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MULTIDIMENSIONAL POVERTY STATUS OF BODO TRIBES OF UDALGURI DISTRICT, BODOLAND, ASSAM*

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This paper examines the multidimensional poverty status and also detects the factors that influence multidimensional poverty of Bodo household of Udalguri district, Assam. The study is entirely based on primary data. Multistage, stratified, purposive and random sampling techniques are used to collect primary data of 660 Bodo household covering twenty-two villages of eleven blocks of the study area. Multiple Correspondence Analysis (MCA) method is applied for constructing household level Multidimensional Poverty Index (MPI). Again, step-wise logistic regression is used to identify the factors influencing the multidimensional poverty status of the study area. The MPI value for the study area predicts that the area is moderately poor and health and literacy are the most important influencing factors.

Keywords: Multidimensional Poverty Index, Multiple Correspondence Analysis (MCA), Bodo households, Udalguri District, Literacy, Health
JEL Classification: I32, I39, C19, D60, I00

1. INTRODUCTION

Assam is one of the eight north-eastern states of India. For administrative and revenue purposes, the state has been divided into 27 districts including Kamrup (Metro) district and four districts under the Bodoland Territorial Council (BTC) areas, viz., Kokrajhar, Baska, Chirang and Udalguri. In Assam, 31.98 percent population are forced to live below the poverty line [2011-12, Tendulkar Methodology, (Singh, 2014)]. It is to be noted that poverty in Tendulkar's methodology (2011-12) (Press Note on Poverty, 2013) is defined in terms of income and reflects the overall situation of India but the figures specifically, on Indian tribes are not at all impressive. The status of tribal's in India has been subjected to many great changes over the past millennia. The aim of this

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paper is to identify the multidimensional poverty situation of Bodos in Udalguri district of Bodoland and the factors influencing the multidimensional poverty status of the Bodos.

The study area covers Udalguri district of Assam created newly in the year 2004 after signing of the Tripartite Peace Agreement on 10th February 2003 through a Memorandum of Settlement between the Bodo Liberation Tigers, Government of India and the Government of Assam. This came into being after amending the Sixth Schedule of the Constitution of India. As a part of the settlement an Autonomous Council called Bodoland Territorial Autonomous District, (BTAD) was created and Udalguri is now one of four districts under BTAD. It was notified as a district, vide Govt Notification No. GAG (B)-137/2002/Pt/117 dated 30th October 2003 and was formally inaugurated as a district on 14th June 2004 (Udalguri, Official Website). The district is bounded by Bhutan and Arunachal Pradesh in the north, Sonitpur district in the east, Darrang district in the south and Baksa district in the west.

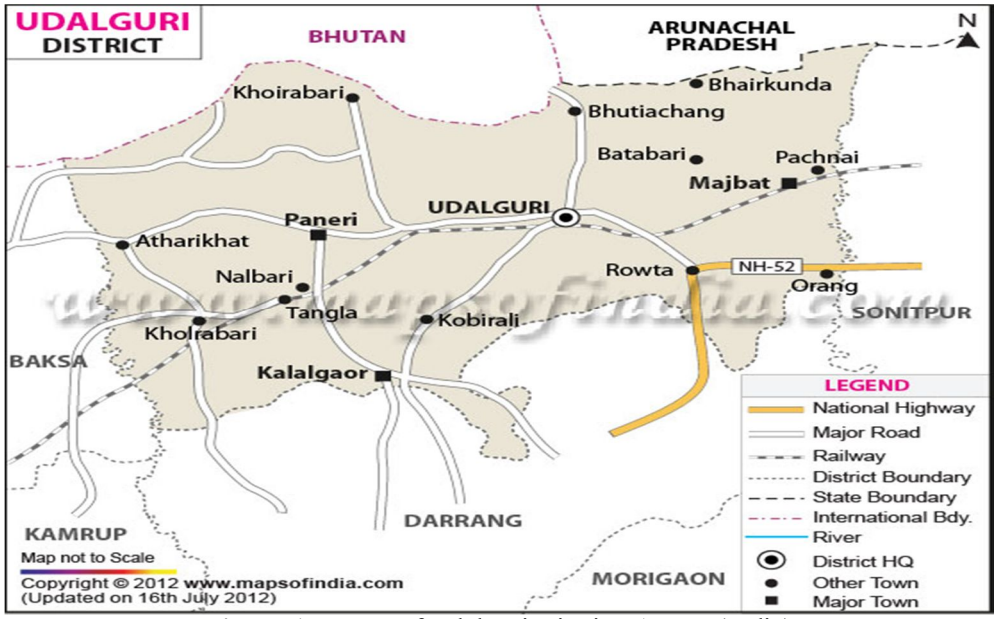

Figure 1. Map of Udalguri District, Assam (India)

Among the Scheduled Tribe's population in the district, more than 80 percent population are Bodos. In spite of having the autonomous council in the study area, the Bodos are unable to improve their socio-economic conditions as well as educational status. Bodos are generally dependent on agriculture. However, 40 percent of the Bodos are landless labourers. Due to poor economic conditions and illiteracy, the healthcare

awareness is also very poor among the Bodos. Under such circumstances, it will be appropriate to investigate the poverty situation of the Bodo people in the multidimensional aspect but not in consumption or in asset space alone. Thus the main objective of this study is to determine the multidimensional poverty status of the Bodo households of Udalguri district of Bodoland. Along with this the study also investigates to identify the factors influencing the multidimensional poverty status of Bodo households of Udalguri district.

