A Study on Socio-Economic Conditions of Bodo Community in Chirang District, BTAD (Assam): Human Capability and Human Development Approach

Abstract

By.
Rahin Chandra Das
(PH.D. REGISTRATION NO. FINAL/06ECO0013 of 2013-2014)

Introduction:

Instead of a single definition, socio-economic status is viewed in heterogeneous ways by the researchers. For example, it refers to a relative socio-economic position of the people in terms of income, education and occupation; people's hierarchical social standing; relative socio-economic advantage and disadvantage of the people in terms of their accessibility of material and social resources; people's ability to participate in the society, etc.

The socio-economic status of any community reflects a separate identity or position of that community. On the other hand, the socio-economic status of any community is reflected in many socio-economic variables that determine the educational status, health status and living conditions of the community.

In India, the occupational based classifications of family heads done by the British Registrar General are considered as socio-economic studies before 1960. The family heads were classified according to their occupation like professional, managerial, technical, skilled and unskilled. Similarly, B. G. Prasad classified Indian families based on per-capita monthly income in 1961 which was modified in 1968 and 1970. Kuppuswami introduced the socio-economic scale in 1976 and since then it has been using extensively to measure individual socio-economic status in urban areas. Udai Pareekh introduced nine socio-economic characteristics to study the socio-economic status of rural areas. At present, as an index of socio-economic status, researchers have estimated area basis and community basis Socio-Economic Index (SEI) based on socio-economic variables. Principal Component Analysis

(PCA) is a statistical technique for data reduction which has been using commonly by researchers to estimate SEI.

All the socio-economic and demographic variables are incorporated with overall development or human development. Hence, the overall development or human development of any community should be verified with socio-economic status as well as deprivation of that community. This helps us to identify more specific factors responsible for poor socio-economic status and deprivation of any community. Human Development Index (HDI) is a measure of human development and the Multidimensional Poverty Index (MPI) is a measure of multidimensional deprivation. Both the HDI and MPI are some of the applications of the famous capability approach which was funded by Nobel laurite Prof. A. K. Sen.

The Bodo is the largest ethnic group among all the ethnic groups of Assam belongs to Indo-Mongoloid ethnic group of the Tibeto-Burman language family. At present, Bodos belong to the scheduled tribes of India. Bodos are 4.37% of the total state population but they are 35.06% of all tribal population of Assam (Census 2011).

As the first settler of the entire Brahmaputra Valley, Bodos had their king in the long past but they don't have even kingship today. At present, the majority of Bodo people are living in the east-west long strips under the foothills of Himalaya located northern part of the state Assam in North-East India. Bodoland Territorial Area Districts (BTAD) was created in 2003 as the Bodoland Territorial Council (BTC) consisting of four districts namely-Kokrajhar, Chirang, Baksa and Udalguri. Kokrajhar is the largest district (329659 sq. km.) followed by Baksa (2457 sq. km.) and Udalguri (2012 sq. km.). Chirang is the smallest district with 1923 sq. km. geographical area. According to Census 2011, the highest percentage of the Bodo population is found in Baksa (32.05%) followed by Kokrajhar (25.01%) and Udalguri (24.29%). But, as the percentage of district population Bodos are 34.82 percent in Chirang district which is the highest relative to that of other districts in BTAD. Bodos are 30.36 percent of the district population in Baksa district followed by Udalguri (26.28%) and Kokrajhar (25.37%). Similarly, the percentage of Bodos out of the total ST population is the highest in Chirang (93.96%) followed by Baksa

(87.13%), Udalguri (81.75%) and Kokrajhar (80.76%). Thus, Bodos have the highest majority in terms of district population as well as district ST population in Chirang district relative to other districts in BTAD.

Statement of the Problem:

Indigenous tribes have been contributing culture, heritage and linguistic diversity to the nations. Their traditional knowledge and strong connection with land and nature have been evolving the prospects of economic development. “Despite these achievements, indigenous people have to confront and overcome histories of discriminations, loss and dispossession.” (OECD, 2019 pp.4). They are living in economically backward region.

In Assam, the Bodo is the largest ethnic tribe. According to Census 2011, Bodos are 4.37% of the state population but they are 35.06% of all tribal population of Assam. At present, the majority of Bodo people are living in the east-west long strips under the foothills of Himalaya located northern part of the state Assam where Bodoland Territorial Area Districts (BTAD) was created in 2003 consisting of four districts namely-Kokrajhar, Chirang, Baksa and Udalguri. Now, BTAD is known as Bodoland Territorial Region (BTR). In Chirang district, Bodos are the highest as the percentages of district population (34.82%) as well as the district ST population (93.96%) among all BTAD districts (Census 2011).

