

## Poverty and food security analysis: A study of fishermen households in a selected area of Bangladesh

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### Abstract

This study examines the poverty and food security analysis of fishermen households in a selected area of Gopalganj Sadar Upazila in Gopalganj District in Bangladesh. A sample size of 60 households was selected purposively from four villages. Data was collected through field survey by using pre-designed and pre-tested questionnaire. Calorie intake levels were calculated and statistical comparisons were done. Multiple regression analysis was carried out to determine the factor influencing calorie intake in individual levels. Food consumption scores were used to determine calorie intake levels. The major findings of the study were that income, education, cultivable area and rented area had positive impact on calorie intake but age of the respondents and family size had negative impact on calorie intake. About 68.33% of the respondents belonged to hard core poor whose average calorie intake was 1692.32 k. calories and 25% of the respondents had an average calorie intake 1890.93 k. calories and they belonged to absolute poor. The rest 6.67 % of the respondents took above 2122 kilo calories and average calorie intake was 2193.50 k. calories. There was 20% households having poor food consumption and 42% having borderline food consumption. Only 6.67% fishermen households have acceptable low food consumption and 3.33% have acceptable high food consumption.

**Keywords:** Poverty, Food Security, Fishermen, Calorie intake

### Introduction

Poverty and food security in Bangladesh have been major concern in the recent times. Bangladesh faces high poverty and under nutrition rates, exacerbated by frequent natural disasters and high population density. The percentage of the population living under the poverty line came down to 31.5 in 2010 from 40 in 2005, due to consistent economic and remittance growth (HIES, 2010). Food has recently added a security threat towards world peace. Most of the developing countries like Bangladesh are facing this problem, which remains very vulnerable throughout the country. This study attempts to present an analysis of poverty and food security of fishermen households. Food security is usually defined as access to enough food by all people at all times to live active and healthy life. In other words, food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious foods to meet their dietary needs and preferences for a healthy and active life (WFP, 2005). Food security includes the related concepts of access, sufficiency, vulnerability and sustainability. In other words, achieving food security requires that the aggregate availability of physical supplies of food is sufficient, that households have adequate access to those food supplies through their own production, through the market or through other sources and that the utilization of those food supplies is appropriate and socio-culturally acceptable to meet the specific needs of individuals.

The economy of Bangladesh is predominantly agriculture based and the people depend largely on fish for protein. The fisheries sector is very important to the people of Bangladesh. Fish accounts for about 14.6% of per capita protein intake and contributes about 60% of protein (HIES, 2010). However, it may be mentioned that per capita fish consumption has declined significantly over the years. i) Per capita fish consumption was 11.6 kg in 1962 which increased to 18.06 kg in 2010 (BBS, 2010). ii) In 2008-09, per capita domestic production of fish was only 50 gm per day which contributes 58% of the daily intake requirement for a 2200 K. calories diet (BBS, 2010). However, current per capita per day intake of fish is very low. But protein is very much essential for health and growth of the human body. iii) This protein may come from meat, eggs, fishes, milk etc. of which fishes is the significant source of animal protein. Moreover, it is generally accepted that fish protein are available protein. A vast majority of households are involved in some kind of freshwater aquaculture on the floodplains throughout the country. Their socio-

economic condition is poor and most of them are illiterate and food insecure. They live from hand to mouth. Based on the above mentioned situation, the present study has given much emphasis on focusing the issue of poverty and food security of the fishermen households. To figure out the real situation of poverty and food security levels of the fishermen households, the researchers attempted to undertake the study with the following objectives:

- i) to analyze the socioeconomic characteristics of the sample households;
- ii) to identify factors influencing calorie intake and ;
- iii) to study the calorie intake level of the sample households.

## Materials and Methods

In this study, 60 fishermen households were purposively selected from four villages namely Satpar, Tetulia, Lakkhipur and Telivita of Gopalganj Sadar Upazila in Gopalganj district. The required data were collected during the January to March, 2013. A purposive sampling technique was followed in this study. Descriptive analysis was used to describe the socio-economic variables. Multiple regression analysis was carried out to determine the factors influencing calorie intake in individual levels. Food consumption scores were also used to determine calorie intake levels. To estimate the factors influencing calorie intake the required model was used which was specified as:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + e_i \dots\dots\dots(i)$$

Where,

- Y = Calorie intake per day per person
- x<sub>1</sub> = Income of the household
- x<sub>2</sub> = Education level of the respondent
- x<sub>3</sub> = Age of the respondent
- x<sub>4</sub> = Family size
- x<sub>5</sub> = Cultivable Area
- x<sub>6</sub> = Rent in Area
- a = Constant
- b = Regression co-efficient
- e<sub>i</sub> = Error term

## Food consumption scores (FCS)

In order to measure food security, food consumption score (WFP-2009) was used in this study. The FCS is a frequency weighted diet diversity score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. In the Table 1 describes the Food groups and their weight through calculation steps.

