

Poverty, Income Inequality and Determinants of Income of the Ethnic Communities of Bangladesh¹

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The study examines the levels of poverty, income inequality and determinants of income of five major ethnic communities (i.e., Chakma, Garo, Khasi, Marma and Tripura) of Bangladesh using a survey data of 250 households. Results revealed that agriculture constitutes 72.6% of the total income followed by salaried employment at 13.4% and off-farm income at 6.1%. The amount of cultivated land, the share of land rented-in and the number of working family members significantly increase agricultural income whereas education, the number of working family members and experience significantly increase non-agricultural income. Income is significantly higher for the Garo and Khasi communities and lower for the Tripura community. Income inequality varies across communities with high level of inequality amongst the Khasi and Garo communities (Gini coefficient 0.39 and 0.35) while the Chama, Marma and Tripura communities have a low and similar level of inequality (Gini coefficient 0.23-0.26). Poverty level is high for the Garo community and low for the Chakma and Marma communities. However, the depth of poverty is highest for the Tripura community. Policy implications include investment in education and land and tenurial reform measures to consolidate farm size as well as smooth functioning of the land rental market in order to increase agricultural and/or total household income of the ethnic communities.

Keywords: Ethnic communities, Income inequality, Poverty, Determinants of income, Multivariate regression model, Bangladesh

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INTRODUCTION

The recently announced Sustainable Development Goals (SDG21) specified “No poverty: End poverty in all its form everywhere” as its number one goal (MDG, 2015). Globally, extreme poverty has declined significantly over the last two decades as the proportion of poor living on less than USD 1.25 a day had dropped from nearly 50% in 1990 to 14% in 2015 (MDG, 2015). But large numbers of people are still living under the poverty line in Sub-Saharan Africa (51%), South Asia (40%) and East Asia (17%) (Krishna, 2013). Bangladesh also has made considerable progress in reducing poverty and improving the standard of life of its people. The MDG progress report of Bangladesh noted that the country has reduced its poverty level to 24.8% by 2012 which is lower than the MDG1 target of reducing poverty to 29% by 2015 (PC, 2015). However Rogers (2012), based on field hear-

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ings from 34 community participants, concluded that the level of inequality has actually increased drastically over the past few decades which has led to worsening of the well-being of the people in poverty. However, Rogers and Balazs (2016) noted that inequality has remained constant in 16 nations including Bangladesh during the 1980s and 1990s. Their estimates show that if a redistribution of 3% of the income from the top quintile (i.e., reducing from 40.2–37.2%) to bottom quintile (i.e., increasing from 9.3–12.3%) will result in a reduction of extreme poverty from 20% to zero percent.

Bangladesh is one of the most populous countries with a population size of 164 million and density of 1,222 people per sq km in 2014 (World Bank, 2015). The country is also highly dependent on agriculture which plays an important role by supplying food and improving food security for its fast-growing population base. Approximately 80% of the total population are directly and indirectly involved in the agricultural sector. The agricultural sector contributed 15.51% to Gross Domestic Product (GDP) in 2014–15 fiscal year and employed 47% of the total labor force (BBS, 2015).

The agricultural trade liberalization policies, launched in 1992, resulted in major structural reforms and technological progress in agricultural production, particularly, rice, which finally led to the achievement of the goal of self-sufficiency in food-grain production by 1990s (Ahmed and Sattar, 2004; Farooq et al., 2013; Islam and Habib, 2007; Klytchnikova and Diop, 2006; Talukder 2014). However, the decline of poverty rate remained very low estimated at only 1% per year during the past two decades (1990–2010). In other words, the impressive growth performance could not tackle the high rate of poverty because more than 40% of the country's population are still poor and most of them live in the rural areas (Ahmed and Sattar, 2004; Klytchnikova and Diop, 2006; MoF, 2010). Rahman (1999) noted that the degree of income inequality is lowest for villages characterized by medium level of adoption of modern agricultural technology but equally high for villages with high level of adoption and low level of adoption. He also noted that the impact of modern agricultural technology adoption on the distribution of income is complex and contributes about 29% to total income inequality.

Within Bangladesh, large disparities exist in the distribution of poverty depending on the location and geographic characteristics. For example, percentage of total population below national poverty line is as high as 63.7% in Kurigram, between 50–60% in Chandpur, Jamalpur, Mymensingh and Shariatpur and under 10% in Noakhali and Kushtia districts in 2010 (World Bank, 2011). The situation is even worse in pockets of underprivileged areas, such as, hill tract regions where most of the ethnic communities live. The ethnic population of Bangladesh is estimated at 1.59 million in Population Census of 2011 which constitutes about 1.10% of the total population (BBS, 2011). In Population Censuses of 1991 and 2001, the number of ethnic population was recorded at 1.21 and 1.41 million, respectively. The Small Ethnic Communities Cultural Institution Act 2010 uses the term '*Khudro Nri Gosthi*' to identify them.

