# Socio-economic Condition and Nutrient Intake of Riverine and Marine Fishing Communities of Bangladesh

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**Abstract**

The study was conducted among the 205 randomly selected riverine fishermen households of Harirampur upzilla of Manikgonj district and 97 of marine fishing households of Cox's bazar district. Data were also collected from another 100 non-fishing households of Harirampur upzilla adjacent to riverine fishing households for comparison. There was no H.S.C & above level of education among marine fishermen against 1.1 per cent and 8.2 per cent of this level of education in riverine and non-fishing community respectively. By occupation there were 26.1 and 21.1 per cent fishermen in riverine and marine fishing community respectively. There were 59.5 per cent riverine and 46.4 per cent marine fishermen in the monthly income category of Tk. 1000-1999 against 64 per cent of the non-fishing households in the income category of Tk. 3000 and above. Per capita per day food intake was 864.4 g in marine fishermen followed by 809.2g in non-fishermen and 654.8g in riverine fishermen. Cereal intake was highest (478.34g) in riverine fishermen, 452g in marine fishermen and about 445g in non-fishermen. Per capita per day energy intake was 2111 Kcal in marine fishermen, 2101 Kcal in non-fishermen and 1927 Kcal in riverine fishermen. The overall socio-economic condition of the non-fishermen was better than both of the riverine and marine fishermen community.

*Key Words*: Fishing Community, Socio-economic Conditions, Nutrient Intake

## Introduction

In Bangladesh, like many other developing countries, small scale fishing has been in practice alongside traditional agriculture for a long time. About 10 per cent of the population depend on fisheries for their livelihood. There are about 1.2 million commercial fishermen of which about 60 per cent are inland and 40 per cent marine.[1]

In the past several nutrition surveys have been conducted in the country to assess the health and nutrition situation of the people.[2-5] But few studies have been conducted only on socio-economic condition of the riverine and marine fishing communities of the country[6]. In India and Indonesia several limited studies were conducted amongst the fishing communities[7-9].

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In Bangladesh so far known no study has yet been conducted in riverine fishermen community and marine fishermen community about their nutritional status. In order to improve the health and nutritional status of the riverine and marine fishing community, it is important to know their daily food and nutrient intake pattern.

Besides, a non-fishing community in the same location of the riverine fishing community was selected for collection of similar information like those of the two fishing communities for comparison.

## Materials and Methods

### *Study Population*

The study was conducted in two locations of Bangladesh, Harirumpur upazilla of Manikganj district and Cox's Bazar sadar upazilla. In Harirampur upazilla one group of study population was riverine fishermen and the other group was non-fishermen living in the same area. In Cox's Bazar sadar upazilla the study population was marine fishermen who catch fish in the Bay of Bengal and live in the adjoining areas. The non-fishing community which is situated adjacent to riverine fishing community are people of various occupations.

### *Development of questionnaire and field trial*

A questionnaire was developed to obtain relevant information on the socio-economic state and household dietary intake. The questionnaire was pre-tested on small scale in another riverine fishing community similar to the selected fishing community in order to measure the understandability, responsiveness and comprehensibility of the questionnaire. The questionnaire was then modified and finalized in accordance with the study objectives and suitability based on the outcome.

### *Collection of socio-economic information*

The socio-economic status such as family size, monthly income, amount of cultivable land, possession of fishing boat and net, education level of the family member, employment pattern were obtained mainly from head of the family. Other members present during interview also provided necessary information.

### *Dietary assessment*

Household food consumption was recorded for the last 24 hours by dietary recall method. This method was standardized beforehand in another fishing community outside study population.

The study housewives provided information about the food intake of the family. Standardized cups and plates were shown to the housewives for her convenience to assess the amount of food consumed. A food composition table was used to calculate the energy and nutrient contents of foods.