Geographically, Chirang district is located in a backward region. Its north side is completely bounded by the Indo-Bhutan boarder. Three main rivers of lower Assam Champamati, Aie and Manas flow through this district and joined Brahmaputra river. The road communication is very poor. In this district, 92.67 percent people are living in the rural area. The rural areas of the Chirang district cover 99.37 percent geographical area of the district (Total area = 1923 sq km, Rural area = 1910.94 sq km and Urban area = 12.06 sq km.) (Table 1.3). Moreover, 98.73% of Bodo people live in rural area in Chirang district (Census, 2011).

Among the four districts of BTAD, Chirang district has the lowest percentage of households accessing electricity (72.0%), safe drinking water (70.8%) and sanitary facility (32.6%) (NFHS-4, 2015-16). This district is highly affected by the crime

because the crime rate per-lakh population is 209.27 which is the highest among BTAD districts (SHB Govt. of Assam, 2019).

According to Census 2011, Chirang district has the lowest literacy rate (63.55%), but it has the highest Lower Primary schools per-lakh population (174) as well as the highest transition rate (87%) from lower primary to upper primary level among all districts of BTAD. Moreover, the school dropped out ratio is recorded in Chirang district as 17.2 percent in lower primary level and 7.5 percent in upper primary level and those are the lowest among the BTAD districts. The Chirang district has the lowest literacy rate though it has the highest number of lower primary school per-lakh population. It means that some sections of the population are out of schooling in Chirang district.

This sort of information indicates that most of the Bodo people in Chirang district were living in rural areas with limited infrastructures; those may be called as back-pushing forces behind this study. This is the first study in the study area which considers three attempts at a time namely studies on socio-economic status, human development and deprivation of Bodo people in Chirang district.

Objectives:

The general objective of this study is to study the socio-economic status of the Bodo people in Chirang district subject to the following specific objectives.

(i) To calculate the Socio-Economic Index (SEI) of the Bodo households in Chirang District.

(ii) To estimate the Human Development Index (HDI) of Bodo people of the study area.

(iii) To measure the Multidimensional Poverty Index (MPI) to study the capability deprivation of Bodo people in the study area.

Hypothesis:

The following two hypotheses were tested to obtain the main objectives of this study.

(i) The Bodo community in the Chirang district of Assam has poor socio-economic status.

(ii) Bodos have poor Human Development Index in Chirang district relative to other communities of the district

The thesis has been organized into eight chapters. They are, (i) Introduction, (ii) Review of Literature, (iii) Methodology and Data Collection, (iv) District Wise Variation in the Socio-Economic Status and Human Development in Assam, (v) Socio-Economic Status of Bodo Households in Chirang District, (vi) Human Development of Bodos in Chirang District of Assam, (vii) Capability Deprivation of the Bodo Households in Chirang District and (viii) Summary of the Findings, Conclusion and Recommendation.

Review of Literature:

An extensive literature was surveyed related to socio-economic status, Bodo communities and socio-economic studies, human development index and multidimensional poverty index.

Methodology:

The Socio-Economic Status of Bodo people in the Chirang district were calculated based on primary data. In the case of districts of Assam, Inter-district variations in terms of socio-economic status and human development were studied based on secondary information.

To study the socio-economic status of Bodo households in Chirang district, 430 sample Bodo households were selected with the multistage sampling method. At first, 252 Bodo majority villages and two towns were purposively selected. The 252 villages were divided into two groups- 153 nearer villages that are located within 20km range of their nearest towns and 99 farthest villages that are located beyond

20km away from their nearest towns. Secondly, 38 sample villages were selected in such a way that 23 nearer villages out of 153 nearer villages and 15 farthest villages were selected randomly out of 99 farthest villages. Thirdly, 254 sample households from 23 nearer villages, 144 sample households from 15 farthest villages and 32 households from 2 towns were selected proportionately at random considering the percentage of ST population as the weightage for the selection of the sample households of a sample village. Ultimately, 398 sample households from 38 sample villages (23 nearer villages and 15 farthest villages) and 32 sample households from 2 sample towns sum up to 430 sample households.

Inter-district variations of the socio-economic variables and human development among the districts of Assam were studied comparing secondary data available at the district level. Depending on the availability and accessibility of data at the district level, we consider nine demographic variables namely the area of the district, population, growth rate of population, density of population, rural-urban population, life expectancy rate and infant mortality rate, ten social variables namely literacy rate, school dropped out rate, transition rate from lower primary to upper primary level, households accessing electricity, safe drinking water, sanitary latrine, clean fuel and pucca house, crime rate and road length per-lakh population and one economic variable per-capita income.

