

Socioeconomic Aspects of Carp Production And Consumption in Bangladesh

M. F. Alam

ICLARM-The World Fish Centre, Dhaka, Bangladesh

Alam, M.F. 2002. Socioeconomic aspects of carp production and consumption in Bangladesh. pp. 83-93. In: Penman, D.J., Hussain, M.G., McAndrew, B.J. and Mazid, M.A. (eds.). Proceedings of a workshop on Genetic Management and Improvement Strategies for Exotic Carps in Asia, 12-14 February 2002, Dhaka, Bangladesh. Bangladesh Fisheries Research Institute, Mymensingh, Bangladesh. xxx p.

Abstract

The paper describes the status of carp production and consumption in Bangladesh. The importance of the fisheries sector in general and carp species in particular is reviewed. Source-wise contribution of carp production has been highlighted. Consumption levels of different carp species have been focused on and socioeconomic factors affecting carp production and consumption have been identified. Finally, the need for fuller utilization of waterbodies has been emphasized, keeping in view the productivity of Bangladesh waters, potential of the species and its market acceptance.

1. Introduction

Fish and fisheries have been an integral part of life of the people of Bangladesh from time immemorial, and play a major role in employment, nutrition and foreign exchange earning and other aspects of the economy. Fish is a natural complement to rice in the national diet, giving rise to the adage *Maache-Bhate Bangalee* (a Bengali is made of fish and rice¹): fish alone supplies about 60% of animal protein intake¹. The fisheries sector provides full-time employment to an estimated 2 million fishermen, small fish traders, fish transporters and packers, etc. (World Bank, 1989), and another 10 million people are partly dependent on fishing, e.g. part-time fishing

¹ FAO statistics show fish providing 47% animal protein and 6% of total protein intake in 1993. Also, amongst UN-defined Low-Income Food Deficit countries, Bangladesh has an unusually low consumption of animal proteins.

for family subsistence (BFRRS, 1986). The sector contributes about 5.5% of GDP, 18% of Gross Agricultural product and 6.28% of export earnings. Fisheries exports comprise frozen shrimp, frozen frogs' legs, frozen fish, dry fish, salted and dehydrated fish, turtles, tortoises and crabs, shark fins and shark maws.

2. Fisheries Resources

Bangladesh is ideally suited for fish production, having one of the highest man-water ratios in the world, at 20 persons per ha of water area (Task Force, 1991). The fisheries are multi-species in nature: there are about 300 species of fish and 20 species of prawns in Bangladesh (Rahman, 1989). The most common species is Hilsha², which accounts for nearly half of the total marine catch, and about 18% of total fish production.

The fisheries sector of the country is generally classified as (i) inland open waters; (ii) inland closed waters; and (iii) marine waters (see Table 1):

- Inland open water bodies, where capture fishing is mainly carried out, comprise rivers and estuaries, *beels* (small lakes, low-lying depressions, permanent bodies of floodplain water, or bodies of water created by rains or floods that may or may not dry up in the dry season; in the wet season, *baors* or shallow lakes may be formed as smaller water bodies are joined up), Kaptai Lake (a man-made lake created for hydroelectricity), floodlands (annually flooded, low-lying areas associated with rivers) and polder/enclosures (regulated floodplains created mainly for irrigation purposes). The total area of inland open water bodies is 4.92 million ha (93.53 % of total inland areas), comprising 1.03 million ha of rivers and estuaries, 2.83 million ha of floodlands (53.63% of total inland water areas), 0.83 million ha of polder and enclosures (16.53% of total inland water) and small areas of *beels* and Kaptai Lake.
- Inland closed water bodies, where aquaculture (fish farming) at various intensities is carried out, include ponds, *dighis* (big ponds) and *baors* (oxbow lakes), and also some coastal waters. The 0.36 million ha of inland closed water areas include 0.11 million ha of ponds and *dighis* (4.07% of total inland water area), 0.14 Mha of traditional shrimp farms in coastal areas, small areas of *baors*, drains and ditches, and semi-intensive shrimp farms.

