

---

# Micro Level Study of Ethnic and Non-Ethnic Households' Food Security and Dietary Diversity

M. Mizanur Rahman Sarker<sup>1</sup>, Farah Hossain Jury<sup>2</sup>, Maruf Khan<sup>1</sup>

<sup>1</sup>Department of Agricultural Statistics, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh

<sup>2</sup>Department of Agricultural Economics, Sher-e-Bangla Agricultural University, Dhaka, Bangladesh

## Email address:

sarker@sau.edu.bd (M. M. R. Sarker), fhossain3398@gmail.com (F. H. Jury)

## To cite this article:

M. Mizanur Rahman Sarker, Farah Hossain Jury, Maruf Khan. Micro Level Study of Ethnic and Non-Ethnic Households' Food Security and Dietary Diversity. *International Journal of Agricultural Economics*. Vol. 7, No. 2, 2022, pp. 75-81. doi: 10.11648/j.ijae.20220702.13

**Received:** February 12, 2022; **Accepted:** March 12, 2022; **Published:** March 23, 2022

---

**Abstract:** Although Bangladesh has achieved rice self-sufficiency, this does not imply to food security. Around 25% of the population is still food insecure. The fundamental factor is poverty. Despite improvements in many aspects of food security, the Bangladeshi people still lack dietary diversity, resulting in nutritional imbalance. The investigation's focus is on Bangladesh's northwestern region. Though numerous attempts have been made to comprehend rural people's food insecurity, ethnic minority communities are often overlooked. They make up about 1.25 percent of the Bangladeshi population. Many ethnic groups from the plains confront harsh living conditions, such as inadequate housing, contaminated drinking water, and insecurity. In this study the socioeconomic status, household food security, consumption status and dietary diversity of ethnic groups are compared with the majority Bengali community. Ethnic groups expenditure level exceeds their income. Although their income is very poor but the ethnic groups has more months' of cereal food availability than non-ethnic groups. Most of them are landless. Whatever land they have, most of it is homestead area. They have three meals a day but their dietary diversity is not sufficient. It can be seen that 98.39% non-ethnic households and 97.04% ethnic households have access to safe drinking water. Both groups are vulnerable, marginal and poor. It is important to emphasis on poverty alleviation through income generating activities.

**Keywords:** Food Security, Dietary Diversity, Ethnic, Poverty, Household Food Security

---

## 1. Introduction

Food security is an indicator of welfare. Income, employment, ethnicity and disability can influence one's food security. Household food security (HFS) is defined as when all members of a given household have physical and economic access to sufficient, safe and nutritious food at all times that can meet their dietary needs and food preferences for an active and healthy life [1]. household welfare is directly and significantly associated with food security [2]. A household can acquire food from its own production or by purchasing. Amount of food intake depends on their income level and expenditure. About 60% of household total expenditures are spent on food [3]. Dietary diversity is an indicator of food security. The number of unique food item consumed over a given period of time is called dietary diversity. One person must eat 2200-1800 calories per day. But it must come from different types of food groups such as

cereals, vegetables, fruits, poultry, egg, fish, dairy. sufficient amount of nutrients intake cannot be ensured without dietary diversity. In Bangladesh rice is the staple food which is just carbohydrate. Other nutrients come from non-rice foods. There are many households who consume minimum per capita amount of food but they are mostly staple food. Almost all households prioritize purchasing staple food. Poorer household gets only staple food like rice. Rice contributes for about 92% of the total food grains produced in the country and covers about 77% of agricultural land [4]. Research has shown that as rice prices fall, households in Bangladesh continue to purchase the same amount of rice as when rice prices are high [5]. Income is a significant determinant of household dietary diversity in Bangladesh [6]. The more they income the variety of food they purchase. Even if a household fulfils the food energy requirement, it does not guarantee whether it could manage the required nutrient to maintain a healthy life [7]. Though Bangladesh has become self-sufficient in rice production that does not