The inter-district variations of socio-economic status were studied by calculating district level Socio-Economic Index (SEI) applying the methodology of Principal Component Analysis (PCA) by selecting 11 social, economic and demographic variables. They are DP = Density of Population, PUP = Percentage of Urban Population, LR = Literacy Rate, HAEL = Households Accessing Electricity for Lighting, HASDW = Households Accessing Safe Drinking Water, HAISF = Households Accessing Improved Sanitary Facility, HACFC = Households Accessing Clean Fuel for Cooking, HAPH = Households Accessing Pucca House, CR = Crime Rate per-lakh population, RL = Road Length per-lakh population at district level and PCI = Per-Capita Income

Similarly, the socio-economic statuses of 430 sample Bodo households were studied by estimating Household Socio-Economic Index (HSEI) using the PCA

methodology by selecting five variables. Out of the five variables, two social variables, two demographic variables and one economic variable were selected. Two social variables are namely household literacy status and distance between a sample village and its nearest town, two demographic variables are namely household family size and household family member of the age group of 15-59 years and one economic variable is annual per-head household income. Village wise SEI was calculated by averaging HSEI scores.

According to Alkire and Foster (2007, 2011a), a household is not literate if no family member has completed five years of schooling on the assumption that the benefits of any literate member are enjoyed equally by all household members. Therefore, a Bodo household is considered as not literate if the entire family members have not completed schooling up to Class-V. This variable is considered on the assumption that a literate household gains better socio-economic status than an illiterate household. Here, we assign 0 for a household if no household member has completed five years of schooling up to Class-V and 1 otherwise. Therefore,

LITERATE (Literacy Status) = 0 if all family members have not completed five years of schooling up to Class-V.

= 1 if at least one family member has completed schooling up to the Class-V.

Another social variable is the distance (DISTANCE) stands for roadway distance between a village and its nearest town assuming that a village located nearby a town gains better infrastructural facilities with better socio-economic status than that of a village located farthest away from its nearest town. The Chirang district is located at the foothills of the Himalaya nearby the international border of neighbouring county Bhutan and it has lots of forest villages, many rivers and tributaries. Considering geographical features and observing road and communication and other facilities at the time of field survey in Chirang district, the roadway distance of 20 km of a village to its nearest town is the maximum limit beyond which a village may be assumed as a farthest village. Therefore, a household is said to be nearer to the nearby town if its village is located within 20 km roadway

distance from its nearest town. We assign 0 as a dummy for a nearer village and 1 otherwise.

DISTANCE (Distance) = 0, if the village is nearer to town

= 1, otherwise.

Number of indices have been devised by the researchers over the years like Duncan's Socio-Economic Index, Townsend's index, Living Conditions Index developed by the Social and Cultural Planning Office of the Netherlands, etc. (Boelhouwer & Stoop, 1999). This study has adopted the methodology of calculating Socio-Economic Index (SEI) using the technique of Principal Components Analysis (PCA) and which was developed and used for constructing area-based as well as a community-based socio-economic index by various researchers and scholars. The PCA approach to measuring socio-economic index has been using frequently by researchers in socio-economic research (Fotso & Kuatedefo, 2005; Rygel, O'Sullivan, & Yarnal, 2006; Vyas & Kumaranayake, 2006; Antony & Rao, 2007; Fukuda, Nakamura, & Takano, 2007; Havard, et al., 2008; Messer, et al., 2008; Krishnan,2010; Maity, Haobijam and Sen, 2014; Kachari, 2015). The methodology for calculating the socio-economic index applied for this study is based on the methodologies particularly adopted by Vyas & Kumaranayake (2006), Maity, Haobijam and Sen (2014) and Kachari (2015).

Principal Component Analysis (PCA) is a useful technique for transforming a large number of correlated variables into a smaller set of uncorrelated (orthogonal) factors called principal components. The principal components account for much of the variance among the set of original variables. Each component is a linear weighted combination of the initial variables. The components are ordered so that the first component accounts for the largest possible amount of variation in the original variables. The second component is completely uncorrelated with the first component and accounts for the maximum variation that is not accounted for in the first. The third accounts for the maximum that the first and the second not accounted for and so on. In general, the factor analysis encompasses both the techniques PCA and principal factors analyses. In most cases, these two methods yield similar results.

However, PCA is preferred for data reduction while principal factor analysis is preferred for detecting the structure of the data set. The PCA is an approximation to principal factor analysis when components are rotated. The matrix of the scores of principal components is called the Rotated Component Matrix.

Before going to factor analysis, it is necessary to carry some statistical tests for the verification of appropriateness of the data set. Otherwise, the factor analyses on findings may become misleading. First of all, there may have some extreme values in the data set called outliers which affect the normalcy of the data set. Different statistical tools like histogram, normal Q-Q plot, box-plot and 5 percent trimmed mean are applied to detect the outliers present in the distribution of a data set.

