

Household consumption pattern and buying behavior for fish in an area Mymensingh, Bangladesh

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Abstract

The study was conducted on 238 households in Bangladesh Agricultural University campus and its adjoining areas in Mymensingh. The household were divided into four groups based on their per capita income. Monthly expenditure on fish, income elasticity of demand and marginal propensity to consume were calculated. 'Weighted average' method was used to study the level of preference for fish by sex and age groups and frequency of its purchase. The per capita monthly expenditure on fish of overall households was found to be Tk. 178.83. The consumption increased considerably between and among the income groups rising from Tk. 63.95 in the lowest income group to Tk. 249. 11 in the, highest income group. Based on income elasticity the proportion of income spent on fish was found to be greater than the proportion of increase in income for lower middle and upper middle income groups. However, percent expenditure decreased from 8. 15 in lowest to 5.49 in the highest income group. Female members between 20 and 40yrs had the highest preference for *fish in* general followed by male members of above 40 yrs. Children (0 to 8 yrs), on the other band, had the least preference for fish, Sing and Magur (Catfishes) were the most preferred fish species for each age and sex group. Rui, a carp, was the single most purchased fish while the introduced *exotic fishes* were the least bought. Freshness was found to be the most important factor followed by the appearance and taste perception that positively affected the fish purchase,

Key words : Consumption pattern, Buying behavior, Frequency of purchase

Introduction

Fish has been the most favorite food item of the people of Bangladesh. In fact, with rice it has become one of their most important cultural characteristics. Once fish was abundant in the water systems of this country. People, rich and poor, then could afford to include some fish in their daily diets. But the situation gradually changed for the worse.

High population growth rate, construction of darns and other flood control measures, use of biocides in agriculture and above all over-fishing and indifference to fishing laws have contributed to the loss of much of the spawning grounds with the result that the natural stock of fish dwindled to an alarming extent. To combat this

problem emphasis has recently been laid on scientific aquacultural practices to preserve the germ plasm and improve the stock of indigenous fish species and also on the introduction of exotic high yielding rapidly growing species into our inland closed water systems. As a result of these efforts the situation has improved significantly. Thus during the period 1984 to 1994 pond fish production increased from 107,944 MT to 222,542 MT representing on the average 10.62 percent annual increase as against only 4.47 per cent increase in overall fish production in the country (DOF 1994). One of the obvious effects of this has been a rapid change in species composition.

The increased supply of fish is also reflected in the progressively increasing per capita per day consumption of fish (BBS 2000). Nevertheless, in quantitative term the consumption is still much less than the requirement particularly because fish still remains the main source of animal protein. Although the consumption has increased in statistical terms there is no information about the consumer behavior towards fish particularly the exotic species that have been introduced in our waters and which now constitute a significant segment of the fish market. Hence the study of the consumer behavior of different income groups towards various fishes becomes important and its knowledge worthwhile. This should shed light on the level of acceptability of exotic vs. the indigenous species, small vs. large fishes and lean vs. fatty fishes. Furthermore, aquaculturists will gain some insight into whether the introduction of exotic fishes has had any impact on consumer behavior towards and level of consumption of the indigenous fish species. Unfortunately, not much has been done in this line in Bangladesh. Raha (1994) studied the consumption pattern of fish and other animal products in selected areas of Mymensingh districts. He found that fish along with other animal products were preferred food item for many people of this country. He, however, observed that the availability of fish over the years has been declining while that of egg and meat increasing. He attributed this to population growth resulting in higher demand for fish while production being unable to keep pace with demand. McGee *et al.* (1989) studied the demographic and attitudinal characteristics of catfish in USA. His findings did not support the general perception that the consumption of catfish was the highest among the poorly educated low-income households. Recently Gheyas (2002) studied the consumer behavior of households of Mymensingh Sadar Upazilla in and around Bangladesh Agricultural University. The work reported here deals with the consumer behavior towards fish in general, expenditure related to fish consumption and preference for different fishes by different income, age and sex groups

Material and methods

The work is based on survey conducted among the households in and around Agriversity campus. The data were collected through pre-tested, closed and structured questionnaires from literate respondents and through interview schedules from the illiterate ones in order to elicit relevant information about the households surveyed in terms of per capita monthly income, the number of the family members, their ages, sex, level of education and occupation, preference level of individual member of the family,

level of household consumption and frequency of purchase of fish and factors affecting their purchase.

