Measurement of Poverty in Bangladesh: A Study on Khulna District

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Abstract

The concept of poverty is vague and consequently the best definition of poverty is a matter of considerable academic dispute. Perhaps the only point of general agreement is that people who live in poverty must live in a state of deprivation, a state in which their standard of living falls below some minimum acceptable standard. Definitions of poverty vary, firstly, over the question of how to measure different standards of living. Within poverty research, disposable income is the most commonly used measure of a person's standard of living but this is not without limitations. Secondly, studies of poverty can differ according to the choice of income unit. It seems true that most nuclear families share their income so perhaps it is more appropriate to compare family incomes than individual incomes. People are defined to be in poverty if the equivalent income of their nuclear family falls below a certain threshold. This threshold is the poverty line. Poverty line has been developed and people can be identified as poor or not poor. There is no unique standard used in classifying whether an individual is poor. The choice of poverty indicator and the determination of poverty line are conceptual issues on the measuring poverty. Poverty measurement is essential to implement effective policies to fight against poverty and to evaluate the poverty impacts of policies. The paper is organized as follows: section one examines the introduction, section two focuses on objectives of the study, section three analyzes the methodology of the study, section four discusses the literature review, section five explains the axioms of poverty measurement, section six explain poverty line estimation by CBN method, section seven explore the measurement of poverty and final section explore conclusion.

Key Points: Poverty and poverty line, standard of living, disposable income, threshold, conceptual issues.

I. Introduction: Poverty measures are used first and foremost to monitor social and economic conditions and to provide benchmarks of progress or failure. Here, poverty measures are indicators by which policy results are judged and by which the impact of events (e.g., runaway inflation or the introduction of a government transfer program) can be

weighed. Measures used for monitoring and targeting need to be trusted and require rigorous underpinning. The measures will function well as long as everyone agrees that when poverty numbers rise, conditions have indeed worsened (and conversely, when poverty measures fall, that progress has been made). The first question in judging measures is how well each index reflects basic properties desirable on philosophical grounds.

A second important use for poverty measures is descriptive. Poverty statistics play critical roles in summarizing complex social and economic conditions that inform conversations around economic and social priorities. Economists have sharpened discussions by identifying a set of desirable normative characteristics of poverty measures (often stated mathematically as axioms) around which consensus can be built. The search focuses not on identifying descriptively useful measures in the sense above; instead, the focus is on moral relevance – even if the outcome is a set of measures that yield numbers with little intuitive meaning. Acceptable poverty measures must satisfy a given set of axioms or must have certain characteristics, it is possible to sharply narrow the number of potential candidates for poverty measures. In the most desirable case, a single, unique measure would emerge that would be fully characterized – that is, there would be only one possible candidate that satisfies all of the axioms on which we agree. So far, though, the search has left a long list of possible poverty measures still on the table, and the task for analysts remains to understand the basic properties of the chief contenders.

Focuses on the well-being of the household those are below the poverty line - the changes among better-off people do not affect measured poverty. This axiom rules out measures based on relative notions of poverty, i.e., where poverty is not measured by absolute deprivations relative to a fixed poverty line but instead the poor are identified relative to a shifting statistic like the median income of the whole population.

II. Objectives of the Study: The basic objective of this study is to provide a guide line of measurement of poverty in Bangladesh in the context of Khulna District. For this purpose the specific objectives are :

  i)   To evaluate the past measurement of poverty in Bangladesh;
  ii) To estimate the measurement of poverty at Khulna District in Bangladesh.

III. Sources of Data and Methodology: Poverty is not a new topic in economic development. Considerable research has been performed on the issue of poverty and its long run social and economic effects in developed as well as in developing countries. A large number of studies have also been conducted in Bangladesh on poverty. In the present study an attempt is made to measurement of poverty I Khulna.

Both primary and secondary data are used for the study but emphasis has been given on primary data. Primary data are used to estimate different indicators of poverty. Secondary data have also been used for necessary comparison and comments. Secondary data are collected from Bangladesh Bureau of Statistics monthly and yearly Bulletins; Household Expenditure Survey; Ministry of Food and Agriculture; Database on Food Situation in

Bangladesh; Planning Commission of Bangladesh and various government and Non-government institutions and departments; individual studies and reliable internet sources etc.

