A Situational Analysis of Multidimensional Poverty for the North Eastern States of India using Household Level Data

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Abstract

Deprivations in non-monetary achievements such as health, education and standard of living are more serious than that of income deprivations as the former contribute to a situation of greater vulnerability in the long run. Taking into consideration such non-monetary deprivations, the present study attempts to estimate the relative positions of the states in the North-Eastern Region of India in terms of multidimensional deprivations of well-being using the methodology as proposed by Alkire and Foster (2011). The study tries to cover a wide range of variables related to health, education, standard of living and nature of employment at the household levels for each of the states and districts of North-Eastern Region of India. It deals with inter-state as well as intra-state (rural-urban in particular) disparity in the NER in terms of multidimensional poverty using household level information from DLHS-4. Health appeared to be a crucial dimension of deprivations for NER states with malnutrition as the major contributor to poverty.

1. Introduction

India has a relatively sustained economic growth nearly at five percent per annum on an average since 1980s. However, there has been increasing trend for inter-state or intra-state economic and social disparities in India in spite of various public measures for backward areas development (Mathur, 1983; Kurian, 2000; Kannan & Raveendran, 2011; Bhattacharya & Sakthivel, 2004). Over the past two decades, India's per capita Net Domestic Product at constant prices (Base Year, 2011-12) has grown at a rate of 5.29 per cent per annum. Among the Indian states, the state of Kerala has persistently outperformed in all social indicators such as literacy, life expectancy, infant mortality, under-nourishment and fertility (Goldin, 2016, pp. 2). So far as the North Eastern Region (NER) of India is concerned, the region is considered to be more vulnerable

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i.e. in need of special care and support considering their economic backwardness in both the monetary and non-monetary deprivations for a long period of time since independence. In general, the performance of NER states with respect to poverty reduction and key social indicators is not satisfactory in comparison to the state of Kerala and to the national average (see Table A1 given in the Appendix. Though Mizoram, Sikkim and Tripura have registered a higher annual growth rate of per capita Net State Domestic Product (at 2011-12 constant prices) than Kerala and the national average since 1993 but it is important to note that only increase in per capita income is not sufficient for human development. More important factors for human development both from individual as well as social points of view are non-monetary achievements in the areas of health, education, living standard and so on. However, majority of the north eastern states are lagging behind with respect to literacy, child survival rate, nutrition, basic amenities etc. which are important factors for enhancement of human capability (Table A1 in the Appendix).

Keeping in mind the diversified developmental experiences of the North Eastern states, the present study aims to estimate the relative positions of the NER states in terms of multidimensional deprivations of well-being using Alkire and Foster (2011) method. Further the study tries to explore the inter-state as well as intra-state disparity in the NER states in terms of multidimensional poverty index using household level information from DLHS-4. For the purpose, the present study decomposes the values of indices into region (rural-urban), and also finds the dimensional as well as indicator wise contributions to the overall poverty for facilitating the target specific policy interventions.

2. Conceptual Framework of Poverty Measurements

2.1. Rationale for Multidimensional Poverty Measurements

There have been conceptual changes in the literature on poverty in the last few decades embracing more comprehensive multidimensional framework including economic well-being, capability and social inclusion. The changes go beyond the notion of economic well-being embedded in the traditional (income) approach. The attempt by the UNDP (1997, 2010) marks an important progress in this regard, where 'human poverty indices' are computed as the weighted average of longevity, knowledge, decent standard of living, and the social inclusion (only in case of OECD countries) where in 'multidimensional poverty indices' captured ten indicators from health, education and standard of living dimensions in the line of 'human development index'. Human capability is a more important component to 'functions' in the society and lead to the life one values and has a reason to value (Alkire, 2002; Sen, 1993, 2000). From the perspective of capability, various multidimensional approaches have essentially broadened the concept of poverty, i.e. manifestation of inadequate human well-being and not only shortfall of income (Alkire, 2002; Jayasuriya, 2000). Therefore, both 'capability' and 'functioning' could have been instrumental and constructive values with a set of basic capability, including education, health, gender equality, and self-respect, to function in the society, made them most fundamental aspect of well-being

(Alkire, 2002; Sen, 1993,1997). The issue of multidimensional poverty arises because individuals, social observers or policy makers want to define a poverty limit on each individual attribute such as health, education, income and so on (Bourguignon and Chakravarty, 2003; Fusco, 2003). Thus, multidimensional non-monetary poverty measurements have a clear departure from the concept of income poverty measurements and have strengthened literature on dimensions of poverty.

2.2. The Evolution of Poverty Measurements

Historically, poverty measurements have been guided by the notion of economic well-being taking into consideration the level of income and consumption as proxy to wellbeing. However, the conventional one-dimensional approach to poverty measures through income (e.g. Per Capita Income at the aggregate level) and consumption (e.g. minimum calories requirement at the individual level) are unable to capture the multiple dimensions of deprivations and poverty. It is a fact that income poverty often fails to capture the value of the necessities such as access to safe water, sanitation, education, health which have enormous contribution to household welfare and are so costly that they need to be provided by the government. Poverty refers to deprivations in basic capabilities of the individual or family (Sen, 1993). The deprivation of basic capabilities is multidimensional in nature, which includes early death, observable malnutrition, persistent disease, lack of education and lower standard of living etc. All these are intrinsically and instrumentally important for enhancing basic capabilities of the people through education and health care as they help in enhancing productivity and income. Moreover, there is no linear relationship between income deprivations and non-monetary deprivations. Franco, Harriss-White, Saith & Stewart (2002) found that 53 per cent of malnourished Indian children do not live in income-poor households and 53 per cent of the children living in income-poor households are not malnourished. Bourguignon, Bénassy-Queéré, Dercon, et al. (2010) did not find any empirical evidence that a reduction of monetary poverty be associated with a reduction of non-monetary deprivations. The capability approach of poverty measurements clearly assumes that poverty results from the lack of human capabilities to '*function*' in the society or to '*achieve*' well-being, where well-being is defined as the ''*ends*'' and capability as the ''*means*'' to achieve it (UNDP, 2000).

The ILO's World Employment Conference of 1976 at Geneva can be considered as the starting point of the multidimensional approach where focus has been given to the "Basic Needs" consisting of food and other essential requirements. However, the approach got a clear shape with the "Physical Quality Life Index" proposed by Morris D. Morris (1979) to measure the quality of life or well-being of a country with the indicators of basic literacy rate, infant mortality, and life expectancy at age one. Multidimensional measurement of human wellbeing got enriched with the sequential development of Human Development Index (Haq and Sen: UNDP, 1990), Gender Development Index (UNDP, 1995) and so on. A significant departure was noticed with the development of Human Poverty Index by Sudhir Anand and Amartya Sen (UNDP, 1997) where the focus changed from human achievements to human deprivations in the same dimensions of health, education and income. The history of poverty

measurements is characterised by two major turning points viz. from economic development to human development and from human achievements to human deprivations.

The UNDP (1997, 2010) approach further strengthened the method whre in 'human poverty indices' are computed as the weighted average of longevity, knowledge, decent standard of living, and the social inclusion (only in case of OECD countries) and 'multidimensional poverty indices' capture ten indicators from health, education and standard of living dimensions in the line of 'human development index'. The Human Development Report (1997) and World Development Report (2000) have been intensely introducing poverty as a multidimensional phenomenon. The Millennium Development Goals (2000), also provided multiple dimensions of poverty. The issue of multidimensional poverty arises because individuals, social observers or policy makers want to define poverty on each individual attribute such as health, education, income and so on (Bourguignon and Chakravarty, 2003; Fusco, 2003). The multidimensional poverty measurements based on capability approach with a normative framework for evaluating alternative policies can be broadly clustered into axiomatic approaches (Tsui, 2002, Bourguignon and Chakravarty, 2003; Chakravarty and Silber, 2008; Bossert, Chakravarty and D'Ambrosio, 2009; and Alkire and Foster, 2011), information theory approaches (Maasoumi and Lugo, 2008), fuzzy set theories (Lemmi and Betti, 2006 and Chiappero-Martinetti and Roche, 2009), and latent variable methods (Kakwani and Silber, 2008 and Asselin, 2009). Atkinson (2003) provides an excellent analysis of social welfare approaches vis-a-vis counting approaches. However, majority of the multidimensional measurements are aggregate in nature focusing on the development or deprivations of the society or country as a whole.

Among the various multidimensional poverty measures, Alkire-Foster method has some basic policy advantages owing to its methodology that satisfies the poverty focus axiom following the identification function, which includes the union and intersection approaches to identify the poor in the space of capability. The characteristics of joint distribution of A-F measures assist to derive partial indices that capture both the incidence as well as the intensity of poverty. The Alkire-Foster class of poverty measure combines the desirable axioms of the well-known Foster-Greer-Thorbecke (FGT) measures (Foster, Greer & Thorbecke, 1984) of unidimensional poverty measurement with the counting approach (Atkinson, 2003). Further, the axiom of *decomposability* allows decomposing into its geographical, social or dimensional components.