Literature abounds on measurements of household income, income disparity and intensity of poverty in rural areas of developing economies including Bangladesh (e.g., Rahman, 2015; Talukder, 2014; Achia et al., 2010; Cherdchuchai and Otsuka, 2006; Anwanyu, 2005; Benson et al., 2005; Rahman, 1999). Rahman (2015) noted that modern agricultural technology contributes more to income inequality than mixed crop farming in Bangladesh. He also noted that ownership of land, farm capital assets, modern irrigation, non-agricultural income and education of the household head significantly increase consumption. Furthermore, regional factors also significantly affect inequality and consumption. Talukder (2014) noted that the determinants of household income of rural Bangladesh were household size and land area and the main sources of household income in turn are agriculture, business/commerce, rental income from housing and gift/remittance/assistance. Achia et al. (2010) noted that education significantly reduces the probability of being poor and the rural households are more likely to be poor as compared to their urban counterparts in Kenya. They also noted that demographic factors such as age, religion, ethnicity and region influence poverty. Cherdchuchai and Otsuka (2006) noted that significant structural shift from farm to non-farm sources has occurred in the composition of household income in rural Thailand. They also attributed the role of rural nonfarm sector and education in reducing income gap and poverty between favorable and unfavorable regions in Thailand. Anyanwu (2005) noted that household size, pri-

mary/lower level of education and rural occupation are positively associated with poverty in Nigeria including feminization of poverty and differential influence of geographic location on poverty. Benson et al. (2005) noted positive influence of education in reducing poverty in Malawi but highlighted that the relationship is somewhat more complex than generally understood and emphasized increasing access to district level services to address poverty.

It is clear from the aforementioned review that although the thrust of these studies are in rural areas of the developing world, studies analyzing poverty, income inequality and factors influencing income of the ethnic communities have received less attention. Hills et al. (2010) noted that inequalities within minority groups are substantial and often greater than the whole population in the UK. Platt (2011) noted that equalizing inequality between minority groups would contribute little to overall inequality. Similarly, Nandi and Platt (2011) focusing on ethnic women also provided the same conclusion.

Given this backdrop, the objectives of the present study are to: (1) estimate household income and its composition of five major ethnic communities of Bangladesh, i.e., Chakma, Garo, Khasi, Marma and Tripura communities; (2) identify the determinants of income of these ethnic households; and (3) compute measures of poverty and inequality of these ethnic households. The main contribution of our study to the existing literature is that we have provided a detailed analysis of income, poverty and inequality of these ethnic communities using state-of-the-art methodologies, which is expected to serve as a benchmark information for economists, researchers and policy makers aimed at improving their welfare in Bangladesh and elsewhere in Asia with similar socio-economic setting.

METHODOLOGY

Study Areas and the Data

Primary survey data were collected from Tangail, Sherpur, Moulvibazar, Khagrachari, and Bandarban districts. These districts were purposively selected because most of the ethnic communities of Bangladesh live in these districts. The Chakma, Garo, Khasi, Marma, and Tripura communities were also purposively selected because they are the dominant ethnic communities of Bangladesh who reside in these districts. A total of 250 households (50 from each ethnic group) were randomly selected for the study. Given remoteness of locations along with sparsity of population density where these ethnic groups live, 50 randomly selected sample for each ethnic community is considered to be sufficient. A pre-tested structured questionnaire was administered to collect information on socio-economic condition, agricultural production and income generation activities for the fiscal year 2014-2015.

Analytical Framework

State-of-the-art methods of poverty and inequality analyses were used including a multivariate regression analysis to identify the determinants of household income. The details are as follows.

Determinants of household income: A multivariate regression model

The following multiple regression model was used to identify the factors influencing household income of the five ethnic communities.

$$INCM = f(AMLND, PCLRE, WORKM, AGE, PIRRIG, EDUCH, GARO, KHASI, MARMA, TRIPURA) \quad (1)$$

where,

INCM	= total family income of the household (BDT)
AMLND	= amount of land cultivated by household (acre)
PCLRE	= proportion of cultivable land rented in (acre)
WORKM	= number of working members in the households (persons)
AGE	= Age of the head of household (years)

PIRRG	= Proportion of cultivable land under irrigation (acre)
EDUCH	= Completed years of formal schooling of the head of household (years)
GARO	= ethnicity dummy (1 if Garo, 0 otherwise)
KHASI	= ethnicity dummy (1 if Khasi, 0 otherwise)
MARMA	= ethnicity dummy (1 if Marma, 0 otherwise)
TRIPURA	= ethnicity dummy (1 if Tripura, 0 otherwise)

The dummy variable for Chakma community was not included in order to avoid collinearity with the intercept term of the regression model which is a standard practice. The effect of Chakma community on household income is subsumed in the intercept terms. The choice of the variables used in the regression is based on the literature and the justification thereof (e.g., Rahman, 2015; 1999).

Measures of Income Inequality: The Gini Coefficient and the Lorenz Curve

Gini Coefficient is most commonly used to measure income inequality. The coefficient varies between 0 and 1, where 0 reflects perfect equality and 1 represents complete inequality. Graphically, the Gini coefficient can be easily represented by the area between the Lorenz curve and the 45° line of equality.