1.1. Why Multidimensional Poverty?

The traditional poverty traps have been studied either in consumption or in asset space. In recent years, it has been identified by the welfare economists that poverty should be multidimensional. Most of the welfare economists of recent times have recognised the importance of considering poverty as a state of multidimensional nature of deprivation (Sen, 1976; Kolm, 1977; Atkinson and Bourguignon, 1982; Duclos et al., 2001; Ravallion, 1996). In fact, multidimensional poverty measure is the evolution of the conceptual thinking on poverty towards functioning and capabilities as initiated by Sen (1993). The Multidimensional Poverty Index developed by the United Nations Development Programme (UNDP), reflects the view that poverty is multidimensional, incorporating multiple aspects and poverty indicates the presence of multiple deprivations in basic assets, education and/or health components, (Anand and Sen, 1997; Alkire and Foster, 2011; UNDP, 2010).

The consequence of this conceptual revolution has broadened the notion of poverty by including vulnerability, exposure to risks, voicelessness and powerlessness (World Bank, 2001). The multidimensional perspective of deprivation includes both quantitative and qualitative measures, such as the joy of choices, opportunities, and others which are most basic to human development and can draw a different conclusion about poverty situation in any given country (Alkire, 2002). As a consequence of this, significant numbers of researchers are now contributing to identifying poverty in multidimensional space (Alkire and Foster, 2007; Alkire and Foster, 2011).

In recent days some researchers developed a new statistical tool to index the multidimensional aspect of poverty which is termed as Multiple Correspondence Analysis (Batista-Foguet et al., 2004; Asselin et al., 2005; Njong and Ningaye, 2008; Wardham, 2010; Kabubo-Mariara et al., 2010; Ezzrari and Verme, 2012 and Noglo, 2014).

In the dual cut-off method, it is first determined whether deprivation in each element is sufficiently severe to be deemed deprived in that element for each household, and if a sufficient number of deprivations have been counted then the family is identified as multi-dimensionally poor. The idea behind this is that if severe deprivation exists in more than one dimension then it becomes a more difficult task for the family to get out of poverty. Thus, this study is complementary to the new research on multidimensional poverty and contributes to taking a step beyond measuring multidimensional poverty to

examining its potential effects. In this paper, we will investigate the range of extreme poverty in terms of household assets, health, nutrition, education, etc.

The aim of this paper is to identify the poverty situation of Bodo tribes of Udalguri district of Bodoland and the factors influencing the multidimensional poverty status. In that sense, this paper is the complementary to the present research trend in poverty and beyond that author also identified the factors which can improve the non-poor status of Bodo tribes in the study area.

The paper is organised as follows: after a short introduction and investigation of related literature, in Section 2 we illustrate the data relating to 660 Bodo households. Section 3 deals with the methodology and econometric model. Section 4 shows the estimates of the multidimensional poverty index and the estimates of the parameters related to the regression equation and other empirical results. Finally, Section 5 concludes and deals with policy implications.

2. SAMPLE DESIGN

The present study is entirely based on a primary data that has been collected especially to investigate the multidimensional poverty status of Bodos. Such a study was not done earlier in the study area. Bodo villages are the main sources and Bodo households in the entire Udalguri district are the sample units for the present study. In order to collect related data, we adopted the multistage random sampling with stratified and purposive sampling techniques. The profile of the study area is presented in Table 1.

Table 1. Profile of the Bodoland Territorial Area Districts in Assam

Sl. No.	District	Sub-division	Block	Geographical Area (Sq. Kilometers)	Population (in Lakhs)	Revenue Village	Towns
1	Baksa	03	10	2,457.00	950,075	692	02
2	Chirang	02	05	1,923.00	482,162	509	02
3	Kokrajhar	03	11	3,296.00	887,142	1,070	03
4	Udalguri	02	11	2,012.00	831,668	802	03

Source: Based on 2011 Census India (Primary census Abstract, 2011)

From the table, it is clear that there are mainly two sub-divisions in the Udalguri district. Out of these two sub-divisions, we selected one sub-division at first and then another covering different development blocks and Village Council of Development Committees considering high, middle and low-income groups. In Udalguri district, there are 802 revenue villages. The revenue village indicates the revenue collection area by the state government from the landlords. Among the 802 revenue villages in the district, there are 750 Bodo villages. Since there are 11 development blocks in the district, the average number of villages per block is 72.82 (approx 73). Thus, we selected 6 percent

of the average number of villages per block and then the number of the village in each block became 4.38 (approx 4) resulting 44 villages in total. We have selected four villages from each block purposively so that one should be nearby the main town and other far from the main town. After that, out of total Bodo households of these villages, sample size specific to the concerned village was determined on the basis of Krejcie and Morgan (1970) formula and finally by using random number table, through utilization of the information furnished by village head, we completed the random personal interview sampling procedure for 660 Bodo households (Table A.1, Appendix).