In the Indian context, the Planning Commission has been defining the poverty line as sufficient level of per capita consumption expenditure, which meets the average per capita daily calories requirement of 2,400 kcal in rural areas and 2100 kcal in urban areas since 1977. However, the country has moved from an income approach to a multidimensional approach to identify the poor families targeting a better government service provisions since the year 2002. Construction of a new 'index of multiple deprivations' in India started in 2008. There has been a wide range of empirical studies

on multidimensional poverty measures in India. Abraham and Kavi Kumar (2008) has applied the fuzzy set approach in a set of core dimensions such as consumption, education, sanitation, access to water, source of energy for cooking and dwelling to capture multidimensional poverty and the vulnerability of entities. UNDP's axiomatic approach of human poverty index (1997) has been applied by Roy and Haldar (2008) to find regional disparity in terms of multidimensional poverty among the major states of India. Their study finds an increasing regional disparity over time (1981–2001) for the major states of India. Again, the incidence of non-income poverty is much more alarming than that of income poverty in the different states of India which has been found from NFHS-3 of 2005-06, and DLHS-3 of 2002–04 by using the Principal Component Analysis on the indicators such as malnutrition, reproductive and child health, and basic amenities (Radhakrishna, 2014). There has been robust evidence of declining multidimensional deprivations in India though the decline was uneven both between the reforms (1993/1994–1999/2000) and the post reforms (1999/2000–2004/2005) periods, and between the rural and urban areas considering a wide range of welfare indicators including mother and child health based on the information from National Sample Surveys and National Family Health Surveys (Mishra and Ray, 2013; Jayaraj and Subramianan, 2010). Recently Bagli S. (2017) computed a multidimensional poverty index (MPI) for each of the states and for each of the district in northeast India, covering three dimensions namely *Knowledge*, *Health* and *Living condition*. Illiteracy rate and financial illiteracy rate have taken as deprivation indicators under knowledge dimension; use of unsafe drinking water and no access to improved sanitation under health dimension and the dimension of living condition includes four indicators such as households having dilapidated residence, no census assets, no access to electricity or solar energy for lighting and no access to improved fuel for cooking. The MPI has been calculated testing the normalised inverse 'Euclidian distance' of the observed vector of the indicators of deprivation from the vector indicating worst state of multidimensional poverty. The disparities among the states and among the districts in terms of the indicators under consideration have also been revealed. Study did not find any straightforward relation between MPI of the states and percentage of population living below the poverty line income.

Traditionally, poverty measurement in India revolves around the ability to spend on goods and services rather than the capability to being and functioning in society (Sen, 1985). Though there has been methodological revisions and debates on multifaceted nature of poverty and need for inclusive growth (GoI, 1993, 2009, 2014; Sen and Himanshu, 2004; Deaton and Dre'ze, 2002, 2009; Subramanian, 2011, Ahluwalia, 2011), many of the empirical studies have shown that a significant percentage of multidimensionally poor are not income poor and vice-versa (Laderchi, Saith and Strewart, 2003; Wang, Feng, Xia and Alkire, 2016).

Though a wide range of literature pertaining to poverty measurements are available for India and the major Indian states, there is but dearth of literature related to poverty measurements for NER states, either in terms of monetary or non-monetary approaches. Most of the available studies are descriptive in nature mainly focusing on the state as

a unit of analysis (Nayyar, 2005; Kurian, 2000; Reddy, Galababd Rao, 2003). Alkire and Seth's (2013) study tried to examine the changes in multidimensional poverty for states in North East India for the period from 1998-99 to 2004-05.

2.3. NER Perspectives

The north-east is diverse with numerous ethnic groups, varied languages and diverse religions, varied forms of governance, varied topography, natural climate, and uneven economic development. The region is characterised by low educational attainment levels, lack of adequate health service facilities, insufficient road connectivity between and within states and lack of basic amenities. Hence a, unidimensional measure of poverty is unable to capture all the dimensions of deprivations as well as the actual causes of backwardness of the region. A multidimensional measurement of poverty based on capability approach is expected to reveal the deprivations persisting in the states of North East. This would also help in identifying the policy gaps and required thrust within the much debated provision of Non-Lapsable Central Pool of Resources (NLCPR) earmarked for North East for its development expenditure. Despite many development initiatives including the provision of Non-Lapsable Central Pool of Resources (NLCPR) ,there have been enormous variations among the states in the region in terms of poverty reduction, curbing inequality, growth rate of per capita NSDP etc. (Shah and Debnath, 2015; Debnath & Shah, 2015; Dehury and Mohanty, 2015; Radhakrishna, 2014, 2015; Alkire and Seth, 2013).

Given the diverse social, geographical and economic features of the states in the region, a multidimensional measurement of poverty would help in appreciating the inter and intra state variation across social groups and religion. The incidence of non-income deprivations is much more alarming than that of income poverty in the different states of the region as revealed from the indicators on malnutrition, reproductive and child health, and basic amenities etc. (see Table A1 in Appendix). Moreover, it has been mentioned before that there has been dearth of research studies in this area covering the NER. Alkire and Seth (2013) attempt of measuring the reduction of poverty in the Indian states including the NER is based on NFHS – II & III and no such recent works on the NER at the household level has been found in this area to portray the developmental changes that took place after 2004-05. The present study is an attempt to capture the current situation of deprivations in the states of NER as well as the changes therein over 2004-05. For the purpose, the present study also follows the same dimension or indicators and same cut-offs

2.4. Objectives of the Study

The study primarily focuses aims to:
I.   Find out the relative positions of the NER states in terms of multidimensional poverty index (MPI)
II. Explore the inter-state as well as intra-state (rural-urban) disparity for the NER states in terms of multidimensional poverty index (MPI).

III. Estimate the relative contribution of the indicators to the overall MPI for each of the states.

3. Data and Methodologies

3.1. Description of Data

The study uses household level information from the fourth round of District Level Household and Facility Survey (DLHS-4), 2013-14. The survey contains information related to maternal and child health (MCH) indicators and prevalence of morbidity for a wide range of common, communicable, non-communicable and lifestyle diseases, demographic and socio-economic characteristics of households, ownership of assets, access to public services etc. The study focuses on the north-eastern states of India, namely, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura and also on the districts of each of these states. The study excludes Assam as it was not covered in the DLHS–4 for household survey. All these seven states together cover about 15 percent of the surveyed households and 16 percent of the population covered in DLHS–4[1].

For the present study households have been taken as the unit of identification. So, the households with a missing value of any of the indicators of multidimensional poverty have been dropped from the sample. However, the present study sets a rule of assigning value to a household when at least two-third of the individual's information are available for whom the indicator is applicable. For example, if at least one of the adult members of household has complete primary or higher level of education, although other members have missing values, the household has been considered as non-deprived. If any household have information on at least two-thirds of the household members, each having less than primary education, then the household has been considered as deprived; otherwise it was dropped from the sample. In the present study only 96 households (0.15 per cent of total sample) have been dropped from the sample.

3.2. Construction of Multidimensional Poverty Index

The estimation of Adjusted Head Count Ratio (AHCR) in the study was based on the counting approach developed by Alkire and Foster owing to its advantages of dual cut-off, joint distribution and decomposability (Alkire and Foster 2011; Alkire and Santos,

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[1]   DLHS-4 covered a total of 3,91,774 households comprising of 17,34,213 individuals across the country. DLHS-4 utilises a multi-stage stratified sample design with rural and urban areas of the districts as usual strata following NSSO in the line of Urban Frame Survey (UFS) blocks as Primary Sampling Units (PSUs) and the households as Second Stage Sampling Units (SSUs) for the urban and the census villages as PSUs and the households as SSUs for the rural. For the NER states, a total of 60,227 households were surveyed from 2,237 PSU of which rural areas cover 45,868 households from 1696 PSUs and urban areas cover 13,560 households from 541 PSUs. The study uses health, educational information of each individual and information regarding household amenities, housing type, sources of water, lighting and cooking fuel to measure multidimensional poverty.

2013; and Seth and Alkire 2014). UNDP has been using the AHCR to calculate Multidimensional Poverty Index (MPI) for several countries since 2010.

3.2.1. The Alkire-Foster Method

The Alkire-Foster method identifies poor by using two stage cut-off, that is, deprivation cut-off and poverty cut-off. Before the application of these cut-offs, a set of ten indicators (I_j) were selected on the basis of their general acceptance for human wellbeing. These indicators were classified into three broad dimensions (*D*) with equal weightage. The weight for each of the indicators is assigned on the basis of dimension weights such that the weight attached to indicator *j*, with $j = (1, 2, \ldots, d)$ is represented by $w_j^d = \frac{1}{D} \cdot \frac{1}{I}$.

The first stage cut-off is related to deprivation cut-off for each of the ten indicators to identify the household as deprived in particular indicator. A particular household *i* need to achieve the minimum level of *j*th indicator in order to define as non-deprived. The deprivation cut-off of each of the ten indicators is given in appendix (Table -A2 in Appendix). Deprivation cut-off is represented by a vector $Z_j = (z_1, z_2, \ldots, z_d)$. Thus, the household *i* is considered as deprived in *j*th indicator if its achievement is less than the cut-off Z_j, and replaced by $X_{ij} = \rho_j(X_{ij}, Z_j) = 1$ if $X_{ij} < Z_j$, otherwise $X_{ij} = \rho_j(X_{ij}, Z_j) = 0$, where $X = [X_{ij}]$ is the $n \times d$ order achievement matrix.