## Results

**Table 1. Distribution of the household members of the study population excluding under 5chidren by education level**

| Educational level of the members | Riverine fishermen (n = 205) | | | Marine fishermen (n = 97) | | | Non-fishermen (n = 100) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| Illiterate | 33.0 (167) | 42.8 (203) | 37.7 (370) | 57.8 (104) | 59.4 (104) | 58.6 (208) | 12.9 (30) | 20.2 (54) | 16.8 (84) |
| Can sign only | 14.8 (75) | 14.9 (71) | 14.9 (146) | 10.0 (18) | 14.3 (25) | 12.1 (43) | 13.4 (31) | 9.7 (28) | 11.4 (57) |
| Class I-V | 39.1 (198) | 34.9 (166) | 37.2 (364) | 26.7 (48) | 24.6 (43) | 25.6 (91) | 32.3 (75) | 36.0 (96) | 34.3 (171) |
| Class VI-IX | 8.5 (43) | 6.4 (30) | 7.4 (73) | 3.9 (7) | 1.7 (3) | 2.8 (10) | 20.2 (47) | 17.6 (47) | 18.8 (94) |
| S.S.C | 2.6 (13) | 0.8 (4) | 1.7 (17) | 1.7 (3) | - | 0.8 (3) | 10.8 (25) | 10.1 (27) | 10.4 (52) |
| H.S.C & above | 2.0 (10) | 0.2 (1) | 1.1 (11) | - | - | - | 10.4 (24) | 6.4 (17) | 8.2 (41) |
| Total | 100.0 (506) | 100.0 (475) | 100.0 (981) | 100.0 (180) | 100.0 (175) | 100.0 (355) | 100.0 (232) | 100.0 (267) | 100.0 (499) |

Figures in the parentheses indicate number of subject

Table-1 shows that illiteracy was highest among marine fishermen (58.6 per cent) while that was lowest among non-fishermen group (16.8 per cent). In riverine fishing community proportion of male and female having primary level of education were 39.1 and 34.9 per cent respectively which were 32.3 and 36 per cent for non-fishermen group while 26.7 and 24.6 per cent for marine fishing community respectively. More than 37 per cent of non-fishermen group had higher education level which included class VI to IX (18.8 per cent), S.S.C (10.4 per cent) and H.S.C and above level (8.2) as against 10.2 per cent and only 3.6 per cent for riverine and marine fishermen group respectively. Of course, higher education level was observed among male in more population compared to females in all the three groups.

Table-2 shows the occupation of the study population. There was no farmer in the riverine and marine fishing communities but 5.3 per cent of the non-fishermen community were farmer as against 26.1 and 21.1 per cent respectively were fishermen in riverine and marine fishing communities while

**Table 2. Distribution of the total household members of the study population by occupation**

| Occupation of the members | Riverine fishermen (n = 205) | | | Marine fishermen (n = 97) | | | Non-fishermen (n = 100) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total | Male | Female | Total |
| Farmer | - | - | - | - | - | - | 11.2 (31) | - | 5.3 (31) |
| House Wife/Household work | 0.3 | 46.0 (256) | 22.6 (258) | 0.4 (1) | 44.5 (102) | 21.5 (103) | 0.7 (2) | 47.7 (144) | 25.2 (146) |
| Day Labourer | - | 0.2 (1) | 0.1 (1) | - | - | - | 1.4 (4) | 0.7 (2) | 1.0 (6) |
| Business | - | - | - | - | - | - | 16.9 (47) | - | 8.1 (47) |
| Service | 0.3 (2) | - | 0.2 (2) | - | - | - | 13.3 (37) | 1.7 (5) | 7.2 (42) |
| Student | 12.0 (70) | 10.6 (59) | 11.3 (129) | 12.4 (31) | 14.8 (34) | 13.6 (65) | 21.6 (60) | 30.5 (92) | 26.2 (152) |
| Fishermen | 49.8 (291) | 1.3 (7) | 26.1 (298) | 40.4 (101) | | 21.1 (101) | - | - | - |
| Children | 30.7 (179) | 31.1 (173) | 30.9 (352) | 36.0 (90) | 34.1 (78) | 35.1 (168) | 18.7 (52) | 12.6 (38) | 15.5 (90) |
| Unemployed | 6.5 (38) | 10.8 (60) | 8.6 (98) | 10.8 (27) | 6.6 (15) | 8.8 (42) | 7.6 (21) | 6.6 (20) | 7.1 (41) |
| Skilled labour | 0.3 (2) | - | 0.2 (2) | - | - | - | 8.6 (24) | 0.3 (1) | 4.3 (25) |
| Total | 100.0 (584) | 100.0 (556) | 100.0 (1140) | 100.0 (250) | 100.0 (229) | 100.0 (479) | 100.0 (278) | 100.0 (302) | 100.0 (580) |

Figures in the parentheses indicate number of subjects.

there was none having fishing occupation among non-fishermen group. About 8.8, 8.6 and 7.1 per cent were found unemployed among marine, riverine and non-fishermen group respectively.