equate with food security. About 25% of the population remains food insecure. Poverty is the main reason. Despite the improvement in many aspects of food security, people of Bangladesh still lack dietary diversification, which leads to nutritional imbalance [8]. Though there have been many attempts to understand the food insecurity of rural people, ethnic minority groups are often forgotten. They constitute approximately 1.25 percent of Bangladesh's population. Many plain land ethnic groups face difficult living conditions, including poor housing, unsafe drinking water and insecurity [9]. They are socioeconomically more vulnerable. The level of food insecurity is very high among ethnic minority groups. Among the ethnic communities, the Santal and Koch are dominant in the plain land, 60% and 52% of Koch and Santal households classify as absolute poor, consuming less than 1,805 kcal/capita/day, whereas the figure for the Bengali community is 44% and the national average for rural areas is 35.2%, respectively [10]. Even Government service and benefits often do not reach them. In this study we will examine the socioeconomic status of ethnic groups of Paba and Tanore upazilla of Rajshahi district and compare their household food security, consumption status and dietary diversity with the majority Bengali community.

## 2. Methodology

### 2.1. Study Area

The study area of this investigation is North-West region of Bangladesh. The study was done at one pre-selected district of Rajshahi. The study is based on primary data from two different study locations across the districts. Keeping in view the objectives of the study and considering the limitations of the research with respect to time money and other facilities two Upazilas under Rajshahi district- Paba and Tanore four villages were selected purposively. Paba upazilla has the largest ethnic population and Tanor has mostly bengali population. Paba is selected as Ethnic group inhabited region and Tanor as Non-ethnic group inhabited region. The upazila is the lowest tier of administrative government in Bangladesh. The districts of Bangladesh are divided into sub-districts called Upazilas [11].

### 2.2. Data Collection

Field survey, interview, communication and interaction with different respondents were conducted for primary data collection. A pre-design pre-tested interviewer made questionnaire was used to conduct the survey. Twelve trained interviewers conducted the survey by face-to-face interview. Attention was given to the wording of the questions during questionnaire design. Around 250 respondents were selected randomly, 125 respondents from Paba and 125 respondents from Tanore upazilla. "Household food security status" of the ethnic and non-ethnic households of Paba and Tanore Upzillas of Rajshahi district was the main focus of the study and considered as a predicted variable.

### 2.3. Measurement of Variables

#### 2.3.1. Measurement of Household Food Security Status

Household food consumption status was measured by households' food expenditure. To do this the amount of different food groups consumed by the households were multiplied by the market price. Then households' food expenditure was calculated by summing up the costs of all food groups.

#### 2.3.2. Measurement of Independent Variables

The characteristics of the households i.e. family size, educational level of household head, occupational status of household head, monthly income, land holding, expenditures, food availability from own production, average number of meals per day, dietary diversity of average food consumption, access to safe drinking water and access to sanitation facilities were considered as the Independent variables of the study. Procedures followed for measuring each of these characteristics are described below:

**Family size:** The family size was measured by the total number of members in the family who lived and ate together.

**Educational Level of Household Head:** Education was measured in terms of one's years of schooling.

**Occupational Status of Household Head:** Occupation normally applies to economically active persons only. Occupation refer to the type of work done or the job held for the longest time during the year by the person.

**Household Monthly Income:** Monthly income referred to the total financial return of a household from farm (crops, livestock, poultry and fish) and non-farm sources (business, job, remittance and others) in one month. It was expressed in Taka.

**Monthly Expenditures of Household:** Average monthly expenditure of the families on basic needs means monetary value of food and other goods purchased. Families' basic needs and expenditures categories should be set according to the area relevance. General expenditures categories to consider are: food, shelter, farm expenses, health, education, utilities, fuel, transportation and clothing. It was expressed in Taka.

**Landholding:** Respondents were requested to provide estimates of their land in decimal. Land were classified into one of eight different categories, namely Homestead area, own land in cultivation, rented in, rented out, leased in, leased out share cropping in and share cropping out.