Estimation of Poverty Indices

There are many indices to estimate intensity of poverty. The following four commonly used measures of poverty were utilized to examine the degree of poverty, consistency and stability (Rahman, 2015; 1999):

$$(i) \text{ Head count ratio } (H) = q/N \quad (2)$$

where, q = is the number of poor household having income no greater than the poverty line expenditure X (BDT) and N is the total number of households.

$$(ii) \text{ Income-gap ratio } (I) = [X - M^*]/M^* \quad (3)$$

Where M^* = per capita income of the poor

$$(iii) \text{ Sen index } (P_{\text{sen}}) = H [I + (1 - I) G^*] \quad (4)$$

Where, G^* = Gini coefficient among the poor (Sen, 1976).

$$(iv) \text{ Kakwani index } (PI_k) = (H/M) [X - M^*(1 - G^*)] \quad (5)$$

(taking into account inequality among poor)

Where, M = per capita income of all households (Kakwani, 1980).

$$(v) \text{ Foster-Greer-Thorbecke (FGT) Poverty gap ratio } (PI_{FGT}) = H^*I \quad (6)$$

HOUSEHOLD INCOME: SOURCES, COMPOSITION AND STRUCTURE

The Ethnic Population of Bangladesh

The majority of Bangladeshi people are Bengalis. Beside them, there are over 27 small communities in Bangladesh which are known as 'ethnic people' or '*adivasi*' (BBS, 2011). Among them Chakma, Garo, Khasi, Marma and Tripura are the most well known ethnic people of Bangladesh. The number of ethnic minorities is 1,586,141 which is only 1.10 % of the total population (BBS, 2011). The Bangladesh *Adivasi forum* claims that there are 45 ethnic communities with approximately 3 million people living side by side with Bengalis (Chakma et al., 2015). Most of the ethnic communities live in different parts of the hilly zones and some plain lands in southeastern, northwestern, northcentral and northeastern regions of Bangladesh. These include Chittagong Hill Tracts and some of the districts of Sylhet, Rajshahi and Mymensingh Divisions. Although most of the ethnic communities in Bangladesh draw their income from agriculture, they have their distinctive ways of living. They are distinctive than the others and proudly possess and practice their own culture, live closer to the nature and use nature as the main source of their livelihood. The leading communities of Chittagong Hill Tracts region are Chakma, Marma and Tripura. Khasi people live in Sylhet division, the northeastern region of Bangladesh. They are distinct from other ethnic communities of Bangladesh for their culture, language, agricultural production practices, way of life and economic

system. Garo people live mainly in greater Mymensingh region bordering Meghalaya, India. They also live in Sylhet division, Modhupur upazila (sub-district) of Tangail district and Sherpur upazila of Gazipur district.

Components of Household Income

Six main income components, namely, agriculture, off-farm, services, migrant remittances, pensions/allowances and land rent which in turn consist of additional sub-items were considered in this study. The annual net household income was estimated by subtracting the cost of generating such income from the gross income by each of the components.

Agricultural Net Income: Net income from the production of rice, vegetables, betel leaves, betel nuts, lemon, sugarcane, fish pond, livestock, and animal product and agricultural wages are the main components of agricultural net income in the study areas. Net income of each agricultural crop is derived as a sum of total revenue from sale (e.g., rice, vegetables, fish, milk, meat, eggs, etc.) + opportunity cost of family consumption of the crop/product + any value of the byproduct (e.g., rice straws) – all kinds of input costs incurred in the production process (e.g., power tiller cost, manure, chemical fertilizers, pesticides, land rent, hired labor, opportunity cost of family supplied labor, seeds, machinery cost of threshing, weeding medicine, irrigation, fingerlings, feed, etc.).

Off-farm Income: The earnings from economic activities other than agriculture and services, are considered as off-farm income. Ethnic people are engaged in petty trading (e.g., small shop, tea stall, selling fruit, selling liquor, etc.), carpentry, private tuition, bio-fuel/wood/bamboo collection and selling, renting out vehicle, open water fishing and hunting etc. The net income from all such individual activities were derived as revenues generated minus costs of tools and equipment (e.g., nets and hooks) and opportunity cost of family labor use.

Salaried Services: Services include all earnings from salaries earned by the members of a household. Total earnings of all members of the household from services such as teaching, working for the government and non-government organizations, private firms, nursing or any other type of work for which payments are received monthly were included in this component.

Migrant Remittances: Household members who migrated to other parts of the country or abroad due to their working places but send a part of their earnings to home are considered as remittance. The amount of money they send is considered as income of the household. Money received from family members abroad is also estimated and included as migrant remittances.

Pensions/Allowances: Any grant/income received from any firm or organization after retirement is called pensions. Any grant received from different development projects of government or non-government organizations, e.g., social safety net program, is estimated and added to the total income of the household.

Land Rental Income: Money received by renting out agricultural land to others is considered as earnings from land rent. Sometimes, in the villages, crop share is given instead of cash as rent. In those cases, the local market price is used to estimate land rent.

Composition of Household Income

The estimation of household income of the five ethnic communities is presented in Table 1. Significant differences exist with respect to all types of agricultural income amongst the ethnic communities, although some similarities were observed between pairs of communities. The dominant source of agricultural income is from rice production followed by vegetables and fruits. Similarly, significant differences exist with respect to off-farm income, services, migrant remittances and total household income (Table 1). The underlying causes of such significant differences are diverse and worth discussing. For example, income from rice is significantly different between Chakma and Tripura communities. The main reason is, although all communities cultivate rice, but their way of cultivation and location of the land is not the same. In Chittagong Hill Tracts, *jhum*² is the common practice of cultivation of the Chakma, Marma and Tripura communities. The Chakma and Marma also cultivate

²*Jhum* cultivation refers to the practice of slash and burn agriculture. This cultivation practice involves clearing a given piece of forest land either by burning and/or clear felling and then growing crops which are suitable for such areas, e.g., upland rice, vegetables and/or fruits.

