskets and polythene sheets were used for packaging^[9] reported two types of packages for marketing of dried product i.e. fish wrapped inside gunny bag

only and wrapped with polythene inside the gunny bag. Most of the professional's 52.50% income group was Tk. 20000-30000 annually followed (22.50%), (15.00%), (7.50%) and (2.50%) were in the income group Tk. 30000-40000, Tk. 40000-50000, Tk. 50000-60000 and more than Tk. 60000 per annum respectively. Similar findings also found by [6]. From the data, it was found that most of the sampled person's main profession was fish drying. In off-season they were involved in other subsidiary occupations such as agriculture (35%), labour (27.50%), and small business (7.55), (30%) were unemployed also [10] found about 34% depending on farming as subsidiary occupation. Among the interviewed population illiterate (22.5%), can sign only (47.5%), primary (15%), secondary (10%) and above SSC was (5%). In Bangladesh most of the fish drying activities are can sign only and few have primary level education [11]. The poor education condition might be due to unconsciousness and unavailability of local institution. From the questionnaire interview, it was found that the highest (42.50%) was found in 21-30 years age groups, and the lowest (7.50%) was above 60 years. Highest (77.5%) was found medium size and lowest (2.50 %) was found large family size.

In the study area, most of the houses (77.5%) were kacha, rest were semi-paka (15.0%) and paka (7.5%). This finding more or less similar to [12]. From the present survey, it was found that (12.5%) fish drying professionals were landless, (30.00%) were 1-5 Bigha, (22.5%) were 6-10 Bigha, (25%) were 11-15 Bigha, (10%) were above 15 Bigha and it was found that (67.50%) were defecated in semi-paka, (17.50%) in kacha, (10.00%) in sanitary latrine and (5.00%) in pit. The similar findings were also observed by [12] in the study area *Chalan beel*. About (60.00%) people were used only tube well, (70.50%) used both tube well and pond water, (22.50%) used both tube well and beel water and (10.00%) used both tube well and river water for drinking and household purposes. Similar findings are also observed by [13].

Conclusion

Traditional fish drying practice in the study areas is playing an important role in the development of the dry fish farmer's socio-economic condition. This activity creates employment opportunities and supplies animal protein to the people. In most of the observed fish drying places, sun drying is carried out in an unhygienic condition, due to different reasons. If modified drying process is followed in commercial production, with proper hygiene and sanitation this product will fetch higher price. Marketing distribution system of the dried fish needs to be improved as well as reducing marketing chain. The socio-economic condition of the drying professionals put light on the fact that the actual share of the market price for either raw or dry fish are not entering in their pockets.

References

1. Nowsad AKMA. Low cost processing of fish in coastal Bangladesh. Empowerment of coastal fishing communities for livelihood security. GOB/UNDP/FAO project: BGD/97/017:5/2005, 2005, 73,
2. DoF. Matshaw Sampad Unnayan Avijan (in Bengali), Department of Fisheries, Ministry of Fisheries and livestock, Dhaka, Bangladesh, 2008, 81-85.
3. Alam MS, Hossain MS. National encyclopedia of Bangladesh, Asiatic Society of Bangladesh. 1st edi. Dhaka, Bangladesh, 2004.

4. Galib SM, Samad MA. Harvesting, traditional preservation and marketing of fishes of Chalan beel, Bangladesh. *Aquaculture Asia Magazine*, xiv(1):12-15, 2009.
5. Pervin S. Fumigation toxicity of plant derived compounds against *Dermestes maculatus* (Degeer) and *Necrobia rufipes* (Degeer) infestation dried fishes. M.Sc. thesis (unpublished), Department of Zoology, Rajshahi University, 2004, 182,
6. Azam K. Fishermen Community of kuakata, Bangladesh: Fisheries Activities and Quality of Dried Fish. Final Report, Support for University Fisheries Education and Research, DFID. 2002, 227,
7. Nowsad AKMA. Participatory Training of Trainers: A New Approach Applied in fish Processing, 2007, 328,
8. Esser JR. Biology of *Chrysomya megacephala* and reduction of losses that it causes to salted- dried fish in southeast Asia. *Bulletin of Entomological Research*. 1991; 81:33-47.
9. Rubbi SF, Muslemuddin M, Jahan SS, Begum M. Storage of solar-tent dried pomfret (*Stomateus sp*). In: The production and storage of dried fish. Proceedings of the workshop on the production and storage of dried fish. University Pertanian Malaysia, Serdang Malaysia. 1982, 93-100,
10. Ahamed MNU. Reports on the fishermen's socioeconomic survey. Fisheries survey and monitoring programme. Department of Fisheries, Tangail. 1996, 4,
11. Rahman AKA. The small-scale marine fisheries of Bangladesh, In: Socio-economic issues in coastal fisheries management, Proceeding of the IPFC Symposium, Bangkok, Thailand. FAO Indo pacific Fisheries Commission, Dhaka, 1994, 49,
12. Serajee MRI. Fisheries resources, traditional fishing, marketing and socio-economic status of the fishermen of south-eastern part of Chalan beel. Department of Zoology, University of Rajshahi. 2005, 260,
13. Zaman T. Livelihood status of fishers (fish farmers and fisherman) in Mohanpur upazila under Rajshahi district. Department of Fisheries, university of Rajshahi. 2005, 103.