The second stage cut-off is related to identification of the households as to define whether multidimensionally poor. The choice of poverty cut-off (***k***) is likely to be $1 \leq k \leq d,$ so that the poverty neither defined as being deprived in only in one indicator, $k = 1$ (which is known as union approach) nor it is defined as being deprived in all indicators, $k = d$ (which is called as intersection approach). Thus, the value of ***k*** can be chosen normatively, either based on the previous studies or based on the reasons deem to be fit to the society concerned. On other hand, k can be chosen in such a way that reflects the goal of the state's or government's policy specification. The present study chooses $k = 0.33$ to identify multidimensionally poor households to make comparability with the poverty cut-offs set by Alkire and Seth (2013). Hence, a household is defined as multidimensionally poor, if they are deprived in at least one-third of the sum of weighted indicators, called deprivation score. The deprivation score of a household is the sum of the weighted number of deprivations in which the household is deprived and is represented by the vector $C_{ij} = \sum_{j=1}^{d} w_j^d \rho_j(X_{ij}, Z_j)$. If $C_{ij} \geq k$ then the household *i* is defined as multidimensionally poor and reported as $q(k) = \sum_{1}^{d} w_j^d \rho_k(X_{ij}; Z) \; ; \; C_{ij} \geq k$, where *q* is the number of multidimensionally poor households. Then the estimation of Multidimensional Head

Count Ratio (or called as incidence of poverty) can be obtained as $H = \left(\frac{q}{n}\right)$, where n is the total number of households. The vector $C_{ij}^{*}(k)$ represents the censored deprivation score of the multidimensionally poor households and average deprivation score of the poor households, which is called intensity of poverty, defined as $A = \left[\frac{\sum_i^q C_{ij}^{*}(k)}{q}\right]$. Finally, the estimation of the Adjusted Head Count Ratio or Multidimensional Poverty Index (MPI), which represents the deprivation of the households with respect to health, education and standards of living, the prime components of human capability, can be obtained by the formula:

$$M_0 = \frac{1}{n.d}\left[\sum_{i=1}^{n}\sum_{j=1}^{d} C_{ij}^{*}(k)\right] \text{ ; Adjusted Head Count Ratio}$$

$$= \frac{1}{n}\sum_{i=1}^{n}\left[\frac{1}{d}\sum_{j=1}^{d} C_{ij}^{*}(k)\right] \text{ ; Individual Poverty}$$

$$= \frac{1}{d}\sum_{j=1}^{d}\left[\frac{1}{n}\sum_{j=1}^{n} C_{ij}^{*}(k)\right] \text{ ; Censored Deprivation}$$

$$= \left[\frac{1}{n}q(k)\right].\left[\frac{1}{q}\sum_i^q C_{ij}^{*}(k)\right] \text{ ; Product of } H \text{ and } A$$

3.2.2. Decomposition

Adjusted Head Count Ratio is decomposable by the population subgroups because the measure is expressible as the weighted sum of individual poverty. Hence, the overall poverty can be represented as follows: $M_0 = \sum_{s=1}^{l}\frac{n_s}{n}M_0^s$ and contribution of the population subgroup, *s* to the overall poverty M_0 is $C_s = \frac{n_s}{n} \times \frac{M_0^s}{M_0}$ for $s = 1, 2, 3, \ldots, l$, where $\left(\frac{n_s}{n}\right)$ and $\left(\frac{M_0^s}{M_0}\right)$ are the population share and the AHCR of subgroup *s,* respectively.

Similarly, the AHCR is also decomposable by its indicators, because the measure is expressible as the weighted sum of the censored deprivations by indicators. Hence, the overall poverty can be represented as follows: $M_0 = \sum_{j=1}^{d}\left(\frac{w_j}{d}\right)h_j(k)$ and the contribution of an indicator *j* to the overall poverty is for, whereis the censored head count ratio of indicator *j*.

3.2.3. Robustness and Redundancy Test of Multidimensional Poverty for the NER States

A number of robustness tests are there which help to determine the sensitivity of comparisons to the level and composition of MPI to changes in parameters such as the poverty cut-off *k* and indicator weights. However, the present study focuses only on changes in the level of MPI, incidence and intensity of poverty with the changes in the poverty cut-off (i.e. value of *k*). To make comparability of the present study with the work of Alkire and Seth (2013), equal weights have been assigned to each of the dimensions.

Figures 3(a), (b), and (c) represent that the level of MPI, incidence, and intensity of multidimensional poverty for various levels of the poverty cut-offs *k* follow the expected pattern. They show that when *k* = 5 per cent, MPI is 0.246 for the state of Tripura; incidence is 90 per cent, indicating that a large majority of the population is deprived in at least one of the weighted indicators; and intensity is 27 per cent, implies that 90 per cent poor, who are deprived in more than one quarter of the indicators. When *k* is larger than 65 per cent, poverty is practically zero, implying that almost none is deprived in more than three quarters of the weighted indicators. The figures advocate that there are no sharp discontinuities in MPI, and incidence of multidimensional poverty around the chosen *k*-value of 33 per cent. It is also noticeable in the intensity band diagram that a number of persons are deprived in nearly half of the MPI weighted indicators.

Figure 3(a): MPI of Poverty for different Values of Poverty Cutoff k
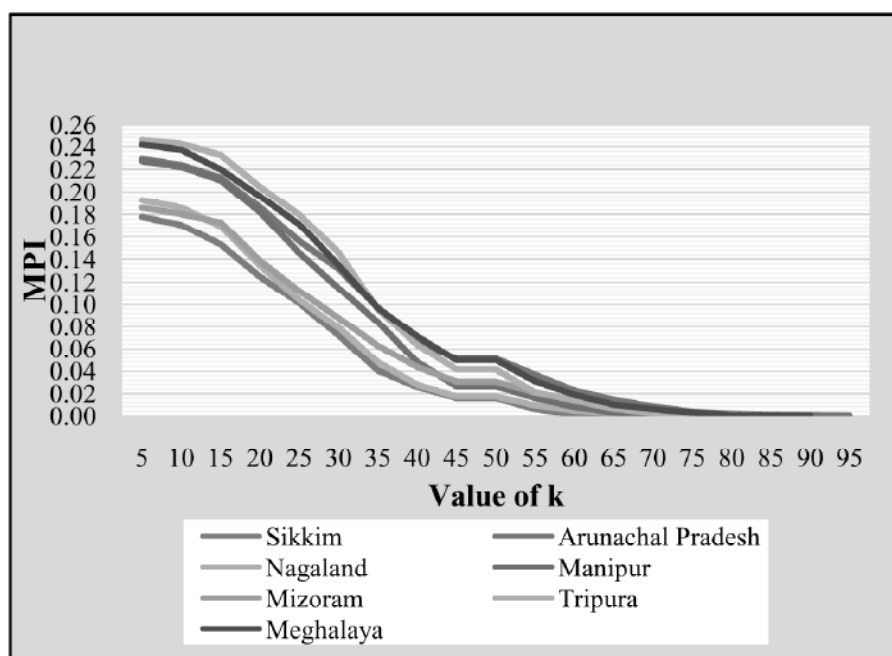
Figure 3(b): Incidence for Different Values of the Poverty Cutoff k
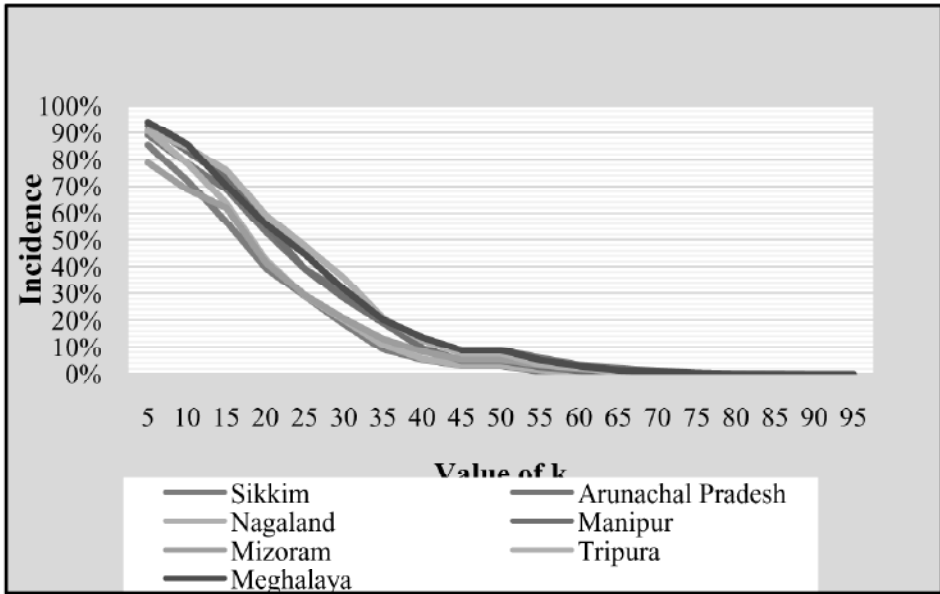
Figure 3(c): Intensity of Poverty for Different Values of Poverty Cutoff k
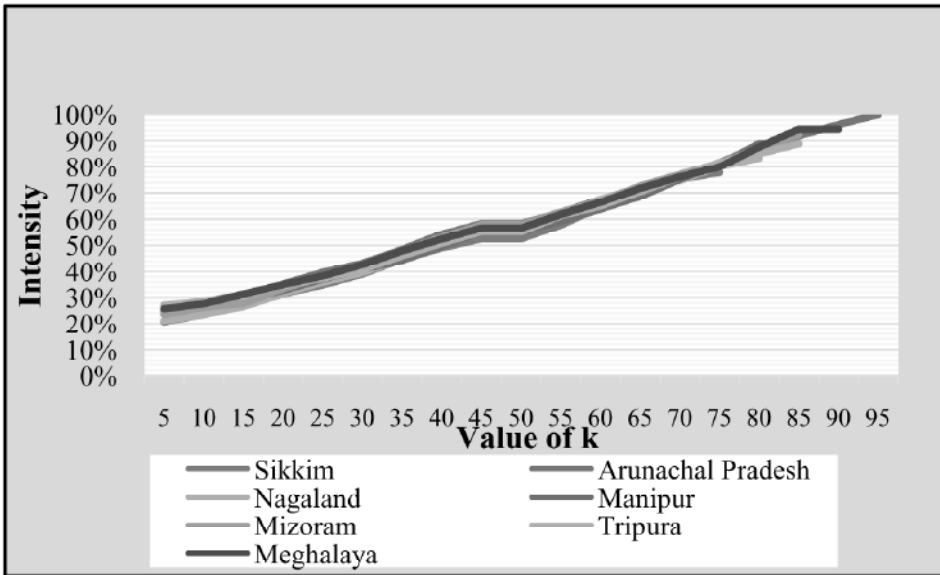
Redundancy measure (Alkire et. al, 2015) has been used to check redundancy among the indicators. The redundancy measure shows that the matches between deprivations as a proportion of the minimum of the marginal deprivation rates. Thus the measure of Redundancy displays the number of observations which have the same deprivation

