Segmental Variations In Fish Consumption Behaviour: A Case Study Of Sonitpur District Of Assam

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INTRODUCTION

Fish has a vital role to play in mitigating the protein deficiency in developing countries. Fish has been described as the meat of the third world, and fish makes important contributions to developing and developed countries as a source of employment, income generation and foreign exchange earnings. Dey et al. (2005) studied fish consumption and preference patterns for fish species based on income groups and geographic profile of rural/urban areas in seven countries, viz. , Bangladesh, China, India, Indonesia, the Philippines, Thailand, and Vietnam. The study revealed that freshwater fish species constitute a major share in the total per capita fish consumption in most of these countries and the total intake of fish protein constituted 15% to 53% in these countries. Fish consumption patterns were dependent on the economic conditions of households and per capita fish consumption increased with increase in income. The percentage share of expenditure on fish over total animal protein expenditure is higher for lower income groups, which clearly indicates that the poor people (lower income group) depend more on fish as a source of animal protein than the rich (high income group) . The low-priced fishes were consumed more by the low income groups than by the high income groups, and the high income group spent a significant portion of their budget on expensive fish. The study also revealed that per capita consumption of fish was substantially higher in rural areas than in urban areas.

Statistical information regarding fish consumption patterns in India are limited. Only the National Sample Survey Organization (NSSO) has been conducting household consumer expenditure surveys since 1973-74 and in these surveys, NSSO has collected monthly per capita consumption for a number of commodity groups on a national scale. In India, composite data on consumption of meat, egg and fish are available. But exclusive data on fish consumption are not found. Only rough estimates are generally given about per capita consumption of fish in the country. There is an urgent need to collect reliable statistics on per capita and total fish consumption in India (Malhotra and Sinha, 2007).

According to a study conducted by the National Council for Applied Economic Research (NCAER) in 1976, the proportion of household expenditure on the consumption of fish, out of the total expenditure on food was 7.6% in Bangalore, 14.6% in Kolkata and 6.3% in Delhi and per capita consumption of fish was 9.12 kg, 12.12 kg and 0.56 kg for Bangalore, Kolkata and Delhi respectively. The study revealed that the average expenditure of fish across four income groups increased from 1.49 % to 6.80 % from the lowest to the highest income groups.

Bhatta (2000) in his study *"Production And Consumption Patterns In Karnataka – A Case Study"*- reported that fish consumption was higher in the rural areas as compared to the urban consumers. According to this study, the rural consumers consume on an average, 24 kg per annum, irrespective of income classes. However, for urban consumers, the per capita consumption of fish per month increases with the rise in annual income. Again, the study revealed that *rohu* and *catla* were the most preferred species in both the rural and urban areas and gender classes. *Mrigal* was the least preferred fish both in the rural and urban areas.

The result of a study conducted by Nandeesha et al. (2008) revealed that per-capita consumption of fish in Arunachal Pradesh, Tripura, Manipur, Mizoram and Meghalaya was 28.35 kg, 18.14 kg, 17.66 kg, 10.5 kg and 14.27 respectively. The study also revealed that the state of Tripura was consuming more than two times of the locally produced fish based on the estimated level of per-capita consumption of fish of 18.14 kg per annum.

The minimum per capita consumption of fish of an average Indian should be 11.0 kg per annum, as recommended by the ICMR (Indian Council of Medical Research). However, the per-capita consumption of fish in India is only 5.0 kg

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per annum, whereas, per-capita consumption of fish in Japan was 62.6 kg, China - 30 kg, Bangladesh - 35 kg. The average per capita consumption in Asian countries was 23 kg, in USA it was 19 kg, and in the EU, it was 23 kg, while the global average was 17 kg per annum (Das, 2009). Dietary fish consumption patterns are influenced by complex interactions of several factors such as availability, income, prices, tradition and customs, consumer preference as well as demographic and geographic profile. According to Malhotra and Sinha (2007), price does not seem to play a great role in per-capita fish consumption, and at the macro-level, fish consumption does not seem to be linked primarily to income, but rather to consumers' cultural and traditional food habits. They stated that in general, what *"rice and fish*" are to the eastern India, *"bread and butter"* are to the northern and western India.