**Food Availability from Own Production:** The months of food availability from own production (MFAOP) are defined as the average number of months in a year in which a family has the ability to meet food needs from own farm. Therefore, the higher the number, the more stable is the access to food.

**Average Number of Meals Per Day:** Number of meals consumed per day is the number of meals consumed by family members on a typical day.

**Dietary Diversity of Average Food Consumption:** The dietary diversity is a reflection of the economic ability of the household to consume a variety of foods' however; it is not directly related to the nutritional status of household

members. The food groups consumed across all participants were Rice/Wheat, Vegetables, Meat, Egg, Fish, Dal /bean, Milk, Fruit and Tea. Respondents were requested to provide the estimates (in kg or in liter where appropriate) for the food groups.

**Access to Safe Drinking Water:** Access to safe drinking water is measured by the proportion of people in households with access to an adequate amount of safe drinking water located within a convenient distance from the user’s dwelling. The World Health Organization (WHO) and UNICEF joint monitoring program defined safe drinking water as water used for domestic purposes, drinking, cooking and personal hygiene.

**2.4. Statistical Analysis**

The specified regression model [12] is used in the study to investigate the determinants of household food security among the ethnic and Bengali households surveyed was as follows:

The model is explicitly specified as follows;

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \dots + \beta_k X_k + U_i$$

Where,

$Y_i$  = Dependent variables

$\alpha$  = Intercept

$\beta_1 - \beta_k$  = Regression coefficients

$X_1 - X_k$  = Independent variables

$U_i$  = Error term designed to capture the effects of unspecified variables in the model

The following model was fitted to the empirical data to determine the respondents’ food security status;

$$Y_i = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + \dots + b_k X_k + e_i$$

Where,

$Y_i$  = Food security status

$X_1$  = Education of the respondent (years of schooling)

$X_2$  = Monthly income of the respondent (TK)

$X_3$  = Household expenditure (TK)

$X_4$  = Age of the household head (years)

$X_5$  = Family size of the respondent (Number)

$X_6$  = Food availability from own production (Months)

$X_7$  = Land holdings of the respondent (Decimal)

$X_8$  = Per capita per day expenditure on food (TK)

$X_9$  = Access to safe drinking water

$a$  = Intercept

$b_1 - b_k$  = Coefficients of the respective explanatory variables

$e_i$  = Disturbance or error

**3. Results and Discussions**

**3.1. Income**

For households and individuals, income is the sum of all the wages, salaries, profits, interest payments, rents and other forms of earnings received in a given period of time [13]. Household food security depends on income. Average annual income of the farmers was Tk.195,189 and Tk.121,813 for Cumilla and Rangpur districts respectively [14]. In Figure 1 Average monthly income of Bengali households in Paba are higher than the tribal households in Tanore. They are respectively 7309 and 5304 TK per month.