### Calculation steps:

- I. Using standard Vulnerability Analysis and Mapping (VAM) 7-day food frequency data group all the food items into specific food groups.
- II. Sum all the consumption frequencies of food items of the same group, and recode the value of each group above 7 as 7.
- III. Multiply the value obtained for each food group by its weight (see food group weights in table below) and creates new weighted food group scores.
- IV. Sum the weighed food group scores, thus creating the food consumption score (FCS)
- V. Using the appropriate thresholds, recode the variable food consumption score, from a continuous variable to a categorical variable. These are the standard Food Groups and current standard weights used in all analyses.

**Table 1. Food groups and their weight**

|   | FOOD ITEMS (examples)   | Food groups (definitive) | Weight (definitive) |
|---|---|--------------------------|---------------------|
| 1 | Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals Cassava, potatoes and sweet potatoes, other tubers, plantains | Main staple              | 2                   |
| 2 | Beans, Peas, groundnuts and cashew nuts   | Pulse                    | 3                   |
| 3 | Vegetables, relish and leaves   | Vegetables               | 1                   |
| 4 | Fruits  | Fruit                    | 1                   |
| 5 | Beef, goat, poultry, pork, eggs and fish  | Meat and fish            | 4                   |
| 6 | Milk yogurt and other diary   | Milk                     | 4                   |
| 7 | Sugar and sugar products  | Sugar                    | .05                 |
| 8 | Oils, fats and butter   | Oil                      | .05                 |
| 9 | Spices, salt, fish power, small amounts of milk for tea.  | Condiments               | 0                   |

Source: WFP, 2009

### Bangladesh specific Food Consumption Scores (FCS) thresholds

Given the importance of fish in the diet of the Bangladeshi people, these thresholds were elevated. As a result, FCS thresholds were revised for Bangladesh and four food consumption groups were created:

- Poor consumption ( $\leq 28$ ),
- Borderline Consumption ( $>28$  and  $\leq 42$ ),
- Acceptable Consumption ( $>42$ ).
- An additional threshold was introduced to distinguish the acceptable households between acceptable low (43-52) and acceptable high ( $>52$ ).

Source: WFP, 2009

## Results and Discussion

### Age distribution

In the present study, the fishermen were classified into different age groups such as: 16-25 years, 26-35 years, 36-45 years, 46-55 years and above 55 years.

Table 2 shows some basic information about the respondents. This table reveals that 41.67 % of the respondents were between the age of 36-45 years, 40 % of the respondents were between the age of 26-35 years, 11.67% percent of the respondents were between the ages of 46-55 years, 5% of the respondents were above 55 years and only 1.67% of the respondents were between the age of 16-25 years.

**Table 2. Age distribution of the respondents according to age**

| Age group (Years) | Number of Fisherman | Percentage |
|-------------------|---------------------|------------|
| 16-25             | 1                   | 1.67       |
| 26-35             | 24                  | 40.00      |
| 36-45             | 25                  | 41.67      |
| 46-55             | 7                   | 11.67      |
| Above 55 years    | 3                   | 5.00       |
| <b>Total</b>      | <b>60</b>           | <b>100</b> |

Source: Field Survey, 2013

### Family structure of the respondents

Family size of the respondents ranged from 2 to 8 members. Distribution of households according to their family size is shown in Table 3. Family size of the respondents were classified into three categories: (1) Small (up to 3 members), (2) Medium (4-6 members) and (3) Large (7 and above).

It is evident from the Table 3 that the average family size was about 5.04. The Table also reveals that most of the respondents were within medium family size in both of the villages.

**Table 3. Distribution of households according to their family size**

| Categories according to family size | Number of households | Total members | Average     |
|-------------------------------------|----------------------|---------------|-------------|
| Small family (up to 3)              | 11                   | 33            | 3.00        |
| Medium family (4-6)                 | 45                   | 220           | 4.88        |
| Large Family (7 and above)          | 4                    | 29            | 7.25        |
| <b>Total/Average</b>                | <b>60</b>            | <b>282</b>    | <b>5.04</b> |

Source: Field Survey, 2013

### Educational level of the respondents

Education is the ability of an individual aged above 6 years to read and write or formal education received up to certain standard. It helps a person to have day to day information about the modern technologies, production cost and also production skills. Literacy has its own merits and it contributes to economic and social development. From the literacy point of view, the fishermen households in the study area were categorized into six groups:

- i. Illiterate
- ii. Can sign only
- iii. Primary level
- iv. Up to Secondary
- v. Up to higher secondary
- vi. Graduation and above

Those who cannot put signature, read and write were considered as illiterate. Table 4 shows the educational level of the fishermen households. The Table 4 reveals that 68.33 % of the fishermen had sign only, 20 % had education at primary level, 8.33 % had education at secondary level and only 3.33 % of the fishermen were illiterate.