A purposive sampling method for the selection of households to be included in the survey was used in this study. The 238 households included in this study covered four income groups having per capita income of above Tk. 3,000 (group I), above Tk. 2,000 to Tk. 3,000 (group II), above Tk. 1,000 to Tk. 2,000 (group III) and Tk.1000 or less (group IV). The data were analyzed and response ranked on the basis of the weighted averages of the responses (Gheyas 2002). The linear regression model was employed for the analysis of quantity consumed and expenditure incurred where form Marginal Propensity to Consume and Income elasticities of demand for fish were calculated.

Results and discussion

Monthly per capita expenditure on fish

Table 1 presents the monthly average per capita expenditure on fish for the different income groups and for all households surveyed, since fishes are generally sold by taka and not by weight in the study area. Average monthly expenditure on fish as percent of income for different income groups has also been included in the table.

Table 1. Monthly per capita expenditure and expenditure as a percentage of income for fish

Parameters	Income groups				
	Upper	Upper middle	Lower middle	Lower	All
Expenditure per capita (Tk)	249.11	167.43	144.38	63.95	178.83
Expenditure as a percentage of income	5.49	6.51	9.34	8.15	7.07

It is seen that the per capita expenditure on fish progressively decreases from the higher income group to the lower income group. The monthly average per capita expenditure of *highest income* group households was found to be nearly four times as much as that of the lowest income group households emphasizing the preference for fish for those who can afford. Average per capita monthly expenditure on fish consumption of all households was found to be nearly Tk. 179. On the other hand, it was seen that the lowest and the lower middle income groups spent higher percentage of their income on fish whereas the highest income group the least. The per capita monthly average percentage expenditure for all households was 7.07

Marginal propensity to consume and income elasticities of demand for fish

Marginal propensity to consume (mpc) expressed as MPC (mpc x 1000) and income elasticity of demand for fish for various income groups are presented in table 2. The results showed that for the lower income group the MPC was 70.86 indicating that for every thousand taka increase in per capita income the increase in per capita fish

expenditure was nearly Tk. 71.00. However, this result should be taken at its face value. The households belonging to this income group generally live in villages and in many cases they catch some fish. Obviously, this point has not been and cannot be accounted for in the consumption parameter. For lower middle and upper middle income groups the MPCs were 192.99 and 105.56 respectively representing a considerable increase in consumption over the lower income group. The upper income group, however, showed very small increase i.e. 14.33. This was not unexpected as increase in per capita income to the extent of Tk. 3,000 or more would, as a rule, increase the consumption of other non-food luxury commodities significantly with concomitant decrease in fish consumption. The MPC for overall households was 32.53.

Table 2. Marginal propensity to consume expressed in thousand taka and income elasticities of demand for fish of all households and different income groups

Parameters	Income groups				All
	Upper	Upper middle	Lower middle	Lower	
MPC	14.33	105.56*	129.99**	70.86	32.53**
=mpc x1000	(1.13)	(2.62)	(3.35)	(1.24)	(6.22)
Income elasticities	0.28	1.61*	2.07**	0.87	0.54**
	(1.13)	(2.62)	(3.35)	(1.24)	(6.22)

Note: Figures within parentheses are t-values * Significant at 5% level **Significant at 1% level

The income elasticity of demand for fish clearly shows that the proportion of income spent on fish by the lower middle and upper middle income groups was greater than the proportional increase in their per capita income and had elasticities greater than unity i.e. 2.07 and 1.61 respectively making fish a superior food commodity for these groups. The explanation put forward for MPC data for the lower and upper income groups holds in this case also.