**Table 3. Distribution of study households by monthly income**

| Income range | Study households | | | |
|---|---|---|---|---|
| | Riverine fishermen (n = 205) | Marine fishermen (n = 97) | Non-fishermen (n = 100) | Total |
| <Tk. 1000 | 11.2 (23) | 4.1 (4) | - | 6.7 (27) |
| Tk. 1000-1499 | 35.6 (73) | 17.5 (17) | 9.0 (9) | 24.6 (99) |
| Tk. 1500-1999 | 23.9 (49) | 28.9 (28) | 14.0 (14) | 22.6 (91) |
| Tk. 2000-2999 | 17.1 (35) | 32.0 (31) | 13.0 (13) | 19.7 (79) |
| Tk. 3000+ | 12.2 (25) | 17.5 (17) | 64.0 (64) | 26.4 (106) |
| Total | 100.0 (205) | 100.0 (97) | 100.0 (100) | 100.0 (402) |

Figure in the parentheses indicates number of subjects

**Table 4. Per capita mean food intake by the study population by defferent food groups**

| Food Groups | Riverine fishermen (n =205) | | Marine fishermen (n =97) | | Non-fishermen (n =100) | | P-value |
|---|---|---|---|---|---|---|---|
| | Mean | SD± | Mean | SD± | Mean | SD± | |
| Cereal (g) | 478.34 | 108.16 | 452.00 | 129.57 | 444.93 | 108.95 | .028 |
| Roots & Tubers (g) | 42.52 | 47.13 | 120.80 | 76.44 | 94.50 | 71.15 | .000 |
| Sugars (g) | 2.08 | 10.46 | 2.77 | 7.87 | 2.21 | 8.77 | .836 |
| Pulses & Nuts (g) | 14.60 | 23.83 | 16.63 | 22.67 | 29.35 | 31.11 | .000 |
| Vegetables (g) | 39.24 | 51.81 | 142.18 | 146.05 | 107.38 | 107.21 | .000 |
| Fruits (g) | 1.40 | 9.94 | 0.12 | 1.22 | 10.23 | 38.49 | .000 |
| Fishes (g) | 50.05 | 46.34 | 74.90 | 100.98 | 47.15 | 45.46 | .002 |
| Meats (g) | 1.40 | 11.02 | 18.99 | 55.56 | 7.98 | 35.9 | .000 |
| Eggs (g) | 1.57 | 9.11 | 3.35 | 12.85 | 8.36 | 17.45 | .000 |
| Milk & milk prod (g) | 7.85 | 44.01 | 2.02 | 2.04 | 29.77 | 79.79 | .000 |
| Fats & Oils (g) | 7.11 | 7.30 | 16.13 | 10.28 | 19.22 | 15.47 | .000 |
| Misc. (g) | 7.09 | 6.77 | 12.18 | 27.30 | 6.04 | 6.47 | .005 |
| All foods (g) | 654.81 | 172.76 | 864.40 | 284.67 | 809.18 | 255.72 | .000 |

Highest proportion of households in non-fishermen group (64.0 per cent) was found to have monthly income of Tk. 3000 and above (Table-3). The proportion of the households in the same income groups was 17.5 and 12.2 per cent in marine and riverine fishermen group respectively.

Table-4 shows the per capita mean food intake of the study population. It shows that mean intake of all food was 864.4g among marine fishermen which was also the highest while the intake was lowest (654.81g) in riverine fishermen. The difference in total food intake among the groups were statistically significant (P=.000). Cereals intake were 478.34, 452.0 and 444.93g for riverine, marine and non-fishermen respectively. The difference in intake was statistically significant (P=.028). The pulses and nuts intake was two times higher in non-fishermen than the intake of other two groups. The non- fishermen consumed 29.35g of pulses followed by 16.63g by marine fishermen and 14.6g by riverine fishermen and the difference in intake among the groups were highly significant (P=.000).Fish intake was higher among marine fishermen which was found to be 74.9g followed by 50.05g by riverine fishermen and 47.15g by non-fishermen which was highly significant(P=.002) among the groups. Fats and oils intake was 19.22g by non-fishermen followed by 16.13g by marine and 7.11g by riverine fishermen and the difference in intake was also found highly significant(P=.000).

Table-5 shows that per capita per day energy intake of the marine fishermen was 2111.3 Kcal which was higher than that of other two groups. Per capita protein intakes of marine, riverine and non-fishermen groups were 61.2, 46.0