Table 1. Average household income of the ethnic communities

Components of household income	Chakma	Garó	Khasi	Marma	Tripura	F-stat for differences
A. Agricultural income						
(1) Rice	25195 ^B	21098 ^{BC}	0	25344 ^A	14841 ^C	5.45***
(2) Vegetable	3386 ^A	571 ^B	0	3919 ^A	3874 ^A	3.02**
(3) Fruit	5880 ^C	2399 ^D	13130 ^A	4191 ^{CD}	9564 ^B	7.82***
(4) Betel leaves	0	0	590569	0	0	NA
(5) Betel nuts	0	1306 ^B	30540 ^A	64 ^B	0	88.85***
(6) Sugarcane	0	0	0	0	1580	NA
(7) Pond	4720	960	0	5720	0	NA
(8) Livestock	16757 ^{AB}	13773 ^B	4700 ^C	18449 ^A	21104 ^A	16.58***
(9) Animal Product	4940 ^A	998 ^B	0	666 ^B	976 ^B	7.64***
(10) Lemon	0	0	26860	0	0	NA
(11) Wages (hired)	31680 ^{AB}	22680 ^{BC}	0	35157 ^A	12648 ^C	4.42**
(12) Wages (own farm)	3306 ^{CD}	1480 ^D	45504 ^A	6529 ^{BC}	8895 ^B	101.84***
B. Off-farm Income						
(1) Petty trading	21258 ^{AB}	1200 ^C	2784 ^{BC}	21996 ^A	11728 ^B	5.11***
(2) Carpentry	0	0	0	0	600	NA
(3) Private tuition	360	0	0	0	0	NA
(4) Biofuel	252	0	0	600	11440	NA
(5) Vehicle rent	2880	0	0	0	0	NA
(6) Fishing/hunting	0	4340	0	0	3768	NA
C. Service						
(1) Salaries	31680 ^B	83634 ^A	2160 ^C	31860 ^B	33672 ^B	8.63***
D. Migrant remittances						
(1) Elsewhere of Bangladesh	5280 ^B	25440 ^A	4800 ^B	3840 ^B	0	4.00***
(2) Abroad	0	4800	0	0	0	NA
E. Pension/allowances						
	3780	0	0	280	3336	NA
F. Land rent						
	1480	2060	0	3600	0	NA
Total household income	162835 ^B	186738 ^B	718047 ^A	162215 ^B	138027 ^C	3.64***
Sample households	50	50	50	50	50	

Note: The same block letters in superscript represent similarities in income among communities based on LSD (least squares difference) at 5 % level of significance ($p < 0.05$).

***Significant at 1 per cent level ($p < 0.01$); **Significant at 5 % level ($p < 0.05$).

Source: Field survey 2015.

rice in low lands, i.e., valleys where production is higher than the *jhum* method. On the other hand, the Garó community cultivates in plain land following almost the same conventional technology practiced by general farming population of Bangladesh, but their farm operation size is very small compared to those of other ethnic communities of the Chittagong Hill Tracts.

Table 1 also shows uniqueness of the choice of crops. For example, the Khasi economy depends mainly on cultivation of betel leaves, which is a tree crop. The Khasi community also plant a range of fruit trees, e.g., orange, banana, pineapple etc., which generates higher income. The significant differences in livestock income of the Khasi community with other communities is that the Chakma, Marma and Tripura communities take advantage of the fallow forest lands in the Chittagong Hill Tracts for grazing and nurturing animals. Also, since Khasi community cultivates betel leaves, they do not prefer rearing of livestock because it can destroy plantation of betel

leaves. On the other hand, the Garo community prefers raising livestock as part of their culture. Table 1 also shows that only the Khasi community cultivates lemon for commercial sale and is a major source of agricultural income mainly because it is suited to the agro-ecological zone where they are located. It is also interesting to see that the Khasi community do not work as agricultural wage labor but work on own farm, which is highly labor intensive because of cultivation of betel leaves.

Income from off-farm activities are very low for the Garo community followed by the Khasi community in petty trading. Open water fishing is practiced by only Garo and Tripura communities because they have access to open water bodies. Income from remittances is zero for Tripura community but substantially high for Garo community where some members of these households migrated abroad (Table 1).