Primary data are collected through field investigation. A total sample of 1600 households was selected from Khulna district of Khulna Division. Multistage sampling plan was used to select households. Cluster sampling has two important advantages over Simple Random Sampling and Stratified Sampling. In the first stage, four Upazilas/Thanas were selected from Khulna District, in the second stage, five Ward Councils were selected from Kotawali Upazilas/Thanas, Four Union Councils were selected from Dumuria and Dighalia and three Union Councils were selected from Phultala, in the third stage, 01 village was selected from each union council; and in the fourth stage, 100 households were selected from each village. Thus a total sample of 1600 households was selected from Khulna district. The main data collection techniques used in this study was semi-structured interviews, participant observation, group discussion, documentation analysis and questionnaires. To have a representative sample for poverty estimation and its predictors, it is decided to collect data on households according to various income /expenditure groups, various occupational groups, namely landowners, tenants, wage labour, artisan, businessman, teacher etc. The HIES measures the poverty at division and national levels. No data are available in HIES at Upazilas/Thanas for poverty measurement. So, the study measures the poverty at Khunla Division from the field survey based on above Upazilas/Thanas. The period covered in the study is five successive HIES years i.e., 1991-92, 1995-96, 2000, 2005 and 2010.

The cost of basic needs (CBN) approach will be used to compute the poverty line based on the household expenditure survey data. After determining poverty line(s) expenditure (upper & lower) the study will classify the sample households around this line according to the extent, depth and severity of poverty. The Foster Greer Thorbecke (1984) class of poverty indicators will be used for the measurement of poverty especially in terms of poverty gap and severity of poverty of the sample households.

Algebraically FGT poverty index can be represented as follows:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left\{ \left[\frac{z - y_i}{z} \right] \right\}^\alpha \qquad \dots \dots (i)$$

Where,

z   is the poverty line;

q   is the number of person/households living below the poverty line;

y_i is the expenditure of ith individuals/households;

n   is the size of the survey population;

α is a sensitivity parameter;

α is 0, 1,2 respectively;

α is 0 means incidence of poverty;

α is 1 means poverty gap or depth of poverty;

α is 2 means severity of poverty or squared gap poverty;

▪ If α is 0, then $P_0 = \dfrac{q}{n}$ ……………………….......(ii)

▪ If α is 1, then $P_1 = \dfrac{1}{n}\sum_{i=1}^{q}\left[\dfrac{z-y_i}{z}\right]$ ………………. ..(iii)

▪ If α is 1, then $P_2 = \dfrac{1}{n}\sum_{i=1}^{q}\left[\dfrac{z-y_i}{z}\right]^2$ ……………… ..(iv)

P_0 Indicates the head count ratio; P_1 indicates the 'depth of poverty' or 'poverty gap', which tells us the average shortfall in expenditure per head of a poor household from the poverty line. P_1 is also useful in that it can be used to calculate the minimum cost requirement, per head of population in order to eliminate poverty. If, an anti-poverty scheme 'filled' each household's gap exactly to the point where all poor households reach the poverty line, then this would constitute the minimum cost of eradicating poverty (Ravillion 1995). However, P_1 does not capture income inequalities, which the P_2 (severity of poverty) measure does; P_2 indicates the 'severity of poverty' or 'poverty intensity. P_2 measures allow for an expenditure improvement of a person or household for below the poverty line to be valued more than the same gain for a person just short of the poverty line. Hence, P_2 is an indicator of the 'severity' of poverty and helps us to capture income inequalities. Various techniques were used for analyzing primary data collected from household's survey such as headcount index, poverty gap, squared poverty gap and formulas for measuring poverty. Log linear multiple regression model was used for analyzing the determinants of poverty and identifying the correlates. To assess the various initiatives taken by government and non-government organization to alleviate poverty data were collected. The SPSS version 16.0 was used to analyze the data.