Rice and fish are the two basic diets of the Assamese people. For 95% of the state's current population, fish is an important protein rich food (Das and Goswami, 2002). But in Assam, having a great potentiality of fisheries resources, the present fish yield was only 1.81 lakh tonnes of fish, against an annual demand of 2.83 lakh tonnes, calculated on the basis of minimum nutritional requirement of 11kg per capita consumption (Statistical Hand Book of Assam Fisheries, 2004) and the deficit in production is met from import of fish from nearby states. No systematic investigation has been carried out on the consumption pattern of fish by the consumers in Assam. There is a belief that the Assamese and the Bengali communities consume more fish compared to the other communities of the state. As the concept of marketing calls for understanding the needs of the consumers , an attempt was made to carry out a study to find out the consumption patterns with respect to fish in Sonitpur District, Assam with the following objectives.

OBJECTIVES

The objectives of the study are :

1. To examine the segmental variation in fish consumption among different strata of population in Sonitpur District, Assam.

2. To find out the factors affecting the fish consumption patterns among different strata of population in Sonitpur District, Assam.

3. To formulate effective strategies for marketing of fish.

METHODOLOGY

The study was carried out in Sonitpur district, which is one of the resourceful districts in the state of Assam in terms of its fishery resource potential. The district has 117.65 ha of ponds and tank areas, 1146.93 ha *beels* (flood-plain wetlands), 6533 ha riverine fisheries, 461.35 ha derelict water bodies, 144.10 ha forest fisheries, covering a total area of about 9879.33 ha, producing 7565.38 tonnes of fish during 2008-09 (Office of the DFDO, Sonitpur).

Secondary data about fisheries resources, present fish production and demographic profile of Sonitpur district were collected from the office of the DFDO, Sonitpur; Directorate of Fisheries, Govt. of Assam and Hand Book of Economics and Statistics, Govt. of Assam.

For collection of primary information, quota sampling technique had been followed. Sonitpur district was first divided into two broad categories – rural and urban. This was followed by selection of sampling units from both the rural and the urban areas, again making divisions on the basis of community. Four different communities were considered for selection of sampling units – the Assamese, the Bengalis, the Nepalis and the Biharis. 40 respondents of the Assamese (20 from rural areas and 20 from urban areas), 40 respondents of the Bengali community (20 from rural areas and 20 from urban areas), 30 from the Nepali community (15 from rural areas and 15 from urban areas) and 12 from the Bihari community (6 from rural areas and 6 from urban areas)- a grand total of 132 respondents had been selected following the quota sampling. The incomes of the respondents were also considered while selecting the sampling units and were divided into four income group categories - Category-I (Income up to ₹10000.00),Category-II (₹ 10000.00 to ₹ 20000.00), Category-III (₹ 20000.00 to ₹ 40000.00), and Category –IV (income above ₹ 40000.00).

For collection of the responses from the respondents about fish consumption pattern and related information, a structured questionnaire was personally administered.

DEMOGRAPHIC BREAK- UP OF THE RESPONDENTS IN THE STUDY AREA

a) Educational Status Of The Respondents : In general, a higher percentage of the respondents (32.6%) had education up to the graduate level and above, followed by respondents with education below 10^{th} standard (31.1%), upto 10^{th}

standard (19.7%), undergraduate (9.1%) and primary level (7.6%). The education scenario in the study area is presented in the Table 1.

Table 1 : Educational Status Of The Respondents (Figures In Percentage)

Respondent's Profile	Graduate level and above	Undergraduate	10+2	Below 10th. standard	Primary level
Geographic					
Rural	24.2	9.1	15.2	43.9	7.6
Urban	40.9	9.1	24.2	18.2	7.6
Demographic					
Assamese	50	10	15.5	17.5	7.5
Bengali	30	7.5	22.5	32.5	7.5
Nepali	27.5	12.5	22.5	30	7.5
Bihari	-	-	16.7	75	8.3
Overall	**32.6**	**9.1**	**19.7**	**31.1**	**7.6**

b) Caste of The Respondents : In the study area, the majority of the respondents (56.15%) belonged to the General caste; followed by OBC (33.85%), SC (6.15%) and ST (3.85%).The Table 2 shows the distribution of the respondents over different castes in the study area.