**Table 4. Educational Background of the Fishermen households**

| Literacy level | Number of Fisherman | Percentage |
|----------------|---------------------|------------|
| Illiterate     | 2                   | 3.33       |
| Can sign only  | 41                  | 68.33      |
| Primary        | 12                  | 20.00      |
| Secondary      | 5                   | 8.33       |
| <b>Total</b>   | <b>60</b>           | <b>100</b> |

Source: Field Survey, 2013

### Annual income of the respondent

Income is the most important indicator of socio-economic status of people. Annual income of a family has been estimated based on yearly carrying from all sorts of income generating activities (IGAs) accrued by all active male and female members of the family in present study. Average total family income has been calculated by adding up farm and non-farm sources of income during the study period. Fishing was the main source of income of the sample fishermen. The sources of other income of sample participants are farming and labor.

Table 5 depicts the distribution of sample households according to their average annual income earned from fishing as well as other nonfarm IGAs.

Table 5 depicts that about 68.33% of the respondents were within the categories of Group A, 31.67% of the respondents were within categories of Group B and there was no respondents in the Group C categories.

**Table 5. Distribution of sample households on the basis annual average income**

| Categories according to income (Tk.) | Number of respondent | % of total |
|--------------------------------------|----------------------|------------|
| Group A (up to 60,000)               | 45                   | 68.33      |
| Group B (60,001-100,000)             | 19                   | 31.67      |
| Group C(>100,000)                    | 0                    | 0          |
| <b>Total</b>                         | <b>60</b>            | <b>100</b> |

Source: Field Survey, 2013

### Land Holding and Utilization Pattern

Total land holding was defined as the total of all types of cultivable land possessed by the individual owners of fish farmers and having legal rights on it. Therefore the respective farm size in the study area was measured by using the following formula;

Farm size = Homestead (including garden) area + Pond + Own land+ Rented in- Rented out.

It is observed from Table 6 that the respondents had average homestead area of 4.2 decimal, average cultivable areas of 6.6% respondent used 3.6 decimal, average rented in areas of 89.2% respondent has land they used land as a rental.

**Table 6. Average Land Distribution of the Respondents**

| Utilization of land | Fishermen       |            |
|---------------------|-----------------|------------|
|                     | Area in decimal | %          |
| Homestead area      | 2.27            | 4.2        |
| Cultivable area     | 3.6             | 6.6        |
| Rented in area      | 48.53           | 89.2       |
| Rented out area     |                 |            |
| <b>Total</b>        | <b>54.4</b>     | <b>100</b> |

Source: Field Survey, 2013

### Factors influencing calorie intake

The independent variables used in explaining the behavior of caloric intake function were household's income, education, age, family size, cultivable land area, and rent in area. Co-efficient having sufficient degrees of freedom were tested for significance level at 1 percent, 5 percent and 10 percent probability; Co-efficient of multiple determinations ( $R^2$ ) indicated the total variations of output explained by the independent variables included the model; F-values were used to measures the goodness of fit for different types inputs.

Table 7 shows that the intercept term was positive, which means that if all the independent variables income, education, age, family size, cultivable land area, and rent in area were absent, caloric intake must happens. The estimated value of the coefficient of income, education, cultivable area and rented in area were positive with individual calorie intake, On the other hand, age of the respondents and family size of the respondents coefficient were negative with individual calorie intake. When the respondents' income level increased, they were able to buy more goods to consume thus help to increase the calorie intake level. If respondents were more educated, they were able to select more nutritious foods to get more calorie by using less money. More cultivable area and more rented in area gave more earning capacity to the respondents so they were able to consume more foods to get more calorie and more opportunity to consume their own produced foods. The variable age and the family size with negative relationship implies that when the respondents' age increase, they were not able to consume all kind of good items and their digestion capacity reduced thus causes the negative relationship with calorie intake level. On the other hand, if number of the family member increased, the share of the food basket decreased because of their limited amount of foods.