² Basically a marine diadromous species. For spawning, it migrates to rivers where a large number get caught. It is also caught in marine waters.

- Marine waters extend over 166,000 km² (16.6 Mha) of sea area, following the 1974 declaration of a 200-nautical mile Exclusive Economic Zone (EEZ), within which Bangladesh also has the right to exploit and manage living and non-living resources.

Table 1. Water areas for Bangladesh fisheries, 1999-2000 (source: Department of Fisheries, DOF, 2001; Saronika, Fish Week, 2001).

Type of water body	Water areas (ha)	Water areas (%)	Fish production (metric ton)	Fish production (%)
A. Inland open waters:				
Rivers and estuaries (including Sundarban)	1,031,563	19.53	154,335	9.29
<i>Beels</i>	114,161	2.16	72,885	4.38
Kaptai Lake	68,800	1.30	6,852	0.41
Floodlands	2,832,792	53.63	424,805	25.57
Polder/Encloser	873,000	16.53		
Total inland open water	4,920,316	93.15	670,465	40.36
B. Inland closed waters:				
Ponds and <i>dighis</i>	215,000	4.07	561,050	33.77
<i>Baors</i> (Ox-bow lakes)	5,488	0.11	3,622	0.22
Coastal shrimp farms	141,353	2.68	92,448	5.56
Total inland closed waters	361,841	6.85	657,120	39.55
Total inland waters (A+B)	5,282,157	100.00	13,27,585	79.91
C. Marine waters (Bay of Bengal):				
Industrial	16,607,000		16,304	0.98
Artisanal			317,495	19.11
Total marine waters			333,799	20.09
Total waters (A+B+C)	21,889,157		1,661,384	100.00

3. Total Fish Production

Fish production of the country for the year 1999-2000 was 1.66 million metric ton, of which 79.91% came from inland waters and 20.09% from marine water. The contributions of inland open and closed waters are 40.36% and 39.55% respectively. Floodlands (including the regulated polders and enclosures) contribute the most from the inland open waters. Rivers and estuaries, although constituting large areas, contribute very little to the total fish production. On the other hand, ponds provide the most (about 38%) to the total production although water areas are much lower

compared to the open waters. Artisanal fisheries contribute the most (19%) to the total production (Table 1).

3.1 Carp Production

There are two main production environments for carp species in the inland waters of Bangladesh. These are inland open waters, and inland closed waters. The different open waters growing carps are: (i) rivers and estuaries, (ii) beels, (iii) Kaptai lake, and (iv) floodplains. Inland closed waters producing carps constitute (i) ponds and *dighies* and (ii) *baors* (ox-bow lakes). The different carp species produced in different environments are shown in Table 2.

A few aspects of Table 2 merit attention. First, carp production in 1999-2000 constituted about 43 percent of the total inland fish production. Second, the share of production of carps in general to total inland fish production kept on increasing over the last decade. Third, production of major carps has been on the increase but production of minor carps has declined during the same period. Fourth, exotic carp production has been increasing gradually over the years. Finally, carps constitute very dominant species in the total inland fish production of the country.

Table 2. Production of carp species over time. Major carp = rui, catla and mrigal; minor carp = ghania, kalbasu and kalia; exotic carp = silver carp, common carp, mirror carp and grass carp. Data shown is metric tonnes, with percent contribution to total fish production in parentheses.

Year	Major carp	Minor carp	Exotic carp	All carp	All species
1990-91	120,178 (18.36)	16,473 (2.52)	24,858 (3.80)	161,509 (24.68)	654,397 (75.32)
1991-92	140,957 (19.95)	9,875 (1.40)	30,197 (4.27)	181,029 (25.62)	706,605 (74.38)
1992-93	144,877 (18.81)	8,735 (1.13)	31,293 (4.06)	184,905 (24.00)	770,162 (76.00)
1993-94	164,046 (19.58)	11,396 (1.36)	47,967 (5.73)	223,427 (26.67)	837,566 (73.33)
1994-95	173,774 (19.13)	10,481 (1.15)	54,916 (6.05)	239,171 (26.33)	908,218 (73.67)
1999-00	374,523 (28.21)	10,526 (0.79)	180,708 (13.61)	5,65,757 (42.61)	13,27,585 (57.39)