3. METHODOLOGY

When poverty is conceptualised as multidimensional, it should be measured through the aggregation of the different deprivation experienced by the individual. For the purpose of indexing the multiple deprivations, we use Multiple Correspondence Analysis (MCA). MCA allows one to analyse the pattern of relationships of several categorical dependent variables (Asselin, 2002). As such, MCA is used when the variables to be analysed are categorical (nominal) instead of quantitative.

3.1. The MCA Model

Technically MCA is obtained by using a standard correspondence analysis on an indicator matrix (i.e., a matrix whose entries are 0 or 1). For the construction of a Multidimensional Poverty Index from K ordinal categorical indicators, the monotonicity axiom must be respected (Asselin, 2002). The axiom just means that if a household i improves its situation for a given variable, then its multidimensional poverty index value MPI_i increases and consequently the concerned household's poverty level decreases (larger values mean less poverty or equivalently, welfare improvement). When all the variables (modalities) have been transformed into a dichotomous nature coded 0/1, giving a total of P binary indicators, the MPI for a given household i can be written as (see Asselin, 2002):

$$MPI_i = \frac{1}{K}(W_1 I_{i1} + W_2 I_{i2} + \cdots + W_p I_{ip}), \quad (1)$$

where W_p the weight (score of the first standardised axis, (score or $\sqrt{\lambda_1}$) of category p. I_p binary indicator (0 or 1), which takes on the value 1 when the household has the modality, and 0 otherwise. The MPI value reflects the average global welfare level of a household.

By using MCA we calculate Literacy Index (LI) (by using five modalities), Health Index (HI) (by using nine modalities), Living Standard Index (LSI) (by using three modalities) and Utilities and Durable Index (UDI) (by using ten modalities) separately (Table A.2a, A.2b, A.2c, A.2d Appendix). Then by giving equal weight to all indices,

we compute the household multidimensional poverty index by taking the weighted arithmetic mean of four indices, where weights in all cases are $1/4$. The formula for calculating HMPI is mentioned below:

$$HMPI_i = \frac{w_l LI_i + w_h HI_i + w_{ls} LSI_i + w_{ud} UDI_i}{w_l + w_h + w_{ls} + w_{ud}}, \quad i = 1, 2, \cdots, 660, \tag{2}$$

where $w_i = w_h = w_{ls} = w_{ud} = 1/4$, $i = 1, 2, \cdots, 660$. The HMPI constructed this way by nature lies between (0, 1).

By taking the simple arithmetic mean of the HMPI of any village we construct the Village wise Multidimensional Poverty index (VMPI) for that village. Again by taking the weighted arithmetic mean of the VMPI of two villages, we calculate the Block wise Multidimensional Poverty Index (BMPI) for the corresponding block, where weights are the number of the sampled household considered from the sampled village of that block.

For the purpose of comparison of the relative poverty position of the sampled Bodo household, we consider self-developed three levels of values following UNDP prescribed HDI values. If MPI_i falls below 0.550 it is a case of poor. If MPI_i takes values from 0.550 to 0.799 it indicates the self-sufficient and MPI_i value of 0.800 and above suggests the surplus income of the concerned Bodo household. It is to be noted here that both self-sufficient and surplus fall into the category of non-poor.

Finally, the overall poverty position of the study area is identified by considering the composite mean of the BMP_{lk} which stands for the MPI of the study area and to understand the relative position of the villages, blocks and the study area as a whole, we consider the same range as the benchmark of comparison.

3.2. Econometric Model

After construction of the MPI, we classify the households as poor or non-poor. In this regard, the relative multidimensional poverty status of the selected Bodo household can be explained by considering a binary system. The selected household for which the MPI suggests that the household belongs to the poor community can be given a value '1', otherwise '0'. For the relative position of a Bodo household, we consider mean HMPI as the benchmark of comparison. One of the main objectives of this study is to examine the factors influencing the multidimensional poverty status of Bodo household of the Udalguri district of Bodoland and for this purpose; we consider seven social, demographic and economic variables.

The notations given to the selected independent variables are mentioned as: family size (X_1), educational status measured in terms of mean years of schooling of the selected household (X_2), work participation measured by number of employed in the age group (15-59) (X_3), annual consumption expenditure in rupees (X_4), the size of the operational land holding of the household in acres (X_5) and the distance of that village from the nearby main town in kilometers, where the concerned Bodo household lives (X6). These variables have been identified based on field experience and on the basis of

the earlier studies Rao and Rao, (2010). With the help of above-mentioned variables, we have used step-wise logistic regression model in this study. It is specified as follows:

$$p_i = \frac{1}{1+\exp\{-(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i)\}}, \quad j = 1, 2, \cdots, m \quad \text{and} \quad i = 1, 2, \cdots, n, \tag{3}$$

$$\text{or } 1 - p_i = \frac{\exp\{-(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i)\}}{1+\exp\{-(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i)\}},$$

$$\text{or, } \frac{p_i}{1-p_i} = \frac{1}{\left\{1+e-\left(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i\right)\right\}} \frac{\{1+exp\{-(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i)\}\}}{exp\{-(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i)\}}$$

$$= \frac{1}{exp\{-(\alpha+\sum_{j=1}^{m}\beta_j X_j+u_i)\}} = exp(\alpha + \sum_{j=1}^{m}\beta_j X_j + u_i),$$

where exp=stands for "exponential". The term "$exp(x)$" is the same as writing e^x, p = probability of relative multidimensional poverty status of Bodo people's household, α = a coefficient on the constant term, β_i = the coefficient of the jth independent, variable X_j = the jth independent variable and u = error term.