The multicollinearity problem arises when there are strong correlations among the variables. Multicollinearity may increase the standard error of factor loadings causing less reliability. Multicollinearity problems may be reduced by either combining collinear variables or doing eliminate them. Some researchers use factor analysis if the variables show multicollinearity and some others forgo factor analysis altogether. But, the Kaiser-Meyer-Olkin (KMO) is a Measure of Sampling Adequacy (MSA) which helps us to handle multicollinearity problems so that the appropriateness of the data set for carrying out a factor analysis can be detected. More specifically, sampling adequacy predicts if data are likely to factor well, based on correlations and partial correlations. The KMO measure compares the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. The formula for the KMO test is as given below,

$$KMO = \frac{\sum_{i=1}^{p} \sum_{\substack{j=1 \\ i \neq j}}^{p} r_{ij}^2}{\sum_{i=1}^{p} \sum_{\substack{j=1 \\ i \neq j}}^{p} \rho_{ij}^2 + \sum_{i=1}^{p} \sum_{\substack{j=1 \\ i \neq j}}^{p} r_{ij}^2} \qquad (1)$$

Where,

$$\rho_{ij} = \frac{R_{ij}}{\sqrt{R_{ii} \cdot R_{jj}}} \text{ and } r_{ij} = R(X_i, X_j)$$

Here, ρ_{ij} stands for partial correlation coefficient and r_{ij} stands for the Pearson correlation coefficient.

KMO test assumes that lower the partial correlation coefficients compared to total correlation coefficients indicate more sampling adequacy. The KMO measure ranges from 0.00 to 1.00. Therefore, the higher the value of the KMO test indicates that the data is more adequate for factor analysis. It suggests six ranges of values for deciding sampling adequacy. It suggests that the value lies 0.00 to 0.49 indicates unacceptable, 0.50 to 0.59 indicates miserable, 0.60 to 0.69 indicates mediocre, 0.70 to 0.79 indicates middling, 0.80 to 0.89 indicates meritorious and 0.90 to 1.00 indicates marvellous (Antony & Rao, 2007; Planning Commission, 1993).

Bertlett's (1954) Test of Sphericity is a test for determining the strength of the relationship among variables. This test was done taking the null hypothesis that the population correlation matrix was an identity matrix or the variables are uncorrelated in the population correlation matrix. According to Bartlett's test of sphericity, a small value of significance level less than 0.05 rejects the null hypothesis at a 5 percent level of significance.

The basic principle of PCA is to extract a set of new uncorrelated variables (principal component) Z_i (i=1, 2, ……,k) as the linear combinations of original variables X_j (j=1, 2, ……,k). Here, a new variable Z_i (i=1, 2, ……,k), is known as i^{th} Principal Component and it is given by the linear combinations of X_j's as given in equation 3.2.

$$\left.\begin{aligned} Z_1 &= b_{11}X_1 + b_{12}X_2 + b_{13}X_3 + \ldots\ldots\ldots\ldots + b_{1k}X_k \\ Z_2 &= b_{21}X_1 + b_{22}X_2 + b_{23}X_3 + \ldots\ldots\ldots\ldots + b_{2k}X_k \\ &\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ &\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ Z_k &= b_{k1}X_1 + b_{k2}X_2 + b_{k3}X_3 + \ldots\ldots\ldots\ldots + b_{kk}X_k \end{aligned}\right\} \qquad (2)$$

This method is applied mostly by standardizing the variables using the formula defined by equation.

$$Z = \frac{X - \text{Mean}}{\text{Standard Deviation}} \qquad (3)$$

Where, the 'b_{ij}' s are called the factor loadings. The b_{ij}s are determined in such a way so that

a) Principal components are uncorrelated, that is, orthogonal, and
b) The first principal component has the maximum variance followed by the second, third and so on.

Keiser's criterion indicates that we should consider only those Principal Components for whom the eigenvalues or latent roots are greater than one. The Principal Components so extracted or retained are then rotated from their beginning position to enhance the interpretability of the factors. Communality or h^2 value shows how much of each variable is accounted for by the factors retained in PCA. A high communality value means that not much of the variables are left over after whatever the factors represent is taken into consideration. So,

h^2 of the i^{th}, variable = (i^{th} factor loading of 1^{st} factor)^2 +(i^{th} factor loading of 2^{nd} factor)^2 + …… (4)

The amount of variance explained by each principal factor is equal to the corresponding root. Factor scores (f_{jk}) are obtained by regressing the variables on factor loadings. f_{jk} measures the position of the j^{th} Bodo household with others concerning the k^{th} factor (Singh and Das, 2013).

To compute the Household Socio-Economic Index (HSEI), the factor scores and the corresponding weights are used. The formula for calculating the $HSEI_j$ of j^{th} household is,

$$HSEIj = \sum w_{kj} f_{jk} \text{ for all j = 1, 2, ……, k} \quad (5)$$

Where,

$HSEI_j$ = Household-level Socio-economic Index of j^{th} Bodo household

w_{kj} = the percentage of the variation of the k^{th} factor

f_{jk} = factor score of the k^{th} factor.

