MEASURING POVERTY IN UTTAR PRADESH, INDIA: FROM UNIDIMENSIONAL TO MULTIDIMENSIONAL APPROACH

Ph.D. THESIS

by

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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE-247 667 (INDIA)
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A THESIS

Submitted in partial fulfilment of the requirements for the award of the degree

of

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ROORKEE

CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled "**MEASURING POVERTY IN UTTAR PRADESH, INDIA: FROM UNIDIMENSIONAL TO MULTIDIMENSIONAL APPROACH**" in partial fulfilment of the requirements for the award of the Degree of Doctor of Philosophy and submitted in the Department of Humanities and Social Sciences of the Indian Institute of Technology Roorkee, Roorkee is an authentic record of my own work carried out during a period from July, 2012 to September, 2018 under the supervision of Dr. S. P. Singh, Professor, Department of Humanities and Social Sciences, Indian Institute of Technology Roorkee, Roorkee.

The matter presented in the thesis has not been submitted by me for the award of any other degree of this or any other institute.

(AKARSH ARORA)

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

(S. P. Singh)
Supervisor

The Ph. D. Viva-Voce Examination of **Mr. Akarsh Arora**, Research Scholar, has been held on.....

Chairperson, SRC **Signature of External Examiner**

This is to certify that the student has made all the corrections in the thesis.

Signature of Supervisor **Head of the Department**

Dated:

Abstract

Uttar Pradesh (U.P) is home to around twenty-two per cent of the poor in India, whereas it holds a share of sixteen per cent of the overall population of the country. Besides this disproportionality, it accounts for the largest proportion of Scheduled Castes (SCs), Muslims and the rural population of India. Looking at geographical differences and social realities within U.P, it is essential to analyse poverty across regions, districts and social and religious groups (SRGs) of the state. However, there is a dearth of studies based on regional and district level statistics and across SRGs in the state. Poverty across SRGs is critically significant to monitor, particularly in recent years, as earlier data could not include Other Backward Classes (OBCs) as a separate category due to the unavailability of classified data. Beyond the domain of analysis, there is conceptual and normative justification related to the notion of poverty that is largely neglected by earlier studies on poverty. As far as the Indian notion of poverty is concerned, identification of the poor is mainly limited to food-related dimensions, following prescribed norms of either minimum calories or subsistence nutritional requirements. However, interest demands a multidimensional assessment of poverty.

The present study undertakes unidimensional and multidimensional notions of poverty to build a comprehensive scenario of poverty prevailing in U.P. Starting with overall state analysis, it proceeds by segregating populations across four economic regions—Western (WR), Central (CR), Southern (SR), and Eastern (ER)—and among three major social groups (SCs, OBCs and 'others' representing upper castes), and two major religions (Hindus and Muslims). The unidimensional notion of poverty is measured in terms of consumption expenditure, using the unit level records of four quinquennial Consumption Expenditure Survey of NSSO (38th, 50th, 61st, and 68th) by classifying the study period into three phases; first decade (1983 to 1993-94); second decade (1993-94 to 2004-05) and the contemporary period (2004-05 to 2011-12). District-wise analysis of unidimensional poverty can only be carried out for the contemporary period with the availability of unbiased estimates. Consumption poverty is aggregated in terms of the total number of poor, levels of poverty, and differences in poverty. The levels of poverty are assessed in terms of Headcount Ratio (*HCR)*, Poverty Gap Ratio (*PGR)* and Square Poverty Gap Ratio *(SPGR)*, which target nearly poor, moderately poor or poorer, and severely poor or ultra-poor populations, respectively. The differences in poverty have been analysed by absolute and relative poverty risks. It also

examines the proximate factors underlying poverty differences at the inter-regional and inter-group levels in rural and urban areas of the state during 2004-05 and 2011-12, using survey logistic regression.

The second notion, Multidimensional Poverty, comprises the construction of the Uttar Pradesh Multidimensional Poverty Index (UP-MPI) that includes three dimensions—education, health, and standard of living (SOL), which are represented by ten indicators such as years of schooling, child school attendance, undernutrition, child mortality, electricity, safe drinking water sources, improved sanitation, safe cooking fuel, housing structure and assets. A household is considered deprived when no household member has completed at least six years of schooling or there exists a child aged 7 to 14 who is not attending the school. A household is also considered deprived if there exists an underweight woman (15–49 of age) or a stunted child or a child death within the last five years of the survey. Furthermore, a household is deprived if it has no access to electricity; clean/safe drinking water sources (or if a source of clean/safe drinking water is located at 30 minutes or more walk from home, roundtrip); improved sanitation(or if improved but shared); safe sources of cooking; or if the structure of the house is *kachha* type; or if household do not own at least one asset related to access to information (radio, TV, telephone) and one asset related to mobility (bike, motorbike, car, truck, animal cart, tractor) or at least one asset related to livelihood (refrigerator, arable land, livestock).

These three dimensions are equally weighted (33.33% each), and that is distributed equally across indicators. Finally, any household whose total deprivation count is higher than or equal to poverty cut (k=33.3%) is considered an MD poor. After identification, the aggregation of MD poverty is estimated by way of Headcount (*H)* and Intensity (*A)* components of UP-MPI. The former defines the incidence (or proportion) of people that are MD poor and the latter refers to the intensity of poverty which is the average deprivation of the MD poor people. The UP-MPI in the form of an index is computed as a product of *H* and *A.* The value of the UP-MPI index represents the share of the population that is MD poor adjusted by the intensity of the deprivation suffered. Next is the decomposition of UP-MPI in the sense of contributions to overall poverty, first by dimensions and indicators, and then by population subgroups (including social groups, religious groups and four classified regions of rural and urban U.P).

The estimation of UP-MPI spanning a period of more than two decades (1992-93 to 2015-16) based on four rounds of National Family Health Survey (NFHS), conducted

respectively during 1992-93 (NFHS-1), 1998-99 (NFHS-2), 2005-06 (NFHS-3), and the latest during 2015-16 (NFHS-4). MD poverty is also estimated for the same classification of subgroups that was done for consumption poverty so that both types of poverty can be compared meaningfully. However, the disaggregated and regional profile of MD poverty can only be analysed for the latest NFHS-4. After refining the sample, it is estimated that in all four NFHS, not less than 85 per cent of the original sample is being utilised in any case, except for WR (NFHS-4). Moreover, to balance the non-eligible and missing observations, an adjustment procedure for the re-sampling of weights suggested by Alkire and Santos (2015) and Kovacevic and Calderon (2014) has been followed. The precision of UP-MPI estimates is tested on grounds of mismatches in the identification of MD poor when equated with other notions of poverty (wealth and consumption), followed by correlation analysis and conditional probabilities associated with them. The robustness of UP-MPI estimates is determined by a sensitivity analysis of the changes in deprivation weights and poverty cut-offs (k=33.3%).

The study foregrounds the grim poverty scenario prevailing across rural CR and urban ER of the state. These two regions have emerged out as critically poor on various grounds. For both consumption and MD poverty, contemporary changes in the levels of poverty, particularly in favour of SCs (rural), OBCs (urban) and Muslims (rural and urban) bring out shrinking inter-group differences in poverty. Besides this decline, the levels of poverty are still high among them. The majority of Muslims and SCs in the state have remained impoverished over a long period. Poor SCs and Muslims are relatively more intensely deprived across dimensions and indicators, which signal the historical roots of poverty or the chronic state of poverty among them.

Regression estimates find that SCs and Muslims are poor largely on similar grounds such as illiteracy, casualisation of the workforce and the sudden increase in poverty in CR in general and low engagement in self-employment agricultural occupation, large household size, marginal land holdings and backwardness of rural ER in particular to rural households. The two most unfortunate facts observed among SCs are that even the Semi-medium landholders (more than two but less than or equal to four hectares) are poor, and for any given category of occupation, they experienced the highest poverty in both rural and urban areas during 2011-12.

Traditionally, the poor in the state are mostly deprived among SOL indicators in general. Recently, in 2015-16, health deprivation played a significant role for almost all the

population subgroups under consideration, due to the presence of at least a stunted child or an undernourished woman. Exceptions are the poor Muslims who have been relatively more deprived in both the indicators of education in both rural and urban areas of the state over the last two decades. In addition to undernutrition, poor people are most often deprived in sanitation, cooking fuel and electricity. In general, deprivation in water, child mortality, housing and assets is relatively low in the state.

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I firmly believe in Mother Teresa's reasoning that "when a poor person dies of hunger, it has not happened because God did not take care of him or her. It has happened because neither you nor I wanted to give that person what he or she needed". Fortunately, God has given me the ability to write a thesis on poverty but it has really been a journey too long and hard. A formal statement of affirmation will barely communicate the feeling of appreciation and commitment to everyone who helped me in the fruition of this undertaking. Without their help, direction and support, it would not have been a fruitful journey.

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(Akarsh Arora)