Using statistical Package STATA-12 and other relevant statistical tools, analysis of the collected data is performed. Using the above mentioned six variables, the stepwise logistic regression model is practiced in this study. The regression equation is specified as follows:

$$\frac{p_i}{1-p_i} = exp(\alpha + \sum_{j=1}^{6}\beta_j X_j + u_i), \quad j = 1, 2, \cdots, 6 \quad \text{and} \quad i = 1, 2, \cdots, 660. \tag{4}$$

4. ANALYSIS OF RESEARCH RESULTS

In this section, we are going to discuss the results related to the objectives mentioned earlier. First of all, we will discuss the results related to the first objective.

4.1. Multidimensional Poverty Index

In order to get a more prominent picture of the poverty situation of the study area, we consider the analysis of VMPI scores as well as the percentage of households who are poor and moderately poor in each village by considering all forty-four villages together. The result is presented at Table 2.

A perusal of Table 2 reveals that the highest value of VMPI is obtained for Arrabari village with a value 0.4084, followed by Langlinga (0.4057) and Dhakhin Chewni (0.3953). On the other hand, the lowest score of VMPI is obtained for 1 No. Kachari para with a VMPI scores 0.3243 preceded by 1 No. Maz Gaon (0.3299) and Khajuabil (0.3318). Arrabari is the only village whose VMPI score exceeds 0.400. VMPI score for all villages is within the ranges of 0.31-0.49 and all villages are categorised as moderately poor or borderline.

Table 2. Village wise Multidimensional Poverty Index values and Corresponding Ranking

Village Name	VMPI	Rank	Identification of the village	Percentage of Poor	
				Moderate Poor	Poor
2 No. Kajiamati (Jurpukhori)	0.3445	39	Moderately Poor	87	13
Mohanpur	0.3463	38	Moderately Poor	93.33	6.67
Batabari	0.3904	10	Moderately Poor	100	0
Ekorabari	0.3703	21	Moderately Poor	100	0
Kachamari	0.3509	36	Moderately Poor	86.67	13.33
Manuh mari (Kachari gaon)	0.3469	37	Moderately Poor	86.67	13.33
Kamarchuburi	0.3646	26	Moderately Poor	100	0
Kacharison	0.3739	18	Moderately Poor	100	0
LailangPara (Gerua)	0.3642	27	Moderately Poor	93.33	6.67
Sarbaherua	0.3692	24	Moderately Poor	93.33	6.67
Batamari	0.3915	9	Moderately Poor	100	0
Niz-Dalgaon	0.3639	28	Moderately Poor	93.33	6.67
2 no. Singribari	0.3691	23	Moderately Poor	100	0
No.1 Dakhin Chewni	0.3537	34	Moderately Poor	93.33	6.67
Dhakhin Chewni	0.3953	3	Moderately Poor	100	0
Langlinga	0.4057	2	Moderately Poor	100	0
Soanipara	0.3652	25	Moderately Poor	93.33	6.67
Mazar chuba	0.3755	16	Moderately Poor	100	0
Arrangpara	0.3928	6	Moderately Poor	100	0
Dildangpara	0.3925	7	Moderately Poor	100	0
Murmela	0.3784	15	Moderately Poor	100	0
Simaluguri	0.3560	33	Moderately Poor	93.33	6.67
Landangpara	0.3794	14	Moderately Poor	100	0
Arrabari	0.4084	1	Moderately Poor	100	0
Khas Ranthali	0.3412	41	Moderately Poor	80	20
Chengapathar East	0.3696	22	Moderately Poor	93.33	6.67
Kasibari	0.3834	13	Moderately Poor	100	0
Chengapathar	0.3872	12	Moderately Poor	100	0
Jhakua	0.3575	32	Moderately Poor	86.67	13.33
Khajuabil	0.3318	42	Moderately Poor	86.67	13.33
No-1 Khajuabil	0.3747	17	Moderately Poor	100	0
Kapati Bagicha	0.3884	11	Moderately Poor	100	0
1 No. Maz Gaon	0.3299	43	Moderately Poor	86.67	13.33
1 No. Kachari para	0.3243	44	Moderately Poor	86.67	13.33
No-2 Jhargaon	0.3424	40	Moderately Poor	100	0
Kacharipara	0.3921	8	Moderately Poor	100	0
Niz-Margalbesa (revenue)	0.3719	20	Moderately Poor	93.33	6.67
Chandowlpara West	0.3600	31	Moderately Poor	93.33	6.67
Chapai Punia	0.3943	4	Moderately Poor	100	0
Chandowlpara	0.3731	19	Moderately Poor	100	0
Mainaoguri	0.3636	30	Moderately Poor	100	0
Kishanpur	0.3639	29	Moderately Poor	100	0
Lamabari	0.3536	35	Moderately Poor	86.67	13.33
No-1 Bahadurgaon	0.3932	5	Moderately Poor	100	0

Source: Author's own calculation based on primary data.