IV. Literature Review: Poverty measurement and analysis is needed to identify the poor, the nature and extent of poverty and its determinants, and to assess the impact of policies and welfare programs on the poor. The last two decades have seen considerable analytical efforts in the poverty related literature, directed toward driving good practices in measuring poverty in all its dimensions and generating the data requirements. A good number of researches were conducted on poverty in Bangladesh and they discussed the different aspects of poverty in Bangladesh. It is hoped that the literature review will help us to gain knowledge regarding various aspects of the past studies conducted on poverty status in Bangladesh. It also familiarizes us with various studies that dealt with the implications of technological change and government policies, and give us information that could be used in formulating the methodology for this study.

Ahmed (2004) discussed the poverty measurement techniques and poverty profile in Bangladesh. The study revealed that the incidence of poverty, the head count ratio of poverty, poverty gap and squared poverty gap were reducing. He found that the distribution of income had become skewed with high concentration of income in the highest deciles and

comparatively lower income share in lowest deciles. He also found that with respect to, as non income indicator, such as infant mortality rate decline, life expectancy increased and enrollment in primary and secondary level increased.

Ahmed *et al* (1991) analyzed the measurement and decomposition of poverty by using Foster Geer Thorebecke measurement. They estimated the levels of poverty in rural and urban areas in Bangladesh. They investigated in the context of Bangladesh, the most powerful effect of poverty in terms of a shortfall in food for daily calorie intake by the poor. It provided inter temporal comparison of poverty and its decomposition among subgroups. The results revealed a significant improvement in poverty situations in rural areas from 1982 to 1986.

Morduch (1994) constructed theoretically appealing measures of poverty. The most widely used measures of poverty remain the headcount index and the income gap index. There were good reasons that the two measures were seen unrivaled popularity. He found that the fraction of the population which is below the poverty line was headcount and the sum of money required to completely eliminate poverty through a perfectly-targeted transfer program was income gap. The measure was also decomposable as the weighted sum of poverty indices of population sub-samples. The index was shown to satisfy the most important normative axioms considered in the literature.

Ravallion (1990) analyzed the arithmetic of poverty in Bangladesh was challenging from a number of perspectives. He restricted attention to a narrow definition of "poverty", whereby a person is judged to be poor if he or she resides in a household whose income does not permit attainment of a pre-determined consumption bundle, as judged necessary for the fulfillment of certain basic consumption needs, most importantly adequate nutrition. He found the narrow definition of poverty used here probably does capture much of what does matter to individual living standards in Bangladesh - most importantly the adequacy of household food entitlements - and it is at least a tractable definition for empirical analysis.

Shaohua *et al* (2007) estimated measures of absolute poverty for the developing world over 1981- 2004. They found that the poverty trend declined in the percentage of people who were absolutely poor was evident, with uneven progress across regions. They also found more mixed success in reducing the total number of the poor. Indeed, the developing world outside China has seen little or no sustained progress in reducing the number of the poor, with rising poverty counts in some regions, notably Sub-Saharan Africa. There were encouraging signs of progress in reducing the incidence of poverty in all regions after 2000, although it was too early to say if this was a new trend.

V. Axioms of Poverty Measurement: There are a large number of theoretical literatures on the measurement of poverty, establishing a number of desirable properties for such measures. Most researchers agree that a list of these desirable properties of a poverty index include the monotonicity, transfer and subgroup consistency axioms.

i) Monotonicity Axiom : Other things remaining the same, a reduction in the income of any household below the poverty line must increase the poverty measures.

ii) Transfer Axiom : Other things are remaining the same, a pure transfer of income from a poorer household below the poverty line to a richer household still below the poverty line must increase the poverty measure. In other words, any increase in the inequality among the poor due to a pure transfer must be reflected as an increase in the poverty line

iii) Subgroup Consistency Axiom : Other things remaining the same, the overall level of poverty must decrease whenever poverty falls within some subgroup of population while it remains unchanged outside that group. This is sometimes referred to as the property of additive decomposability into population subgroups.