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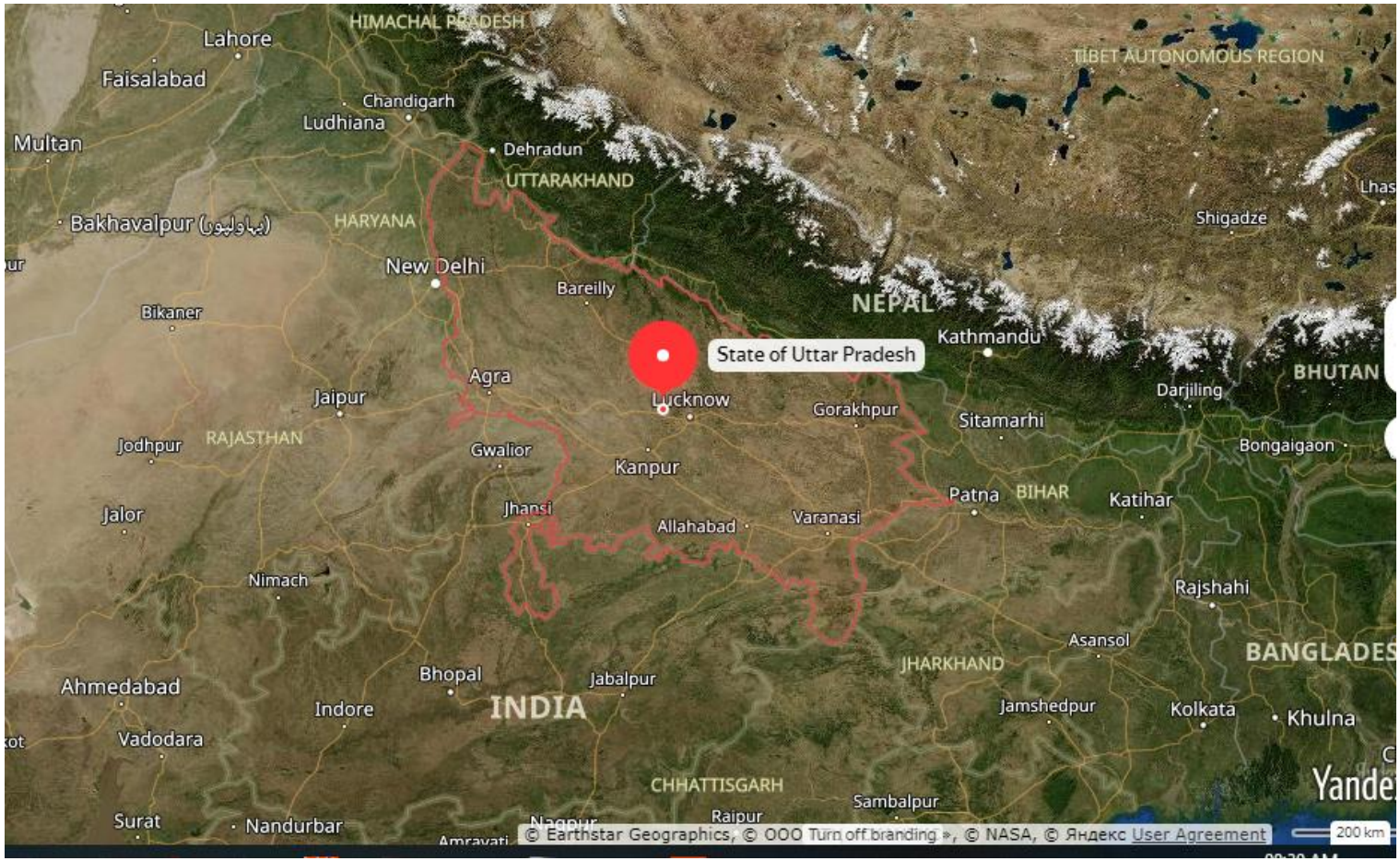
Abbreviations

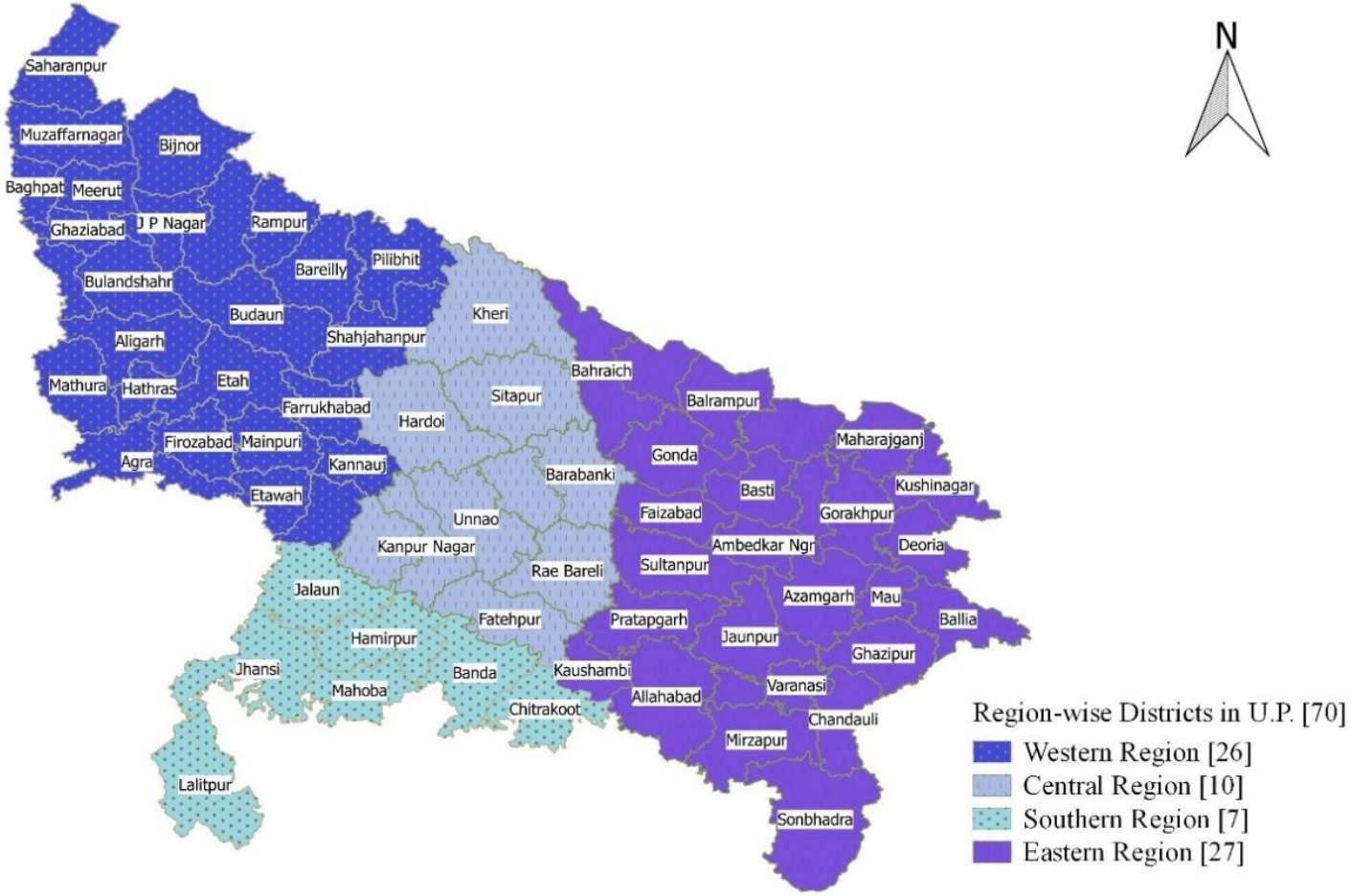
BPL	Below Poverty Line
CES	Consumption Expenditure Survey
CI	Confidence Interval
CR	Central Region
DHS	Demographic and Health Survey
ER	Eastern Region
HCR	Headcount Ratio
IMR	Infant Mortality Rate
JMP	Joint Monitoring Programme for Water Supply and Sanitation
LEG	Lakdawala Expert Group
MD	Multidimensional
MDGs	Millennium Development Goals
MPCE	Monthly Per-capita Consumption Expenditure
MPI	Multidimensional Poverty Index
MRP	Mixed Reference Period
NFHS	National Family Health Survey
NSSO	National Sample Survey Office
OBCs	Other Backward Classes
PCI	Planning Commission of India
PGR	Poverty Gap Ratio
PSMS	Poverty and Social Monitoring Survey
SCs	Scheduled Caste
SDGs	Sustainable Development Goals
SPGR	Square Poverty Gap Ratio
SR	Southern Region
SRGs	Social and Religious Groups
TEG	Tendulkar Expert Group
U.P	Uttar Pradesh
U-5 MR	Under-Five Mortality Rate
UP-MPI	Uttar Pradesh-Multidimensional Poverty Index
URP	Uniform Reference Period
WHO	World Health Organisation
WR	Western Region

Location of Uttar Pradesh



Coordinates: 26.85°N 80.91°E *Source: yandex.com*

Uttar Pradesh District Map



Note: Figures in parentheses represents the number of districts

CHAPTER 1

Introduction

1.1 The Context

The doctrine of the vicious circle of poverty argues that "a country is poor because it is poor" (Nurkse 1952). It highlights that the dominant source of economic backwardness and poverty is significantly linked. Indian economic backwardness has usually been associated with the BIMARU[1] states way back since the eighties. As far as poverty contributions are concerned, even after three decades, these states[2] hold more than half of the poor population of the nation (Government of India 2013a, 2014d), while their share in the total population is 42.4 per cent as per the 2011 India Population Census. These states bear a comparatively high poverty burden and are at risk of high poverty. Further disaggregating these estimates among the states discloses that around 22 per cent of the country's poor population originated from U.P, which has a 16 per cent share of the total population of India. Besides high population and impoverishment, U.P accounts for the largest proportion of SCs (20.5%[3]), Muslims (22.3%[4]) and rural (18.6%) populations[5] of India. In such a larger state, there is a possibility that a few of the subgroups are so deprived that the entire state comes to be seen as impoverished. It is often argued that poverty in bigger states like U.P cannot be eliminated unless disaggregated analysis is conducted, and policy prescriptions are made accordingly (Chaudhuri and Gupta 2009, Diwakar 2009, Odhiambo 2015, Chauhan et al. 2016, Coondooa, Majumdera, and Chattopadhyaya 2011). Furthermore, "poor countries with poor regions may find ethnic or racial tensions exacerbated by income disparities leading to interregional tensions that make both regions and the country as a whole riskier to invest in" (Perry et al. 2006). In this regard,

[1] The term BIMARU was coined by Bose (2007) acronym with four North Indian states- Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh- to pinpoint India's demographic malady and also in resembles with Hindi word meaning 'ill', 'sick' or 'unwell'.

[2] Including bifurcated parts/ states such as U.P and Uttarakhand, Bihar and Jharkhand, Madhya Pradesh and Chhattisgarh.

[3] Based on Population Census 2011 of India, U.P comprises the highest number of SC's, i.e., 41.4 million (20.5 % of the country's SC population).

[4] Based on Population Census 2011 of India, U.P holds the highest proportion of the country's Muslim population (38.48 million or 22.34%).

[5] The state also possesses the second highest proportion of urban population (11.80%), after Maharashtra (13.48%).

an important step to redress poverty is to identify subgroups, which are exceptionally poor. Since resources to be deployed to combat poverty are limited, such types of targeted interventions can be considered a suitable solution to eradicate poverty.

Most often, studies dealing with poverty analysis in India could not go beyond state-level estimates. However, in recent times, some of the government, as well as non-government studies, have explored the disaggregated patterns of poverty in U.P (Government of Uttar Pradesh 2014a, b, 2011, Government of Uttar Pradesh and The World Bank 2006, Government of Uttar Pradesh 2002, Kozel and Parker 2003, Ojha 2007, Diwakar 2009, Kapur et al. 2010, World Bank 2010). Nevertheless, there is a dearth of studies based on regional and district level statistics and across social and religious groups, particularly for measuring poverty in U.P.