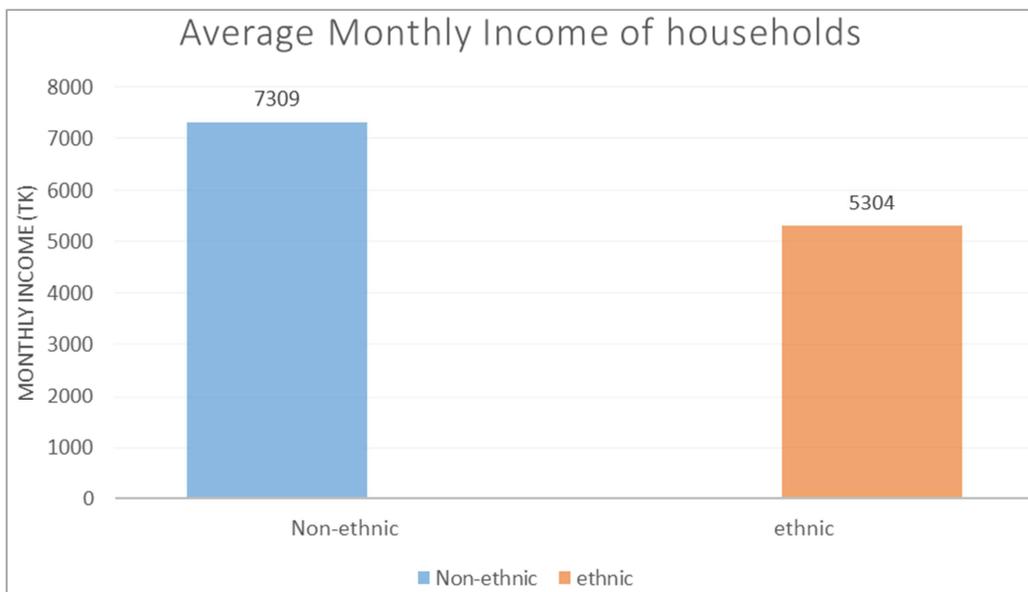


Figure 1. Average monthly income of the households.

**3.2. Expenditures**

Expenditures are the amount of money spent on basic necessities and other goods in a month. General expenditures include food, shelter, farm expenses, health, education, utilities,

fuel, transportation and clothing. Average monthly expenditures of non-ethnic households and ethnic households are 6504 TK and 6238 TK per month. If compared, from Figure 1 and Figure 2 it can be seen that monthly expenditures of tribal households exceed their monthly income.

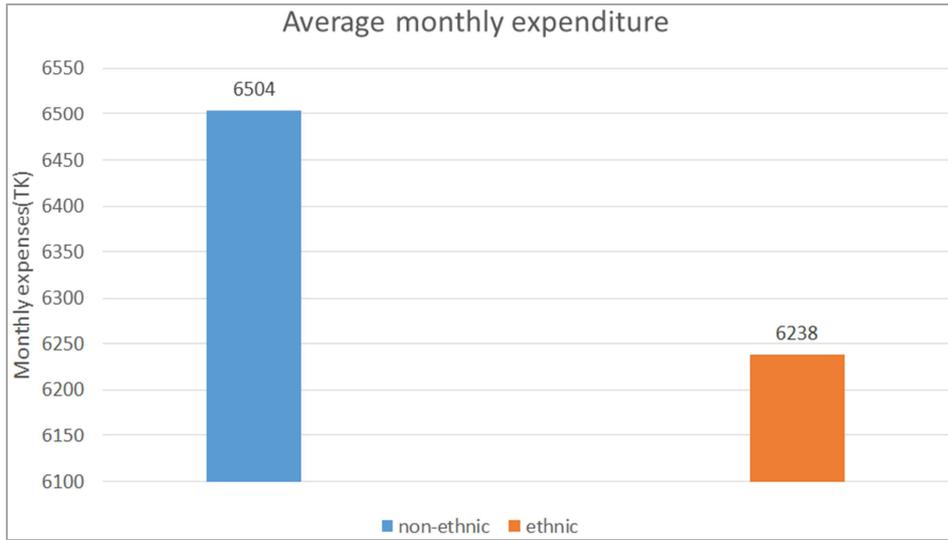


Figure 2. Average monthly expenditure of the household.

Table 1. Land Holding pattern of respondents in percentage.

Land type	Location Type	
	Non-ethnic	Ethnic
Homestead area	89	72
Own cultivated	17	15
Rented in	4	1
Rented out	2	4
Leased in	4	2
Share cropping	1	4

3.3. Land Holdings

It can be seen from Land ownership pattern that majority of both Bengali and tribal households are landless. Percentage of household with homestead area and cultivable land of ethnic household is less than non-ethnic household. Bengali households have around 89%, 17%, 4%, 2%, 4%, 1% and Tribal households have around 72%, 15%,

1%, 4%, 2%, 4% in homestead area, own land in cultivation, rented in, rented out, leased in and share cropping respectively.