Table 2. Structure of household income of the ethnic communities

Sources of Income	Share of component income to total income (%)					
	Chakma	Garo	Khasi	Marma	Tripura	All Communities
A. Agricultural	58.9	34.9	98.6	61.7	53.2	76.2
(i) Rice	15.5	11.3	0.0	15.6	10.8	6.3
(ii) Vegetables	2.1	0.3	0	2.4	2.8	0.9
(iii) Fruits	3.6	1.3	1.8	2.6	6.9	2.6
(iv) Betel leaves	0.0	0.0	82.2	0.0	0.0	43.2
(v) Betel nuts	0.0	0.7	4.3	0.0	0.0	2.3
(vi) Sugarcane	0.0	0.0	0.0	0.0	1.1	0.1
(vii) Pond	2.9	0.5	0.0	3.5	0.0	0.8
(viii) Livestock	10.3	7.4	0.2	11.4	15.3	5.2
(ix) Animal Products	3.0	0.5	0.0	0.4	0.7	0.6
(x) Lemon	0.0	0.0	3.7	0.0	0.0	2.0
(xi) Wages (hired)	19.5	12.1	0.0	21.7	9.2	7.5
(xii) Wages (Own farm)	2.0	0.8	6.3	4.0	6.4	4.8
B. Off farm Income	15.20	2.97	0.39	13.93	19.95	6.1
(i) Petty trading	13.1	0.6	0.4	13.6	8.5	4.3
(ii) Carpentry	0.0	0.0	0.0	0.0	0.4	0.0
(iii) Private tuition	0.2	0.0	0.0	0.0	0.0	0.0
(iv) Biofuel/wood/bamboo sale	0.2	0.0	0.0	0.4	8.3	0.9
(v) Vehicle rent	1.8	0.0	0.0	0.0	0.0	0.2
(vi) Fishing/hunting	0.0	2.3	0.0	0.0	2.7	0.6
C. Service (Salaries)	19.5	44.8	0.3	19.6	24.4	13.4
D. Migrant remittance	3.2	16.2	0.7	2.4	0.0	3.2
(i) Within Bangladesh	3.2	13.6	0.7	2.4	0.0	2.9
(ii) Abroad	0.0	2.6	0.0	0.0	0.0	0.4
E. Pensions/allowances	2.3	0.0	0.0	0.2	2.4	0.5
F. Land rent	0.9	1.1	0.0	2.2	0.0	0.5
Total household income	100.0	100.0	100.0	100.0	100.0	100.0
	(BDT 162,835)	(BDT 186,738)	(BDT 718,047)	(BDT 162,215)	(BDT 138,027)	(BDT 273,572)

Note: Figures in parenthesis are total average income of per household.

Source: Field Survey, 2015.

The results also indicated that the household income of the Khasi community is significantly higher than all other ethnic communities in the study areas mainly because of the cultivation of betel leaf. Geographical location of the Khasi community is also comparatively better than Chittagong Hill Tracts. Vehicles like jeep, CNG, small trucks can reach almost all Khasi villages which are unthinkable in Chittagong Hill Tracts. Therefore, both unique agricultural practice and favorable road transportation generates higher income for the Khasi households. In contrast, the Tripura community lives on top of the hills which makes their life difficult for agricultural activities as they practice mainly *jhum* cultivation and have poor access to infrastructure, transport and other forms of communication. The Chakma and Marma communities always prioritize easy access to water to build their houses which makes it easier for practicing agriculture. They also engage more in different types of occupation.

Structure of Total Household Income

The share of income components to total household income is presented in Table 2. Agricultural income remains as the main source of household income of all ethnic communities contributing 76.2% to total income and is highest for the Khasi community at 98.6% and lowest for the Garo community at 34.9%. The households of the Khasi people earn significantly more than the households of other ethnic communities mainly because they were engaged in cultivating betel leaves which is an export item. Bangladesh exports betel leaves to Pakistan, UK, Qatar, Kuwait, Kingdom of Saudi Arabia, UAE, Singapore, Italy, Germany, France, Africa, Oman, Bahrain etc. (Mridha, 2002).

The next dominant source of income is salaried services contributing 13.4% to total income and highest 44.8% for the Garo communities. It indicates that the Garo people are finding ways to generate income from non-agricultural sources. The remittance income of the Garo community is also substantially high. The share of off-farm income to total income is similar for the Chakma, Marma and Tripura communities. The households of these three communities were engaged comparatively more in petty trading for their daily livelihood. Because of access to the forest, they could collect bio-fuels such as bamboo and wood and hunt wild animals for home consumption as well as selling to the local markets which was not possible for the households of Garo and Khasi due to the geographical locations of their residence.

Determinants of Household Income

After analyzing the sources and structure of income, we then identify the socio-economic determinants of in-

Table 3. Determinants of household income of the ethnic communities

Variables	Agricultural income	Non-agricultural income	Total household income
Constant	31199.19 (0.56)	-67475.1 (-2.38)**	-34507.73 (-0.55)
AMLND	56705.16 (12.70)***	-4025.719 (-1.48)*	55479.99 (11.06)***
PCLRE	99466.2 (22.49)***	-1078.231 (0.48)	99998.32 (20.11)***
WORKM	23264.17 (2.40)**	17916.12 (3.65)***	45257.96 (4.16)***
AGE	-1215.456 (-1.32)	793.3557 (1.70)*	-511.6753 (-0.49)
EDUCH	-1299.666 (-0.48)	9042.241 (6.64)***	7838.052 (2.59)**
Garo	20077.49 (0.64)	24442.65 (1.53)	47656.06 (1.34)*
Khasi	245365.1 (7.16)***	-62538.66 (-3.60)***	199664.2 (5.18)***
Marma	-39606.69 (-1.30)	11812.08 (0.77)	-32501.86 (-0.95)
Tripura	-116505 (-3.79)***	-4699.73 (-0.30)	-126629 (-3.67)***
R ²	0.85	0.33	0.79
F _(10, 239)	133.44***	9.91***	102.76***

Note: Figures in parentheses are *t*-ratios.