Table 2 : Caste Of The Respondents (In Percentage)

Caste	Overall	Rural	Urban	Assamese	Bengali	Nepali	Bihari
General caste	56.15	47.00	66.70	60.00	40.0	60.0	91.7
OBC	33.85	43.9	22.70	37.5	40.0	30.0	8.3
SC	6.15	6.10	6.10	-	20.0	-	-
ST	3.85	3.00	4.50	2.5	-	10.0	-

c) Type of Family System: On an average, 65.2% of the respondents had a nuclear type of family system, and the rest had a joint type of family system in the study area. More than 60% of the consumers had a nuclear family in both the rural and urban areas. The percentage of the nuclear family is comparatively more in the urban areas than in the rural areas. The nuclear type of family system was found to be more prevalent among all the communities, and its percentage was found to be the highest among the Bengalis. More than 60% of the respondents of different income group categories had nuclear type of family system.

d) Family Size: The average family size in the study area was found to be 4.83. The average family size in the rural areas was 4.92 and in the urban areas, it was 4.73.The average family size was 5.25, 5.03, 4.75 and 5.03 respectively among the Bihari, Bengali, Assamese and the Nepali communities. The average family size among the different income group categories varied from 4.47(Category-III) to 5.10 (Category-II).

e) Occupational Status: A higher percentage of the respondents (53.0%) were engaged in business, followed by service (42.4%) and professionals (4.6%).More than 50% of the respondents were engaged in business and 42.2% of the consumers were doing service in both the rural and urban areas and the rest were professionals. The percentage of respondents engaged in service was found to be the highest in the Assamese (60%), followed by the Nepali (50%), the Bengalis (27.5%) and others (8.3%). The percentage of respondents engaged in business was found to be the highest in others (91.7%) followed by the Bengalis (65%), the Nepalis (42.5%) and the Assamese (40%).

f) Monthly Average Family Income : The average monthly income in the study area was found ₹14450.00. The monthly average income in rural areas was found to be ₹ 11553.00 and in the urban areas, it was ₹ 17348.00. Majority of the respondents (52.3 %) had their monthly average income up to ₹ 10000.00 and 30.3 % of the respondents had ₹ 10000.00 – ₹ 20000.00 as their average monthly income, 11.4% had ₹ 20000.00- ₹ 40000.00 as their average monthly income, and only 6 % had a monthly income above ₹ 40000.00.The monthly average income in urban areas (₹

17186.57) was more than it was in the rural areas (₹ 11630.77).
The monthly average income was found to be ₹ 20750.00, ₹ 13425.00, ₹ 11512.00 and ₹ 6667.00 respectively among the Assamese, the Nepali, the Bengali and the Bihari communities.

FISH CONSUMPTION PATTERNS

❁ **Per Capita Consumption Of Fish :** The per-capita fish consumption in the study area was found to be 13.22 kg. The per-capita consumption of fish in the rural areas (13.68 kg) was more than it was in the urban areas (12.76 kg). The per-capita consumption of fish, irrespective of rural or urban areas was found to be 13.2 kg in the study area, which is more than the national average (5.0 kg). The finding of the present study revealed that the per-capita fish consumption was more in the rural areas than in the urban areas. The per-capita consumption of fish was found to be the highest among the Assamese (16.2 kg), followed by the Bengali (13.4 kg), the Nepali and the Bihari (9.8 kg) community. All the communities of the rural areas consumed more fish than the communities residing in the urban areas. The Table 3 shows the exact scenario of fish consumption among different communities and geographic locations.

Table 3 : Per Capita Consumption Of Fish (Kg/Annum) Among Different Communities

Communities	Rural	Urban	Overall
Assamese	17.46	15.07	16.26
Bengali	12.61	14.18	13.40
Nepali	11.95	9.79	10.87
Bihari	11.05	8.72	9.88
Overall	**13.78**	**12.67**	**13.22**