This index measures the socio-economic status of one Bodo household relative to the other on a linear scale. The value of the index can be positive or negative, making it difficult to interpret. Therefore, a non-standardised household socio-economic index (NSHSEI) is standardized to a scale of 0-100 using the following formula,

$$\mathrm{SHSEI_i} = \frac{\mathrm{NSHSEI_i - MinNSHSEI}}{\mathrm{MaxNSHSEI - MinNSHSEI}} * 100 \qquad (6)$$

Where,

$SHSEI_i$ = standardized household socio-economic index for i^{th} Bodo household

$NSHSEI_i$ = non-standardised household socio-economic index for i^{th} Bodo household

MinNSHSEI = minimum value among the non-standardized socio-economic index of the Bodo households

MaxNSHSEI = maximum value among the non-standardized socio-economic index of the Bodo households

The Village Socio-Economic Index (VSEI) of a village is obtained by averaging the Household Socio-Economic Index (HSEI) of the households of that village. The formula for calculating VSEI for j^{th} village is,

$$\mathrm{VSEI_j} = \frac{1}{N}\sum_{1=0}^{N} \mathrm{HSEI_i} \qquad j = 1, 2, \ldots\ldots\ldots, 40 \qquad (7)$$

Where, N is the number of households of the j^{th} village.

For specifying the socio-economic status of a household/village/town, we applied the UNDP 2010 recommended schemes of benchmark of HDI specification such that.

Scheme 1. Socio-economic status is poor if HSEI/SEI < 50

Scheme 2. Medium socio-economic status is to be considered when HSEI/SEI ≥ 50 and HSEI/SEI ≤ 79.9

Scheme 3. High socio-economic status is to be recognized when HSEI/SEI ≥ 80.

To study the human development of Bodos, Human Development Index (HDI) for sample villages/towns was calculated based on primary data applying the UNDP HDI Methodology 2010. Moreover, to study the deprivation of Bodo people in the study area, the Multidimensional Poverty Index (MPI) of the sample villages/towns was estimated based on primary data adopting the UNDP Methodology 2010.

According to the new methodology, HDI is the geometric mean of Life Expectancy Index, Education Index and Income Index. The formula for calculating HDI is,

$$\text{HDI} = \sqrt[3]{\text{Education Index} * \text{Income Index} * \text{Life Expectation Index}} \quad (8)$$

Where,

a. Life Expectancy Index

Life Expectancy Index is calculated from life expectancy at birth. Life expectancy is the year of life that a child can expect to live at the time of his/her birth. The formulas for calculating the life expectancy index is,

$$\text{Life Expectancy Index} = \frac{\text{Actual Life Expectancy} - \text{Minimum Life Expectancy}}{\text{Maximum Life Expectancy} - \text{Minimum Life Expectancy}} \quad (9)$$

Where Minimum Life Expectancy is 20 and the Maximum Life Expectancy is 85.

Using Chiang Method, the life expectancy for Bodo people has been calculated at village level based on the records of death and birth obtained from the head man of the village called 'Gaonburha'.

b. Education Index

The Education Index is an average of the index for Mean Year of Schooling (MYS) and index for Expected Years of Schooling (EYS).

$$\text{Education Index} = \frac{\text{MYS Index} + \text{EYS Index}}{2} \quad (10)$$

Where,

$$\text{MYS Index} = \frac{\text{MYS}}{15} \; and \tag{11}$$

$$\text{EYS Index} = \frac{\text{EYS}}{18} \tag{12}$$

The average year of institutional education is known as the mean year of schooling (MYS). Fifteen (15) years MYS is the projected maximum value for 2025. The expected year of schooling (EYS) is the year of institutional education that a child can expect to complete in his/her life. Eighteen (18) years is considered as the maximum value of EYS because it is equivalent to achieve a master's degree in most countries.

c. Income Index

The formula for calculating Income Index is,

$$\text{Income Index} = \frac{\log(\text{Actual Income}) - \log(\text{Minimum level Income})}{\log(\text{Maximum level Income}) - \ln(\text{Minimum level Income})} \tag{13}$$

This study has used household income data obtained from a sample survey. Per-capita income has been calculated at village level at a constant price of the financial year 2013-14. Similar to the AHDR, 2014, the minimum level of income of Rs. 5090/- as and the maximum level of income of Rs. 119032/- are used in this study for normalisation of the income index.

To study the deprivation of Bodo households we have estimated Multidimensional Poverty Index (MPI) of Bodo households based on primary data. Deprivation is multidimensional and poverty is a measure of deprivation. A single indicator, such as income, can not uniquely able to capture the multiple aspects that contribute to poverty (Alkire, 2011). This is the reason due to which the Multidimensional Poverty Index (MPI) comes into existence as a framework for assessing the capability deprivation. The methodology for measuring MPI was proposed by Alkire & Foster (2007, 2009). The MPI is a measure for multiple deprivations at the household and individual level in the areas of education, health and living standard. As a measure of acute poverty, MPI bears two characteristics. Firstly, it includes people living under conditions where they do not reach the

minimum internationally agreed standards in indicators of basic functioning. And secondly, it considers people living under conditions where they do not reach the minimum standards in several aspects at the same time (Santos, 2010).