Preference levels of fish for different age and sex groups

The preference levels of fish among the members of all households on the basis of age and sex has been reported in Table 3. It is seen that female members belonging to age group >20 to 40yrs had the highest preference for fish followed by the males of >40yrs of age. Children from 0-8yrs had the least preference for fish. By and large younger members exhibited lower preferences for fish compared to older ones. The reason children do not generally like fish is that they contain bones which makes them hazardous.

Table 3. Relative levels of preference of different age and sex groups for fish

Age and sex groups													
> 0-8 yrs		>8-20 yrs (M)		>8-20 yrs (F)		>20-40 yrs (M)		>20-40yrs (F)		>40 yrs (M)		>40 yrs (F)	
WA	PL	WA	PL	WA	PL	WA	PL	WA	PL	WA	PL	WA	PL
2.09	VII	2.14	VI	2.27	V	2.43	IV	2.58	I	2.56	II	2.54	III

W.A=Weighted average-, PL= Preference level, M=Male, F=Female

Roman letters represent preference levels of fish in decreasing order

On the other hand meat and egg are more tasteful and therefore, generally preferred by children and young men and women. The reason why female members between 20 to 40 prefer fish to meat is probably that they become more conscious about their body weight and figure. Men and women over 40yrs prefer fish to meat presumably because the later is less digestible and carries the risk of heart diseases.

Preference of different fishes by age and sex groups

Table 4 reports the result of survey on preference of the members of different age and sex groups for individual fishes or groups of fishes. In this connection one point must be underlined. Preference hem does not necessarily involve actual purchase or consumption. It is an expression of what one likes most regardless of whether he actually can afford to buy it or not. It is an expression of what one likes. For convenience of discussion the following arbitrary classification of fishes based on the rankings using weighted averages has been made:

- i) Fishes of high preference level - rankings I to IV
- ii) Fishes of moderate preference levels-rankings V to X
- iii) Fishes of low preference levels-rankings XI to XVII

The result showed that children (0-8 yrs) exhibit high preference for Shing and Magur, Ilish and Rui, Catla & Mrigal, Kol and Chingri. Fishes receiving moderate preference were Gulsha & Tengra, Pabda, Mola, Dhela, Batashi group, Rita, Boal & Pangas group, Sharputi puti group and Tilapia. Rest belonged to low preference level groups. Shutki and Nona Ilish received lowest preferences.

Male members of the households of age group >8 to 20 yrs showed the highest preference for Shing & Magur followed by Ilish and Rui, Catla & Mrigal group. Lowest ranking fishes were Carpio Silver Carp & Grass Carp group, Nona Ilish, and Shutki. Female members of this age group showed the highest preference for Shing & Magur followed by Rui, Catla group, Ilish and Mola, Dhela group. The lowest preferred fishes included Carpio, Silver Carp group, Nona Ilish, Tilapia and Shole & Lati group.

Male members of age group >20 to 40yrs exhibited high preference for Shing & Magur, Mola, Dhela group, Ilish and Rui, Catla group while the lowest preferred fish were Carpio Silver Carp group, Nona Ilish, Shole & Lati and Tilapia. Female members of the age group >20 to 40yrs showed high preference for Shing & Magur, Ilish, Rui, Catla

group and Mola, Dhela group. The lowest preferred fishes of this group were Carpio, Silver Carp group, Nona Ilish, Tilapia, Rita, and Boal group.

Male members above 40yrs indicated high preference for Shing & Magur. Rui, Catla group, Mola, Dhela group and Koi. For members of this group the least preferred fishes were Carpio, Silver Carp group. Nona Ilish, Tilapia and Shutki and Rita, Boal group. Female members above 40yrs indicated high preference for Shing & Magur, Ilish, Pabda and Rui, Catla group. The least preferred fishes for them were Carpio, Silver Carp group, Tilapia, Nona Ilish, Rita, and Boal group.