To find out whether the difference in consumption among different communities is statistically significant, one way ANOVA was carried out with the null hypothesis -

$$H_0: \mu_1=\mu_2=\mu_3=\mu_4$$

$$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$$

Where,
μ_1 = mean fish consumption of the Assamese community;
μ_2 = mean fish consumption of the Bengali community;
μ_3 = mean fish consumption of the Nepali community;
μ_4 = mean fish consumption of the Bihari community;
ANOVA results show that 'p' value is 0.006 , which is less than the level of significance (alpha) at 95% level of confidence. Hence, the null hypothesis is rejected.
It indicates that there is a difference in the mean consumption of fish among the different communities. To know the existence of significant difference of per capita consumption of fish among different communities, post- hoc analysis was done and it was found that there is a significant difference of per capita consumption of fish between Assamese, Nepali and Bihari communities. The difference of per capita consumption of fish between Assamese and Bengalis was not significant.
To know which communities among the Assamese, the Nepali and the Bihari consume more fish, the descriptive statistics were studied .This revealed that the per capita consumption of fish is the highest in the Assamese (16.26 kg) followed by the Nepalis (10.87 kg) and the Biharis (9.88 kg).
Similar analysis with income as the independent variable revealed that the per capita fish consumption is highest among the category-IV (13.22kg) and lowest in the Category-I (10.02kg).

❁ **Expenditure On Fish Over Total Expenditure On Food Items :** The average monthly expenditure on fish per family in the study area was found to be ₹ 505.15. This expenditure on fish in rural areas was found to be ₹ 480.63 and in the urban areas, it was ₹ 528.94. The monthly average expenditure on fish was found to be the highest among the Assamese (₹ 665.50) and lowest among the Biharis (₹ 383.33). The monthly average expenditure on fish was found to be ₹ 481.25

and ₹ 400.00 respectively among the Bengali and the Nepali communities.

The monthly average expenditure on fish has been analyzed among the different income groups. The monthly average expenditure on fish was found to be ₹ 322.46, ₹ 644.36, ₹ 636.67 and ₹ 1248.57 respectively in Category-I, Category-II, Category-III and Category-IV respondents. The percentage of expenditure on fish with respect to total household expenditure was 11.63%, 16.9%, 16.32% and 23.12% respectively for Category-I, Category-II, Category-III and Category-IV.

Data analysis on fish consumption across income groups revealed that the amount of money spent on fish as a percentage of total food expenditure tends to increase with increase in income level, indicating a positive income elasticity of demand.

❁ **Frequency Of Eating Fish :** Overall, 46.2% of the respondents consumed fish twice a week, 20.0% consumed it three days in a week, 13.1% consumed it thrice a week, and 11.5% consumed it five days in a week. The majority of the consumers in both the rural and urban areas consumed fish at least twice a week. In the rural areas, 47% of the consumers and in urban areas, 45.5% of the consumers ate fish at least twice a week.

Most of the respondents (more than 40%) of different communities consumed fish at least twice a week and only 2.5% of the consumers of both Assamese and Bengali communities consumed fish daily. The frequency of eating fish 5 days a week was found to be the same between the Assamese and Bengali respondents.

About 43% of the consumers of the Category-IV consumed fish 5 days a week, whereas only 5.8%, 12.5 % and 20 % of the consumers of Category –I, Category-II and Category-III respectively consumed fish 5 days in a week. The majority of the percentage of consumers of Category –I, II and Category-III consumed fish at least twice a week. It clearly indicates that the high income group was found to consume fish more frequently, in general, as compared to the lower income groups.

Based on this information of frequency of eating fish, the producer and marketing intermediaries can take decisions for making schedules of supplying fish to realize higher prices in the market.

❁ **Average Quantity Of Fish Purchased :** Overall, the average quantity of fish purchased at a time by consumers was found to be 500 gms. 63.1% of the respondents purchased 500 gms of fish at a time, while 18.5% of the respondents bought 250 gms of fish, 17.7% of the consumers bought 1 kg and only 0.8% bought more than 1.0 kg at a time. The average quantity of fish purchased at a time in each family was 500gms both in the rural and urban areas.66.7% of the respondents of the urban areas and 59.4% of the respondents of the rural areas purchased 500 gms of fish at a time. Only a few numbers of consumers purchased fish more than one kg at a time. The average quantity of fish purchased at one time was found to be 500gms among all the communities. The average quantity of 250gms purchased at a time was found to be the highest among the Bengalis (25%) followed by Biharis, Nepalis and the Assamese. Only 2.5% of the consumers of the Assamese community purchased more than 1 kg of fish at a time. No consumers were found to buy more than 1 kg of fish at a time. The percentage of consumers who purchased 500 gms fish at a time was found to be the highest among all the income groups. No consumers were found to be buying 250 gms of fish at a time in the income group category-III and IV.