***Significant at 1% level ($p < 0.01$). **Significant at 5% level ($p < 0.05$). *Significant at 10% level ($p < 0.10$).

come using Eq (1). We have separately estimated agricultural, non-agricultural and overall household income of the five ethnic communities.

Table 3 presents the parameter estimates of the income models using the Ordinary Least Squares (OLS) method. The values of the R^2 were 0.85, 0.33 and 0.79 for agricultural, non-agricultural and total household income, respectively. In other words, the explanatory variables explained about 85%, 33% and 79% of the variations in income, respectively. Land area is the most dominant source of agricultural income and total household income as expected. Talukdar (2014) and Rahman (1999) also noted significant influence of cultivated land on agricultural income. Similarly, Rahman (2015; 2009) noted that ownership of land significantly increases household consumption and reduces the probability of being poor, respectively. Income is significantly higher for tenant households as indicated by the significant positive coefficients on the share of land rented in agricultural and total income. The dependency of the Khasi community on rented-in land to expand their farm size for betel leaf cultivation is the main reason for this result. In contrast, Rahman (1999) noted significant negative influence of tenancy in Bangladesh, which is expected for general farming communities. The amount of cultivated land significantly negatively influence non-agricultural income as expected, as these households are more likely to engage in agricultural activities.

The number of working family members significantly influence agricultural as well as non-agricultural income as expected. The main reason is that the ethnic communities mainly live in remote areas with low levels of education and the household members mainly engage in agricultural and other activities which do not require higher level of education. Also, large number of working members in the family enables them to involve more in non-farm activities. Hossain and Sen (1992) and Rahman (1999) also found similar results. In contrast, Ananyu (2005) noted that larger family size is positively associated with poverty in Nigeria.

Experience significantly influence non-agricultural income only. The main reason is that pretty trading is the main component of non-agricultural income and its success depend on experience. Similarly, education positively influence non-agricultural income as education opens up opportunities to move away from agricultural to off-farm, salaried and other activities. Achia et al. (2010) and Benson et al. (2005) also noted positive influence of education on income in Kenya and Malawi, respectively. Similarly, Rahman (2015) also noted positive influence of head's education on household consumption, a proxy measure of income.

There is a sharp ethnicity contrast in income derived from agricultural and non-agricultural sources. Agricultural and total household income is significantly higher for the Khasi communities which econometrically confirms the observations made in Tables 1 and 2. Total household income is significantly lower for the Tripura community.

Comparison of Income of the Ethnic Communities with Rural and All Bangladesh

Table 4 presents income of the sampled ethnic communities in the context of average household income of rural and overall Bangladesh. It is clear from Table 4 that family size of the Khasi community is 6.2 persons per household which is higher than all other communities as well as rural and national averages. It is surprising to see that the per capita income of the all ethnic communities are higher than the average rural income in Bangladesh. For the Khasi community, the income is even higher than the recently computed national average income

Table 4. Comparison of income of the ethnic communities with rural and national income of Bangladesh

Communities	Chakma	Garo	Khasi	Marma	Tripura	All	National	Rural ³
Family size	4.2	5	6.2	4.5	5.5	5.1	4.68 ¹	4.5
Per capita	40470	39802	120516	37043	26407	54023	102648 ²	25560
Household	162835	186738	718047	162215	138027	273572	4796623	115776

Notes: ¹BBS, 2011. ²The 2015 per capita income of Bangladesh at the national level was USD 1,316 (Exchange rate: USD 1.00 = BDT 78.00) (Daily Star Newspaper, 2016). ³Household Income and Expenditure Survey 2010 (HIES, 2010).

of Bangladesh as a whole. This challenges the conventional view that poverty amongst the ethnic groups are higher than the general population in Bangladesh.

INCOME INEQUALITY: LORENZ CURVE AND GINI COEFFICIENT

Gini coefficient is used to measure income inequality because it is useful to compare income distributions across households and ethnic communities. Also, Gini coefficient satisfies four main principles required for inequality metric to be reliable, i.e., transfer principle, scale independence, anonymity and population independence.

The Lorenz Curve

The Lorenz curve is a graphical representation of the cumulative distribution function of the empirical probability distribution of income or wealth (Lorenz, 1905). Figure 1 presents Lorenz curve of the household income of the five ethnic communities and shows that inequality is highest among the households of the Khasi community followed by the Garo and Marma communities with lowest for the Tripura community. The implication is that the households of the Chakma, Marma and Tripura communities were economically more homogenous although their total household income is substantially lower than the Khasi community. In contrast, high inequality amongst the Khasi community indicates that there are a few rich households while the rest are very poor.