Beyond the domain of analysis, there is conceptual and normative justification related to the notion of poverty that is largely neglected by poverty studies. As far as the Indian notion of poverty is concerned, identification of the poor is mainly limited to food-related dimensions, following prescribed norms of either minimum calories or subsistence nutritional requirements. Based on household consumption expenditure to meet these norms, a poverty line is drawn such that those, having consumption expenditure below it, are considered poor[6]. Certainly, the identification of 'Who is Poor?' is essential in determining the level of poverty. That is why different panels of experts have prescribed specific norms for identification of the poor in India. However, the Indian notion of poverty sticks to only one aspect of deprivation, the minimum level of consumption expenditure considered necessary for subsistence.

Eradication of poverty—whether it is understood in terms of basic needs, well-being, capabilities and freedom, human rights, or some form of generally agreed consensus as specified in MDGs and SDGs—includes manifold aspects of life. The conventional form of poverty, mostly in terms of income and consumption, reflects only the material aspects of it. Obviously, these are amongst the vital considerations, but their sole bases can reflect that these indicators are only supposed to be the proximities for the manifold aspect of life. Moreover, monetary poverty does not give any importance to specific deprivations. This

[6] In India, the official national estimation of poverty is done by the Planning Commission (now, reconstituted as NITI Ayog) based on NSSO quinquennial Consumption Expenditure Surveys, but a Census to identify the Below Poverty Line (BPL) households has been conducted by the Ministry of Rural Development, time-to-time.

implies perfect substitutability between items through relative prices, which does not pass muster on ethical grounds.

The origin of poverty studies has a history of more than a century. However, conceptual enrichment began in the 1970s (Fusco 2003). Since then, the debate recognising multidimensional aspects of poverty has included the "social exclusion approach" (Saith 2001), the absolute and relative terms of poverty between Townsend (1979) and Sen (1983), and the capability approach of Sen (1985), and finally the composite form of the Human Poverty Index (UNDP 1997, 2007). It can be observed that until the end of the last century, almost all the studies on poverty analysis carried a unidimensional approach, based mainly on income or consumption information. When the notion of poverty is multifaceted, why do its measurements often recognise it merely in terms of income and expenditure? The research on Multidimensional (henceforth MD) aspects of poverty has mainly been initiated steadily in the last decade (Ferreira and Lugo 2013, Lustig 2011, Alkire 2009), and the literature available on it is limited in comparison to unidimensional poverty (Jayaraj and Subramanian 2010). Now, many researchers recognise the deviation from unidimensional measures towards MD approaches of poverty, conceptually and empirically, as it has wide acceptability and satisfies both normative as well as empirical motivations (in terms of mismatches between unidimensional and MD Poverty). Moreover, the data adequacy and robust computation techniques convince one in favour of it. Recently, the arena of poverty studies, specific to its measurement, recognises the MD aspect of poverty along with the heterogeneity of the poor. Equating the deprivation in U.P with the most agreed notions of poverty among the rest of the world could provide a chance to compare levels of poverty across the globe. A fact-finding exercise like the present study is often considered essential for framing anti-poverty policies. With this motivation, the present study aims to introduce the MD assessment of poverty in U.P, a most deserving arena for poverty studies.

1.2 Motivation For The Study

Studies on poverty analyses in India have primarily concentrated discussions at the aggregate level by considering states as one subgroup. There is an apparent dearth of studies covering poverty analyses exclusively among poorer states, particularly U.P. There are clear-cut four motivations for measuring poverty in the state as follows: First, it is one of the most populated states in India. As per the 2011 population census, it contributes about 16.5 per

cent of the overall population and 18.6 per cent of the rural population of the nation[7]. The state also has the highest proportion of SC[8] (20.5%) and Muslim[9] (22.3%) population of India. Second, it is one of the most impoverished states in India (World Bank 2010, Kozel and Parker 2003, Drèze and Gazdar 1997). According to the Planning Commission (Government of India 2013a, 2009c), the state hold the highest proportion of the consumption poor population of the country during 2004–05 (17.94%) and 2011–12 (22.17%). In addition, it is highly deprived in number of health parameters. As per NFHS-4, U.P possesses the highest rate of under-five mortality (78 deaths per 1,000 live births) and perinatal mortality (56 deaths per 1,000 pregnancies). As per the Annual Health Surveys, the state has the highest prevalence of stunting (in the 18-59 age group) and underweight (in the 18-59 age group) in India. Third, with the emergence of the Bahujan Samaj Party (BSP), the state has witnessed a resurgence of the Dalit movement with a clear political agenda to capture the state power for bringing socio-economic changes in their lives. Fourth, the state is large and divided into four economic regions (WR, CR, SR, and ER) that have significant differences in terms of various socio-economic development indicators.

The conventional notion of poverty across the globe as well as in India at large is under the preview of discussion due to various normative and theoretical arguments in favour of MD notion of poverty. Generally, the interest in MD measures of poverty increases due to the recognition of MD needs of the poor by the participatory studies and the consensus on the dimensions of poverty. The advancement of data sources and computation techniques is also helpful in assessing MD poverty. With the growth and development of MD poverty studies across the globe, the present work strengthens the interest in studying MD poverty in U.P.

1.3 Research Objectives

Going beyond the conventional consumption notion of poverty, the study aims to explore the poverty profile among three mutually exclusive stratifications of the population (regions, districts, social and religious groups) spanning the last three decades (1983 to 2011-12) in reference to identifying the historical roots of poverty. It is based on the comparative poverty

[7] The state also possesses the second highest proportion of urban population (11.80%), after Maharashtra (13.48%).
[8] Based on Population Census 2011 of India, U.P comprises the highest number of SC's, i.e., 41.4 million (20.5 % of the country's SC population).
[9] Based on Population Census 2011 of India, U.P holds the highest proportion of the country's Muslim population. (38.48 million or 22.34%).

line, using the unit level records of four quinquennial rounds of NSSO's Consumption Expenditure Surveys. Besides other subgroups, it particularly intends to find critical districts where poverty is alarming. Moreover, a recent, more demanding MD notion of poverty is a primary subject of exploration for the present study, by using the last four rounds of NFHS. Based on these two notions of poverty, the study identifies the differences in levels of poverty across population subgroups.

Following the existing literature and realising the need for a state-specific comprehensive study decoding the dynamics of poverty in U.P, the study frames the path of research with the following specific objectives:

1. To measure the extent of consumption poverty across regions, districts, and social and religious groups (SRGs) in rural and urban Uttar Pradesh.
2. To examine the proximate factors influencing the level of poverty among population subgroups.
3. To construct the Multidimensional Poverty Index (UP-MPI) for Uttar Pradesh and to compare the multidimensional poverty across the regions and SRGs.
4. To test the precision of UP-MPI estimates in terms of mismatches with other notions of poverty and the robustness of poverty rankings.

1.4 Scope and Relevance of the Study

The conventional approach to poverty characterises the poor mainly as per the shortfall in economic or monetary indicators (in terms of income or consumption). Theoretically, it is governed by the notion of 'lack of economic welfare' designed on the criteria of utility and thus, warrants the proxy of well-being. There are several shortcomings to this line of reasoning. It is a reductionist approach to human well-being oblivious to the intrinsic needs of the poor and denies their right to choose between different alternatives (Fusco 2003, Bisiaux 2013). Moreover, the approach was criticised heavily as it failed to predict the complex reality of poverty. That is why Sen (1999) recommended that income based analysis of poverty, should only be the beginning in studying poverty. These criticisms have called for an alternative paradigm on well-being in the form of a direct multidimensional poverty assessment. Additionally, the multidimensional notions such as Sen's capabilities and functionings allow us to have a more shaded comprehension of poverty because it takes into account its complex and pervasive nature (Fusco 2003).

The present study documents reliable estimates of consumption and MD poverty in

U.P over the last few decades. The UP-MPI, which includes three dimensions (education, health, and standard of living) represented by ten indicators, is based on the capabilities and functioning approach of Sen. It opens a discussion towards the human development aspects of life, particularly in U.P, one of the most populated and impoverished states in India. Estimates have been comprehensively presented for the selected SRGs and regions of the state over the period. Poverty across social groups is critically significant to monitor, particularly in recent years, as earlier data could not include Other Backward Classes (OBCs) as a separate category due to the unavailability of classified data. Moreover, it is useful to see the leading components of deprivation across and within population subgroups because such type of analysis can be used to design the effective sequence of poverty interventions. These estimates permit the recommendation of structural socio-economic policies that could break the intergenerational reproduction mechanism of poverty in the long-term (Fusco 2003). The MD poverty assessment, particularly in terms of UP-MPI, can be useful in several ways. It can supplement or combine with PCI's consumption poverty; can be useful to monitor and compare the level and composition of poverty; can serve as an ingredient to evaluate the impact of government programmes, and can identify the historical roots or chronic state of poverty among population sub-groups. The analysis would augment the extant literature, help the academicians, policy makers, state planners, and programme executives to explore the spread and distribution of poverty with different dimensions at the disaggregated level, and direct the allocation of resources to combat it.

1.5 Key Terms and Concepts used in the Study

Poor and Deprived: A person is deprived in a particular indicator if his/her achievement in that indicator is below the minimum limit as per the definition. For example, in the case of years of schooling indicator, a household is considered deprived when no member has completed six years of schooling. The deprivation in all the indicators is summed up and weighted to get the total deprivation count. If it is more than a selected poverty cut-off, a household is then considered poor.

Headcount (HCR), Censored and Uncensored Headcount (H) ratio**:** A headcount ratio is simply a proportion of poor among the total population (number of poor/ total population), often referred to as the incidence of poverty. The present study uses *HCR* and *H* to distinguish headcount between consumption and MD poverty specifically. In the MD poverty case, household is firstly identified as poor depending upon its total deprivation score and

poverty cut-off. The UP-MPI considers only the deprivations of the MD poor. This process is called censoring, since it ignores deprivations of households that do not reach the poverty cut-off. A censored headcount ratio (*H*) is the proportion of households who are poor and deprived in each of the indicators. This is different from the uncensored (or raw) *H* in the sense that it only consider the deprivations of the household, irrespective of poor or non-poor status.