3.4. Food Availability from Own Production

The majority of Bangladesh's population ethnic and non-ethnic group is dependent on agriculture which is highly influenced by climate variability and change [15].

Cereal food

Availability is achieved when sufficient quantities of food are consistently available to all individuals. The months of cereal food availability from own production (MCFAOP) are defined as the average number of months in a year in which a family has the ability to meet the food grain needs from their own farm. The MCFAOP are 4.08 and 4.78 months in 2015 at non-ethnic and ethnic. Here, ethnic groups have more months' cereal food availability than non-ethnic groups.

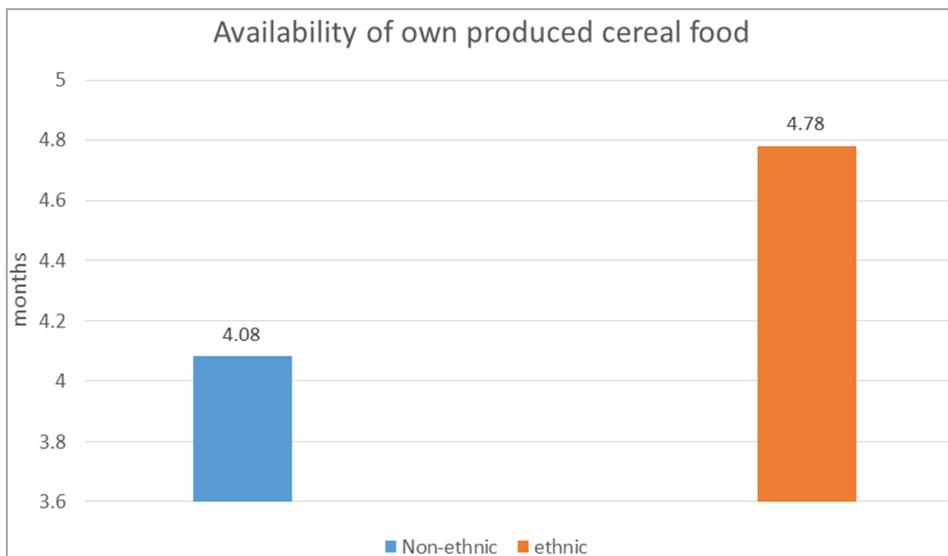


Figure 3. Availability of own produced cereal food (months).

*Vegetable Production*

Vegetables are one of the most important sources of nutrition both vitamins and minerals. Bengali households produced less vegetable than tribal households in 2015.

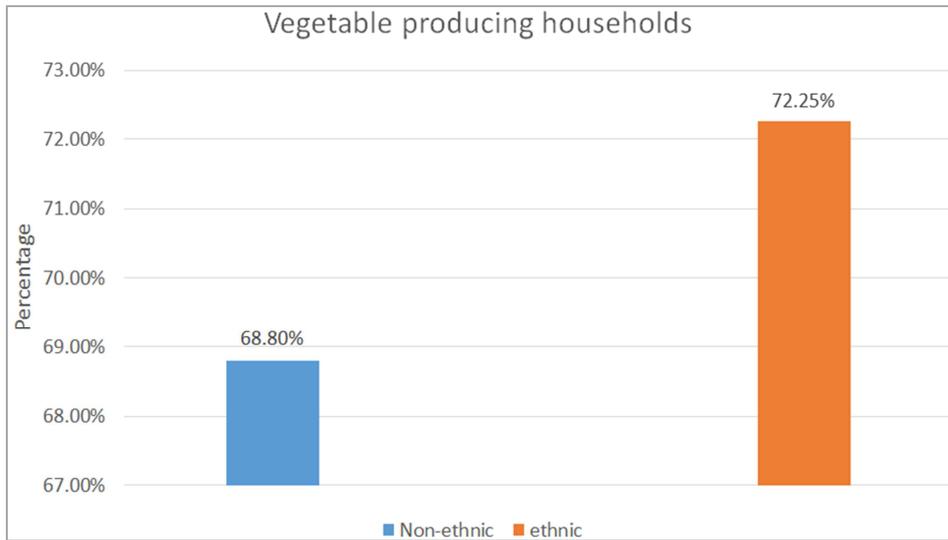


Figure 4. Vegetable producing households in percentage.