3.2 Contribution of different sources to carp production

Statistics indicate that major carp production of the inland open waters, particularly rivers and estuaries, has been declining (can be verified from different issues of the Fish Catch Statistics published by the Department of Fisheries). The overall increase however, is mainly due to the increasing acceptance and production of major and exotic carp species which are very popularly grown in the inland closed water environment such as ponds. The share of carp species in the closed water environments is expected to increase further as aquaculture expands because it is the main culture species. The details of shares of carp production by sources are displayed in Figure 1.

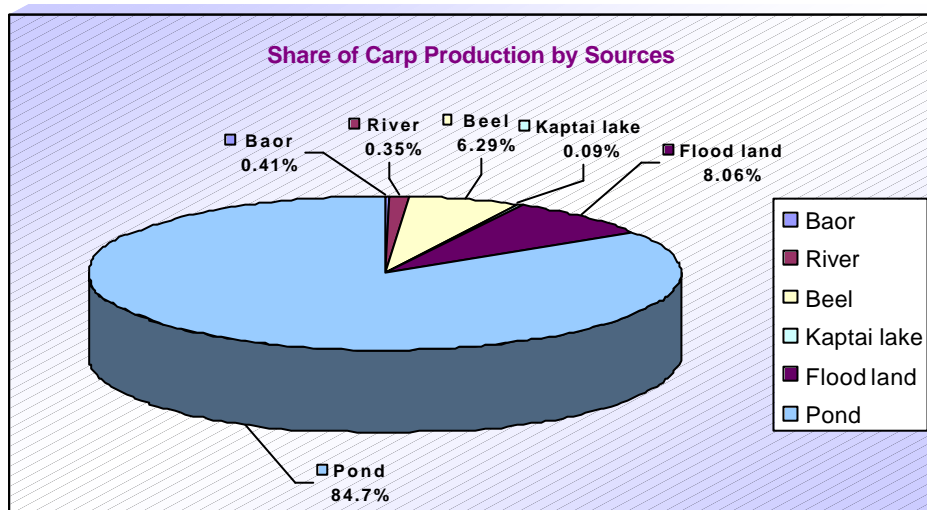


Figure 1. Contribution of different sources to carp production

The major contributor for carp production is pond, which accounts for 86 percent of all carp production in the country. The next important contributors are floodland, *beels*, rivers, *baors* and Kaptai lake. Floodlands and *beels* contribute respectively 8 and 6 percent to the total carp production. The contributions of rivers, *baors* and Kaptai lake to the carp production are very insignificant (less than 1 percent). It is to be mentioned that the share of carp production of rivers has reduced significantly over the past years. In 1990-91 rivers used to contribute 3.09 percent while this has gone down to only 0.35 percent in 1999-00. On the other hand, the share of floodlands to carp production has increased from 5.03% in 1990-91 to 8.05% in

1999-00. The increase of carp production from the floodland is due mainly to the positive impact of the stocking programme of the Department of Fisheries. The overall increase of carp production is due both to the expansion of pond fisheries and productivity increases.

3.3 Species for pond aquaculture :

Table 3 shows that Indian major carps such as rohu, catla and mrigal are the most dominant species in the pond aquaculture. Nearly 23% of the production of the cultured ponds is rohu. The share of the same for the culturable and derelict ponds is about 19 and 16 percent respectively. If the farmers are given the choice to select a single species for the pond, the farmer will certainly go for rohu. As the production statistics show, the most preferred species appear to be rohu, silver carp, catla, and mrigal for cultured and culturable ponds; and silver carp, rohu, catla, and mrigal for the derelict ponds. But the fact remains that the most dominant species for pond fish culture are indeed rohu, catla, mrigal and silver carp. Silver barb is, however, another potential candidate. Pangas got some importance in the mid-nineties but its geographical spread has been very limited.

Table 3: Species composition of pond catches, 1999-2000 (source: Fishery Statistical Yearbook of Bangladesh 1999-2000, DoF).