From Table 2 it follows that all households living in Arrabari are of the category of moderately poor. Even for Langlinga and Dhakhin Chewni all households living in these villages are identified as moderately poor. Although 1 No. Kachari para is ranked as 44th with the lowest score of VMPI, about 13.33 percent households living in this village are identified as poor and 86.67 percent of households are identified as moderately poor. We get the same result for 1 No. Maz Gaon and Khajuabil.

The highest percentage of poor household is found in Khas Ranthali, where 20 percent household are identified as poor. But it is noted that the rank of Khas Ranthali is 41st with VMPI score is 0.412. All together we observe 100 percent households living in 24 villages which are identified as moderately poor and for the rest of the villages we find the coexistence of poor and moderately poor households. At most 13.33 percent poor households live in some villages.

It is worth to be mentioned here that no sampled village is categorised as a surplus village, not even self-sufficient village. The entire sampled villages are identified as moderately poor with VMPI score ranges from 0.4084 to 0.3243.

We next consider the block-wise poverty status of the study area by considering blocks. The block MPI value is calculated by taking the simple average of VMPI values of two sampled villages from the same block.

Table 3. Block Wise Multidimensional Poverty Index Values and Corresponding Ranking

Name of the Block	Block Multidimensional Poverty Index	Rank	Identification of the Block	Percentage of Poor		MPI
				Moderate Poor	Poor	
Rowta	0.3628	9	Moderately poor	95	5	0.369
Borsola	0.3591	10	Moderately poor	96.67	3.33	
Bechimari	0.3721	5	Moderately poor	95	5	
Bhergaon	0.3810	2	Moderately poor	98.33	1.67	
Khoiraibari	0.3815	1	Moderately poor	98.33	1.67	
Udalguri	0.3805	3	Moderately poor	98.33	1.67	
Kalaigaon	0.3704	6	Moderately poor	93.33	6.67	
Dalgaon-Sialmari	0.3631	8	Moderately poor	93.33	6.67	
Pub-Magaldoi	0.3472	11	Moderately poor	83.33	11.67	
Paschim-Magaldoi	0.3748	4	Moderately poor	96.67	3.33	
Mazbat	0.3685	7	Moderately poor	95	5	

Source: Author's own calculation based on primary data.

A close perusal of the Table 3 reveals that all the blocks of the Udalguri district are categorised as moderately poor with no surplus, not even a single self-sufficient block. The calculated BMPI values are within the range from 0.3472 to 0.3815. The highest value of BMPI is obtained for Khoiraibari (0.3815) block followed by Bhergaon (0.3810) and Udalguri (0.3805). The lowest value of BMPI is obtained for Pub-Magaldoi (0.3472) preceded by Borsola (0.591) and Rowta (03628). It is worth to be mentioned here that in

all blocks we find the coexistence of poor and moderately poor households. The block which ranks top in the list is Khoiraibari and from the table, we observe that 1.67 percent sampled households of the block are poor and rest are moderately poor. The highest percentage (11.67 percent) of poor households is obtained for Pub-Magaldoi. At least 2 percent to at most 12 percent households in all blocks are found to be poor.

The MPI of the study area is calculated by considering the composite mean of the BMPIk. The overall MPI of the study area is calculated as 0.3692. Thus the study area is also categorised as moderately poor.

4.2. Factors Influencing the Multidimensional Poverty Status of the Bodo Households

We are now going to discuss the results related to the regression. For the purpose of regression, we have considered six regressors. The detailed specifications of variables are given in the third section of this paper. Table 4 presents the descriptive statistics of these independent variables.

Table 4. Descriptive Statistics of the Regressor

Variables	Mean	S. D	C.V	Skewness	Kurtosis	Min	Max
Family Size (X_1)	4.721	1.479	31.33	1.22	5.33	1	11
Educational Status (X_2)	6.397	2.560	40.02	-0.11	3.02	0	15
No. of Employed in the Age group (15-59) (X_3)	1.578	0.965	61.15	2.10	8.07	1	7
Annual Consumption Expenditure in Rupees (X_4)	9056.15	7550.75	83.37	5.10	51.36	1800	10800
Operational Land Holding (X_5)	5.749	7.398	128.68	5.68	56.83	0	100
Distance from the main town (X_6)	23.15	9.658	41.72	0.30	2.17	5	42

Source: Author's own calculation based on primary data.