*Livestock and Poultry Ownership*

Livestock is considered productive asset for the families. Overall, ethnic groups own more livestock and poultry than non-ethnic households.

Table 2. Average number of livestock and poultry owned by the household.

	Non-ethnic	ethnic
Dairy Cattle	1.54 (22)	1.52 (51)
Beef cattle	2.15 (41)	2.16 (30)
Goat & sheep	1.5 (35)	3.95 (24)
Poultry	10.25 (75)	9.64 (106)
Duck	4.5 (60)	2.5 (25)
Pig	0	2.45 (25)

Figure 4 no household in non-ethnic and ethnic has less than 3 meals per day. 96.61% of ethnic households have at least three meals per day and only 3.39% have three meals with snacks. In non-ethnic 90.32% households have three meals per day and 9.68% of households have three meals with snacks in a day.

**3.6. Dietary Diversity**

The average quantity of food consumption varies among the study locations and may depend on respondents' taste, choice and purchasing power. The dietary diversity is a reflection of the economic ability of the household to consume a variety of foods; however, it is not directly related to the nutritional status of household members [16]. There are very few difference in food diversity among non-ethnic and ethnic households.

**3.5. Average Number of Meal Per Day**

Average number of meals per day consumed is the number of meals consumed by family members on a typical day. In

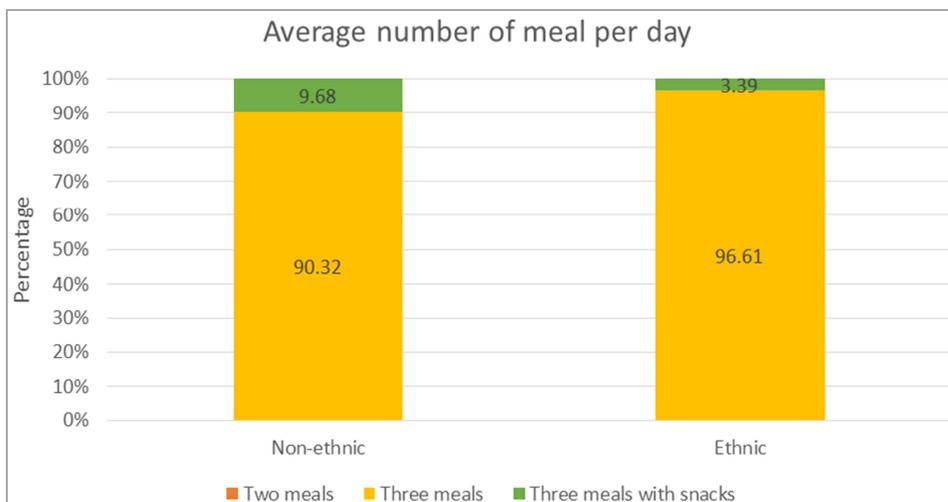


Figure 5. Average number of meal per day.