<i>Species</i>	Percentage of weight of all pond production			
	Cultured ponds	Culturable ponds	Derelict ponds	All ponds
Rui (<i>Labeo rohita</i>)	22.80	19.22	16.28	21.42
Catla (<i>Catla catla</i>)	20.98	14.70	9.85	18.60
Mrigal (<i>Cirrhinus mrigala</i>)	15.48	11.44	8.98	14.03
Kalbasu (<i>Labeo calbasu</i>)	1.92	0.71	0.13	1.50
Mirror carp (<i>Cyprinus carpio</i> var. <i>specularies</i>)	1.87	2.31	2.79	2.05
Silver carp (<i>Hypophthalmichthys molitrix</i>)	22.77	15.45	21.37	21.35
Grass carp (<i>Ctenopharyngodon idellus</i>)	2.44	0.21	0.02	1.78
Mixed carp	5.65	1.07	0.33	4.24
Non-carp species	6.09	34.89	75.36	15.03

The biases for the Indian major carps for pond freshwater aquaculture are due mainly to its relatively better taste and higher price. Studies such as Rahman and Ali (1986), Islam and Dewan (1987) and Alam (1995) showed that Indian major carps are the main cultured species for the fish farmers. A recent study published in 2001

(ICLARM, undated) indicates that order of consumer preferences for freshwater species in Bangladesh are: rohu, followed by catla, mrigal silver barb, common carp, mirror carp, silver carp, grass carp and kalbasu. Good taste, good appearance, easy availability and reasonable price are important reasons for choice of different species.

4. Pattern of Carp consumption in Bangladesh

Conflicting statistics available regarding fish consumption are often produced in Bangladesh. The production statistics published by the Department of Fisheries and the available population statistics of Bangladesh indicate that per capita annual fish consumption is to the tune of 12.51 kg in 1999-00 (Figure 2). One important feature of the per capita annual fish consumption statistics as shown in figure 2 is that the trend is increasing. The conflict is concerned not with the trend but with the magnitude. For example, The Household Expenditure Survey (HES) 1995-96 data (BBS, 1998) shows that per capita monthly fish consumption is 1.13 kg (15.98 kg per year). On the other hand the same source for the year 2000 indicates that annual per capita fish consumption is 14.03 kg. The Mid Term Review of the Fifth Five Year Plan (Planning Commission 2001) mentioned that the per capita per day fish consumption is 37.8 gm (13.79 kg per capita per year). These variations are mainly due to inflow of fish coming from neighboring countries, which is not represented in the published statistics. Since the HES estimate is based on samples, it takes into account the actual consumption. Taking the experiences of all these variations it can be safely concluded that the per capita annual fish consumption is between 13 to 14 kg in Bangladesh.

Data on fish consumption by species hardly exists on a representative basis. But it is believed that since carp constitutes about 43 percent of total inland fish production, its share in the consumption also is relatively higher compared to non-carp species. ICLARM (undated) while showing cross comparisons across different Asian countries showed that annual per capita fish consumption is to the tune of 19.92 kg for the urban producers, 21.36 kg for the rural producers and 18.36 kg for the non-producers.