From the Table, it follows that mean family size of the sampled households is approximately 5 with maximum size 11 and minimum size 1. Family size is positively skewed variable. In fact, all variables, except literacy and health status, are positively skewed. Both literacy and health status are negatively skewed. The mean years of schooling for the sampled households are approx 6 years. The sampled households on average have 6 big has of land. But it is to be noted here that the minimum amount of land operational holding is 0. The highest CV is obtained for land operational holding, indicating maximum dispersion in this variable. Annual average consumption expenditure for the sampled households is Rs. 9056.15. On an average, at least two members in the working age from each sampled household are found to be employed. On average, the sampled villages are 23 Km., distance from the main town with a maximum distance of 42 Km., and the minimum distance of 5 Km.

Next, we consider the analysis of the regression result but before that, we checked

the multicollinearity among the explanatory variables and concluded that no multicollinearity (Table A.3. in the Appendix). The result of the Tables-A.3 is obtained by using the statistical package STATA-12.

The stepwise logistic regression result is presented in Table 5. The estimated coefficients, as well as odds ratios, are also presented in Table 5. The results are also interpreted with the help of odds ratio, as the interpretation of odds ratio is more intuitive. It would mean that for a unit change in the independent variable there would be a corresponding change in the odds ratios (probability of relative multidimensional poverty status of Bodo households).

Table 5. Factor Influencing the Socioeconomic Status of Bodo People

Logistic Regression					
Number of observations	660				
LR chi2(6)	37.3				
Prob > chi2	0.000				
Pseudo R2	0.052				
log likelihood	-424.714				
Iteration 0	log likelihood = -443.364				
Iteration 1	log likelihood = -424.825				
Iteration 2	log likelihood = -424.714				
Iteration 3	log likelihood = -424.714				
Variables	Coefficients	S. E	t	P>|t|	Odds Ratio
Family Size (X_1)	-0.606*	0.030	-20.36	0.00	1.077*
Literacy Status (X_2)	0.147*	0.035	4.2	0.00	1.158*
No. of Employed in the Age group (15-59) (X_3)	0.159***	0.099	1.6	0.10	1.172***
Consumption Expenditure In Rupees (X_4)	-5.57e-06*	1.47e-06	-3.79	0.00	0.999*
Land Holding (X_5)	0.014	0.013	1.05	0.296	0.986
Distance from the main town (X_6)	-0.008	0.008	-0.94	0.347	0.992
Constant	-0.339	0.407	-0.83	0.405	

Source: Author's own calculation based on primary data.

Note: *significant at 1% level, **significant at 5% level, ***significant at 10 % level.

The variable family size negatively associates the multidimensional non-poverty status of the Bodo households. The estimated coefficient is significant at 1 percent level. Economically it means that larger the family higher will be the chance to become poor and it is quite obvious as the same amount of resources will be more thinly distributed among the members of the family and one will not get enough opportunity to explore his/her capability so that he/she can avoid poverty. The result is similar to the result Rao and Rao (2010). Educational status and number of employed family member in the working age group are positively associated with the transformation of poor to non-poor in the multidimensional sense of sampled Bodo households. While the estimated coefficient of the educational status is significant at 1 percent level, but the estimated coefficient of the number of employed in the working age group is significant at 10 percent level. As expected the amount of land operational holding positively and the

distance of the village from the main town negatively associated with the multidimensional non-poverty status of sampled Bodo households. But unfortunately both the estimated coefficients are statistically insignificant.

The social variable, educational status positively associated with the transformation of poor to non-poor in the multidimensional sense. The estimated coefficient is significant at 1 percent level and this means that higher educational status for the household will increase their multidimensional poverty status and they will become multidimensionally self-sufficient or in some better cases surplus. However, another social variable, namely, the distance of the sampled village from the main town has the negative association with the multidimensional non-poverty status of sampled Bodo households but unfortunately, this variable turned out to be statistically insignificant. From the field survey, we found that the means of transportation in the study area is very poor; this means that the farthest village from the town will not be able to get all the facilities that are enjoyed by the nearest village, in terms of hospitals, health centers, schools, colleges etc. Thus those households who are living in the villages which are farthest from the main town have a greater chance to suffer from poverty in the multidimensional sense.

The negative sign of the estimated coefficient of the economic variable consumption expenditure in rupees means that lower consumption expenditure made by them on intoxicants and ceremonies and functions will enhance the possibility of the household to become multidimensionally self-sufficient or surplus. This result is similar that was obtained by Rao and Rao (2010). The other two economic variables, viz., land operational holding and the higher number of employed in the working-age group to the family are positively associated with the multidimensional non-poverty status of the household and the signs are as expected. But unfortunately, the estimated coefficient of the first variable becomes statistically insignificant, although the sign of the estimated coefficient is economically meaningful.