**Table 3.** Quantity of average food consumption per person per day.

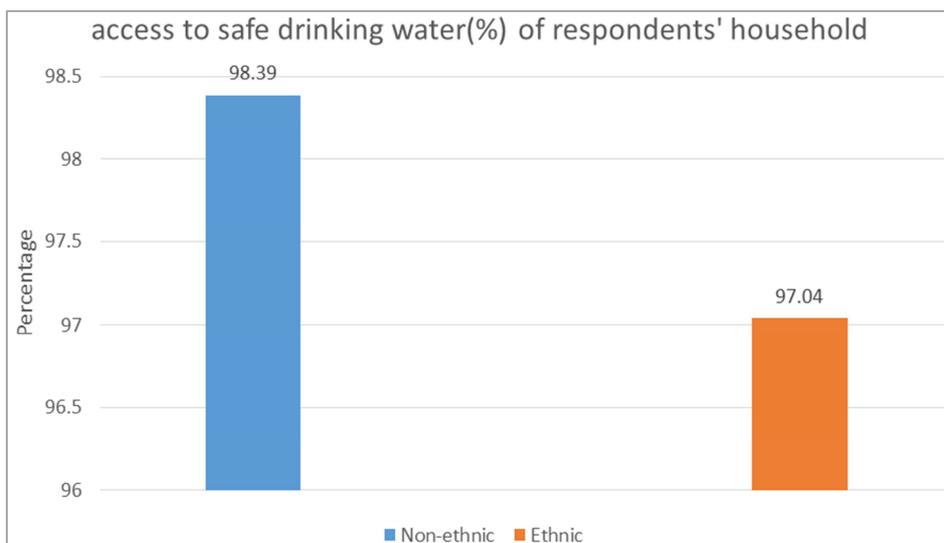
Items	Non-ethnic	ethnic
Rice/Wheat (kg)	0.483	0.52
Vegetables (kg)	0.182	0.182
Meat (kg)	0.022	0.029
Egg (number)	0.177	0.12
Fish (kg)	0.039	0.037
Dal /bean (kg)	0.016	0.022
Milk (liter)	0.053	0.022
Fruit (kg)	0.035	0.03
Tea (Tk.)	0.467	0.54

The rice/wheat, vegetables, meat, egg, fish, dal/bean, milk, fruit and tea are consumed in non-ethnic households are 0.483 kg, 0.182 kg, 0.022kg, 0.177, 0.039kg, 0.053 liter,

0.035kg and 0.467 tk. In ethnic households, 0.52 kg rice/wheat, 0.182 kg vegetables, 0.029 kg meat, 0.12 egg, 0.037 kg fish, 0.022 kg dal/bean, 0.022-liter milk, 0.03 kg fruit and 0.54 TK worth tea are consumed.

### 3.7. Access to Safe Drinking Water

Availability of safe drinking water is also an indicator of food security. From figure 6 it can be seen that 98.39% non-ethnic households and 97.04% ethnic households have access to safe drinking water. Arsenic pollution is one of the causes of unsafe drinking water. Education also has significant impact on environmental pollution issues such as households' knowledge about arsenic pollution [17].

**Figure 6.** Access to safe drinking water (%) of respondents' household.

## 4. Conclusion

From this study, we can see that ethnic groups are lagging behind in case of income and landholdings but have better food availability than Bengali majorities, though they have less access to safe drinking water. Among the food groups the most important was cereals, followed by vegetables. Due to less income they have less purchasing power. Hence we can say that ethnic groups have more food security than mainstream Bengalis, as they are able to grow their own food. But it is not enough. Dietary diversity is not sufficient. Ethnic minorities often go overlooked by government and mainstream system. Household size has direct and negative relation to food security status of household. Although they have food availability and diversified diet, majority of them still live in poverty as their expenditure exceeds their income level. Government and NGOs should try to alleviate them from poverty. Education programs should be strengthened to popularize the idea of balanced food and take steps for communication of dietary guidelines on balanced food in the mass media. Improving income of the households is crucial for improving food security and dietary diversity.

Appropriate agencies and government should work to improve income of the households.