VI. Poverty Line Estimation by Cost of Basic Needs Method: Recently, the Bangladesh Bureau of Statistics (BBS) has adopted the cost of basic needs method for measuring poverty line. Poverty lines were estimated using the cost of basic needs (CBN) method, whereby any household with per capita expenditure below a given poverty line is considered as poor. With the CBN method, poverty lines represent the level of per capita expenditure at which the members of a household can be expected to meet their basic needs (comprised of food and non-food consumption). Making comparisons of poverty rates over time requires that CBN poverty lines in different years are of constant value in real terms. In order to ensure this, CBN poverty lines were first estimated for a new base year 2005, and then matched to 2000 for changes in the cost of living using a price index. As prices of some goods and services may vary between geographical areas in Bangladesh, poverty lines were estimated at a disaggregated level. Specifically, the country was divided into 16 different geographical areas (10 urban and 6 rural) or strata in the 2005 survey. Poverty lines were re-estimated using Household Income and Expenditure Survey (HIES − 2005) because the previous poverty lines (estimated using Household Expenditure Survey HES - 1991-92) are somewhat outdated and HIES 2005 used a new sampling frame that better reflects the current economic and demographic circumstances.

Three steps were followed for estimating what it costs a household to meet its basic needs. First, the cost of a fixed food bundle was estimated. The bundle consists of eleven food items; rice, wheat, pulses, milk, oil, meat, fish, potato, other vegetables, sugar and fruits, as recommended by Ravallion and Sen (1996), based on Alamgir (1974). It provides minimal nutritional requirements corresponding to 2,122 kcal per day per persons − the same threshold used to identify the absolute poor with the direct calorie intake method. The price for each item in the bundle was estimated as the mean of unit values (price per unit) of the item reported by a reference group of households, calculated separately for each of the four Upazilas.

The food poverty line was computed by multiplying the prices with the quantities in the food bundle. The second step is to compute two non-food items, i.e., clothing, shelter and utilities and calculate their allowances for consumption.

The first was obtained by taking the median amount spent for non-food items by a group of households whose per capita total expenditure is close to the food poverty line, which is called the "lower non-food allowance". The second was obtained by taking the median amount spent for non-food items by group of household whose per capita food expenditure is close to the food poverty line, which is called the "upper non-food allowance". The third step consisted simply of adding to the food poverty lines the lower and upper non-food allowances to yield the total lower and upper poverty lines. In this method two poverty lines are estimated, i.e., lower poverty line and upper poverty line. For lower poverty line which corresponds to the extreme poor are those households whose total expenditures on food and nonfood combined are equal to or less than the food poverty line. Upper poverty line which corresponds to the moderate poor is those households whose food expenditures is at the level of food poverty line.

Table-6.1.1 : Poverty Lines by CBN method of Khulna Division per person per month (Tk.)

Poverty Lines	Khulna	Rural	Urban
Lower Poverty Line	1641.50	1342.50	1591.50
Upper Poverty Line	1911.60	1581.00	1946.70

Source : Field Survey

The table 6.1.2, 6.1.3 and 6.1.4 represent the calculation of poverty line by CBN in details are given below:

Table-6.1.2 : Calculation of Poverty Line by CBN Method of Khulna (Aggregate Level) – Upper and Lower Poverty Line

Food Items	Calories (K. Cal.)	Quantity per capita per day (gms.)	Price Per Kg (in Tk.)	Cost of required amount (Food expenditure per day)
Rice (Coarse)	1389	397	32	12.70
Wheat	136	40	32	1.28
Pulses (Masur)	136	40	100	4.00
Milk (Cow)	36	58	45	2.61
Oil (Soyabin)	180	20	110	2.20
Meat (Beef)	14	12	250	3.00
Potato	24	27	16	0.432
Vegetables (Leafy and Non-leafy)	65	150	25	0.375
Fish (Fresh Water)	66	48	200	9.6
Sugar (Gur)	66	20	56	1.12
Fruits (Banana)	10	20	35	0.70
Total	2122	832	---	38.02
Upper Non-food Allowances				25.70
Lower Non-food Allowances				16.70
Upper Poverty Line /person/day				63.72
Upper Poverty Line /person/month				1911.60

| Lower Poverty Line /person/day | 54.716 |
| Lower Poverty Line /person/month | 1641.50 |