status in both variables, which reflects the joint distribution, as a proportion of the minimum of the two uncensored or censored headcount ratios. The measure of redundancy focuses on the precise and clear relationship of the components.

Table 1: Redundancy Test for Uncensored Head Count Ratio for North-Eastern States

	D_{11}	D_{12}	D_{21}	D_{22}	D_{31}	D_{32}	D_{33}	D_{34}	D_{35}	D_{36}
D_{11}	1.00									
D_{12}	0.35	1.00								
D_{21}	0.10	0.10	1.00							
D_{22}	0.41	0.33	0.35	1.00						
D_{31}	0.29	0.28	0.23	0.33	1.00					
D_{32}	0.46	0.45	0.25	0.32	0.34	1.00				
D_{33}	0.86	0.94	0.69	0.76	0.86	0.94	1.00			
D_{34}	0.68	0.73	0.49	0.54	0.63	0.77	0.90	1.00		
D_{35}	0.24	0.25	0.09	0.37	0.44	0.55	0.96	0.84	1.00	
D_{36}	0.58	0.71	0.50	0.56	0.64	0.69	0.87	0.69	0.68	1.00

Source: Authors' Estimation, 2018

Note: D11 denotes currently School Attendance; D12 denotes Highest Years of Schooling, D21 denotes Mortality, D22 denotes Malnutrition, D31 denotes Safe Drinking Water; D32 denotes Sanitation; D33 denotes Cooking Fuel; D34 denotes Housing Type; D35 denotes Electricity; D36 denotes Assets

Table 1 presents results the redundancy tests for the ten indicators using uncensored headcount ratios. The redundancy statistic shows the percentage of possible matches (in which a person is deprived in any two of the indicators) and that are realized and varies from zero to one. For most of the pair wise comparisons, the redundancy is low, indicating that the percentage of matches that could have been realized is less than 50 per cent. There are three indicators in which redundancy is higher: cooking fuel, housing type, and, to a lesser extent, asset holdings. However, this redundancy is in part mechanical probability rather than unexpected: the uncensored headcount ratios of these three indicators are the highest across the ten component indicators. Apart from these three, there is no high redundancy across the included indicators as each appears to contribute independent information.

4. Results and Discussion

4.1. Multidimensional Poverty in the NER States

In respect of Multidimensional Poverty Index (MPI), there are observable differences among the states of North East India. MPI value for the state of Tripura is 0.146, which is two times more than that of Sikkim (i.e. 0.072). MPI is a product of *incidence* of multidimensional poverty and *intensity* of poverty as mentioned earlier where *incidence* represents the proportion of multidimensionally poor people to total population using the poverty cut-off for comparing with Alkire and Seth (2013), and *intensity* indicates

the average deprivation among the poor. For the NER, intensity of poverty is almost same for all states, but incidence of poverty varies across the states. For example, 35.8 per cent peoples are multidimensionally poor in Tripura which is almost twice that of Sikkim. The Government of India's "Report of the Expert Group to Review the Methodology for Measurement of Poverty" (2014) provides geographic estimates of poverty for 2011-12; the income poverty headcount ratio of Manipur is highest among the NER states (i.e. 46.7 per cent), but in terms of multidimensional poverty her position is fourth (with 28.2 per cent poor) among the state of NER (Table 2).It is interesting to note that there has been interchange in relative positions between Tripura and Manipur regarding monetary and non-monetary poverty. This may be the effect of data sources, collected at different time point from different households. However, Nagaland and Sikkim are at lower strata in both the cases.

Figure 4(a): Multidimensional Poverty in NER States

State	Incidence	Intensity	MPI
Tripura	0.358	0.407	0.146
Meghalaya	0.316	0.427	0.135
Arunachal Pradesh	0.305	0.432	0.132
Manipur	0.282	0.408	0.115
Mizoram	0.206	0.425	0.088
Nagaland	0.200	0.396	0.079
Sikkim	0.185	0.390	0.072
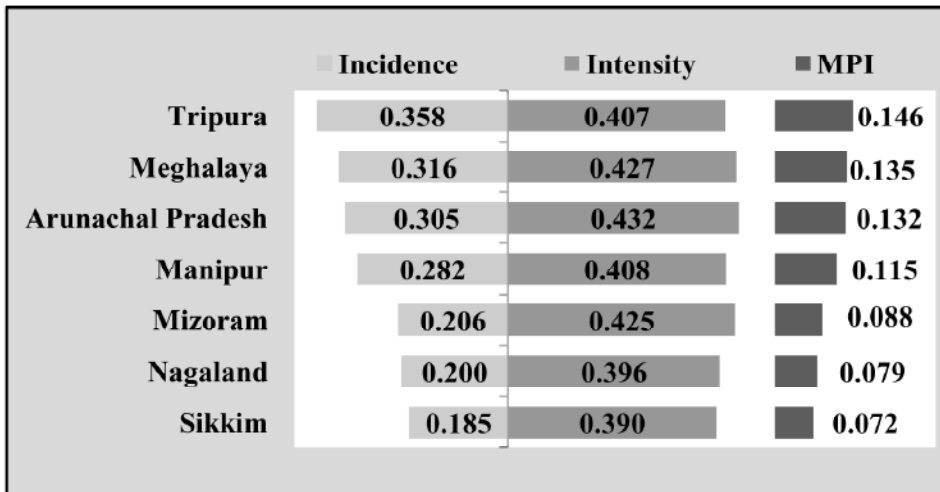
As an extension of the multidimensional poverty estimates of Alkire and Seth (2013), the present study also finds that there has been reduction in multidimensional poverty for the states in North East between 2005-06 and 2013-14. Alkire and Seth study found that multidimensional poverty reduced significantly in Manipur, Meghalaya, and Mizoram by two digits between1998-99 and 2004-05. The result of the present study (as shown in Table 2) reveal that multidimensional poverty has come down in all states of the region both in terms of incidence and intensity of poverty. Although, poverty by headcount ratios have two digits downfall but the reduction in average deprivation is not much satisfactory.

Table 2: Multidimensional Poverty in the NER States

States	2013-14			2005-06@			2011-12#
	Incidence	Intensity	MPI	Incidence	Intensity	MPI	Income poverty
Tripura	0.358 (1)	0.407	0.146	0.466	0.486	0.226	0.249 (4)
Meghalaya	0.316 (2)	0.427	0.135	0.552	0.539	0.297	0.244 (5)
Arunachal Pradesh	0.305 (3)	0.432	0.132	0.515	0.506	0.260	0.374 (2)
Manipur	0.282 (4)	0.408	0.115	0.324	0.457	0.148	0.467 (1)
Mizoram	0.206 (5)	0.425	0.088	0.211	0.442	0.094	0.274 (3)
Nagaland	0.200 (6)	0.396	0.079	0.444	0.491	0.218	0.140 (7)
Sikkim	0.185 (7)	0.390	0.072	0.289	0.456	0.132	0.178 (6)

Source: Authors' Estimation

Note: @Alkire and Seth, 2013, pp. 21,

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4.2. Poverty in the NER: Rural and Urban

The total population of each of the states of NER has been divided into two groups viz. rural and urban. The following figures represent the multidimensional poverty indices for the rural and urban areas.