## References

- [1] WFP reports, Food Assistance Fact Sheet-Bangladesh, 2020.
- [2] Rashidi Chegini, K., Pakravan-Charvadeh, M., Rahimian, M. and Gholamrezaie, S., 2021. Is there a linkage between household welfare and income inequality, and food security to achieve sustainable development goals?. *Journal of Cleaner Production*, 326, p. 129390.
- [3] Thorne-Lyman, A., Valpiani, N., Sun, K., Semba, R., Klotz, C., Kraemer, K., Akhter, N., de Pee, S., Moench-Pfanner, R., Sari, M. and Bloem, M., 2009. Household Dietary Diversity and Food Expenditures Are Closely Linked in Rural Bangladesh, Increasing the Risk of Malnutrition Due to the Financial Crisis. *The Journal of Nutrition*, 140 (1), pp. 182S-188S. nearly all households, even those in the poorest expenditure quintile, prioritize the purchase of staple foods.
- [4] Sarker, M. M. R. & Fagun, A. N. (2021). COVID-19, Food Security, Food Prices and Urban-rural Interrelationship for Sustainable Food and Nutritional Security: A Study on Dhaka City. *International Journal of Agricultural Economics*, 6 (1), 47.

- [5] Torlesse H, Kiess L, Bloem MW. Association of household rice expenditure with child nutritional status indicates a role for macroeconomic food policy in combating malnutrition. *J Nutr.* 2003; 133: 1320–5.
- [6] Rashid DA, Smith L, Rahman T. Determinants of dietary quality: evidence from Bangladesh. *American Agricultural Economics Association Annual Meeting*; 2006 July 23–26; Long Beach, CA. Available from: <http://ageconsearch.umn.edu/bitstream/21326/1/sp06ra11.pdf>.
- [7] Faridi, R., & Wadood, S. N. (2010). An Econometric Assessment of Household Food Security in Bangladesh. *The Bangladesh Development Studies*, 33 (3), 97–111. <http://www.jstor.org/stable/23339854>
- [8] Roy, D., Sarker Dev, D. and Sheheli, S., 2019. Food Security in Bangladesh: Insight from Available Literature. *Journal of Nutrition and Food Security*.
- [9] International Republican Institute, 2020. *The Challenges Facing Plainland Ethnic Groups in Bangladesh: Land, Dignity and Inclusion*.
- [10] Tithi, Farhana & Barmon, Basanta & Rahman, Sanzidur. (2020). Income Inequality, Poverty and Food Security of Plain Land Ethnic Communities of Bangladesh. 11. 16-32. 10.22681/ADP.2020.11.1.16.
- [11] Sarker, M. M. R. (2010). Determinants of arsenicosis patients' perception and social implications of arsenic poisoning through groundwater in Bangladesh. *International Journal of Environmental Research and Public Health*, 7 (10), 3644–3656.
- [12] Gujarati, D., & Porter, C. (2008). *Basic Econometrics* (5<sup>th</sup> ed.). New York, NY: McGraw-Hill Education.
- [13] Case, K. and Fair, R., 2006. *Principles of economics*. Upper Saddle River, N. J.: Pearson/Prentice Hall.
- [14] Mosammod Mahamuda Parvin, Md. Mizanur Rahman Sarker. 2021. Economic Analysis of Tomato Production in Cumilla and Rangpur Districts of Bangladesh. *International Journal of Agricultural Economics*. Vol. 6, No. 4, 2021, pp. 193-197. doi: 10.11648/j.ijae.20210604.16.
- [15] Akhter M. & Sarker M. M. R. (2021) Impacts of Climate Factors Influencing Rice Production in Bangladesh. *International Journal of Environment and Climate Change*, 11 (1), 43-52. <https://doi.org/10.9734/ijecc/2021/v11i130336>
- [16] Swindale A, Bilinsky 2006. Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide VERSION 2 Food and Nutrition Technical Assistance Project (FANTA) Academy for Educational Development 1825 Connecticut Ave., NW Washington, DC 20009-5721 Website: [www.fantaproject.org](http://www.fantaproject.org).
- [17] Sarker, M. M. R. 2012. Spatial modeling of households' knowledge about arsenic pollution in Bangladesh. *Soc Sci Med* 74: 1232–9.