Source : Field Survey

Table -6.1.3 : Calculation of Poverty Line by CBN Method of Khulna (Urban) – Upper and Lower Poverty Line

Food Items	Calories (K. Cal.)	Quantity per capita per day (gms.)	Price Per Kg (in Tk.)	Cost of required amount (Food expenditure per day)
Rice(Coarse)	1389	397	35	13.89
Wheat	136	40	34	1.36
Pulses (Masur)	136	40	110	4.40
Milk (Cow)	36	58	48	2.78
Oil (Soyabin)	180	20	115	2.30
Meat (Beef)	14	12	260	3.12
Potato	24	27	18	0.486
Vegetables (Leafy and Non-leafy)	65	150	30	0.450
Fish (Fresh Water)	66	48	220	10.56
Sugar (Gur)	66	20	60	1.20
Fruits (Banana)	10	20	40	0.80
Total	2122	832	-----	41.35
Upper Non-food Allowances				23.54
Lower Non-food Allowances				11.70
Upper Poverty Line /person/day				64.89
Upper Poverty Line /person/month				1946.70
Lower Poverty Line /person/day				53.05
Lower Poverty Line /person/month				1591.50

Source : Field Survey

The above and after tables indicate the poverty lines by CBN method based on field survey and illustrate the goods used, price used to cost the various items and the prices were derived from the independent survey carried out in Khulna Division between January 2013 to June 2013 and the poverty line expenditure per month per head. The expenditure required on food bundle to cross the absolute poverty line on a calorific threshold of 2122 K. calories per person per day has been calculated Tk. 38.02 and hard core poverty based on threshold of 1805 K. calories is Tk. 32.34. So, the absolute poverty expenditure on food (2122 K. cal.) is calculated taka 38.02 per person per day and hard core poverty line expenditure (1805 K. cal.) is taka 32.34 per person per day.

Table-6.1.4 : Calculation of Poverty Line by CBN Method of Khulna (Rural) – Upper and Lower Poverty Line

Food Items	Calories (K. Cal.)	Quantity per capita per day (gms.)	Price Per Kg (in Tk.)	Cost of required amount (Food expenditure per day)

Rice (Coarse)	1389	397	30	11.91
Wheat	136	40	30	1.20
Pulses (Masur)	136	40	90	3.60
Milk (Cow)	36	58	40	2.32
Oil (Soyabin)	180	20	100	2.00
Meat (Beef)	14	12	220	2.64
Potato	24	27	15	0.405
Vegetables (Leafy and Non-leafy)	65	150	20	0.30
Fish (Fresh Water)	66	48	180	8.64
Sugar (Gur)	66	20	52	1.04
Fruits (Banana)	10	20	30	0.60
Total	2122	832	----	34.65
Upper Non-food Allowances				18.05
Lower Non-food Allowances				10.10
Upper Poverty Line /person/day				52.70
Upper Poverty Line /person/month				1581.00
Lower Poverty Line /person/day				44.75
Lower Poverty Line /person/month				1342.50

Source : Field Survey

VII   Poverty Measurement: In poverty measurement, there is a basic distinction between ad hoc measures and axiomatic measures. The first set of measures, widely used until the axiomatic approach was developed by Sen, 1976, lacks a theoretical derivation. Whereas, the second set of measures is explicitly based on a set of desirable properties that a poverty index should respect (axioms).

7.1 Ad Hoc Poverty Measure:

The ad hoc poverty measure is belonging two categories. These are:

  i) The head-count ratio (HC);
  ii) The poverty gap (PG).

i) The head-count ratio (HC) : The headcount ratio (HC) is the simplest way of measuring poverty. It gives the percentage of population which is not above the poverty line. It can be formally defined as follows :

$$H = \frac{q}{n} - - - - - - - - - - - (1)$$

Where, q is the number of poor people (those below a poverty line z) and n is total population.