Figure 4(b): Multidimensional Poverty in NER States: Rural
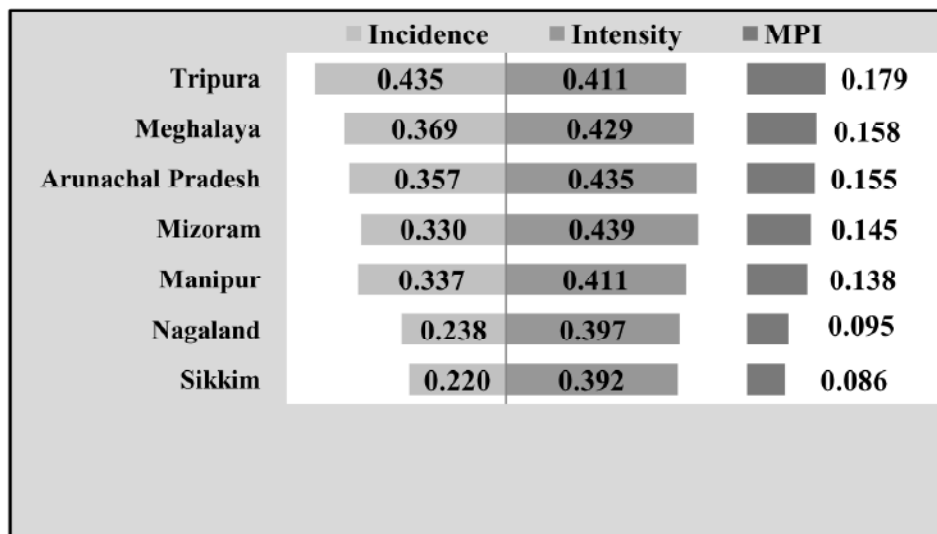
Figure 4(c): Multidimensional Poverty in NER States: Urban

	Incidence	Intensity	MPI
Manipur	0.169	0.398	0.067
Tripura	0.139	0.377	0.053
Meghalaya	0.119	0.401	0.048
Arunachal Pradesh	0.119	0.397	0.047
Nagaland	0.110	0.389	0.043
Mizoram	0.096	0.385	0.037
Sikkim	0.081	0.369	0.030
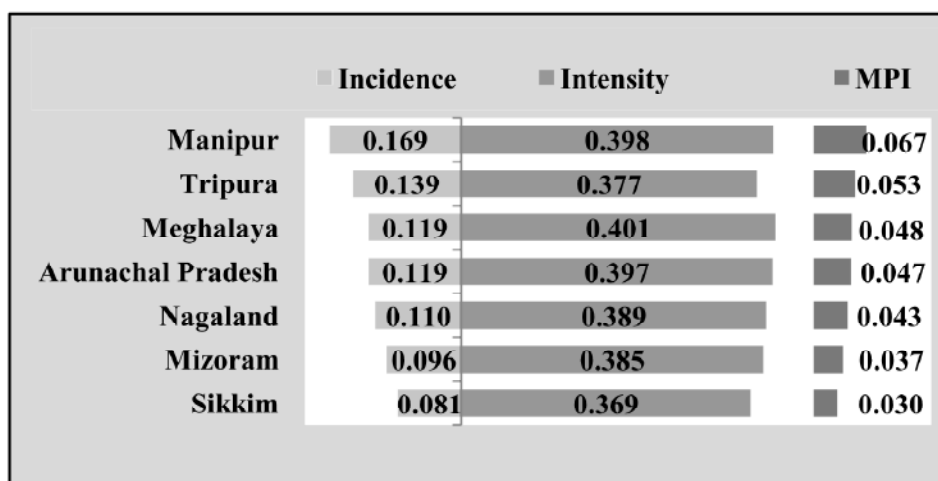
The value of MPI stands at 0.179 for rural areas of the state of Tripura with 43.5 per cent as multidimensional poor with an intensity (average deprivations) of 0.411 among the poor. Thus, multidimensional poverty for Tripura is double the value of MPI for Sikkim (0.086) with nearly twice the percentage of multidimensionally poor (22.0 per cent for Sikkim). Urban poverty is found to be highest for Manipur (16.9 per cent).

Table 3: State of Multidimensional Poverty: Rural and Urban

State	Area	2013-14				2005-06@			2011-12#
		Population Share	Incidence	Intensity	MPI	Incidence	Intensity	MPI	Income poverty
Tripura	Rural	74.0	0.435 (1)	0.411	0.179	0.509	0.489	0.249	0.225 (5)
	Urban	26.0	0.139 (2)	0.377	0.053	0.234	0.448	0.105	0.313 (3)
Meghalaya	Rural	78.7	0.369 (2)	0.429	0.158	0.660	0.546	0.361	0.263 (4)
	Urban	21.3	0.119 (3)	0.401	0.048	0.199	0.454	0.090	0.167 (6)
Arunachal Pradesh	Rural	78.2	0.357 (3)	0.435	0.155	0.574	0.512	0.294	0.393 (1)
	Urban	21.8	0.119 (4)	0.397	0.047	0.337	0.475	0.160	0.309 (4)
Mizoram	Rural	47.0	0.330 (4)	0.439	0.145	0.353	0.452	0.159	0.337 (3)
	Urban	53.0	0.096 (1)	0.385	0.037	0.083	0.406	0.034	0.215 (5)
Manipur	Rural	67.0	0.337 (5)	0.411	0.138	0.382	0.460	0.175	0.349 (2)
	Urban	33.0	0.169 (6)	0.398	0.067	0.198	0.447	0.088	0.734 (1)
Nagaland	Rural	70.0	0.238 (6)	0.397	0.095	0.520	0.496	0.258	0.061 (7)
	Urban	30.0	0.110 (5)	0.389	0.043	0.104	0.226	0.024	0.321 (2)
Sikkim	Rural	74.4	0.220 (7)	0.392	0.086	0.340	0.457	0.156	0.200 (6)
	Urban	25.6	0.081 (7)	0.369	0.030	0.074	0.425	0.031	0.117 (7)

Source: Authors' Estimation

Note: @Alkire and Seth, 2013, pp. 21

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Multidimensional poverty across rural and urban areas for each of the states in the region over time[2] shows that both the incidence and intensity of multidimensional poverty is relatively higher for the rural areas of each of the states than the urban areas (Table

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[2] Compared with the estimates of Alkire- Seth (2005)

3). It is observed that there has been reduction in multidimensional poverty both in terms of incidence and intensity for both rural and urban areas for all the states except Nagaland, where both the incidence and intensity of multidimensional poverty have increased during the 8 years period from 2005-06 to 2013-14. Moreover, incidence of poverty has marginally increased for urban areas in Mizoram, Nagaland and Sikkim during this 8 years period. In case of rural areas, highest reduction of MPI is observed for Meghalaya, followed by Nagaland, Arunachal Pradesh, Sikkim, Tripura, Manipur, and Mizoram. In terms of incidence of multidimensional poverty for rural areas, the percentage reduction in poor people is higher for Meghalaya (29.1), Nagaland (28.2) and Arunachal Pradesh (21.7) but.Manipur, Mizoram and Tripura do not reflect good performance.

4.3. Dimensional Breakdown

The multidimensional poverty index can be expressed as an average of censored head count ratios of indicators weighed by their relative weight. Censored headcount ratio of an indicator represents the proportion of the population who are multidimensional poor as well as deprived in that particular indicator. Decomposing poverty allows multidimensional poverty to give a clear picture of different composition of different dimensions and indicators and their relative contributions.

4.3.1. Uncensored vs. Censored Headcount Ratios

There is an interesting difference between the MPI censored headcounts single indicators and the conventional deprivation rates (uncensored headcounts) in the same indicator. The censored headcount ratios reflect the proportion of people who are poor, identified as MPI poor and deprived in the select indicator while uncensored headcount ratios represent the total proportion of people deprived in a select indicator, regardless of whether they are identified as MPI poor or not. The level of the discrepancy provides evidence on the share of people who are deprived but not poor.