The MPI is composed of three dimensions namely, education, health and standard of living. These three dimensions are measured by using ten indicators. The dimensions of health, education include two indicators each and the standard of living includes six indicators. Each indicator weighted equally within the dimensions associated with each indicator is a minimum level of satisfaction, which is based on international consensus (such as the Millennium Development Goals). This minimum level of satisfaction is called a deprivation cut off. The MPI explicitly weights each dimension equally and each indicator within the dimension equally. Equal weighting between the dimensions is an outcome of the HDI convention. The maximum score is 10, with each dimension equally weighted. Therefore, the maximum score in each dimension is ⅓. The health and education dimensions have two indicators each, so the weight for each component is (1⁄3) ÷ 2 = 0.167 or 16.7%. The standard of living dimension has six indicators, so each component is worth (1⁄3) ÷ 6 = 0.056 or 5.6%.

The method of poverty identification is based on the dual cut-off method of Alkire & Foster (2011a). According to this method, first, indicators of dimensions of MPI are identified which are called indicator cut-offs. And then MPI assigns equal weights across dimensions and within each dimension indicators are weighted equally. Each of the three dimensions gets an equal weight of 1/3 or 33.3%. Education and health have two indicators in each. Therefore, distributing 33.3% equally into two indicators, 16.7% is weighted in each indicator of education or health dimension as stated in the following table. Similarly, distributing 33.3% equally among six indicators of living standard dimension, each indicator is weighted approximately by 5.6%.

Dimensions of MPI with Indicators' Weights

Dimensions	Indicators		Indicator weight
Education	I	No one has completed five years of schooling	**(1/3) ÷ 2 = 16.7%**
	II	At least one school-age child not enrolled in school	**(1/3) ÷ 2 = 16.7%**
Health	I	At least one member is malnourished	**(1/3) ÷ 2 = 16.7%**
	II	One of more children have died in the family age	**(1/3) ÷ 2 = 16.7%**
Living Conditions	I	No electricity	**(1/3) ÷ 6 = 5.6%**
	II	No access to clean drinking water	**(1/3) ÷ 6 = 5.6%**
	III	No access to adequate sanitation	**(1/3) ÷ 6 = 5.6%**
	IV	House has a dirty floor	**(1/3) ÷ 6 = 5.6%**
	V	Household uses "dirty" cooking fuel (dung, firewood or charcoal)	**(1/3) ÷ 6 = 5.6%**
	VI	Household has no access to information and has no access related to mobility or access related to livelihood	**(1/3) ÷ 6 = 5.6%**
Household deprivation score- 'C' (sum of each deprivation multiplied by its weight)			
A household is multidimensionally poor if C ≥ 33.3 percent.			

Source: UNDP Methodology 2016.

N.B.- Assets: not having at least one asset related to access to information (radio, television or telephone) or having at least one asset related to information but not having at least one asset related to mobility (bike, motorbike, car, truck, animal cart or motorboat) or at least on asset related to livelihood (refrigerator, arable land or livestock)

According to Alkire and Foster method, the MPI cross-dimensional cut-off is one third. Therefore, a household is multidimensionally poor if it's weighted deprivations sum up to one third or more. In other words, if a household's total deprivation score is 33.3 or more (i.e.≥ 33.3 percent), then the household is said to multidimensionally poor. If the deprivation score is 20 percent or more but less than 33.3 percent, households are near multidimensionally poor. Households with a deprivation score of 50 percent or more are said to be severely multidimensionally poor.

MPI summarise the information of multiple deprivations into a single number and it is calculated by multiplying the incidence of poverty (headcount ratio) by the average intensity of poverty.

$$\mathbf{MPI = H \times A} \qquad (14)$$

Here, H is the Headcount ratio (H) is the proportion of the population who are multi-dimensionally poor.

$$\mathbf{H = \frac{q}{n}} \qquad (15)$$

Where, **q**= is the number of persons who are multidimensionally poor and **n**= is the total population

And A is the intensity of poverty which represents the average number of deprivation people experience at the same time. The intensity of poverty, **A**, reflects the proportion of the weighted component indicators in which, an average poor person is deprived of.

$$\mathbf{A = \frac{\sum_1^q c}{qd}} \qquad (16)$$

Where **c** is the total number of weighted deprivations the poor experience and **d** is the total number of the component indicators considered (**d** = 10 in this case).

Main Findings of the Study:

The followings are the main findings of this study.

1. Regional disparities in Assam are reflected as the inter-district variations in terms of socio-economic variables. Even, the Districts of Assam also vary in terms of socio-economic status as well as human development. The BTAD area is recognized as a backward region because districts of BTAD have limited socio-economic infrastructure compared to the districts of the Non-BTAD area.