❁ **Form of Fish :** Overall, 75.4% of the consumers had purchased local fish and 24.6% had purchased imported (*chalani)* fish. About 72% of the consumers of the rural areas consumed *local* fish and 28% consumed *chalani* fish, but in the urban areas, 79% of the consumers took local fish and 21% of the consumers consumed *chalani* fish. It clearly reveals that there is a demand for local fish in the study area and the district as a whole.

The percentage of local fish consumers was found to be more among all the communities than imported (*chalani***)** fish and its percentage was found to be the highest among the Assamese (85%), followed by the Bengalis (77.5%), the Nepalis (68.4%) and the Biharis (58.3%).

Though majority of the consumers of different income group categories consumed *local* fish than the *chalani*, the highest percentage of consumers (87.5%) buying *local* fish was found to be the consumers of Category-IV, which may be due to the high price of *local* fish.

SPECIES OF FISH PREFERRED BY THE RESPONDENTS

❁ **Among Carps :** Overall, 57.6% of the respondents had shown their preference for *rohu*, 27.3% of the respondents preferred *catla*, 11.4% of the respondents preferred *bhangon* and only 2.3% of the respondents preferred *mrigal.*

55.4% of the consumers of the rural areas and 59.7% of the consumers of the urban areas showed their preference for *rohu.* The percentage of consumers who showed their preference for *catla* were 26.2% in rural areas and 28.4% in urban areas.13.3% and 9% of the consumers of both the rural and urban areas respectively had shown their preference for *bhangon*. The preference for *rohu* was the highest both in rural and urban areas followed by *catla ,bhangon* and *mrigal* .

❁ **Among Live Fish :** Overall, among different types of *live fish*, the most preferred variety was *the magur* (*Clarias batrachus*). About 63.6% of the respondents preferred *magur* followed by *singi*, *Heterropneustus fossilis* (11% of the respondents), *koi*, *Anabus testudineus* (10.6% of the respondents), *sol*, *Channa straitus* (7.6% of the respondents) and *goroi*, *Channa punctatus* (6.1% of the respondents).

About 71% of the consumers of rural areas and 57% of the consumers of the urban areas preferred *magur*, whereas, 12.3% and 9.0% of the consumers of the rural and urban areas, respectively, had shown their preference for *singi*. The *magur* is the highest preferred live fish in both the rural and urban areas.

Consumers of the category –IV had shown the highest preference for *magur* (75% of the consumers of this category preferred *magur*). The *magur* is the highest preferred live fish among all the categories.

FACTORS INFLUENCING FISH CONSUMPTION

The respondents were asked to indicate the factors which influence the consumption of fish. The factors were mentioned in the questionnaire in the form of statements. The respondents were asked to give their degree of agreeing or disagreeing to the statement using the Likert scale. The highest percentage of respondents (97.7%) agreed that the taste of the fish is the main factor that influences the consumption of a particular fish. Among the respondents, 93.1% opined that high nutritive value is the other factor which influences fish consumption.

PRODUCTION AND CONSUMPTION GAP

The per capita consumption of fish in the study was found to be 13.2 kg. Based on this information, the total fish consumption in Sonitpur district had been estimated at 21,086.17 tonnes. This estimation was made on the basis that 95% of the population of Assam are fish eaters (Das and Goswami,2002) (Figure was taken from the 2001 Census). The existing fish production in the district was 7,565.38 tonnes, as reported by the office of the DFDO,Sonitpur district. Thus, the consumption and production gap in the district was estimated at 13,520.79 tonnes based on this study. Considering ICMR's recommended per capita consumption of 11.0 kg fish, the requirement of fish for the district is estimated at17,571.81 tonnes and thereby, the gap is 10,006.43 tonnes.

Based on this study, it is calculated that 95% of the fish eater population was consuming 3.34 lakh tonnes against 1.80 lakh tonnes of present fish production in the state. Thus, the production and consumption gap of fish in the state is calculated at 1.54 lakh tonnes.