Overall preference level for the households surveyed and considered as a community indicated that the highly preferred fishes were Shing & Magur, Rui, Catla group, Ilish, Mola, Dhela group while the least preferred fishes were Carpio, Silver Carp group, Nona Ilish, Tilapia, Rita, Boal group. Among the moderately preferred fishes by the community were Koi, Gulsha & Tengra, Pabda and Kechki.

Table 4. Preference levels for different fishes by the age and sex groups

Name of fishes	>0-8 yrs	>8-20 years		>20-40 years		>40 years		Overall
		M	F	M	F	M	F	
Ilish	II (2.05)	II (2.28)	III (2.23)	III (2.32)	II (2.42)	VIII (2.00)	II (2.42)	III (2.23)
Rui, Catla, etc	II (2.05)	III (2.16)	II (2.24)	IV (2.27)	III (2.36)	II (2.42)	IV (2.34)	II (2.24)
Chital	XI (1.29)	XI (1.51)	XIII (1.46)	IX (1.88)	XII (1.81)	IX (1.94)	IX (2.34)	XI (1.72)
Rita, Boal, Pungas	VIII (1.48)	XIII (1.47)	XII (1.49)	XIII (1.52)	XIV (1.51)	XIII (1.41)	XIV (2.51)	XIV (1.49)
Carpio, Silver carp etc.	XII (1.15)	XVII (1.18)	XVII (1.12)	XVI (1.13)	XVII (1.26)	XVI (1.00)	XVII (0.89)	XVII (1.12)
Tilapia	X (1.40)	XV (1.31)	XV (1.39)	XIII (1.52)	XV (1.50)	XIV (1.34)	XVI (1.20)	XV (1.39)
Shole, Lati	XI (1.29)	XII (1.48)	XIV (1.40)	XIV (1.51)	XIII (1.76)	XI (1.81)	XIII (1.77)	XII (1.59)
Shorputi, Puti	IX (1.43)	IX (1.67)	X (1.60)	XI (1.76)	IX (1.89)	X (1.82)	XII (1.87)	X (1.73)
Shing, Magur	I (2.19)	I (2.34)	I (2.40)	I (2.48)	I (2.57)	I (2.50)	I (2.43)	I (2.40)
Pabda	VI (1.60)	IV (1.93)	IX (1.86)	X (1.86)	VIII (2.04)	V (2.29)	III (2.36)	VII (1.99)
Gulsha, Tengra	V (1.67)	VIII (1.80)	VI (1.99)	VII (2.09)	VI (2.21)	VI (2.26)	VII (2.27)	VI (2.06)
Koi	III (1.79)	V (1.90)	V (2.10)	V (2.17)	V (2.24)	VI (2.32)	V (2.31)	V (2.10)
Kechki	X (1.40)	X (1.63)	VII (1.90)	VI (2.12)	VII (2.06)	VII (2.12)	VIII (2.14)	VIII (1.90)
Mola, Dhela, etc	VII (1.56)	VI (1.87)	IV (2.13)	II (2.37)	IV (2.34)	III (2.35)	VI (2.28)	IV (2.13)
Chingri	IV (1.78)	VII (1.81)	VIII (2.13)	VIII (2.02)	XI (1.84)	XII (1.66)	X (2.05)	IX (1.86)
Shutki	XIII (0.95)	XIV (1.43)	XI (1.53)	XII (1.64)	X (1.87)	XIV (1.34)	XI (1.99)	XIII (1.53)

Nona shutki	XIV (0.73)	XVI (1.19)	XVI (1.13)	XV (1.29)	XVI (1.36)	XV (1.07)	XV (1.33)	XVI (1.17)
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M=Male, F=Female

Values within parentheses represent weighted average.

From the point of view of all households' preference it seemed that small fishes received moderate preference while exotic fishes such as Carpio, Silver Carp, Grass Carp, Tilapia etc. were among the least preferred of fishes presumably because consumers are still not habituated to eat fishes having non-traditional taste and flavour. Shutki and Nona Ilish were also low preferred fish products. It is interesting to note that all age groups without exception showed the highest preferences for Shing & Magur. This is presumably because these are least bony fishes and hence suitable for children, are perfectly lean fish and therefore, are easily digestible and good for people with cardiac problem and finally, they are delicious, easy to process and cook.