The estimated odds ratios suggest that the most important variable to influence the multidimensional non-poverty status of sampled Bodo household is the number of employed in the working age-group. Next important variables according to their importance in determining the multidimensional non-poverty status of sampled Bodo households are educational status and family size. For the policy purpose, the most important variable is the number of employed in the working age group of the sampled Bodo households, with estimated odds ratio, 1.172 highest in absolute number. Thus, in order to improve the multidimensional poverty status of the area, emphasis should be given to the creation of more employment opportunities. Bodo families are peasant families with agriculture as the sole occupation and thus family members may remain employed as disguised unemployed. If these disguised unemployed labourers can be shifted from agricultural sector to any other productive sector then not only the economic status of the household will improve but also the economic status of the area as a whole will improve. Thus the area needs a proper policy to increase the employment opportunities for the local people. The second most important policy variable is the

educational status of the estimated odds ratio, 1.158. Thus, in order to improve the multidimensional poverty status, the family require pushing themselves in acquiring more education, including for girl child. Next in the row is the family size with estimated odds ratio 1.097. All these variables except family size have a positive influence on the multidimensional non-poverty status of sampled Bodo households, whereas family size negatively influences the multidimensional non-poverty status of Bodo household. The regression analysis suggests that for the purpose of policy prescriptions we need to give more emphasis on the creation of employment opportunities, education and family planning.

5. CONCLUSION AND POLICY IMPLICATIONS

We observe that the Udalguri district is moderately poor with no self-sufficient or surplus block. All the eleven blocks of the district are identified as moderately poor, containing more than 80 percent population as moderately poor. For the Udalguri district as a whole, the MPI value becomes 0.369 with 80 percent sampled households are poor. There are lots of scopes for the central, state as well as local governments for improving the present status by initiating non-interrupted development process in the study area. But all the three units, particularly BTAD Council requires to work in association with state and central government. With the estimated results we suggest the following policy implications:

1. The number of employed family members becomes the most important determining factor for the transformation of the Bodo households from poor to non-poor in the multidimensional sense. In order to improve the employment status of the study area, more employment opportunities are to be created and this is only possible by the collaborative initiative of the local, state and central authorities. Most importantly the road transportation system should be developed and the initiative of which should be taken by local, state and central governments. The improvement of transportation will actually enhance the geographical mobility of the workers.

2. As education becomes the second important positively influenced factor to improve the non-poor or multidimensional non-poverty status of the Bodo households we need to put emphasis on parents for sending their children to school including girl children. More schools, vocational training centers etc. within limited distance are required to be set-up so that children can reach to the school with convenience.

3. By observing the negative influence of the family size the Bodo families should be encouraged to adopt proper family planning programme. In this case, the health unit is required to work along with NGOs.

4. The plain tribes, particularly at the low-income group, have strong intention to spend money on intoxicants and those are the cases here. Thus the counselling of the family head and other intoxicated members of the family is necessary for not spending money for this purpose. At the same time to protect them from spending money on

intoxicants food for work programme for the unemployed or seasonally employed low-income group Bodo households can be implemented.

5. There is no doubt that the proper implementation of the "Land Reform" policy, with full political cooperation, will definitely improve the poverty status of the Bodo households as most of the Bodo families are peasant families with agriculture as their sole occupation.

6. Distance variable can only be taken care by improving the transportation system, particularly by developing roadways, railways and that can only be done by state and central governments.

APPENDICIX

Table A1. Village Wise Population and Sample Size for Bodo Households

Name of the Block	Name of the Village	Population Size (Bodo Household)	Sample Size (whole numbers)	Nearest Main Town	Category of village
Rowta	2 No. Kajiamati (Jurpukhori)	37	15	Udalguri	1
Rowta	Mohanpur	42	15	Udalguri	1
Rowta	Ekorabari	93	15	Udalguri	0
Rowta	Batabari	80	15	Udalguri	0
Borsola	Kachamari	84	15	Udalguri	1
Borsola	Manuh mari (Kachari gaon)	76	15	Udalguri	0
Borsola	Kamarchuburi	131	15	Udalguri	1
Borsola	Kacharison	124	15	Udalguri	0
Bechimari	LailangPara (Gerua)	200	15	Udalguri	1
Bechimari	Sarbaherua	250	15	Udalguri	1
Bechimari	Niz-Dalgaon	35	15	Udalguri	0
Bechimari	Batamari	40	15	Udalguri	0
Bhergaon	2 no. Singribari	85	15	Tangla	0
Bhergaon	No.1 Dakhin Chewni	45	15	Tangla	1
Bhergaon	Langlinga	51	15	Tangla	0
Bhergaon	Dhakhin Chewni	47	15	Tangla	1
Khoirabari	Soanipara	75	15	Tangla	0
Khoirabari	Mazar chuba	178	15	Tangla	1
Khoirabari	Arrangpara	50	15	Tangla	1
Khoirabari	Dildangpara	45	15	Tangla	0
Udalguri	Murmela	100	15	Tangla	0
Udalguri	Simaluguri	107	15	Tangla	0
Udalguri	Landangpara	45	15	Tangla	1
Udalguri	Arrabari	45	15	Tangla	1

Table A1. Village Wise Population and Sample Size for Bodo Households (Con't)