URP and MRP: Consumption poverty is measured based on monthly per-capita consumption expenditure of households (MPCE). MPCE is calculated for food and non-food items. At present, there are three reference points used for estimating MPCE. The first one is the Uniform Reference Period (URP) where estimates of food and non-food items are recorded on the recall period of "last 30 days"; the second one is the Mixed Reference Period (MRP) where food and non-food items are recorded on the recall period of "last 30 as well as last 365 days". The items that were recalled for "last 365 days" are basically low-frequency items such as clothing, bedding, footwear, education, medical (institutional), durable goods, and the rest of the items were on 30-days recalled period. The third reference point used to measure MPCE is Mixed Modified Reference Period, which is based on the '7, 30 and 365' days recalled period and had started only from 66th NSS round (2009-10). Prior to the 50th NSS round (1993-94), only URP reference points were used to compute MPCE. It is from the 55th NSS round from where MPCE is based on MRP. The present study considers the URP and MRP basis of MPCE as per the data available in the Consumption Expenditure Surveys.

LEG and TEG: The Planning Commission of India (now NITI Ayog) constituted a panel of experts to estimate the poverty line. The first panel of experts was constituted under the chair of Prof. D. T. Lakdawala that gave the state-wise poverty line for the year 1983, based on the URP of MPCE. The term LEG is used to represent Lakdawala's Expert Group poverty line. Later in 2005, another expert group was constituted under the chair of Prof. Suresh Tendulkar that considered MRP-based consumption expenditure for the poverty line. The term TEG is used for Tendulkar's Expert Group poverty line, to distinguish between the two.

Population Subgroups and Subgroups: For the present study, the term subgroups include social and religious groups (SRGs), whereas population subgroups cover the complete section of subgroups: regions and districts along with SRGs.

1.6 Structure of the Thesis

The thesis has been organized into nine chapters as follows:

1. **Introduction** —includes the general background, motivation and objectives of the study, key terms and concepts used, along with the organisation of the thesis.

2. **Review of the Literature** —discusses relevant literature on the unidimensional and MD aspects of poverty. Studies on unidimensional poverty surveyed first for U.P as a whole and then across its regions, followed by social and religious groups. It also includes a list of important literature on MD poverty representing its origin and development, followed by an amalgamation of global and Indian studies on the MD poverty.

3. **Multidimensional Poverty: Concept and Essence** —presents conceptual and empirical arguments that support MD assessment of poverty. It includes findings drawn from participatory studies, the consensus on the dimensions of poverty, advancement in the relevant data sources and computational techniques.

4. **Data and Methodology** —describes the sources of data, the design of the study, distribution of samples, and the steps to estimate unidimensional and MD measures of poverty. In between, an estimation procedure of regression analysis to identify factors affecting unidimensional poverty is included.

5. **Unidimensional Poverty in Uttar Pradesh: Aggregated and Disaggregated Analysis** — discusses the poverty profile in U.P for three mutually exclusive stratifications, regions (WR, CR, SR and ER), religious groups (Hindus and Muslims) and social groups (SCs, OBCs and 'others') for the period 1983-2011.

6. **Determinants of Unidimensional Poverty: Logistic Regression Analysis** –examines the proximate causes of poverty across subgroups based on survey logistic regression. It includes micro as well as macroeconomic determinants of poverty.

7. **Multidimensional Poverty in Uttar Pradesh: Aggregated and Disaggregated Analysis** — presents UP-MPI estimates for the last two decades in terms of headcount, intensity and overall poverty across regions, districts and major social and religious groups. It includes

decomposition of UP-MPI estimates along with dimensions, indicators, and population subgroups.

8. **Testing Precision of Multidimensional Poverty: Issues of Mismatches and Robustness** — compares three notions of poverty (consumption, wealth and UP-MPI) in terms of correlations analysis, mismatches (exclusion and inclusion errors), and conditional probabilities associated with them, and test the robustness of UP-MPI estimates by changing deprivation weights and poverty cut-off (*k*).

9. **Summary, Conclusions, and Policy Implications** – provides a summary of the overall findings of the study, and conclusions drawn from the analyses carried out in the preceding chapters. It includes policy implications based on the findings of the study for the effective alleviation of poverty from the state and outlines the scope for future research.

CHAPTER 2

Review of the Literature

2.1 Introduction

This chapter reviews the relevant literature on the unidimensional and MD aspects of poverty. Considering the comprehensiveness of consumption poverty, the literature is surveyed first for U.P as a whole and then across its regions, followed by a separate section on the SRGs of the state. It also includes a list of important literature on MD poverty representing its origin and development, followed by an amalgamation of global and Indian studies on the theme.

2.2 Unidimensional Poverty in Uttar Pradesh and across Regions

A number of studies have been conducted to analyse the level of poverty in India (Dubey and Palmer-Jones 2005, Datt 1997, Kozel and Parker 2003, Parker and Kozel 2005, Pathak 2010, World Bank 2010, Pandey and Reddy 2012, Himanshu and Sen 2014, Datt and Ravallion 1998b, Kakwani and Subbarao 1990, Datt and Ravallion 1992, 1997, Mohanty and Ram 2011, Dubey 2015), but most of them have considered poverty in U.P at the state level, along with some other states. Some studies have also identified the causes and challenges in alleviating poverty at the aggregated level (Kozel and Parker 2003, Parker and Kozel 2005, Tiwana 2014a, Dubey and Gangopadhyay 1998) or specific to a particular region (Lanjouw and Stern 1991, 1998, Mishra 2014). Nevertheless, few researchers have evaluated the inter-regional pattern of poverty in U.P with factors responsible for impoverishment and upliftment. Pandey and Reddy (2012), while emphasizing the region-specific development strategies, suggest generating non-farm activities along with an improvement in land productivity in order to reduce rural poverty in the state. Pathak (2010) argues that the main problem in the state is stark inter-region and intra-region differences in poverty. The World Bank (2010), while identifying major challenges for the state, also stresses on a "regionally-focused strategy to capitalize on the achievements of the faster-growing regions to reverse the trends in the West and the East".

Fundamentally, a majority of studies considering the inter-regional variation of poverty in U.P agree that the ER should be made more competent like the WR so that the level of overall development can be enhanced. The World Bank (2010) argues that "just as India cannot break out of poverty without lifting up millions of U.P's poor, U.P cannot expect

to speed up growth and poverty reduction without jump-starting growth in the WR and engaging the dormant potential of the ER". Likewise, Kohli (1987) also suggests that "if somehow, the eastern half of the state could be made more like the western half, poverty problem would be ameliorated". However, Drèze and Gazdar (1997) observe that the WR is more prosperous (in terms of economic growth and real wages) but in terms of well-being and social advancement (mortality, fertility, literacy and education, gender inequality), it, in general, is not better than the ER.

Some studies have discussed the causes of inter-region variations in the levels of poverty in the state. Diwakar (2009), for example, blames the regional and constituency biases of the leadership in selecting programmes and projects and a high proportion of political representation from the WR and the CR, and marginal share on the part of both SR and ER. On the other hand, Ajwad (2007) highlights the causes in the form of regional variation in the accessibility of social safety net programmes, particularly public works, scholarships and fair price shop usage of grains. Comparatively, households belonging to smaller regions, particularly the SR, have reported higher usage of these programmes, whereas the accessibility of Anganwadi centers is very problematic in the WR. However, Ojha (2007) attributes the primary cause behind inter-regional poverty differences to resource endowments and historical growth records. Official reports of the state government also accept that both SR and ER of the state are chronically backward primarily because of scarcity of some essential natural resources and exposure to natural calamities (Government of Uttar Pradesh 2014a); whereas the WR is comparatively developed, while the CR has witnessed recent industrial decline (Government of Uttar Pradesh and UNDP 2008).

To identify the causes of backwardness in all four regions of the state, quite a few studies have been attempted. Based on the survey conducted in the four poorest districts of each region, Ojha (2007) finds that poverty reduction was highest in the WR, whereas the CR stood at the bottom in this regard. The SR outperforms the ER due to lower extent of downward mobility despite lower upward mobility. An analysis of chronic poverty across regions also reveals a similar order of ranking. On the basis of 1993-2005 poverty trends, the World Bank (2010) reports that in general, poorer regions did relatively well in U.P, but particularly SR and CR witnessed a rapid decline in poverty, whereas, in the other two regions (WR and ER), poverty reduction was modest. Further, the study asserts that the CR has benefited from its urban dynamism absorbing labour freed from agriculture and allowing the non-agricultural sector to expand, whereas the SR had an impetus from the construction

industry. However, for enhancing the pace of poverty reduction in other two regions (WR & ER), the former needs improvement in the investment climate for modern industry and services, rural non-farm growth, and strengthening poor's capability to participate in better-paid activities, whereas the latter needs mutually connected development between farm and non-farm, agricultural diversification specifically towards horticulture, and improvement in transport infrastructure and physical facilities in the market-place. Pathak (2010) also observes that rural as well as urban areas of SR achieved the highest poverty reduction during 1993-94 and 2004-05, and ascribes this reduction to factors such as government programmes (like Swajaldhara), migration and remittances, particularly in rural areas of the region. Pandey and Reddy (2012) observe that rural areas of SR consist of dry land and low productivity districts. Therefore, an improvement in land productivity will have an excessive impact on poverty reduction. While consultations with poor households in the ER and SR, Kozel and Parker (2003) identify factors like "idiosyncratic shocks, such as, long-term and costly illnesses; loss of a breadwinner through death, desertion, alcohol or substance abuse; or a loss of assets through fire, theft, death of livestock, or other personal tragedies" that are highly rampant among them.

It can be concluded that there exists a vast inter-regional poverty difference in U.P that is strongly stressed on regionally focussed strategies. The ER, in particular, should be focussed as far as the poverty levels are concerned. Studies have come to the consensus that amongst the two larger regions, the ER is poorer than the WR. However, different studies have highlighted different factors for their impoverishment (Diwakar 2009, Ajwad 2007, Ojha 2007). Moreover, Ojha (2007) and the World Bank (2010) find that the SR witnessed a rapid decline in poverty. However, the World Bank (2010) attributes it to the construction industry; Pathak (2010) to the government programmes like Swajaldhara along with migration and remittances; and Pandey and Reddy (2012) to the improvememt in the land productivity.

2.3 Unidimensional Poverty across Social and Religious Group of Uttar Pradesh

Extensive research has been conducted to evaluate poverty across and among the SRGs in India. However, these studies are based on national or state level estimates (Dev and Ravi 2007, 2008, Borooah et al. 2014, Himanshu 2007 and many others). Furthermore, studies in particular to SRGs are few in number (Government of India 2011b, Diwakar 1999, 2001, Mutatkar 2005, Sundaram and Tendulkar 2003, Thorat and Dubey 2012, Lanjouw and Zaidi

2001). Most of them reveal that the Scheduled Castes (SCs) and the Scheduled Tribes (STs) are comparatively more vulnerable and impoverished, although they have been showing progress along with other groups over time.