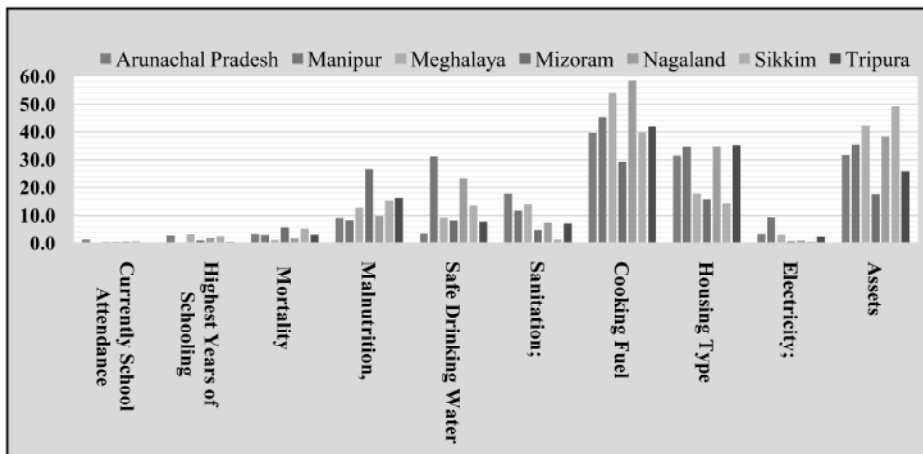**Figure 4(d): Discrepancy between Uncensored and Censored Headcount**

Figure 4(d) represents the percentage of discrepancies between uncensored and censored headcount ratios for the NER states. For example, Meghalaya and Arunachal Pradesh are close in terms of MPI (0.135 and 0.132, respectively), in both the states, the difference between the raw and censored headcounts is highest for cooking fuel. Large differences have also been noticed in assets, housing type, sanitation and malnutrition. However, relative importance is given to the indicator on living standard rather than health and education for the present study. In fact, the uncensored and censored headcount ratios differ most for cooking fuel, assets and housing type, followed by safe drinking water, sanitation and electricity. However, some discrepancy has been found in malnutrition (an indicator for health dimension) for all of the states of NER. Differences were lowest for currently attending school and highest years of schooling. (see Table A3 and Table A4 in the Appendix). Similar observations were found for censored headcount ratio of cooking fuel, housing type and asset holding etc. This implies that no uniform development policy would be appropriate for the region as a whole and the states of NER and a target based policy approach would be most desirable.

4.3.2. Dimensional Contribution to the MPI

Dimensions as well as indicators specific contribution measurements are more useful for policy implications. For the present case, the dimension specific contributions overall, rural and urban are shown in Figure 4(e), (f) and (g) respectively and the indicators specific contributions to poverty are given in Table 4. The contribution of each dimension is the sum of the contribution of each of the indicators in that dimension. For example, the censored headcount ratio for the indicator years of schooling is 8.1 per cent and contributes 9.2 per cent to overall multidimensional poverty. Similarly, the child school attendance indicator contributes 2.0 per cent to overall multidimensional poverty. They together constitute the education dimension and contribute 11.2 per cent to overall multidimensional poverty for Tripura.

Figure 4(e): Dimension-wise Contribution to the MPI: Overall
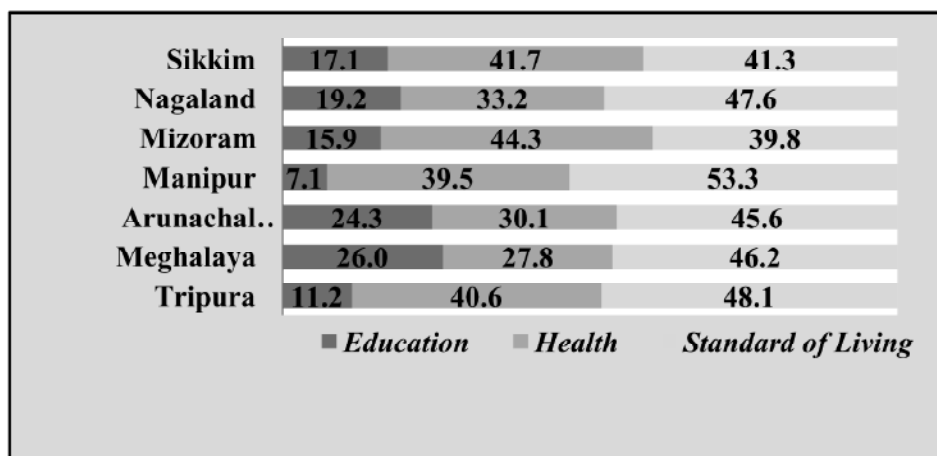
Figure 4(f): Dimension-wise Contribution to the MPI:

State	Education	Health	Standard of Living
Sikkim	16.6	40.0	43.4
Nagaland	19.3	32.1	48.6
Mizoram	18.1	37.2	44.6
Manipur	7.1	38.1	54.8
Arunachal Pradesh	24.5	28.9	46.6
Meghalaya	27.0	26.4	46.6
Tripura	11.7	38.8	49.6

■ *Education*   ■ *Health*   □ *Standard of Living*
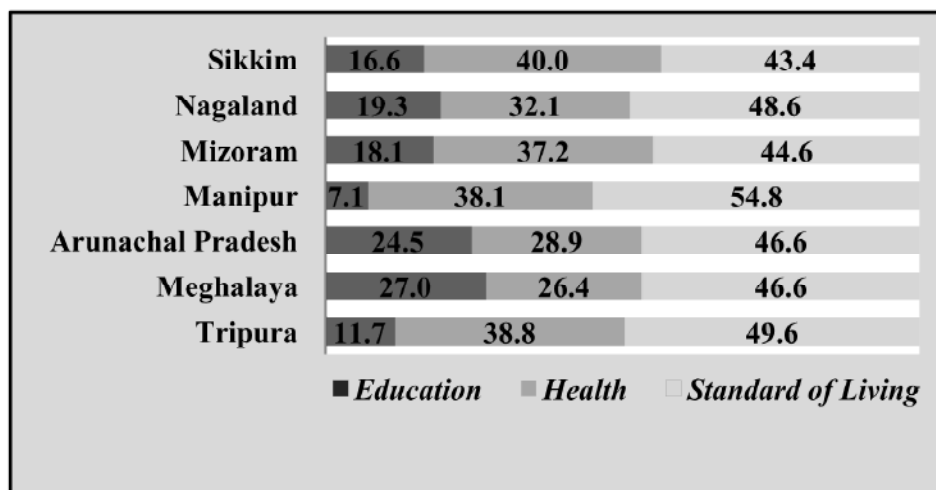
Figure 4(g): Dimension-wise Contribution to the MPI: Urban

State	Education	Health	Standard of Living
Sikkim	21.1	56.1	22.8
Nagaland	18.9	38.9	42.2
Mizoram	8.3	68.8	22.9
Manipur	7.1	45.5	47.4
Arunachal..	21.7	44.4	33.8
Meghalaya	13.2	45.7	41.1
Tripura	7.0	58.7	34.3

■ *Education*   ■ *Health*   *Standard of Living*
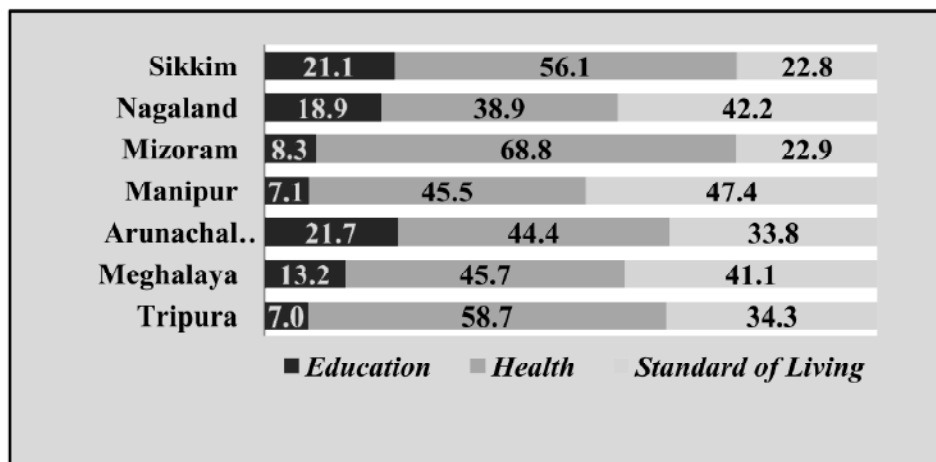
Similarly, deprivations in standard of living dimension contribute 53.3 per cent to poverty for the state of Manipur while indicator specific contributions are diverse: Safe Drinking Water (9.3 per cent), Sanitation (4.8 per cent), Cooking Fuel (12.8 per cent), Housing Type (10.9 per cent), Electricity (4.5 per cent) and Assets (11.6 per cent) (Table 4) .The deprivation in health dimension contributes 39.5 per cent to the MPI, with differences in indicator specific contributions mortality (8.8 per cent) and mal nutrition (30.7 per cent). Malnutrition is highest contributor to MPI for all states of NER among the ten indicators of multidimensional poverty. Cooking fuel, housing type and asset holding indicators for the standard of living dimension are other major contributors to MPI for the NER states.