**Table 5. Per capita nutrient intake by the study population**

| Nutrients | Riverine fishermen (n =205) | | Marine fishermen (n =97) | | Non-fishermen (n =100) | | P-value |
|---|---|---|---|---|---|---|---|
| | Mean | SD± | Mean | SD± | Mean | SD± | |
| Energy (Kcal) | 1927.0 | 453.0 | 2111.3 | 592.8 | 2101.0 | 531.0 | .002 |
| Protein (g) | 46.0 | 13.2 | 61.2 | 27.1 | 53.9 | 19.4 | .000 |
| Fat (g) | 14.1 | 11.8 | 27.0 | 20.8 | 30.1 | 22.6 | .000 |
| Carbohydrate (g) | 403.7 | 91.4 | 403.3 | 107.1 | 403.6 | 96.7 | .999 |
| Calcium (mg) | 369.4 | 270.4 | 417.0 | 340.9 | 447.1 | 280.8 | .074 |
| Iron (mg) | 10.7 | 6.9 | 21.8 | 13.4 | 14.9 | 9.3 | .000 |
| Zinc (mg) | 6.3 | 1.8 | 5.2 | 3.2 | 7.6 | 2.4 | .000 |
| Vitamin A(I.U) | 42.8 | 173.8 | 82.3 | 222.2 | 221.1 | 442.3 | .000 |
| Carotene (μg) | 1205.1 | 2720.4 | 4532.6 | 8845.9 | 3893.7 | 6087.9 | .000 |
| Thiamin (mg) | 1.2 | 0.3 | 1.1 | 0.5 | 1.4 | 0.4 | .000 |
| Riboflavin (mg) | 0.4 | 0.2 | 0.6 | 0.3 | 0.6 | 0.3 | .000 |
| Niacin (mg) | 19.7 | 4.6 | 18.8 | 7.4 | 20.1 | 5.4 | .272 |
| Vitamin C (mg) | 22.1 | 18.1 | 55.9 | 40.3 | 42.3 | 29.4 | .000 |

and 53.9g respectively. More than 30g of fat was consumed by non-fishermen group which was 3 g higher than the intake of marine group and more than double the intake of the riverine fishermen group. Fat intake of riverine fishermen group (14.1g) was about half of the marine fishermen group (27.0g). The difference of intakes among three groups in respect of energy ((P=.002), protein (P=.000), and fat (P=.000) were statistically significant. But carbohydrate intake was around 403g per capita and the intake of all three groups were found to be same with a very negligible differences among the groups which were not statistically significant (P=.999).

## Discussion

The study was conducted with the riverine fishing community and marine fishing community in the two locations of Bangladesh and the results were compared with non-fishing community.

The rate of illiteracy (Table-1) in this study was 37.7 per cent for riverine fishermen and 58.6 per cent for marine fishermen. In another study with marine fishermen in Cox's Bazar[10] the rate of illiteracy was 57.4 per cent which is almost similar to the marine fishermen of the current study.

In both of riverine and marine fishing communities (Table-2) principal occupation was fishing which was 26.1 per cent for riverine fishermen and 21.1 per cent for marine fishermen. In the Haimchar and Gualando study with riverine fishermen the percentage of population involved in fishing were 30 per cent and 35 per cent respectively.[6]

When the total income of two fishermen communities along with that of non-fishing community were considered (Table-3) again it was evident that higher riverine fishermen (35.6 per cent) were in the income group of Tk. 1000-1499 and higher marine fishermen (32 per cent) were in the income category of Tk. 2000-2999. The total income of the non-fishermen community were better than the other two communities.

Although the energy intake between the marine and non-fishermen did not differ much (Table-4) but the intake of riverine fishermen was lower by 8.7 per cent from marine and 8.3 per cent from non-fishing community. The daily per capita requirement of energy of Bangladeshi population was estimated to be about 2039 Kcal in 1995-96[5].
The trends of total calorie intake in the lower low income countries of Asia, as Pakistan, India, Mongolia, Vietnam and Cambodia were around 2300 Kcal in 1992 and 2400 Kcal in 1996[11].

For Bangladesh the daily per head requirement of protein was estimated to be 44.6g[5]. The per capita intake of protein of all three groups of study population met this requirement.

In the lower low income countries of Asia the average intake of protein was 58g.[11] The fat intake of marine and non-fishermen was about two times higher than the riverine fishermen.

The intake of cereal of three groups of study population (Table-4) was higher than the per capita cereal intake (436g) of Bangladeshi population in 1995-96 survey[5]. The intake of riverine fishermen (444.93 g) was almost similar with the national per capita consumption of cereal (436 g) in 1995-96.

Fish intake was higher in all the three groups against the national intake of 33 g in 1995-96[5]. Fats and oil intake were more than twice the national intake (8 g) of 1995-96 in case of marine and non-fishermen. But the intake of riverine fishermen was 11 per cent lower than the national intake.

The higher income of the non-fishermen and marine fishermen may be the contributing factor of the higher food and nutrient intake of these groups than that of the riverine fishermen group. Although the riverine fishermen community lived in the same location of the non-fishermen lower illiteracy rate and good occupation like service and business of the non-fishermen community were the attributing factors of their good intake in terms of food and nutrient. Moreover, overall sanitary condition and dwelling places of non-fishermen were better than both the marine and riverine fishing community as a whole.

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