Studies have also highlighted the causes of poverty among the SRGs. Sundaram and Tendulkar (2003) state that asset-less casual wage labour households (particularly SCs and STs) are doubly disadvantaged (economically as well socially). Mutatkar (2005) emphasises that STs and SCs have been historically marginalized and remained concentrated in the lower quintiles of the economy. Social disparities in living standards are the result of differences in returns to education and land, along with levels of physical and human capital. Thorat and Dubey (2012) show that the growth in consumption expenditure of agricultural households during 2005-10 remained pro-poor for marginalized farmers but not for the SCs, particularly in rural areas. A study by Bhagat (2013), based on the 2001 and 2011 census, reveals that SCs and STs have shown considerable progress in their well-being during the last decade. There also seems to be financial inclusion towards them because of several government programmes being implemented through banking channels. However, the fruits of development have accrued more to non-SCs and non-STs.

Some studies confirm that there has been an improvement in the living standards and well-being of Muslims, along with SCs and STs at the aggregate level. The Government of India (2011b), for example, highlights that though poverty across social groups has been reduced over time; it is still quite perceptible. Rural poverty among Muslims is below the aggregate level, but it is greater in urban areas. Even consumption expenditure among SCs, STs and Muslims has been rising over time; its distribution remains an issue of concern, particularly for SCs. However, the access index of asset ownership[10] shows that SCs and Muslims are not able to enjoy the peaks. Notably, it highlights that poorer states[11] account for more than 50% of SCs, STs, and Muslims of the entire country and there exists a bidirectional relationship between the poverty of states and large proportions of the excluded SRGs.

Nevertheless, few studies have evaluated the socio-economic conditions of the SRGs in U.P (Diwakar 2009, Kapur et al. 2010, Kozel and Parker 2003, Ojha 2007). Some have

10 It is the ratio of assets owned by the community to the total community population.
11 That includes Bihar, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh, Chhattisgarh, and West Bengal.

pointed out that social and religious rigidities in the state play a vital role in impoverishment and social vulnerability, as class and caste coincide with the contemporary social reality of U.P. However, they argue that the most excluded and impecunious subgroups (SCs/STs, and Muslims in general) have shown an improvement in their living standards and well-being. Kapur et al. (2010) observe that since 1990, there have been major changes in the grooming, eating, and ceremonial consumption patterns of Dalits (representing SCs), signalling higher social status, erosion of caste discrimination, and changes in agricultural relations. They have also reported that almost no Dalit worked as a bonded labour, and there has been significant occupational diversification among Dalits. Their study has considered the rise of the Bahujan Samaj Party (BSP), market-oriented reforms, exposure to media, and technological changes in agriculture as the potential driving factors of improvement in the socio-economic status of Dalits in U.P. However, their study is confined to only two development blocks (one each from WR and ER), and therefore may not necessarily reflect the changes that have taken place across the regions.

Based on three field studies, Kozel and Parker (2003) have identified unstable employment, insecure land tenure, and lack of access to land holdings, education and skills, and social networks as the primary factors causing poverty among SCs of the state. The deeply entrenched exclusion and social marginalization (low caste status) are cited as the main reason for the persistence of poverty among them. Even social identity (SCs/STs in particular) has become a stigma for their children and has restricted them from getting higher paying jobs. On the other hand, Ojha (2007) shows that across social groups, incidence, as well as reduction in poverty, was highest among SCs during 1998-99 and 2004-05. In general, some ways of escaping from poverty are "finding a private job through migration to cities/towns, starting of petty trade/ business, diversification of farming by inclusion of animal husbandry and dairying, casual work in the informal sector, shift from traditional to high value crops, and government job". Likewise, reasons for falling into poverty are "unbearable expenditure on illness, beyond-the-capacity expenditure on marriages and other social ceremonies, loss of job, downfall of business and other reasons, including successive crop failure and migration of the key worker of the household". Furthermore, three factors, namely small size of landholding, low capital base, and unemployment or underemployment, are found responsible for chronic poverty. One of the World Bank (2010) studies states that social exclusion has reduced, particularly among SCs in U.P. Overrepresented in the farm sector, SCs benefited from increasing agricultural wages. Also, those SC households who

entered the labour market were educationally better qualified than before, enabling them to opt for self-employment and non-farm occupations. Furthermore, it has been observed that social safety nets act as a last resort for most of the deprived sections of the society. However, affirmative actions taken by the U.P government are constrained by large exclusion and inclusion errors; have significant geographical variations; and are biased towards the poor of SCs/STs, OBCs and Muslims (Ajwad 2007) and programmes like wage employment help the poor only in lean periods (Ojha 2007).

A close examination of the above-mentioned studies reveals that most of them are based upon national or state-level data, and there is a clear dearth of studies based on disaggregated estimates of poverty in U.P, across its regions and SRGs. Furthermore, it can be observed that earlier studies could not include OBCs as a separate category due to the unavailability of classified data. With this background, the present study will fill the gap by building a comprehensive understanding of regional as well as district-wise patterns of poverty along with the dynamics of poverty prevailing among SRGs in U.P.

Studies reveal that SCs and Muslims in the state are historically poorer, but there exists sufficient evidence that witnessed improvement in their living standards and well-being, particularly in recent times (Diwakar 2009, Ojha 2007, Kapur et al. 2010, Kozel and Parker 2003, World Bank 2010). However, different studies have highlighted different potential driving factors among SCs. Diwakar (2009) considers the rise of the BSP, market-oriented reforms, exposure to media, and technological changes in agriculture; whereas Ojha (2007) finds private jobs through migration, occupation diversification towards animal husbandry and dairying in particular, casual work in the informal sector, and government jobs. Nevertheless, studies have highlighted factors causing high poverty among SCs. Kozel and Parker (2003) identify factors like lack of access to land holdings, education and skills, unstable employment, and low caste status, whereas Ojha (2007) highlights unbearable health and marriage expenditure, loss of job, and crop failure in this respect.

TABLE 2-1 SUMMARY OF STUDIES ON CONSUMPTION POVERTY IN UTTAR PRADESH

S. No.	Authors/ Agencies	Objectives	Dataset and Time Period	Identification of Poor: Poverty Line	Aggregation of Poverty	Results	Suggestions for Policy	Limitations
1.	Kozel and Parker (2003)	To study the profile and diagnostic of poverty in U.P.	1. U.P/Bihar Poverty study, 1998/99. 2. Urban consultation with the poor, 2000. 3. NSS data from 1983 to 1999-2000. 4. For education, NSS 43rd and 52th rounds. 5. For health, NFHS-1 (1992-93).	Identify poor in terms of multiple dimensions such as material deprivation, human development (education, health status), vulnerability and social exclusion, Assets (labour, land, human capital, good health), and social capital.	Mostly in terms of *HCR*.	Poor are deprived in material as well as human development aspects of well-being. Poverty is due to low levels of assets (private, public and social) along with low and uncertain returns.	Three suggestions: 1. Expand economic opportunities, 2. Ensure that poor are empowered to take new opportunities. 3. Ensure an effective safety net. 4. Address deprivation in terms of: a. material assets (land), education, skills, health; b. public assets like community infrastructure, etc.; c. informal system of support; d. social and political capital.	Studied the multiple deprivation in individual sense. Better estimates can be carried forward with joint deprivation analysis.
2.	Ojha (2007)	1. To assess and compare poverty dynamics over 1998-99 to 2004-05. 2. To diagnosis poverty dynamics. 3. To suggest suitable measures for a more effective attack on the rural poverty.	Primary survey in 2004-05 in the poorest district of each region of rural U.P based on BPL census 1998-99 figures. For ER - Bahraich, CR-Hardoi, WR-Auraiya, and SR-Chitrakoot.	Poor if MPCE is below Rs. 373 at 2004-05 prices for rural U.P. For 1998-99, BPL census.	1. Population is segregated in terms of remained poor, escaped poor, become poor and remained non-poor. 2. Aggregation of poverty in terms of HCR. 3. Poverty dynamics-escape from poverty and descent in poverty.	1. *WR*- records highest poverty reduction, *CR*-poverty reduction was lowest, chronic poverty was highest. *SCs*- chronic poverty was highest, *General* chronic poverty lowest. 2. Historical association of caste and class explains why CR and SCs are poorer. 3. Escape poverty by starting small-scale business, animal husbandry and dairying. 4. Descent poverty by heavy expenditure on sickness, social ceremonies etc., unforeseen large sized expenditure.	There should be complete enumeration of households along with construction of a household-specific index of income /expenditure status for prioritisation of interventions and better targeting of poor, vulnerable and not-so-poor households.	Consider one district to represent the complete region.