Table 4: Indicator-wise Contribution to the MPI across Rural and Urban Areas in NER States

Rank As per MPI	Name of the States	Area	Education			Health			Standard of Living			
			D_{11}	D_{12}	D_{21}	D_{22}	D_{31}	D_{32}	D_{33}	D_{34}	D_{35}	D_{36}
1	Tripura	Overall	2.0	9.2	8.3	32.4	4.5	5.1	13.2	12.7	2.4	10.2
		Rural	2.1	9.6	6.9	31.8	4.9	5.4	13.4	13.0	2.6	10.3
		Urban	1.6	5.4	21.1	37.6	0.6	2.6	11.2	10.4	0.6	8.9
2	Meghalaya	Overall	6.9	19.1	3.7	24.2	4.5	6.9	12.8	8.9	2.8	10.3
		Rural	7.1	19.9	3.2	23.1	4.6	7.0	12.9	8.9	3.0	10.3
		Urban	4.4	8.8	9.7	36.1	3.5	6.0	11.9	9.4	0.4	9.8
3	ArunachalPradesh	Overall	7.3	17.0	8.9	21.3	2.4	8.0	12.0	10.8	3.2	9.3
		Rural	7.3	17.2	8.4	20.5	2.5	8.3	12.3	10.8	3.4	9.3
		Urban	7.1	14.6	13.7	30.7	1.5	4.3	8.1	9.8	0.8	9.4
4	Manipur	Overall	1.7	5.4	8.8	30.7	9.3	4.8	12.8	10.9	4.5	11.1
		Rural	1.6	5.5	7.7	30.4	9.5	5.1	13.1	11.0	4.8	11.3
		Urban	2.0	5.1	13.5	31.9	8.1	3.5	11.7	10.4	3.2	10.6
5	Mizoram	Overall	3.7	12.2	13.3	31.0	5.1	5.1	10.9	8.5	1.6	8.6
		Rural	4.0	14.1	8.8	28.4	6.0	5.8	12.1	9.3	2.0	9.5
		Urban	2.7	5.6	28.8	40.0	2.0	2.5	6.6	5.9	0.4	5.5
6	Nagaland	Overall	3.6	15.6	6.4	26.9	6.4	3.4	13.6	11.9	0.6	11.6
		Rural	3.2	16.1	5.8	26.4	6.5	3.7	13.8	12.1	0.7	11.7
		Urban	5.9	12.9	9.3	29.6	6.3	2.0	12.3	10.8	0.0	10.9
7	Sikkim	Overall	2.0	15.1	13.1	28.6	5.9	1.5	12.6	8.6	0.8	11.9
		Rural	1.5	15.2	12.7	27.2	6.4	1.6	13.3	8.9	0.9	12.3
		Urban	7.1	14.0	16.1	40.0	0.9	0.5	6.4	5.8	0.2	9.0

Source: Authors' Estimation, 2018

Notes: D11 denotes Currently School Attendance; D12 denotes Highest Years of Schooling, D21 denotes Mortality, D22denotes Malnutrition, D31 denotes Safe Drinking Water; D32 denotes Sanitation; D33 denotes Cooking Fuel; D34 denotes Housing Type; D35denotes Electricity; D36denotes Assets

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5. Conclusion

Monetary and non-monetary poverty do not seem to be linearly related as there has been an interchangeable position in terms of monetary and non-monetary poverty for some of the states in NER. The Alkire-Foster counting approach exemplifies that there has been huge diversity in their situation of multidimensional poverty both in terms of incidence and intensity of poverty. Although, there has been reduction in multidimensional poverty across rural and urban areas for the states of NER compared to 2005,, but all the states do not experience similar reduction. The intensity of poverty is almost same for all states, but incidence of poverty varies across the states. The censored headcount ratios and decomposition of multidimensional poverty indicate that some of the indicators are more crucial; e.g. malnutrition is found to be the most vital health indicator for majority of the north-eastern states with a higher contribution to the overall MPI values. Further, the study indicates that there has been enough scope of disaggregation of multidimensional poverty across indicators,, household categories, age group wise and so on. The future attempts in this regard would indeed contribute significantly towards developmental policy formulation for the development of the NER states. This shows that there is need for a target based policy approach taking into consideration the extent of multidimensional poverty across states, including dimensions and indicators.

This shows that there is need for a target based policy approach taking into consideration the extent of multidimensional poverty across states, including dimensions and indicators. A universal policy in addressing development concerns of North East often obscures the interstate and intra state differences in poverty and its dimensions. There is need for shift in policy thrust in addressing poverty, underdevelopment and growth where individual state concerns need to be prioritized and addressed taking into consideration the variations across multidimensional deprivation levels in the states.

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Table A1: Performance of NER States in Terms of Income, Poverty and Other Social Indicators

Indicators		Year	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	Kerala	India
Income	PCNSDP	1993-94[6]	39054	27630	25349	25293	32995	29760	20010	14342	35564	25261
		2015-16[6]	100387	48465	45652	59949	91985	61363	193569	58888	119763	77803
	GWPCNSDP (%)		**4.41**	**2.64**	**2.82**	**4.40**	**6.77**	**3.62**	**11.18**	**7.20**	**5.96**	**5.29**
Income Poverty	Total (%)	2009-10[3]	31.9	42.5	54.1	28.0	27.3	18.3	23.1	20.1	16.0	38.2
		2011-12[3]	37.4	40.9	46.7	24.4	27.4	14.0	17.8	24.9	11.3	29.5
	Change(%)		**5.5**	**-1.6**	**-7.4**	**-3.6**	**0.1**	**-4.3**	**-5.3**	**4.8**	**-4.7**	**-8.7**
MPI	Overall	1998-99[7]	0.226	0.345	0.212	0.358	0.155	0.246	0.173	0.276	0.136	0.300
		2005-06[7]	0.260	0.285	0.148	0.297	0.094	0.218	0.132	0.226	0.038	0.251
	Change		**0.034**	**-0.06**	**-0.064**	**-0.061**	**-0.061**	**-0.028**	**-0.041**	**-0.05**	**-0.098**	**-0.049**
Mortality	IMR	1997[2]	47	76	30	54	19	17	51	51	12	71
		2016[1]	36	44	11	39	27	12	16	24	10	34
	Change		**-11**	**-32**	**-19**	**-15**	**8**	**-5**	**-35**	**-27**	**-2**	**-37**
Nutrition	NIC	2004-05[5]	32.5	36.4	22.2	48.8	19.9	25.2	19.7	39.6	15.9	42.5
		2015-16[5]	19.5	29.8	13.8	29.0	11.9	16.8	14.2	24.1	15.7	35.7
	Change(%)		**-13**	**-6.6**	**-8.4**	**-19.8**	**-8**	**-8.4**	**-5.5**	**-15.5**	**-0.2**	**-6.8**
Immunisation	DPTIR	2004-05[5]	28.4	31.4	46.8	32.9	46.5	21.0	69.6	49.7	75.3	43.5
		2015-16[5]	38.2	47.1	65.8	61.5	50.5	35.7	83.0	54.5	82.1	62.0
	Change(%)		**9.8**	**15.7**	**19**	**28.6**	**4**	**14.7**	**13.4**	**4.8**	**6.8**	**18.5**
Fertility	TFR	2004-05[5]	3.0	2.4	2.8	3.8	2.9	3.7	2.0	2.2	1.9	2.7
		2015-16[5]	2.1	2.2	2.6	3.0	2.3	2.7	1.2	1.7	1.6	2.2
	Change		**-0.9**	**-0.2**	**-0.2**	**-0.8**	**-0.6**	**-1**	**-0.8**	**-0.5**	**-0.3**	**-0.5**
Education	Literacy (%)	2001[4]	54.3	63.3	70.5	62.6	88.8	66.6	68.8	73.2	90.9	64.8
	Literacy (%)	2011[4]	66.6	73.2	79.9	75.5	91.6	80.1	81.4	87.2	93.9	74.0
	Change(%)		**12.3**	**9.9**	**9.4**	**12.9**	**2.8**	**13.5**	**12.6**	**14.0**	**3.0**	**9.2**
Access of Facility	ISNF (%)	2004-05[5]	39.6	30.7	30.2	37.6	75.5	46.5	60.7	51.5	90.5	29.1
		2015-16[5]	61.3	47.7	49.9	60.3	83.5	75.2	88.2	61.3	98.1	48.4
	Change(%)		**21.7**	**17**	**19.7**	**22.7**	**8**	**28.7**	**27.5**	**9.8**	**7.6**	**19.3**
	IDWF (%)	2004-05[5]	85.0	72.5	52.1	63.1	85.0	62.8	77.6	76.1	69.1	87.6
		2015-16[5]	87.5	83.8	41.6	67.9	91.5	80.6	97.6	87.3	94.3	89.9
	Change(%)		**2.5**	**11.3**	**-10.5**	**4.8**	**6.5**	**17.8**	**20**	**11.2**	**25.2**	**2.3**

Sources: 1 SRS Bulletin Vol.51 (1), September, 2017, Registrar General, India.