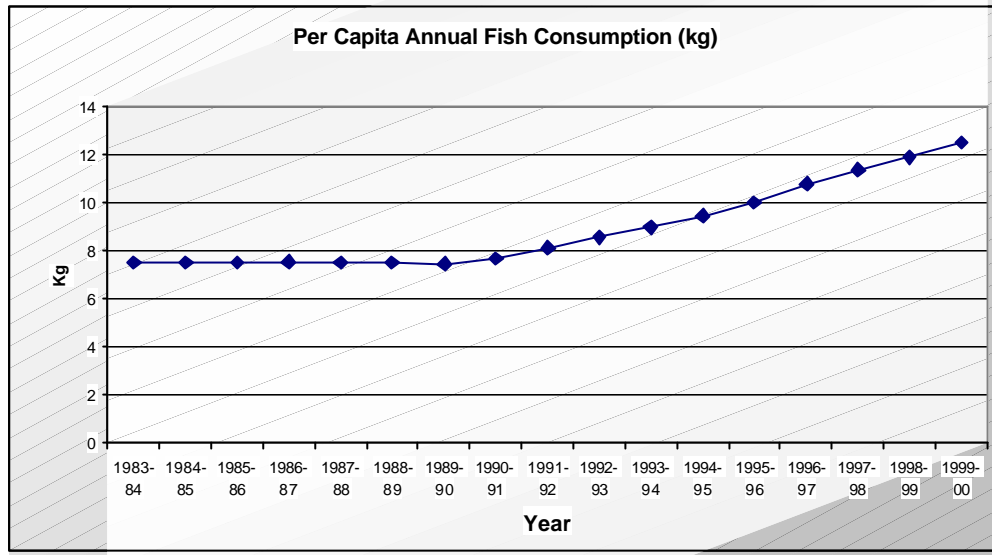


Figure 2. Trend of per capita annual fish consumption in Bangladesh

Table 4 shows the distribution of fish consumption by species. As single species the consumption of rohu, catla, mrigal, silver carp, silver barb and river shad are most important. Table 4 provides information about the monthly as well as annual per capita fish consumption by species and income quartile groups. The mean annual per capita fish consumption of the selected households was found to be 19.95 kg. Of the total fish consumption, carp was found to be dominant. More than 50 percent of the consumption of fish is carp species. Of the carp species, rohu, catla, mrigal and silver carp are the most important. Consumers of different income quartile groups have different levels of fish consumptions. It is also clear that consumption of Indian major carp (rohu, catla and mrigal) is higher for higher income groups. The consumers of 1st, 2nd, 3rd and 4th income quartile groups have consumed 13.05, 17.88, 21.03, and 27.85 kg respectively. This clearly indicates that fish consumption in general is higher for higher income groups.

Table 4. Monthly and annual per capita fish consumption by species. Cons. = consumption.

Name of species	Mean		1st Quartile		2 nd Quartile		3 rd Quarter		4 th Quartile	
	Cons. (kg)	% of Cons.	Cons. (kg)	% of Cons.	Cons. (kg)	% of Cons.	Cons. (kg)	% of Cons.	Cons. (kg)	% of Cons.
Rui	0.131	10.7	0.092	8.5	0.156	10.5	0.181	10.3	0.650	28.0
Catla	0.131	7.9	0.068	6.3	0.098	6.6	0.141	8.0	0.135	5.8
Mrigal	0.103	6.2	0.056	5.2	0.087	5.8	0.102	5.8	0.167	7.2
Silver carp	0.237	14.3	0.168	15.4	0.205	13.8	0.251	14.3	0.176	7.6
Other carp	0.127	7.6	0.063	5.8	0.110	7.4	0.127	7.2	0.107	4.6
Silver barb	0.102	6.1	0.047	4.3	0.082	5.5	0.114	6.5	0.166	7.2
Tilapia	0.045	2.7	0.037	3.4	0.050	3.4	0.050	2.9	0.053	2.3
Hilsha	0.185	11.1	0.123	11.3	0.188	12.6	0.183	10.4	0.260	11.2
Assorted	0.241	14.5	0.264	24.3	0.265	17.8	0.318	18.1	0.177	7.6
Live	0.207	12.5	0.108	9.9	0.155	10.4	0.157	9.0	0.260	11.2
High value	0.107	6.4	0.062	5.7	0.094	6.3	0.129	7.4	0.170	7.3
Total/ Month	1.663	100.0	1.088	100.0	1.490	100.0	1.753	100.0	2.321	100.0
Total/ Year	19.95		13.05		17.88		21.03		27.85	

5. Factors affecting carp production and consumption

Producers prefer to produce major carps (rohu, catla and mrigal) because of the expectation of higher prices while consumers prefer those species because of good taste. Easy availability and its good look are some important consideration for choosing major carps. Colour, size and shape also play good role for choosing carp species for consumption.