The study clearly indicates that to meet the production and consumption gap, the district as well as the state has to import fish, which results in drainage of crores of rupees to other states. This finding has the policy implication of laying emphasis on fish culture in Assam.

MAJOR FINDINGS

1. The per capita fish consumption in the study area was 13.22 kg. The per capita consumption of fish in rural areas was 13.68 kg and in the urban areas, it was 12.76 kg.

2. The per capita consumption of fish was the highest among the Assamese (16.2kg), followed by the Bengalis (13.4kg), the Nepalis (10.8kg) and the Biharis (9.8kg).

3. The per capita consumption of fish increases with increase in income. The high income group consumes more fish in comparison to the low income group.

4. The average monthly expenditure on fish per family in the study area was ₹ 505.15.The percentage of monthly expenditure on fish with respect to total monthly household expenditure on food items was more in urban areas (15.18%) than in rural areas (14.77%).The monthly average expenditure on fish was found to be the highest among the Assamese followed by the Bengalis, the Biharis and the Nepalis.

5. The average quantity of fish purchased at a time by all types of respondents was 500gms.

6. Majority of respondents preferred *local* fish than the imported (*chalani)* fish. The preference for local fish was found to be the highest among the Assamese (85%).The highest percentage of respondents (87.5%) buying *local* fish was found among consumers of Category-IV, which may be due to the high price of *local* fish.

7. 43.5% of the respondents purchased fish from the village market, followed by the town market (33%) and fish peddlers (23.5%).

8. *Rohu* was the highest preferred carp followed by *Catla, Bhangon (Cirrhenous reba)* and *Mrigal*. The Bengalis had shown their highest preference for *Catla.*

9. Among different types of live fish, the most preferred variety was *magur*. About 63.6% of the respondents preferred *magur* followed by *singi* (11% of respondents) , *koi* (10.6% respondents), *sol* (7.6% of respondents) and *goroi* (6.1% of respondents).

10. The consumption and production gap in the district was estimated at 13520.79 tonnes and it was estimated at 1.54 lakh tonnes for the state.

11. The highest percentage of consumers (97.7%) agreed that the taste of the fish is the main factor that influences fish consumption followed by high nutritive value, easy digestibility, less fat content and easy availability of fish in comparison to meat at affordable price.

CONCLUSION

With the changing scenario from production driven marketing to market driven production, more emphasis should be given on production of those fish which have a high consumer demand. Apart from Indian Major Carps, there is a good consumer demand for some indigenous fish like *magur, singi, koi, chital, sol, borali, pabda* and other small fish. The production of these fish should be a part of the policy for pisciculture development of the state of Assam.

Since fish is highly perishable in nature and the consumer prefers live and fresh fish, there is a need for improvement of existing domestic fish marketing system .Infrastructure development in the form of cold storage and refrigerated van for direct marketing of fish will lead to higher levels of satisfaction among consumers. Adequate training to fish peddlers in handling such vans and handling of live fish and scientific method of cleaning fish will increase marketing effectiveness.

Since per capita fish consumption was found to be the highest among the Assamese consumers as compared to the other communities, more emphasis should be given on production and marketing of those species of fish which are preferred by this community .

As it has been found that there is a gap between demand of fish in Assam and its locally produced supply, there are ample opportunities for development of entrepreneurs in this field. The state govt. can undertake policies to encourage entrepreneurship in fish culture, thereby reducing the unemployment in the state. This will also reduce resource outflow from Assam to other states for importing fish.

Modern marketing considers the role by the consumers in the marketing process. Hence, more managerial attention should be focused on consumption behaviour of fish consumers, which will enhance consumer satisfaction. An integrated approach for development of fish culture in the district as well as for the state as a whole should be taken to cater to the demand of fish in the state. The part of imported value may be spent for development of fish culture, which not only reduces the total imported quantum of fish, but also increase the state domestic product by raising fish production in the district. Since majority of the production decisions are influenced by the forces of demand and supply, the findings of such research will be helpful for producers and policy makers in taking decisions for producing those fish which are mostly preferred by consumers in order to realize higher prices in the market. It will also help in generating employment programmes.

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