2. The BTAD districts have low socio-economic status because their average SEI score is 11.88 which is lower than the average SEI score of the Non-BTAD district (26.86) and state average SEI score of 25.35.
3. The variations in socio-economic statuses among the districts of Assam are mainly due to inter-district variations in socio-economic variables.
4. Better performance in education is a symbol of better socio-economic status. The districts of Assam with poor performance in education are found to have a lower socio-economic status. The average literacy rate of BTAD districts (65.86%) is much lower than the average literacy rate of the Non-BTAD districts (72.71%) and the state average literacy rate (72.19%).
5. Well equipped household amenities represent a better socio-economic status. A household without good housing, electricity, sanitary latrine, safe drinking water, using LPG for cooking, etc. is found to have poor socio-economic status. Particularly in the BTAD area, most of the households of Chirang, Baksa, and Kokrajhar districts are very poor in household amenities. Even most of the households do not have latrines and people are still using open space for latrines which is very unfortunate.
6. The growth of the Human Development Index (HDI) of Assam has increased marginally from 0.407 in 2003 to 0.557 in 2014. The UNDP recommendation shows moderate HDI of Assam along with most of the districts, but there is not a single district with high HDI in Assam.
7. The human development in the BTAD area is lower compared to the human development of the remaining parts of Assam because of the lower HDI of the BTAD districts (0.510) than that of the Non-BTAD districts (0.563) and state average HDI (0.557) (AHDR 2014).
8. It is found that the majority of Bodo households (69.07%) have poor socio-economic status because their HSEI scores are less than UNDP's recommended minimum score of 50. About 29.3 percent of sample households are found to have medium due to their HSEI scores are between 50 and 7.99. Only 1.63 households are found with high socio-economic status (HSEI scores are either 80 or more).

9. While studying the village/town level socio-economic index, it is observed that no one of the sample villages or towns has high socio-economic status in Chirang district. Only 4 villages namely Chapaguri, Kukurmari, Kashikotra and Sukhanipara along with towns namely Basugaon and Bijni have medium socio-economic status. But, the remaining 34 villages have poor socio-economic status because they have the Village Socio-Economic Index (VSEI) less than 50. The district average SEI score of Chirang district is found 44.66 and so, Bodo people of the study area have poor socio-economic status.
10. Due to mass illiteracy (literacy rate = 62.27, Male = 67.04 & Female = 55.6), most of the Bodo people in Chirang district are unaware of different development schemes provided by the government through community blocks and other agencies. Therefore, Bodo households are deprived of Govt. funded facilities like sanitary latrine, safe drinking water facilities, public housing schemes etc.
11. Besides aware of medical facilities among the Bodos, some of them unfortunately do believe in traditional believes in Kabiraj or ohjas. The kabiraj or ohjas have been prevailing among some tribal communities based on traditional believes of treatment of disease. Due to this, some untoward social incidence like witch-hunting occurs from time to time in rural areas.
12. Village distance from its nearest town is still a factor affecting the socio-economic status of Bodo people. Nearer villages enjoy the better socio-economic infrastructure and they have better socio-economic status than that of farthest villages.
13. Regarding HDI, 50 percent of sample villages have an HDI score of less than 0.500. Kukurmari village has the highest HDI score (0.684) because it is located nearby Bongaigaon town where maximum socio-economic infrastructure is achievable nearby Chirang district. Uttar Burikhamar is a remote village located in the North-East direction from Bijni Sub-Division where people are living without necessities of living and so, it has the lowest HDI score 0.348. The HDI score for Bodo people of Chirang district is found 0.529.

14. The achievements of Bodo people in terms of the key dimensions of human development are found very poor when compared with the AHDR 2014. Sample villages have low life expectancy, low expected year of schooling and low mean year of schooling.
15. Bodo people in Chirang district have poor socio-economic status and low HDI and hence, they are deprived of many capabilities or real opportunities. We observed that 46.56 percent of Bodo people are found multidimensionally poor because the poverty headcount ratio is found 46.56 which are more than the state average headcount ratio of 30.10 percent.
16. The intensity of poverty for multidimensionally poor Bodo people (46.65%) is found higher than the AHDR-2014 calculated state-level intensity of poverty 16.54 percent.
17. The MPI score for Bodo people is found 0.218 in Chirang district. According to AHDR-2014, the MPI score for Assam is 0.125 and that for Chirang district is 0.111. Comparing them, we are confirmed that the multidimensional poverty of Bodo people in the Chirang district is more than the state average.
18. The Bodo people of Chirang district are multidimensionally poor because the 52.55 percent deprivation is contributed by poor living conditions followed by 25.12 percent deprivation by education dimension and 21.68 percent deprivation by health dimension. Therefore, Bodo people of the study area are mostly deprived of living conditions compared to the deprivations in education and health.
19. It is observed that Bodo people not accessing electricity is 27.5 percent, no access to clean drinking water is 76.4 percent, no access to adequate sanitation is 61.9 percent, living in a dirty floored house is 67 percent, uses dirty cooking fuel is 56.94 percent and no access to information or no assets related to mobility or livelihood is 9.68 percent. Thus, Bodo people are extremely deprived of the necessities of life.