Frequency of purchase of different fishes by different Income groups

Tables 5 & 6 present the survey to assess the relative frequency of purchase of different fishes by all households and by different income groups. The results are based on weighted averages of the response. Arbitrary weighted averages between 2-<2.5 were assigned to the most frequently purchased fish: 1.5-<2.0, 1-<1.5 and 0.5-<1.0 were assigned to frequencies of fishes purchased in decreasing order. It is seen that Rui is the single most frequently purchased fish by overall households whereas Silver Carp, Grass Carp and Vetki are the least frequently purchased ones.

Table 5. Frequency of purchase of different fishes by all respondents

Range of weighted average	Frequency of purchase	Names of fishes
2.0-<2.5	Most frequently purchased fishes	Rui
1.5-<2.0	Second most frequently purchased fishes	Ilish, Catla, Shorputi, Shole, Shing, Magur, Gulsha, Pabda, Koi, Kechti, Chingri, Shutki, Tengra, Dhela, Mola, Lati
1.0-<1.5	Third most frequently purchased fishes	Mrigal, Chital, Boal, Pangas, Carpio, Rita, Tilapia, Kajari, Kalibaush
0.5-<1.0	Least most frequently purchased fishes	Silver carp, Grass carp, Bhetki

Inspection of relative frequency of purchase under different per capita income group shows that although the frequency of purchase includes more fishes in each group yet Rui remains the most frequently purchased fish followed by Catla, Shing and Magur. On the other hand, frequency of purchase of exotic fishes remains in the lower scale. The low acceptability of introduced fishes can be attributed to lower taste and rather unfamiliar flavour

Table 6. Frequency of purchase of different fishes by income groups

Range of weighted average	Frequency of purchase of fishes	Names of fishes			
		Upper income group	Upper middle income group	Lower middle income group	Lower income group
2.0-<2.5	Most frequently purchased fishes	Ilish, Rui, Catla	Rui, Catla	Rui, Shing, Tengra, Mola	Rui, Catla, Shing, Magur, Koi, Shutki, Tengra, Mola
1.5-<2.0	Second most frequently purchased fishes	Shorputi, Magur, Koi, Kechki, Chingri, Tengra, Mola,	Ilish, Shorputi, Shole, Shing, Magur, Koi, Kechki, Chingri, Shutki, Mola	Ilish, Catla, Pungas, Shorputi, Pabda, Ketchki, Koi, Chingri, Shutki, Dhela, Lati	Ilish, Pungas, Shorputi, Shole, Tilapia, Kechki, Chingri, Dhela, Lati
1.0-<1.5	Third most frequently purchased fishes	Mrigal, Chital, Boal, Pangus, Shole, Shing, Gulsha, Pabda, Tilapia, Kajari, Dhela, Lati	Mrigal, Boal, Silver carp, Carpio, Gulsha, Pabda, Tilapia, Kajari, Dheta, Lati	Mrigal, Boal, Silver carp, Carpio, Shole, Tilapia, Kajari, Kalibaush	Mrigal, Boal, Silver carp, Carpio, Kajari, Kalibaush
0.5-<1.0	Least frequently purchased fishes	Silver carp, Grass carp, Carpio, Rita, Kalibaush, Bhetki	Chital, Grass carp, Rita, Kalibaush, Bhetki	Chital, Grass carp, Rita, Bhetki	Chital, Grass carp, Rita, Bhetki,

Besides psychological factors probably also play a significant part. Consumers traditionally used to eating indigenous fishes instinctively believe that exotic fast growing fishes could not be as good as the slow growing indigenous fishes; and they are not entirely wrong too. A parallelism can be seen in the broilers and layers vs. our slow growing chicken and laying hens.