3.	Diwakar (2009)	To examine whether micro-level disparities and deprivations are wider and more alarming than at the aggregate level and whether region-specific, district-level planning needs to address these issues on a priority basis.	U.P government published reports and state sample unit level records of NSSO data for the 61st round.	MPCE based poverty line as defined by the planning commission is Rs 365.84 for rural areas and Rs 483.26 for urban areas for the year 2004-05. Planning commission figures for 1993-94.	HCR	1. Between 1993-94 and 2004-05, SR's decline in poverty was highest in rural U.P, whereas in urban U.P, WR registered faster decline in poverty. 2. Highest poverty among casual labourers, marginal landholders, followed by landless, SCs. 3. No significant differences in poverty between two major religions. 4. Four districts with acute rural poverty: Sonbhadra (67.4%), Kaushambi (67.1%) Shahjahanpur (65%) and Mirzapur (63.5%).	1. The landless, marginal, and small farmers should receive priority. 2. Identifying districts for poverty alleviation need to be prioritised accordingly and special packages designed according to the intensity of poverty.	Factors responsible for inter-regional and intra-regional variation in poverty is missing.
4.	Kapur et al. (2010)	To understand changes in the food habits, lifestyle, caste practices, mobility and occupations of Dalit households (representing SCs) in U.P since 1990.	Primary survey from all Dalit households (census) in two blocks of U.P (Azamgarh and Bulandshahar districts) about conditions currently and in 1990.	1. Asset Ownership (Live in a pucca house , Have a TV set , Basic phone Mobile , Pressure cooker , Fans Use, firewood for fuel, Bicycle, Motorcycle/scooter Chairs); 2.Grooming Practices (Uses toothpaste, shampoo, bottled hair oil, Elderly wear slippers in public, Women wear petticoats); 3. Eating Habits (Does not eat broken rice; "savan" rice; roti chatni for lunch, Does not pluck pea (matar) leaves for saag, Does cook pulses, Children not served previous night's leftovers, Does not drink sugar cane juice in winter; jaggery rus in summer, Uses packaged salt; cardamom or elayachi, Buys tomatoes). 4. Consumption Patterns around weddings and hospitality. 5. Caste-related social practices.		1. Since 1990, major changes in the grooming, eating, and ceremonial consumption patterns of Dalits, signalling at higher social status, erosion of caste discrimination, and changes in agricultural relations. 2. Almost no Dalit worked as a bonded labour, and there has been a significant occupational diversification among Dalits. 3. The rise of the Bahujan Samaj Party (BSP), market-oriented reforms, exposure to media, and technological changes in agriculture as the potential driving factors of improvement in the socio-economic status of Dalits in U.P.	Exclusive focus on material well-being measures (consumption expenditure) misses important changes in socially structured inequalities and hence in individuals' functioning.	Confined to only two development blocks (one each from WR and ER), and therefore may not necessarily reflect the changes that have taken place across the region of U.P.
5.	Pathak (2010)	To analyses poverty and inequality in U.P by regions, across social and occupation	NSS 50th round, 1993-94 and NSS 61st round, 2004-05.	*Poor*: MPCE below planning commission's poverty line. *Ultra-Poor*: when income	Foster Greer-Thorbecke (FGT) class of poverty measures	1. SR recorded a much higher reduction in poverty comparatively. 2. SCs, followed by OBCs	Nothing concreate policy suggestions are provided by the study.	Answering the changes in consumption poverty level in terms of decomposition analysis

		groups.		falls short by 80% of the official poverty line, following Lipton (1983) and Kakwani and Subbarao (1993). *possible poor:* when income is below 20% above the official poverty line.	including *HCR, PGR* and *SPGR*.	show noticeable decline in rural and urban poverty. 3. Poverty in U.P is concentrating into labour classes, be it agricultural labour or other labour.		(growth and inequality) may provide a limited source of information related to dynamics of poverty associated across the subgroups of population.

2.4 Multidimensional Poverty: Origin and Development

The origin of poverty studies has a history of more than a century[12]. However, the most remarkable and path-breaking contribution is Sen (1976)'s "Poverty: An Ordinal Approach to Measurement", which superseded conventional conceptual debates on poverty and initiated systematic and axiomatic measurements by dual steps of identification and aggregation. Only after this publication, intensive research on the topic began and bifurcated into various new approaches. For example, Kanbur (2002) has divided the period of 1970s-2000 for research on distributional issues into two phases: the first fifteen years were a "period of great conceptual leaps and ferment" while the second period was marked by "consolidation, application and fierce policy debate". Similarly, Fusco (2003) has divided this period but has started the first phase from Sen (1976). Moreover, the second phase has initiated a conceptual debate on MD poverty following the social exclusion approach (Saith 2001); debate on absolute and relative poverty between Townsend (1979) and Sen (1983); the capability approach of Sen (1985); and finally the construct of Human Poverty Index (UNDP 1997, 2007).

It can be observed that until the end of the last century, almost all the studies on poverty analysis carried a unidimensional approach, largely based on income or consumption information. Research on MD poverty has begun in the last decade (Alkire 2009, Ferreira and Lugo 2013, Lustig 2011). That is why many call the MD poverty approach a recent one (Fusco 2003).

In fact, interest in MD approaches to poverty has risen sharply in recent years. Bandura (2008) surveyed around 178 composite (including MD) indices in general[13] and concluded three remarkable observations. First, the number of composite indices has increased since 1990s. Second, among the 165 surveyed indices, around 83 per cent have been constructed during 1991-2006 period. Third, over half of these indices surveyed were developed within the past five years. Moreover, Alkire (2009) mentions that out of them, 38 indices are related to MD poverty and 28 of them were developed since 2000.

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[12] As per the records available, it has been initiated with Booth (1903) and Rowntree (1901) that 'introduce the economic concept of poverty, together with that of the poverty line and that of the Headcount ratio on the basis of the basic needs approach'(Kakwani and Silber 2007, Fusco 2003). In India, the origin of poverty studies is associated with Naoroji (1901)'s title 'Poverty and Un-British Rule in India'.

[13] These indices rank countries by economic, political, social, or ecological measure.

Prominently, the origin of MD poverty is associated with the title "Attacking Poverty" of the World Bank (2000) report, acknowledging the guiding force from a basic needs approach to Amartya Sen's capability approach. Fusco (2003) also believes that the adoption of social exclusion indicators by the European Union[14] also backs the origin of MD poverty. The independent academic studies that lead the MD poverty estimation to new heights include Alkire and Foster (2007, 2009, 2011a), Bourguignon and Chakravarty (2003), Chakravarty, Deutsch, and Silber (2008), Deutsch and Silber (2005), Duclos, Sahn, and Younger (2006), Fusco and Dickes (2008), Kakwani and Silber (2009), Maasoumi and Lugo (2008), Tsui (2002) and others. Moreover, the debate between the Alkire and Foster (2011b) and Ravallion (2011) on various conceptual and technical issues related to MD poverty estimation, most pertaining to the Multidimensional Poverty Index (MPI) also deepens this field of research. Two edited books containing a diversified field of experience related to dimensional and quantitative aspects of MD poverty by Kakwani and Silber (2007, 2009) intensify the multidisciplinary and measurement aspect of debate related to the research field under discussion.

Looking at applicability and policy directives, countries have also adopted the MD estimation of poverty, starting with Mexico's MPI[15] in December 2009, followed by Colombia[16] in 2011 (Ferreira and Lugo 2013), along with South Africa and Britain (Alkire 2009). At the global level and specifically among developing countries, MD poverty estimation is widely recognised in terms of MPI, developed by Alkire and Santos (2010), which was reported for over 100 developing countries and later published in the UNDP's Human Development Report 2010.

2.5 Multidimensional Poverty: Practical Applications

Considering the comprehensiveness of MD aspects of poverty, the literature surveyed is arranged in the following subsections.

[14] Refer to Atkinson et al. (2002) for more detail.
[15] In December 2009, Mexico's National Council for the Evaluation of Social Policy (CONEVAL) adopted an MD index as the country's official poverty measure and it makes Mexico the first country in the world to acknowledge MD poverty.
[16] Colombia adopted a five-dimensional poverty reduction strategy and constructed an MD poverty index, a variant of Alkire and Foster (2011a) to measure progress.

2.5.1 Global Studies on Multidimensional Poverty

Alkire and Santos (2010) estimate the Global MPI for 104 developing countries, covering about 78 per cent of the world's population, based on three widely used data sets, namely the Demographic and Health Survey (DHS), the Multiple Indicators Cluster Survey (MICS), and the World Health Survey (WHS). UNDP's Human Development Report (HDR) launched the MPI in 2010 as part of an experimental series that supplements the Human Poverty Index. It primarily includes three dimensions that comprise 10 indicators (refer to Table 2-2). The education dimension includes "years of schooling (no household member has completed 5 years of schooling) and child school attendance (any school-aged child is out of school in years 1 to 8)". The health dimension consists of "child mortality (any child has died in the family) and undernutrition (any adult or child in the family is malnourished)". The standard of living dimension includes "electricity (household does not have electricity)", drinking water ("household does not meet MDG definitions, or water source is more than 30 minutes' walk"), sanitation ("household does not meet MDG definitions, or the toilet is shared"), flooring ("floor is made up of dirt, sand, or dung"), cooking fuel ("household cook with wood, charcoal, or dung"), and assets ("household does not own more than one out of radio, TV, telephone, bike, motorbike or refrigerator and do not own a car or truck"). The choice of dimensions is based on the suggestions provided in Sen (2008, 2004) and Alkire (2008). Weighting schemes are defined such that each dimension is equally weighted and each indicator within a dimension is equally weighted. The second cut-off that defines poor or non-poor status is settled where the weighted sum of deprivation is 30 per cent or more. The outcome of the study clearly states that Global MPI reveals a different pattern of poverty than income poverty. Deprivation in living standards is more than deprivation in health and education. Rural areas are five times poorer than urban areas. Sub Saharan Africa has the highest poverty incidence whereas South Asia has the highest number of poor. It suggests that income poverty is a poor proxy for MD poverty primarily among high poverty countries, as people lack access to basic services. Health deprivation, in particular, very appropriately captures ill health. Countries can follow different pathways to reduce MD poverty.

Fusco (2003) studies the complementarity between single and MD measures of poverty. The MD poverty includes seven dimensions (refer to Table 2-2). First is economic resources that contains equalised income, and "ability to make ends meet, affordability to keep one's home adequately warm, capacity to pay a week's annual holiday from home, capacity to replace

any worn-out furniture, capacity to buy new rather than second-hand clothes, affordability to eat meat, chicken or fish every second day (if wanted), and some money left to save, repay debts other than mortgage". Second is housing conditions that include "basic housing utilities such as indoor flushing toilet, bath, damp walls, and crowding index". Third, is material control over one's environment that includes "durable goods (colour TV, video recorder, microwave, dishwasher, and telephone), tenure status, and labour market status". Next is education that is based on "highest level of education completed by the members in the house". Fifth, Social Interaction and Environment that includes "affordability to have friends or family for drink or meal at least once a month, talk to neighbours, see friends and relatives, and environmental problems like pollution by traffic or industry, crime, and noise". Sixth is bodily health that includes the "status of chronic disease (physical or mental), and person's own perception of her health". Last is subjective satisfaction that considers four types of satisfaction including "work, financial situation, housing situation and amount of leisure time". The study is based on the 7th wave of the European Community Household Panel (ECHP) data covering 15 European countries. For unidimensional measures of poverty, poor means income is below 60% of the median equalised income, which is aggregated in terms of headcount ratio, poverty gap, and Sen Index. The MD poverty estimate is based on fuzzy sets in terms of the Deprivation Index. The study found that Southern European countries seem to be poorer (Portugal and Greece), and Northern countries are in a better situation (Denmark and Finland). The most deprived dimensions include education, with the lowest scale of health and subjective appraisal. The study argues that unidimensional measures suggest policies for short-term poverty alleviation, whereas MD poverty can direct on structural socio-economic policies along with intergenerational breaks to poverty in the long-term.