Gini Coefficient

The Gini coefficient provides an index to measure inequality in a society ranging between 0 (perfect equality) to 1 (perfect inequality). Table 5 presents the Gini coefficient of the five ethnic communities and is compared to the national level. It is clear from Table 5 that inequality is highest amongst the Khasi households (Gini coefficient 0.39) followed by the Garo households (Gini coefficient 0.35), both of which are higher than the national Gini coefficient of 0.32 (World Bank, 2010). The level of inequality for the other three communities are similar and lower than the national level. The reason for high inequality amongst the Khasi and Garo communities is partly due to the location of some households within the semi-urban areas who earns very high income. On the

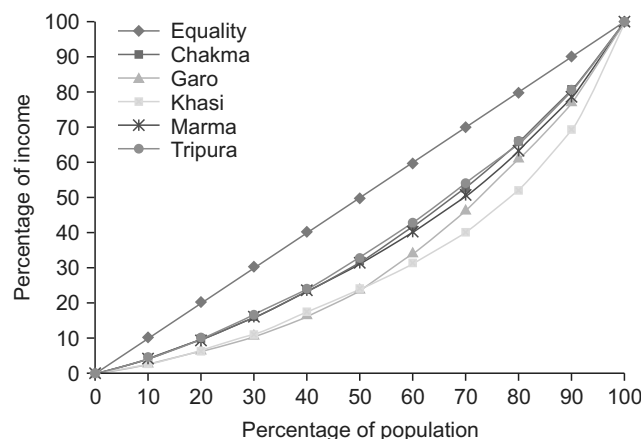


Fig. 1. Lorenz curve of five ethnic people.

Table 5. Income inequality of the ethnic communities

Communities	Chakma	Garo	Khasi	Marma	Tripura	National ¹
Gini coefficient	0.25	0.35	0.39	0.26	0.23	0.32

Source: Computed; ¹World Bank (2010).

other hand, low level of inequality of the Chakma, Marma and Tripura communities is mainly due to the fact that they all share same type of hilly landscape, practice *jhum* cultivation, have poor access to markets, transportation and communication infrastructure. The high inequality amongst the Khasi households is also due to betel leaf cultivation which generates very high income. However, all households do not have the same amount of land and not equally fertile, thereby leading to inequality amongst the households within the Khasi community. Platt (2011), examining minority groups in the UK, noted that there is substantial inequality within groups for all minority groups (i.e., Bangladeshi, Indian, Pakistani, Chinese, Carribean and African). Imai and Gaiha (2007) noted that ethnic minorities in Vietnam are not only poorer but also more vulnerable to shocks as compared to the majority ethnic groups, which is somewhat at contrast with our results.

Poverty Level and Depth amongst the Ethnic Communities

Poverty is largely defined using two major approaches: (i) the ‘absolute approach’ and (ii) the ‘relative approach’ (Anand, 1983). In the ‘absolute approach’, a certain minimum standard is fixed in terms of attaining requisite nutritional level and the cost to attain that level is estimated. It is also assumed that the standard is the same for all countries and does not change over time. For example, the global poverty line income is fixed by the World Bank at USD 1.25 per capita per day in 2008 and USD 1.90 in 2015 on the grounds that this is the minimum income needed for mere survival (World Bank, 2015). The ‘relative approach’ defines poverty in relation to the standard of living of the community as a whole and, therefore, recognizes the interdependence between the poverty line and income distribution of the community.

Although eradication of poverty has been one of the major objectives of the Government of Bangladesh, widespread poverty remains a major problem. The rate of poverty was 31.5% in 2010 which fell to 24.7% in 2015 (BBS, 2015). In this study, Cost of Basic Needs (CBN) approach was used to construct the ethnicity-specific poverty line expenditure which is considered superior to other methods (Ravallion and Sen, 1996) and falls within the category of ‘absolute approach’ to measure poverty. In the CBN method, total value of a bundle of food typically consumed by the poor at local prices first. Next, a specific allowance for nonfood goods, consistent with

Table 6. Poverty line expenditure of the ethnic communities using CBN method

Food item	Cost (BDT) of attaining the optimal diet evaluated of the groups' residence retail market prices						
	Quantity of food (gm) included in optimum diet	Chakma	Garos	Khasi	Marma	Tripura	All
Rice	432.6	14.87	14.56	17.06	14.56	12.48	14.71
Wheat	58.3	0.83	0.83	0.91	0.83	0.83	0.85
Potato	36.7	0.73	0.81	0.92	0.73	0.81	0.80
Lentil	25	1.64	1.70	1.64	1.62	1.57	1.64
Fish	38.3	7.42	5.91	9.90	7.43	6.44	7.42
Meat	1.7	4.05	3.52	5.25	3.71	3.42	3.99
Milk	31.1	1.45	2.19	2.19	1.35	1.35	1.71
Dry Milk	2.5	1.13	1.13	1.13	1.13	1.13	1.13
Sugar	27.2	1.35	1.36	1.36	1.36	1.31	1.35
Oil	12.2	1.51	1.34	1.53	1.34	1.46	1.44
Onion	8.5	0.33	0.34	0.30	0.34	0.34	0.33
Non leafy vegetable	86.80	2.13	1.74	2.60	2.17	2.17	2.16
Leafy vegetable	20	0.49	0.40	0.50	0.44	0.44	0.45
Cost of food per capita per day		37.94	35.82	45.29	37.01	33.75	37.96
Annual cost of food		13847.3	13075.1	16530.9	13508.3	12318.1	13855.9
Annual cost of non-food items		4154.2	3922.5	4959.3	4052.5	3695.4	4156.8
Per capita poverty line expenditure per year		18001.5	16997.6	21490.2	17560.8	16013.5	18012.7

spending by the poor, is added (e.g. Rahman, 2015; 1999). Table 6 presents the poverty line expenditures of the five ethnic communities. The ethnicity-specific poverty line expenditures, thus constructed, reveal similarities amongst the households of the Chakma, Garo and Marma communities, while it reveals large differences amongst the households of the Khasi and Tripura communities. The overall poverty line expenditure of the five ethnic communities is estimated at BDT 18012.7 per capita per year (Table 6).