Storage of fish in the refrigerator

Survey has shown (data not presented) that of the 140 households that had a refrigerator 5% stored fish for a fortnight and 51% for a week whereas 44% bought their fish on the day of consumption. No household stored fish for a month or more. On the other hand, meats were stored for a month or more by 17% of the households, 16% for a fortnight and 42% for a week whereas only nearly 19% bought their meats on the day of consumption. It is generally known that fish during frozen storage and subsequent thawing lose significant level of its quality in terms of taste, flavour and texture. Those who store fish do it more as a matter of convenience rather than due to quality perception. Meat, on the other hand, undergoes improvement in flavour and texture after freezing.

Factors affecting the purchase of fish

Households were surveyed for their opinions about the factors that influence their purchase for fish. The results reported in table 7 shows that freshness was ranked as the most important factors. This is understandable since stale fish lose not only its taste, and flavour but also become nutritionally unacceptable. Appearance of fish was ranked 11 presumably because appearance is an index of freshness as well as health of the fish. Perception of the taste of the fish received the ranking of III while fat content was ranked IV. It is generally true that fat imparts taste to the fish. Hence larger the fish of any species the more tasty it is considered mainly because of higher fat content.

Table 7. Factors influencing consumers' decision to buy fish

Factors	Income groups			
	Upper	Upper middle	Lower middle	Lower
Taste	III (6.33)	III (6.04)	III (5.99)	III (5.42)
Price	VII (4.28)	V (5.78)	V (5.07)	I (6.94)
Size	VI (5.50)	VII (4.87)	VI (5.02)	V (5.34)
Appearance	II (6.98)	II (6.82)	II (6.12)	III (5.87)
Freshness	I (7.00)	I (6.91)	I (6.28)	III (5.91)
Fat content	IV (6.09)	IV (5.94)	IV (5.11)	VI (3.14)
Fewer bones	V (5.98)	VI (5.00)	VII (1.91)	VII (0.74)

Values within parentheses represent weighted average

On the other hand, fat is considered a causative factor for cardiovascular disease. Hence fat content lost its place to taste perception. Price is always a factor to reckon with while making purchase. In matters of food since other reasons are considered more important as briefly discussed above, the price of commodity either leads to purchase or no purchase. It is related more to the ability of the buyer than his willingness or preference to buy a food. Hence, notwithstanding its importance, price has been relegated to rank V ahead of size of fish and its bone content. Since here household rather than individual consumption is under consideration, fish that are highly bony, may not be acceptable to households where there are young children. Size of the fish is also related to bone content. Hence the respondents seem to be quite divided in their opinion about the influence of size and bone content of fish. In terms of overall weighted average bone content or absence of it received the rank VI immediately ahead of size. The reverse seems to be true for lower middle and lower income groups.

Conclusions

Although per capita expenditure on fish increases with the rise of income, the reverse appears to be true for percentage of income spent on fish. The income elasticities of greater than unity for middle-income groups indicate that fish becomes luxury commodity to them. Older people by and large prefer fish compared to younger ones. Female members between 20 to 40 years age show highest preference for fish because they are more conscious about their weight and figure. Preference level for all households indicated that the highly preferred fishes were Shing & Magur, Rui, Catla group, Ilish, Mola Dhela group while exotic fishes such as Carp, Silver Carp, Grass Carp, Tilapia etc. were among the least preferred of fishes presumably because consumers are still not habituated to eating fishes having non-traditional taste and flavour. It is interesting to note that all age groups without exception showed the highest preference for Shing and Magur because these are least bony fish suitable for children, are perfectly lean fish, are good for older people and are taste.

Rui is the single most frequently purchased fish whereas exotic fishes are the least frequently purchased ones for all households. Compared to meat, fishes are stored in refrigerator for shorter period because fish during frozen storage and subsequent thawing lose significant level of its quality in terms of taste, flavour and texture. Freshness was ranked as the most important factor influencing the purchase of fish, followed by appearance and taste. However, for poor consumers price was the most important factor for purchase fish.

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