**Table 7. Estimated coefficients and related statistics of the multiple linear regression function of calorie intake**

| Variables                         | Coefficient | t   values |
|-----------------------------------|-------------|------------|
| Constant                          | 1184.476**  | 18.655     |
| Income of the household           | 0.011**     | 8.887      |
| Education level of the respondent | 1.894       | 0.627      |
| Age of the respondent             | - 0.622     | - 0.625    |
| Family size                       | - 7.804     | - 1.039    |
| Cultivable Area                   | 2.334*      | 3.089      |
| Rented in Area                    | 0.039       | 0.159      |
| R <sup>2</sup>                    | 0.670       |            |
| Adjusted R <sup>2</sup>           | 0.669       |            |
| F                                 | 92.321**    |            |

\*\* and \* indicate significances at 0.01 and 0.05 probability level, respectively.

### Calorie intake

On the basis of the amount of food taken by the respondent and their family members per capita calorie intake was measured. It was classified into the following four categories in Table 8.

Table 8 depicts the percentage of calorie intake by the sample households. There was no respondent belonged to ultra poor. About 68% of the respondents belonged to hard core poor whose average calorie intake was 1692.32 k.cal and 25% of the respondents had an average calorie intake 1890.93 k. calories and they belonged to absolute poor. The rest 6.67% of the respondents took above 2122 kilo calorie and average calorie was 2193.50 k.cal. Therefore, the highest number of respondents belonged to the hard core poor.

**Table 8. Calorie intake by the sample households**

| Categories                    | Number of respondents | Per person per day average calorie intake (k. cal) |
|-------------------------------|-----------------------|--|
| Ultra poor (<1600 k.cal.)     | 00 (00 )              | -  |
| Hard core poor (<1805 k.cal.) | 41 (68.33)            | 1692.32  |
| Absolute poor (<2122 k.cal.)  | 15 (25)               | 1890.93  |
| Non-poor (>2122k.cal)         | 04 (6.67)             | 2193.50  |

Source: Authors Estimation. Figures within parentheses indicate percentages of total.

### Individual food intake

Per person per day food intake has been presented in Table 9. The table reflects that the highest amount of food intake was in rice. The table reveals negative values when we make a difference between availability of food at national level and sample households level expect fish. Per person per day fish consumption was 60.33gm household level while it was 44.65 gm at national level. Therefore, they consumed 15.68 gm more fish than that of national level. They did not intake other food item same as national level.

**Table 9. Food intake per person per day**

| Major food items | Per person per day food intake (gm/person/day) | National Average per person per day food intake (gm/person/day) | Difference between national average |
|------------------|--|---|-------------------------------------|
| Rice             | 435.81   | 516.16  | -80.35                              |
| Wheat            | 0  | 45.21   | -45.21                              |
| Potato           | 80.5   | 96.45   | -15.95                              |
| Vegetables       | 92.66  | 109.58  | -16.92                              |
| Pulses           | 2.32   | 9.86  | -7.54                               |
| Oil              | 3.89   | 5.75  | -1.86                               |
| Meat             | 0.62   | 23.24   | -22.62                              |
| Egg              | 5.72   | 8.03  | -2.31                               |
| Milk             | 0  | 21.64   | -21.64                              |
| Fish             | 60.33  | 44.65   | 15.68                               |

Source: Field Survey, 2013

### Food consumption scores

Food consumption scores of sample household were presented in Table 10. There were 20% households having poor food consumption and 42% having borderline food consumption. Only 6.67% fishermen households have acceptable low food consumption and 3.33% fishermen household have acceptable high food consumption.

**Table 10. Percentage of food consumption score by the sample household**

| Profiles                                       | No. of respondents | % of total |
|--|--------------------|------------|
| Poor consumption ( $\leq 28$ )                 | 12                 | 20         |
| Borderline Consumption ( $>28$ and $\leq 42$ ) | 42                 | 70         |
| Acceptable Consumption low (43-52)             | 04                 | 6.67       |
| Acceptable Consumption high ( $>52$ ).         | 02                 | 3.33       |
| Total  | 60                 | 100        |

Source: Field Survey, 2013

### Conclusion

By analyzing poverty and food security of fishermen household, it is found that most of the fishermen household were live with poverty and food insecurity. Most of their income is spent on food. They can spent very little amount of their income for other basic needs. Major portion of them are hard core poor and having borderline poor food consumption. It was indicated from this study that if the fishermen households will able to increase their income level, they can improve their education qualification, get more opportunity to farming activities beside fish catching, reduce their family size and ensure their good health facilities, increasing their calorie intake level and improving their food security situation. Government, different NGOs and development agencies should give attention to improve their income.

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