Estimation of Poverty Indices

A number of poverty measures were developed during 1980s of which the widely used indices are Sen's poverty index (Sen, 1976), Kakwani's poverty index (Kakwani, 1980) and FGT's distributionally sensitive poverty measure (Foster et al., 1984). In this study, all of these indices are computed to examine the degree of poverty, consistency and robustness of the results when diverse measures are utilized. Table 7 presents the results of these poverty measures classified by ethnic communities. The overall number of population below poverty line is estimated at 30% which is strikingly similar to the rate of poverty in Bangladesh in 2010 (31.5%). Sen Index was estimated at 0.15 which shows a decrease in poverty. All measures of poverty, i.e., Sen's Index, Kakwani's index and FGT index reveal that high level of poverty exists among the households of the Tripura community followed by the Garo community. Comparatively, relatively lower level of poverty was found amongst the households of the Chakma and Marma communities. On the other hand, no poverty was found amongst the households of the Khasi community. This is because their income level was higher than the estimated poverty line expenditure estimated for that community. The distributionally sensitive measure of poverty, i.e., FGT index, reveals that poverty is strikingly low amongst the households of the Chakma and Garo communities with least inequality among the poor, while it is relatively higher for households of the Marma community and highest for households of the Tripura community. The overall depth of poverty is estimated at 0.50 which is higher than the national average of 0.40 for the year 2010 (Rahman, 2011).

CONCLUSIONS AND POLICY IMPLICATIONS

The study is set out to explore the composition and structure of household income, its determinants, income inequality and poverty of five major ethnic communities (i.e., Chakma, Garo, Khasi, Marma and Tripura) of Bangladesh using a survey data of 250 households for the year 2014-15. Results revealed that the dominant source of household income is agriculture contributing 72.6% to total income followed by salaried employment at 13.4% and off-farm income at 6.1% with significant variation in income amongst the ethnic communities. Amount of cultivated land, tenancy (i.e., share of land rented-in mainly to expand farm operation size and to produce high income generating betel leaves by Khasi community) and working family members significantly increases agricultural income whereas education, working family members and experience significantly increases non-agricultural income. There is a sharp ethnicity contrast in income derived from agricultural and

Table 7. Poverty estimates of the ethnic communities

Communities	Inequality among poor (G^*)	Per capita income of poor (M^*)	Head Count ratio (H)	Income gap ratio (I)	Sen Index	Kakwani index	FGT Poverty gap ratio
Chakma	0.59	23240.30	0.20	0.02	0.12	0.01	0.01
Garo	0.50	22349.43	0.40	0.02	0.21	0.02	0.01
Khasi	NA	NA	NA	NA	NA	NA	NA
Marma	0.52	20063.00	0.20	0.17	0.12	0.01	0.03
Tripura	0.35	16768.82	0.40	0.27	0.41	0.03	0.11
All	0.50	19660.68	0.30	0.16	0.15	0.01	0.05
Bangladesh (2010)			0.31				0.04

Note: Computed and selected from Rahman (2011) for Bangladesh.

non-agricultural sources. The richest community is the Khasi community followed by the Garo community and the poorest community is Tripura. The main source of income of the Khasi community is its unique practice of commercial betel leaf cultivation which is an export crop and constitutes 98.6% of total household income. Income inequality also varies significantly amongst the communities with high level of inequality within the Khasi and Garo communities (Gini coefficient 0.39 and 0.35). The income inequality amongst the households of the Garo and Khasi communities was higher than the national level while it is lower amongst the households of the Chakma, Marma and Tripura communities. The poverty level is high for the Garo community and low for the Chakma and Marma communities as well. But the depth of poverty is highest for the Tripura community. Surprisingly, no household was found to be below the poverty line in the Khasi community even though the level of inequality in income is highest for this community.

Since the sources and composition of income varies significantly amongst the ethnic communities due to their unique cultural, social and livelihood approaches including the location where they live, ethnicity specific policies are likely to work more effectively instead of a broad range of policies appropriate for the nation as a whole. Nevertheless, the following broad policy measures will significantly contribute in raising income of the ethnic communities as a whole. First, investment in education targeted at the ethnic communities will significantly improve their total household income via non-agricultural income component. Second, land reform measures aimed at consolidating farm operation size will significantly improve total income via agricultural income component. Finally, since tenancy works in favor of the ethnic communities by mainly allowing them to increase farm-operation size to cultivate high income generating betel leaf and/or modern rice crops, tenurial policies aimed at smooth functioning of the land rental market in areas dominated by ethnic population will increase total income through agricultural income component. Effective and targeted implementation of these policies will improve household income, reduce inequality and poverty of the ethnic communities in Bangladesh.

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