Bossert, Chakravarty, and D'Ambrosio (2009) characterise a class of individuals counting measures of MD poverty following the material deprivation notion and assigns different weights, using data for European Union member states (EU-SILC). Further, to know the status of decent standard of living, 18 indicators are chosen, namely, dwelling with "leaking roof, damp walls/floors/foundation, not having proper room with a bath or shower, not having an indoor flushing toilet for the sole use of household", and not having ability to keep the home adequately warm, household in arrears at any time in the last 12 months on "mortgage or rent payments, utility bills, and hire purchase instalments or other loan payments, household cannot afford to pay for a one-week annual holiday away from home, a meal with

meat, chicken, fish (or vegetarian equivalent) every second day, to face unexpected required expenses, a telephone (including mobile phone), a colour TV, a computer, a washing machine, to have a car", and household lives in an area with "noise from neighbours or noise from the street, pollution, grime or other environmental problems caused by traffic or industry, crime, violence or vandalism". Following the counting approach, and using the Bourguignon and Chakravarty (2003) method of MD poverty, the study reports that poverty in countries like Ireland, Luxembourg, the UK, and Spain declined over time, while the Republic of Cyprus, the Czech Republic, Slovenia and Slovakia witnessed higher poverty over time.

D'Ambrosio, Deutsch, and Silber (2011) use the third wave of European panel data to compare three approaches of MD poverty (fuzzy, information theory, and axiomatic). The study considers seven dimensions (18 indicators) such as "Income (total net household income); Financial Situation (ability to make ends meet, rent, mortgage, utility bills, and affordability to pay for week's annual holiday, buy new clothes, eat meat, chicken or fish every second day)"; Accommodation (with bath, damp walls, floors, and no shortage of space); Own Durables (car, colour TV, telephone), Health (own health, illness); Social Relations like meeting with friends; and Satisfaction of Work (refer to Table 2-2). The choice of indicators is based on Pérez–Mayo (2005).

TABLE 2-2 SUMMARY OF GLOBAL STUDIES ON MULTIDIMENSIONAL POVERTY

S. No.	**Authors/ Agencies**	**Objectives**	**Background** (Global, Country-specific, slums, Urban area, children, women etc.)	**Indicators & Dimensions** (with Rationale and Dataset used)	**Rationale for Deprivation and Poverty cut-offs** (Approach to identify MD poor -Union, Intersection and/or Dual cut-off)	**Weighting Criteria** (equal, differential)	**Methodology /Method to analyses multidimensional poverty/ MPI** (A-F, Counting approach, etc.)	**Unit of Account** (Households, Individuals, state, country etc.)	**Most Deprived Indicators and Dimensions /Results**	**Limitations**	**Suggestions**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
1	Alkire and Santos (2010)	To estimate Global MPI for 104 developing countries, covering about 78 per cent of the world´s population.	DHS, MICS, and WHS	Choice of dimensions is based on Sen (2008, 2004) and Alkire (2008). 3 Dimensions comprising 10 Indicators 1 Education- a. Years of Schooling, b. Child School Attendance 2 Health- a. Child mortality, b. Undernutrition 3 Standard of Living- a. Electricity, b. Drinking Water, c. Sanitation, d. Flooring, e. Cooking Fuel, f. Assets	Deprived if; no household member has completed 5 years of schooling; any school-aged child is out of school in years 1 to 8; any child has died in the family; any adult or child in the family is malnourished; household does not have electricity; does not meet MDG definitions of safe water, or is more than 30 minutes walk; does not meet MDG definitions of sanitation, or the toilet is shared; floor is dirt, sand, or dung; cook with wood, charcoal, or	Equal weights across dimensions, and equal weights within dimensions	MPI, which is a multiple of proportion of people who are poor (or called headcount) and percentage of dimensions in which households are deprived (called average intensity of deprivation).	Due to data constraints, Global MPI is based on household. By choice, they want to choose individual.	MPI reveals a different pattern of poverty than income poverty. Deprivation in living standards is more than deprivation in health and education. Rural areas are five times more MD poor than urban areas. Sub Saharan Africa has the highest poverty incidence whereas South Asia has highest number of poor. The number of poor in South Asia is double than	data limitations	Income poverty is a poorer proxy for MD poverty, primarily among high poverty countries, as it lacks access to basic services. Health deprivations, in particular, is very appropriately capturing the ill health. Countries can follow different pathways to reduce MD poverty.

					dung; do not own more than one of: radio, TV, telephone, bike, motorbike or refrigerator and do not own a car or truck. Poor if weighted sum is 30 per cent or more of the dimensions				that of in Africa.		
2	Fusco (2003)	To find complementarity between one and MD poverty measures of poverty.	15 European countries	Using 7th wave of the ECHP and by considered constitutive of well-being, it includes seven dimensions namely economic resources, housing conditions, material control over one's environment, education, bodily health, affiliation or social interactions and satisfaction with one's situation.	Economic resources gather an objective information, Housing conditions are related to information about the accommodation, Material control over one's environment based on Nussbaum (2001), social interaction and environment refers to social relations of the person.	Frequency-based weighting.	For unidimensional measures of poverty, poor means if income is below 60% of the median equalised income, which is aggregated in terms of headcount ratio, PG, and Sen index. The MD poverty estimation is based on fuzzy sets in terms of Deprivation index.	Household	Southern Europe countries seem to be poorer (Portugal and Greece), and Northern countries in a better situation (Denmark and Finland). Most deprived dimensions include education, with the lowest scale for health and subjective appraisal.	Argues that unidimensional measures suggest policies for short-term poverty alleviation, whereas MD poverty can direct on structural socio-economic policies along with intergenerational breaks to poverty in the long-term. However, how it can done is missing in the study.	Unidimensional measures suggest policies for short-term poverty alleviation, whereas MD poverty (such as education and health) can direct on structural socio-economic policies along with intergenerational breaks to poverty in the long-term.
3	Bossert, Chakravarty, and D'Ambrosio (2009)	To characterize a class of individuals counting measures of MD poverty following material deprivation.	European Union member states, to modify the measure of material deprivation	Dataset of EU-SILC, with 18 indicators related to adequate dwelling, ability to pay finances, financial affordability, durables goods,	To know the necessary for a decent standard of living in terms of financial means, housing needs, ownership of durable goods and basic necessities	Different weights assigned to different dimensions. For each indicator, weight is assigned as a % of EU 27	Counting approach, following Bourguignon and Chakravarty (2003) index for measuring MD poverty.	Households	Income poverty and material deprivation differ considerably. Ireland, Luxembourg, the UK and Spain improve over	The study seeks to measure the progress of social inclusion process based on the notion of material deprivation.	Guide policy based on both income poverty and material deprivation.

				safe and secure environment		citizens answering 'absolutely necessary, no one should have to do without'			time, while Republic of Cyprus, the Czech Republic, Slovenia and Slovakia witnessed higher poverty over time. With equal weights, Iceland's position improves by two while Slovakia moves down in the rankings by three positions		
4	D'Ambrosio, Deutsch, and Silber (2011)	Comparison of three approaches of MD poverty and to what extent they identified the same household.	3rd wave of the European Panel data.	18 Indicators classified under 7 dimensions as follows: (1) Income- (2) Financial situation: (3) Quality of accommodation (4) Ownership of durables: (5) Health: (6) Social relations: (7) Satisfaction with work	Following Pérez–Mayo (2005).	Equal weight	Three approaches, including Fuzzy, Information Theory, and Axiomatic Approach.	Households	The three MD approaches indicate that, on an average, 80% of the households defined as poor by any two approaches are identical.		
5	Martinetti (2000)	To suggest an empirical implementation of the Sen's capability approach.	Microdata of a sample survey conducted in 1994 by the Italian Central Statistical Office (ISTAT,	Five functionings 1 Housing: a) Crowding Index b) Basic housing utilities 2 Health: a) Chronic illness. 3 Education and		Indicators of basic utilities included in the housing-functionings. Aggregated by a weighted	A strategy based on fussy sets theory		1 Poorer groups in the population are mainly the elderly, people living in the South or with a		

			Indagine Multiscopo)	Knowledge: a) Higher educational attainment b) Number of books read during the last twelve months c) Frequency of reading newspapers during a week. 4 Social Interactions: a) Passive Participation b) Active Participation, c) Political Interest 5 Psychological Conditions: a) Economic conditions b) Personal and Social relations c) Health, and working conditions, and leisure time.		averaging operator with weights equal to the inverse of the frequency of each elementary indicator. 2 For chronic illness, a standard union operator has been applied. 3 For psychological evaluation equal weights has been assigned.			lower education level. 2 Relatively high degree of achievement in the material dimensions as well as in the health conditions. 3 Relatively low fulfilment in education and knowledge as well as in the participation in the social life outside of family and friends.		

2.5.2 Studies on Multidimensional Poverty in India

Banerjee et al. (2014) calculate MPI for India based on three dimensions (standard of living, health and education), and link it with female deprivations, using NFHS-1 (1992-93), NFHS-2 (1998-99), and NFHS-3 (2005-06). The standard of living dimension is based on six indicators, namely water ("source of drinking water, and 'time to get water and return"), sanitation ("type of toilet facility, and shared toilet"), electricity, assets ("radio, TV, refrigerator, bicycle, motorcycle/bike, car, telephone, mobile phone"), main floor material, and cooking fuel. The health dimension includes undernutrition and child mortality, and the education dimension includes child school attendance and years of schooling. Each dimension is equally weighted and each indicator within the same dimension is equally weighted. MD poverty occurs when the sum of deprived indicators (weighted) exceeds 30 or more. Aggregation of MD poverty follows the Alkire and Foster (2011a). Estimates reveal that Bihar continued to be the leading poor state over the period from 1992-93 to 2005-06. Reasons are primarily concerned with poor standards of living along with improper access to health facilities. Poor states are most deprived in the standard of living. High MD poverty in states like Tamil Nadu and U.P is due to a lack of proper health facilities. Andhra Pradesh and Rajasthan performed fairly well in terms of income poverty but badly in terms of MD poverty. Regions like urban Andhra Pradesh, Karnataka, Gujarat, rural Kerala and West Bengal were not poor but at the same time were highly vulnerable to poverty.