Carp fish farming is the most popular aquaculture practice in Bangladesh. Attitude of non-fish farmers to fish production has changed a lot over the years. For example, multiple ownership of pond was, for long time, a major constraint to carp production which is no longer believed to be a constraint for carp production in Bangladesh. Poaching/theft and marketing of produce are some other such examples. But factors like low farm gate price, high prices of supplementary feed, lack of technical knowledge, lack of quality fingerling and lack of fund etc. are currently the important constraints for carp production in the country. Some important factors affecting carp production are shown in Table 5.

Table 5. Factors affecting/influencing carp production and consumption:

Sl. No.	Production	Consumption
1	Lack of knowledge about practice	Income
2	Non-availability of good quality seed/fingerling	Price of fish
3	Tendency not to use purchased inputs	Availability/supply of fish
4	Lack of capital/credit	Colour, size and shape of species
5	High prices of fish feed and other inputs	Availability of cheaper and substitute species
6	Low farm gate price	Taste of species
7	Poor marketing opportunities/facilities	
8	Breakthrough of disease	
9	Non-availability of water, seepage etc	
10	Multiple pond ownership	
11	Under utilization of resources potential (e.g. rice field, derelict ponds)	
12	Intensity of fish culture practice	

Income is perhaps the most important determinant for carp consumption as the carp species are relatively more costly compared to other species. Consumption of carp is also affected with the availability of substitute species. For example, silver carp production has increased dramatically because it is a cheap species and most poor people do have the access to buy it. The demand for major carp could have been much more had there been no existence of silver carps. Some other exotic carp species also compete with Indian Major carps. Colour, body size and taste are also important in influencing demand for carp species. Silver barb is getting good market due to its relatively cheap price, good look and body shape and taste.

6. Concluding remarks

Carp has a very good potential for production and consumption in Bangladesh. This is due to the existence of abundant waters conducive of production, choices and preferences of the producers and consumers and good existence of market demand. The economic profitability of the carp production practice is the most important reason for the expansion of aquaculture in Bangladesh. Many paddy lands are being converted for fish culture. Production of carps can be increased many fold in Bangladesh if aquaculture concepts are made clear to the fish farmers, unutilized

waterbodies (ponds in particular) are brought into fish culture, practices of the underutilized waterbodies (ponds) are improved and productivity of the already cultured waterbodies (ponds) are improved.

References

- Alam, S. 1995. M-AEP Rural Fish Market Survey 1994: Final Report, submitted to Mymensingh Aquaculture Extension Project.
- Bangladesh Fisheries Resources Survey System, BFRRS. 1986. Water Area Statistics of Bangladesh. Fisheries Information Bulletin, vol. 1, Dhaka, Bangladesh.
- Bangladesh Bureau of Statistics, BBS. 1998. Household Expenditure Survey 1995-96. Statistics Division, Ministry of Planning, GoB, Dhaka.
- Bangladesh Bureau of Statistics, BBS. 2001. Preliminary Report of Household, Income and Expenditure Survey 2000. Statistics Division, Ministry of Planning, GoB, Dhaka.
- ICLARM (undated). Genetic Improvement of Carp Species in Asia - Final Report. Asian Development Bank and ICLARM-The World Fish Center.
- Islam, M.S. and Dewan, S. 1987. An Economic Analysis of Pond Fish Production in Some Areas of Bangladesh. Research Report No. 11, Bureau of Socioeconomic Research and Training, Bangladesh Agricultural University, Mymensingh.
- Planning Commission. 2000. Mid Term Review of the Fifth Five Year Plan 1997-2002. Ministry of Planning, GoB, Dhaka.
- Rahman, A.K.A., 1989. Freshwater Fishes in Bangladesh. Zoological Society of Bangladesh.
- Rahman, M.L. and M.H. Ali (1986). A Study on the Credit and Marketing Aspects of Pond Fisheries in two Selected Districts of Bangladesh. Research Report No. 10, Bureau of Socioeconomic Research and Training, Bangladesh Agricultural University, Mymensingh.
- Task Force 1991. Managing the Development Process: Bangladesh development Strategies, vol. 2. University Press Limited, Dhaka, Bangladesh.
- World Bank 1989. Bangladesh Action Plan for Flood Control. 11 December.