Name of the Block	Name of the Village	Population Size (Bodo Household)	Sample Size (whole numbers)	Nearest Main Town	Category of village
Kalaigaon	Khas Ranthali	180	15	Tangla	0
Kalaigaon	Chengapathar East	120	15	Tangla	1
Kalaigaon	Chengapathar	150	15	Tangla	1
Kalaigaon	Kasibari	45	15	Tangla	0
Dalgaon-Sialmari	Jhakua	45	15	Udalguri	1
Dalgaon-Sialmari	Khajuabil	85	15	Udalguri	1
Dalgaon-Sialmari	No-1 Khajuabil	80	15	Udalguri	0
Dalgaon-Sialmari	Kapati Bagicha	32	15	Udalguri	0
Pub Mangaldoi	1 No. Maz Gaon	126	15	Tangla	0
Pub Mangaldoi	1 No. Kachari para	75	15	Tangla	0
Pub Mangaldoi	No-2 Jhargaon	65	15	Tangla	1
Pub Mangaldoi	Kacharipara	95	15	Tangla	1
Paschim Mangaldai	Niz-Margalbesa (revenue)	130	15	Tangla	0
Paschim Mangaldai	Chandowlpara West	40	15	Tangla	1
Paschim Mangaldai	Chapai Punia	105	15	Tangla	1
Paschim Mangaldai	Chandowlpara	39	15	Tangla	0
Mazbat	Mainaoguri	59	15	Udalguri	1
Mazbat	Kishanpur	85	15	Udalguri	0
Mazbat	Lamabari	57	15	Udalguri	1
Mazbat	No-1 Bahadurgaon	41	15	Udalguri	0
Total	44	3719	660		

Source: Author's own specification for primary data collection.
Note: 0 = Farthest village from the town, 1 = nearest village from the town

Table A2a. Literacy Indicators and their Corresponding Weights

Indicator	Modality	Weights
Literacy Status	Head of household alphabetized (if yes=1, otherwise=0)	0.083
	Household share with no education	
	less than 1/3	0.031
	between 1/3 &1/2	0.029
	between 1/2 &3/4	0.022
	more than 3/4	0.018
	No member of the household has completed five years of schooling (if no=1. otherwise=0)	0.097
	At least one school age children not enrolled in school (if no child & no=1. otherwise=0)	0.092
	Distance to nearest public school	
	distance >3 km	0.001
	1km<distance<3Km	0.019
	Distance<1km	0.081

Source: Author's own calculation based on primary data.

Table A2b. Health Indicators and their Corresponding Weights

Indicator	Modality	Weights
Health Status of the Household	Antenatal Child Care (if yes=1, otherwise=0)	0.064
	Postnatal Child Care (if yes=1, otherwise=0)	0.067
	Polio affected household (if no=1, otherwise=0)	0.075
	Family Planning Adoption (if yes=1, otherwise=0)	0.06
	Household access to health	
	Partial access	0.075
	No access	0.002
	Household medical coverage (if yes=1, otherwise=0)	0.026
	Type of health centre consulted	
	Quack practitioner	0.007
	Health centre	0.071
	Distance to the nearest health centre	
	Distance>3km	0.038
	1km<distance<3km	0.025
	500m<distance<1km	0.014
	Child malnutrition (if no and no child=1, otherwise=0)	0.076

Source: Author's own calculation based primary data.

Table A2c. Standard of Living Indicators and their Corresponding Weights

Indicator	Modality	Weights
Living Standard Index	roof materials	
	Thatches/mats	0.006
	Zinc sheets	0.019
	Cement/Tiles	0.119
	floor materials	
	mud/Wood/others	0.024
	cement	0.118
	type of toilet facility	
	Unconstructed latrine	0.02
	Constructed latrine	0.123

Source: Author's own calculation based primary data.

Table A2d. Utilities and Durability Indicators and their Corresponding Weights

Indicator	Modality	Weights
Utilities and Durable Index	Source of water supply	
	Spring/wells	0.013
	Public tap	0.049
	Source of lighting	
	Kerosene lamp	0.008
	Electricity	0.054
	Energy for cooking	
	Firewood	0.05
	Charcoal/sawdust/ Kerosene	0.001
	Gas	0.012
	Distance to nearest tarred road	
	1 k m <distance< 1 0 k m	0.03
	distance<500m then 1, otherwise =0	0.033
	Owned Electricity, if yes=1, otherwise =0	0.055
	Possession of mobile phone (if yes=1, otherwise=0)	0.058
	Possession of TV set (if yes=1, otherwise=0)	0.031
	Possession of cycle (if yes=1, otherwise=0)	0.06
	Possession of motored vehicles (Two wheelers) (if yes=1, otherwise=0)	0.013
	Possession of motored vehicles (Four wheelers) (if yes=1, otherwise=0)	0.001

Source: Author's own calculation based primary data

Table A3. Correlation Diagnostics

Variable	Family Size (X_1)	Literacy Status (X_2)	No. of Employed in the Age group (15-59) (X_3)	Consumption Expenditure In Rupees (X_4)	Land Holding (X_5)	Distance from the main town (X_6)
Family Size (X_1)	1					
Literacy Status (X_2)	0.0503	1				
No. of Employed in the Age group (15-59) (X_3)	0.4061	0.0058	1			
Consumption Expenditure In Rupees (X_4)	0.1612	0.318	-0.0235	1		
Land Holding (X_5)	0.3442	0.276	0.1435	0.3595	1	
Distance from the main town (X_6)	-0.0027	-0.043	-0.0035	0.0273	-0.0345	1

Source: Author's own calculation based on primary data

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