It is worth noting that HC is directly related to the Cumulative Distribution Function (CDF) F(y). The latter, by definition, gives the percentage of population below a given income level. At income level z, the corresponding value of the CDF illustrates the percentage of the poor population, i.e. HC = F(z).

ii) Poverty Gap (PG) : For any individual, the poverty gap may be defined as the distance between the poverty line z and his/her own expenditure y. Aggregating individual poverty gaps for all poor individuals, gives the aggregate poverty gap :

$$PG = \sum_{i=1}^{q} (z - y_i) ------------- (2)$$

Where, q is the number of poor individuals (and not the size of total population). A refined version of the poverty gap normalizes expression [2] over the maximum amount of money that would be needed to wipe out poverty. This last amount is given by the product between the number of poor individual's q and the poverty line z. The intuition is simple. As z represents the minimum individual expenditure for which an individual is not considered poor, the product of this expenditure with the number of poor individual's q gives the amount of money that is necessary to eradicate poverty.

According to this definition, we have a normalized version of the poverty gap:

$$PG = \sum_{i=1}^{q} \left(\frac{z - y_i}{q_z} \right) -------------- (3)$$

In turn, expression [3] may be restated in another way. As P and z are constants under the summation sign, we can rewrite:

$$PG = \sum_{i=1}^{q} \left(\frac{z - y_i}{q_z} \right) = \frac{q_z}{q_z} - \frac{y_q}{q_z} = 1 - \frac{\bar{y}_q}{z} ------------ (4)$$

Where, y_q is the total expenditure of poor individuals, while, $\bar{y}_q$ is the mean expenditure of the poor. Expression [4] may be defined as the percentage of average expenditure of the poor that falls short of the poverty line.

7.2 FGT Class of Poverty Measures: There has been much interest in the class of poverty measures proposed by Foster, Greer and Thorbecke (1984), which will be referred to as the FGT index, which is like to the Sen's index that was a weighted sum of the individual poverty gaps. The difference between the Sen (1976) and FGT (1984) measures are that Sen used rank weights which were determined by the number of household between a given poor household and the poverty line. The FGT index, on the other hand, used the actual proportionate expenditure shortfall of a poor household, raised to the power of parameter α, which satisfy the axioms of poverty measurement. The parameter α indicates the importance given to the poorest of the poor – the larger the α, the greater is the emphasis given to the poorest families. Each member of the FGT class poverty measures is indentified by the values of the parameter α. The formula is given by:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{(z - y_i)}{z} \right]^\alpha$$

Where y_i is expenditure of ith individuals/ households, z is poverty line, n is total number of people/households , q is number of poor households those with incomes at or below z, $(z - y_i)$ is the poverty gap, $\left[\frac{(z-y_i)}{z}\right]$= poverty gap ratio and α.≥0 is a measure of poverty aversion. Three members of the FGT class will be considered in this study:

The FGT poverty measure for α.= 0, which is simply the head count index. This gives the proportion of the population which lives below the poverty line: $P_0 = \frac{q}{n}$. While this is the most commonly used poverty measure, it lacks two desirable properties. A poor person may become poorer without an increase in the measure of poverty, violating the monotonicity axiom. Also, an income transfer from a poorer person below the poverty line to a richer person will not change the poverty measure, violating the transfer axiom. The poverty measure for α.=1, referred to as the average poverty gap in the population expressed as a proportion of the poverty line . This is given by:

$$p_{1=}\frac{1}{n}\sum_{i=1}^{q}\frac{z-y_i}{z}$$

The poverty gap is a useful statistic to assess how many resources would be needed to bring every unit below the poverty line up to the poverty line perfectly targeted to the poor. Also, it satisfies the monotonicity axiom because it is sensitive to the depth of poverty. However, since the poverty deficits are given equal weights, it is not sensitive to the distribution of living standards among the poor, thus violating the transfer axiom. The poverty measure for α=2, is often described as a measure of the severity of poverty, based on the sum of the squared poverty gap. While the poverty gap takes into account the distance separating the poor from the poverty line, the squared poverty gap takes the square of that distance into account. In squared poverty gap, the poverty gap is weighted by itself, so as to give more weight to the very poor. In other words, the squared poverty gap takes into account the inequality among the poor. It satisfies the main axioms for a desirable poverty measure. It is obtained as follows :

$$P_2 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(z-y_i)}{z}\right]^2$$

This index is sensitive to both the depth of poverty and the distribution of living standards among the poor, satisfying both monotonicity and transfer axioms. The table 7.4.2(a) illustrates the calculation of poverty measures in 2013 by using the HIES data based on the base year 1995-96.