Conclusion and Recommendations:

The Bodo people of Chirang district have lower socio-economic status than the other communities. They are multidimensionally poor and have low human development. They are living mainly in rural areas with minimum necessities of living. Based on the foregoing discussion and observation, we can forward the following conclusion and recommendations for the overall development of the Bodo people in the study area.

1. Regional disparities in Assam are reflected as the inter-district variations in terms of socio-economic variables. Districts of Assam vary not only in terms of socio-economic variables, but also vary in terms of socio-economic status as well as human development. Special attention should be given to the backward regions through government policy initiatives to mitigate the regional disparities or inter-district variations among the districts of Assam.
2. Bodo people in the Chirang district are living mainly in rural areas some of which are forest villages and some other located nearby forest area nearest to the Indo-Bhutan border. These villages have limited socio-economic infrastructures like limited hospital facilities, limited educational facilities, limited household amenities, limited administrative facilities, and poor quality of road connectivity. Forest villages should be well equipped with establishments of schools and colleges, hospitals and dispensaries, rural electrification, providing safe drinking water, and providing the minimum required household amenities.
3. The rural-urban connectivity roads and the village inter- linking roads are very poor in quality in Chirang district. As a result, the roadway distance between a village and its nearest town is still one of the main factors responsible for the poor socio-economic status of the Bodo people. A Bodo inhabited village nearer to a town has better socio-economic status than a village located farthest away from a town. So, the village interlinking roads should be improved up to the level of all-weather usable.
4. As a whole, the Bodo people of Chirang district have poor socio-economic status and low human development. Similarly, Bodo people in this district are

multidimensionally poor mainly because of their limited access to household amenities. Most of the Bodo households are living in the kutcha house, without safe drinking water, without sanitary latrine, without clean fuel and electricity. Thus, Bodo people are deprived of many necessities of living, those must be provided by the government directly to the beneficiaries.

5. Similar to the other areas, the Chirang district is also introducing different programs for rural development and employment generating such as Pradhan Mantri Awaas Yojana (PMYA)/ Indira Awaas Yojana (IAY), Pradhan Mantri Gram Sadak Yojana (PMGSY), Deen Dayal Upadhaya Grameen Kaushalya Yojana (DDUGKY), Swarnajayanti Gram Swarozgar Yojana (SGSY), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Swachchh Bharat Mission (SBM), Training to Rural Youth for Self Employment (TRYSEM), Roshni: Skill Development Scheme for Tribals (RSDST), National Rural Health Mission (NRHM), Sarva Siksha Abhiyan (SSA), etc. Funds are allocated in such programs equally by the state government like other districts, but the respective departmental authorities are not properly implementing in time which we have seen by comparing to the other districts of Assam. Proper monitoring should be done for the proper implementations of the rural development schemes in time.
6. To improve educational status, the respective authority should take necessary steps basically for the implementation of allotted funds and arrangement of awareness programs to create an educational environment in the study area in time. Most of the lower primary (LP) and upper primary (UP) schools are running without the minimum requirement of teachers. The study area does not have the minimum required numbers of senior secondary schools, junior colleges and degree colleges. Many times, the Bodo students' union, Bodo Sahitya Sabha and other organizations of Bodos are demanding fulfilment of a required number of teachers and establishment of provincialised junior and degree colleges in the remote areas in the BTAD area. But the respective state government knowingly or unknowingly did not respond to the demand of the Bodos. Thus, we can suggest that the respective government should take immediate initiatives in this regard.

7. Safe drinking water is an important factor for good health. Most of the villages in the study area are using drinking water from unsaved sources. This is one of the reasons for various health problems suffered by the villages of the study area. More than 80 percent of the Bodo villages in the study area are not covered by water supply facilities of the Public Health and Engineering (PHE). Even most of the water supply systems facilitated by PHE are seen as either non-functioning or malfunctioning in the villages. Therefore, respective authorities should take the necessary steps for providing safe drinking water in this area.
8. Agriculture is the main occupation of Bodo households in the study area. They have enough land to cultivate but due to illiteracy, primitive culture and traditions, lack of irrigation facilities and lack of financial assistance, productivity are very low. They do not have proper storage facilities like cold-house or wear-house, due to which they are bound to sell their products below the minimum support price at the time of harvesting. It reduces their incentives to cultivate, as a consequence they cultivate only once a year. And also they are bound to cultivate only in the monsoon season due to lake of irrigation facilities. Therefore, to improve agricultural productivity, the irrigation department should take the required irrigation project relevant to the study area. Regarding the removal of difficulties in receiving financial help, the bureaucratic complicacy should reduce for implementing the smooth flow of allotted funds. In this respect, the respective authority should be monitored properly in the study area.
9. Finally, the government should emphasize all prospects of development of the study area keeping special attention to the weaker section of the society. In this regard, the government should prepare and execute effective plan-policies with adequate funds to bring overall upliftment to the study area.

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