2   *SRS Bulletin Vol.33 (1), April, 1999, Registrar General, India. (For the state of Nagaland data are taken for year 2004.)*

3   *Report of the Expert Group to Review the Methodology for Measurement of Poverty, Planning Commission, June 2014, Govt. of India*

4   *Data-Book Compiled for use of Planning Commission , Planning Commission, December 2014, Govt. of India, http:// planningcommission.gov.in*

5   *NFHS-4 (2015-16)Ministry of Health and Family Welfare, Govt. of India*

6   *RBI Report 2007-08 and 2016-17, Govt. of India*

7   *Alkire & Seth (March 2013) – OPHI-WP60*

Notes: *PCNSDP means Per Capita Net State Domestic Product At Constant (2011-12) Prices{PCNSDP for Mizoram taken at 2000-01}; GWPCNSDP denotes Annual Average Growth rate of Per Capita Net State Domestic Product [At Constant (2011-12) Prices]; IMR denotes Infant Mortality Rate (per 1,000 live births); NIC denotes Nutritional Information of Children under 5 years who are underweight (weight-for-age); DPTIR denotes DPT Immunisation Rate; TFR denotes Total fertility rate (children per woman); ISNF denotes Improved Sanitation Facility; IDWF denotes Improved Drinking Water Facility; LR denotes Lorenz Ratio from Monthly Per Capita Expenditure (MPCE) based on MRPTable A2Dimensions, Indicators, Deprivation Cut-offs and Weights for the MPI*

Table A2: Dimension weights and cut offs used

Dimension (Weight)	Indicator (Weight)	Deprivation Cut-off
Education (1/3)	Years of Schooling (1/6)	Deprived if at least any adults member of household has not completed primary level of education
	Child Enrolment (1/6)	Deprived if any school-aged child (6-14years) in the household is not attending school in the academic years
Health (1/3)	Mortality (1/6)	Deprived if any member of the household including children has died in the family since 2008
	Nutrition (1/6)	Deprived if any adult or child for whom there is nutritional information is malnourished
Standard of Living (1/3)	Electricity (1/18)	Deprived if the household has no electricity
	Drinking water (1/18)	Deprived if the household does not have access to clean drinking water
	Sanitation (1/18)	Deprived if they do not have an improved toilet or if their toilet is shared
	Flooring (1/18)	Deprived if the household has kachha House or other
	Cooking Fuel (1/18)	Deprived if they cook with fire wood, crop-residue, kerosene or cow-dung-cake
	Assets (1/18)	Deprived if the household owns any of the following assets: television, radio, telephone or mobile, Watch/ Clock, By-cycle, cart driven by animal or other cart. At the same time, does not own any of the following assets: a refrigerator, a motorbike, a car, a computer, washing machine, sewing machine, Air Conditioner, water pump, a thresher, or a tractor

Table A3: Uncensored Head Count Ratio across the States of NER

Rank As per MPI	Name of the States	Area	MPI	Education		Health		Standard of Living					
				D_{11}	D_{12}	D_{21}	D_{22}	D_{31}	D_{32}	D_{33}	D_{34}	D_{35}	D_{36}
1	Tripura	Overall	0.146	1.8	8.5	10.2	44.6	19.5	20.6	76.5	68.8	8.8	52.7
		Rural	0.179	2.2	10.7	9.4	46.4	26.1	26.3	91.8	82.2	11.6	59.8
		Urban	0.053	0.5	2.1	12.5	39.4	0.9	4.3	33.0	30.6	0.8	32.4
2	Meghalaya	Overall	0.135	6.1	18.6	4.2	32.1	20.3	30.5	85.2	39.5	9.8	67.0
		Rural	0.158	7.3	22.5	3.7	32.8	24.0	35.0	95.4	44.7	12.3	72.7
		Urban	0.048	1.5	4.3	6.1	29.8	6.8	13.8	47.4	20.2	0.4	46.0
3	ArunachalPradesh	Overall	0.132	7.1	16.2	10.3	26.0	9.1	36.7	67.8	56.9	10.7	53.5
		Rural	0.155	7.9	18.9	10.6	26.5	10.7	44.2	81.2	64.4	13.5	57.9
		Urban	0.047	4.3	6.3	9.3	24.4	3.1	10.0	19.8	29.9	0.8	37.8
4	Manipur	Overall	0.115	1.2	4.0	9.1	29.5	50.3	21.6	71.8	57.2	18.7	58.5
		Rural	0.138	1.4	4.8	7.9	30.7	56.6	26.2	84.6	65.4	23.5	67.6
		Urban	0.067	0.9	2.2	11.4	26.9	37.6	12.3	45.8	40.8	8.9	39.9
5	Mizoram	Overall	0.088	2.3	7.4	12.8	42.9	16.2	12.8	46.3	29.4	3.1	31.2
		Rural	0.145	3.6	13.6	11.8	46.5	27.6	22.3	79.1	43.6	6.3	48.0
		Urban	0.037	1.0	1.9	13.7	39.8	6.0	4.4	17.2	16.8	0.4	16.2
6	Nagaland	Overall	0.079	2.2	9.2	4.7	22.6	32.4	12.3	77.7	51.8	1.8	54.8
		Rural	0.095	2.2	11.0	4.5	23.3	34.7	16.0	91.5	61.6	2.5	61.4
		Urban	0.043	2.4	5.0	4.9	21.0	26.9	3.7	45.6	28.9	0.3	39.4
7	Sikkim	Overall	0.072	1.5	8.9	11.0	27.8	21.0	3.3	56.1	25.6	1.6	64.6
		Rural	0.086	1.1	10.3	11.9	27.8	26.2	4.3	72.1	31.9	2.1	73.2
		Urban	0.030	2.8	5.0	8.4	27.6	5.8	0.4	9.4	7.3	0.3	39.8

Source: Authors' Estimation, 2018

Notes: D11 denotes currently School Attendance; D12 denotes Highest Years of Schooling, D21 denotes Mortality, D22 denotes Malnutrition, D31 denotes Safe Drinking Water; D32 denotes Sanitation; D33 denotes Cooking Fuel; D34 denotes Housing Type; D35denotes Electricity; D36 denotes Assets

Table A4: Censored Head Count Ratio across the States of NER

Rank As per MPI	Name of the States	Area	MPI	Education		Health		Standard of Living					
				D_{11}	D_{12}	D_{21}	D_{22}	D_{31}	D_{32}	D_{33}	D_{34}	D_{35}	D_{36}
1	Tripura	Overall	0.146	1.8	8.1	7.2	28.4	11.8	13.4	34.7	33.4	6.4	26.8
		Rural	0.179	2.2	10.3	7.4	34.2	15.8	17.3	43.1	41.7	8.4	33.2
		Urban	0.053	0.5	1.7	6.6	11.9	0.6	2.4	10.6	9.9	0.6	8.4
2	Meghalaya	Overall	0.135	5.6	15.4	3.0	19.5	11.0	16.8	31.1	21.7	6.8	24.9
		Rural	0.158	6.8	18.9	3.0	22.0	13.2	20.0	36.7	25.3	8.5	29.3
		Urban	0.048	1.2	2.5	2.8	10.3	3.0	5.1	10.2	8.1	0.4	8.4
3	ArunachalPradesh	Overall	0.132	5.7	13.5	7.0	16.8	5.7	19.0	28.5	25.5	7.5	21.9
		Rural	0.155	6.8	16.1	7.9	19.1	6.9	23.2	34.5	30.3	9.4	25.9
		Urban	0.047	2.0	4.1	3.9	8.7	1.3	3.6	6.9	8.3	0.7	7.9
4	Manipur	Overall	0.115	1.2	3.8	6.1	21.2	19.1	9.9	26.5	22.5	9.3	22.9
		Rural	0.138	1.3	4.6	6.4	25.2	23.7	12.7	32.6	27.4	12.0	27.8
		Urban	0.067	0.8	2.0	5.5	12.9	9.8	4.2	14.2	12.6	3.8	12.8
5	Mizoram	Overall	0.088	1.9	6.4	7.0	16.3	8.0	8.0	17.2	13.5	2.5	13.6
		Rural	0.145	3.5	12.3	7.7	24.7	15.6	15.1	31.6	24.2	5.1	24.7
		Urban	0.037	0.6	1.2	6.4	8.9	1.3	1.6	4.4	4.0	0.3	3.7
6	Nagaland	Overall	0.079	1.7	7.4	3.0	12.8	9.2	4.9	19.3	16.9	0.9	16.5
		Rural	0.095	1.8	9.1	3.3	15.0	11.0	6.3	23.6	20.6	1.3	20.0
		Urban	0.043	1.5	3.3	2.4	7.6	4.8	1.5	9.4	8.3	0.0	8.3
7	Sikkim	Overall	0.072	0.9	6.5	5.7	12.4	7.6	2.0	16.3	11.1	1.1	15.4
		Rural	0.086	0.7	7.9	6.6	14.1	10	2.6	20.7	13.9	1.4	19.1
		Urban	0.030	1.3	2.5	2.9	7.2	0.5	0.3	3.5	3.1	0.1	4.8

Source: Authors' Estimation, 2018

Notes: D11 denotes currently School Attendance; D12 denotes Highest Years of Schooling, D21 denotes Mortality, D22denotes Malnutrition, D31 denotes Safe Drinking Water; D32 denotes Sanitation; D33 denotes Cooking Fuel; D34 denotes Housing Type; D35 denotes Electricity; D36 denotes Asset.