Table-7.2 (a) : Calculation of Poverty Incidence, Poverty Gap Index and Squared Poverty Gap Index by FGT Class of Poverty Measures (Khulna Division) in 2013 by using HIES data (in percent).

	Head Count Ratio (P_0)	Poverty Gap Index (P_1)	Squared Poverty Gap Index (P_2)

	K	R	U	K	R	U	K	R	U
Using the Lower Poverty Line	13.28	5.82	4.27	0.50	0.50	0.40	0.74	0.74	0.64
Using the Upper Poverty Line	30.95	9.82	4.68	0.07	0.79	0.94	0.88	0.79	0.10

Source : HIES (According to the annual rate - base year 1995-96)

K = Khulna; R = Rural; U = Urban

The table 7.4.2(b) illustrates the calculation of poverty measures by using the field survey data in 2013.

Table-7.2 (b) : Calculation of Poverty Incidence, Poverty Gap Index and Squared Poverty Gap Index by FGT Class of Poverty Measures (Khulna Division) in 2013 by using field survey data(in percent).

	Head Count Ratio (P_0)			Poverty Gap Index (P_1)			Squared Poverty Gap Index (P_2)		
	K	R	U	K	R	U	K	R	U
Using the Lower Poverty Line	16.50	8.70	7.38	0.68	0.03	0.00	0.63	0.48	0.46
Using the Upper Poverty Line	33.56	6.10	2.89	0.15	0.61	0.90	0.01	0.81	0.24

Source : Field survey

K = Khulna; R = Rural; U = Urban

During the field survey, a total number of 1600 respondents were interviewed; out of which we found 537 respondents are living below the upper poverty line and 272 respondents are living below the lower poverty line. So, irrespective of the category, the headcount ratio at aggregate level (rural and urban) is 33.56per cent, i.e., about 34 per cent people are living under absolute poverty, and about 17 per cent people are in extreme poverty. The poverty gap is 8.15 which mean that the average income gaps between the poor households' standards of living and the poverty line is 8.15. This also means that in aggregate, the required income to eradicate poverty is 8.15 per cent of the poverty line times the number of poor individuals. Alternatively, it means that the average income of the poor is only 92 per cent of the poverty line (1- .0815). The depth of poverty is higher in urban areas compare to rural areas. The squared poverty gap index or the severity of poverty of Khulna is estimated at 2.01 per cent, implying that there is 2.01per cent inequality among the poor. The survey data shows that the degree of inequality amongst the poor themselves is also higher in urban compare to rural areas. Survey result shows more poverty in field survey than official data. By using the upper poverty line the gap between the official and field survey data are 2.61, 3.07 and 1.42 in headcount calculation at Khulna, rural and urban respectively.

VIII. Conclusion: CBN approach and FGT measures have been employed to set the poverty line and compute the magnitude of poverty in Bangladesh. Accordingly, the lower poverty line was found Tk.1641.50 per person per month and the upper poverty line was Tk. 1911.60 per person per month. The incidence, depth and severity of poverty stood at 33.56, 81.5 and 2.01 percent. The multi-dimensional poverty index is 0.35. The study clearly indicates that the magnitude of poverty in Khulna exceeds the corresponding household survey. A log linear multiple regression model has been employed so as to identify determinants of poverty in Bangladesh. The dependent variable, households' welfare was regressed against seven explanatory variables. The coefficients for household size, dependency ratio, have positive effect on poverty and educational attainment of the household head, land holdings status; number of earners, value of physical assets, and occupation of the household head were found significant negative effect on poverty. In poverty measurement, there is a basic distinction between ad hoc measures and axiomatic measures. The first set of measures, widely used until the axiomatic approach was developed by Sen, 1976, lacks a theoretical derivation. Whereas, the second set of measures is explicitly based on a set of desirable properties that a poverty index should respect (axioms).

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