Alkire and Seth (2013) propose a method to target MD poor households, along with a provision of updates, by presenting a case for India. Considering the fourth Indian BPL census, their study illustrates the way to calibrate BPL targeting as per the benchmark MD poverty measure of Alkire and Santos (2010). Accordingly, it compares the mismatches in poverty estimates based on the fourth Indian BPL census methodology (denoted as SECC-poor) with the Alkire and Santos (2010) based Global MPI (define as MDP-poor). Using NFHS-3 data, their study finds that "it is not possible to identify more than 54.9 % of the rural population" as MDP-poor, implying a much smaller proportion of MDP-poor are being identified by SECC-poor. Furthermore, around 8.4 % of households that would be automatically excluded from the SECC are found to be significantly deprived in at least malnourished woman or child school attendance and cooking fuel. Therefore, both the inclusion and exclusion criteria neglect a significant proportion of MDP-poor. In the

limitation part, some of the exclusion and inclusion criteria of SECC are not appropriately found in NFHS-3. Either they are dropped or some of the closest proxies are selected. The study suggests that the BPL methodology should be based on the proposed benchmarking MD poverty measures.

Alkire and Seth (2009) test the extent of coincidence between India's 2002 rural BPL census methodology and Alkire and Foster (2011a) in the identification of poor with the same set of dimensions as proposed in the BPL census using NFHS-3 (2005-06) data. The census comprises thirteen questions for each household, covering topics such as food security, type of house, land ownership, sanitation, assets, education, labour, occupation, child status, indebtedness, clothing, reason for migration and preference of assistance. The minimum and maximum score for each question is zero and four respectively, so a household can get the minimum and maximum welfare score of zero (0*13) and 52 (13*4) respectively. The poverty cut-off is fixed at the state level, along with the limit to BPL numbers, equivalent to 10 per cent above the BPL estimates during 1999-2000. The study finds that around 12 per cent of the poor and 33 per cent of the "extreme poor" can be misclassified as non-poor if employing the BPL census (Pseudo-BPL method) in respect of Alkire and Foster (2011a) methodology. The study suggests that BPL census methodology can be strengthened with a more relevant choice of indicators that can guide the policy in a more effective way. Accordingly, the poverty is estimated with an improved selection of indicators reflecting multiple deprivations. The study includes nine dimensions based on eleven indicators such as housing type, electricity, BMI, women's BMI, water and sanitation, cooking fuel, assets, years of education, occupation, child labour, and women's empowerment. Around 77 per cent of rural Indians are deprived of improved sanitation. Using a cut-off of four out of eleven indicators, the study estimates that 46 per cent of rural Indians are MD poor. The intensity of poverty shows that the poor are being deprived in 52.7 per cent of all dimensions on average. Among the Indian states, Jharkhand is poorest, with more than 80 per cent of its population as MD poor. States with more than half of the population as poor include Madhya Pradesh (63 %), U.P (61%), Orissa (54%), Rajasthan (53.5%), Chhattisgarh (54.1%), and Bihar (50.3%).

Bennett and Mitra (2013) argue that MD poverty measures, particularly Alkire and Foster (2011a) generate a number of statistical hypotheses such as choices of dimensions representing deprivation, number of dimensions to be treated as MD poverty and its

robustness, and poverty ordering across subgroups. The study shows that such hypotheses can be tested based on a minimum p-value approach. To test its applicability, the study considered MD poverty across two major religious groups in urban India (Hindus and Muslims) based on the NSSO's 60th round (2004) on health and morbidity. The MD poverty estimation is based on seven dimensions (with deprivation criteria defined in parentheses), including monthly per capita consumption expenditure, educational attainment levels (not even a primary education), "source of drinking water (if using river, canal, pond, or well)", type of housing structure (except *Pucca*), sanitation facility (if no), available of drainage facilities (if not accessible), and main source of cooking "(if no cooking arrangement or used firewood or dung cakes)". The unit of analysis remains a household. As a rationale for dimensions, the study asserts, "the dimensions are chosen to represent the standard of living and the capabilities of the households to improve their position", with health being a notable omission. The study finds that except in cases of sanitation and drainage, the incidence of poverty is lower for Hindus compared to Muslims. With robust analysis in terms of varying poverty cut-off ('*k*'), it is inferred that at *k*=3, poverty among Muslims is higher than poverty among Hindus. However, as the value of *k* is 5-6, this ranking reversed significantly even for all the chosen dimensions, and at *k*=4, there is no significant difference between the two. Finally, the study concludes that as long as *k*>=4, income is not sufficient to differentiate poverty between Hindus and Muslims, and we need more dimensions that support the relevance of studying MD poverty in India.

Sarkar (2012) computes the MPI for rural India considering five consecutive thick (quinquennial) NSSO rounds, namely 43rd (1986-87), 50th (1993 – 1994), 55th (1999 – 2000), 61st (2004 – 2005), and 66th (2009 – 2010), with an aim to find the discrepancy between unidimensional poverty (consumption expenditure based) and MD poverty. Unidimensional poverty is significantly influenced by household size, GDP and consumption expenditure recall error. The unidimensional poverty line is based on the minimum calorie requirement of 2400 kcal and 2100 kcal for rural and urban India respectively. The MPI includes four dimensions with eight indicators, and a deprivation cut-off is defined in parentheses if not otherwise specified. Education dimension is based on the highest educational attainment in household, with cut-off primary schooling; Income dimensions is determined as per consumption expenditure based poverty line; Food Consumption dimensions include two indicators--calorie consumption (2400 Kcal) and protein consumption (58.4 gms); lastly

Living Standard is based on four indicators, embracing "employment (labourers), land (1 acre agricultural land and /or 0.5 acres irrigated land), electricity (no access), and cooking fuels (firewood and chips, coke and coal, dung cake, or charcoal)". The poverty cut-off is deliberately selected in a range of 50% to 60%. Income has the highest contribution, followed by education and food consumption across a period of study. Both types of poverty seem to be highest among the SC/ST groups. Furthermore, economies of scale are not always increasing in the case of MD poverty as in the case of unidimensional poverty. The effects of the recall error are not so high for the MPI.

Dotter and Klasen (2014a) develop a relative multidimensional poverty (R-MDP) measure for India and compare it with Global MPI, using NFHS-3 (2005-06) dataset. Since it is a replication exercise of Global MPI in terms of choice of indicators, weights and poverty cut-off, the same three dimensions and ten indicators are used as in Global MPI. The deprivation in the case of "education and standard of living dimensions (except assets and electricity) is fixed at the median of the distribution with reference population -state (RMP1), and urban/rural (RMP2)". The study finds that RMP1 gives a higher poverty incidence than Global MPI, whereas RMP2 depicts a lower poverty incidence. When RMP2 was applied, poverty intensity also decreased, with "significantly lower poverty incidence for Bihar, U.P, Assam, Jharkhand and Chhattisgarh states". Both RMP1 and RMP2 show "Madhya Pradesh to be the poorest instead of Bihar". The poorer states are comparatively less deprived in education but they reveal an improvement in the standard of living using RMP1 and RMP2.

Abraham and Kumar (2008) estimate MD poverty along with vulnerability ranking across 15 Indian states ("Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal") based on 50^{th} (1993-94) and 55^{th} (1999-00) NSSO data. To measure vulnerability, they adopted a fuzzy logic-based approach suggested by Qizilbash (2002). The selected indicators include Consumption (MPCE), Education (no education), Sanitation (no latrine), Access to Water Sources (no drinking water facilities within the premises or near to it), Source of Energy for Cooking (leaves/straw/firewood, and firewood and chips), Dwelling (per capita floor area below 20 square metres). The weighting criteria follows the Borda ranking process wherein every dimension is given equal weight and seen as contributing equally to overall well-being. On the outcome side, the study finds that although income poor states are also MD poor in various dimensions, this is not the case for all the states. For

example, Andhra Pradesh and Rajasthan performed fairly well in terms of income poverty but badly in terms of MD poverty. Most of the states (including urban Madhya Pradesh/Orissa, rural Uttar Pradesh/Andhra Pradesh) were identified as MD poor and vulnerable, but there were several other states that were not poor but were at the same time highly vulnerable to poverty (for example, urban Andhra Pradesh/Karnataka/Gujarat and rural Kerala/ West Bengal). They recommend that measures of poverty and vulnerability should complement as both provide additional information. On the limitation part, as usual, they comment that the choice of indicators to represent the identified dimensions is limited as it is often governed by the availability of data.

Jayaraj and Subramanian (2010) study the MD deprivation in the Indian context, by sensitising identification and aggregation exercise to the range of deprivation, with a graphical device called the 'D'-curve and a measure 'M' based on this curve. Furthermore, the class of headcount indices is used to replicate the indices of social exclusion by Chakravarty and D'Ambrosio (2006) using NFHS 1992-93 and 2005-06 surveys. The MD poverty is measured based on eight dimensions with deprivation criteria as follows: Water ("no access to a source of drinking water on its premises"); Electricity ("no access to electricity"); Clean Fuel ("no access to kerosene, liquid petroleum gas, biogas, or electricity"); Decent Shelter ("no access to a *pucca* house"); Sanitation and Privacy ("no access to toilet, including a pit latrine"); Knowledge ("if member of household 6 or more years of age and is illiterate"); Mobility (no access to bicycle); and Source of Elementary Entertainment (no access to radio). The selection of dimensions is based on the intrinsic plausibility, the availability of data, and the possibility of inter-temporal comparability. The deprivation is assessed in terms of five categories of poor: *Not Deprived*, if not deprived in any of the dimension; *Mildly Deprived*, if deprived in one or two dimensions; *Moderately Deprived*, if deprived in three or four dimensions; *Considerably Deprived*, if deprived in five or six dimensions; and *Severely Deprived*, if deprived in seven or all eight dimensions. The results specify that maximum deprivation has been experienced in access to clean fuel for cooking, followed by access to *pucca* housing or by access to a toilet facility, followed, in turn, in the same order in both the years, by access to an on-premises source of drinking water, access to a radio, access to a bicycle, access to electricity for lighting, and access to knowledge.

Mehta (2003) measures chronic MD poverty in India at the district level. Using data from the Indian 1991 census, Centre for Monitoring Indian Economy (CMIE) and Bhalla and Gurmail

(2001), the study estimates deprivation in terms of illiteracy (depicts access to information), infant mortality (means of accessing good health), low levels of agricultural productivity (poor resource base), and poor infrastructure including electricity, toilet facilities and postal and telegraphic communications (denial of prospects out of income growth) for about 379 districts in 15 large states of India. For aggregation of this information, three sets of indices were estimated, namely set one (income, education in terms of female literacy, and health), set two (income, education in terms of female literacy, health, and development of infrastructure), and set three (income, literacy of 11-13 aged children, health, and development of infrastructure), with equal weights for all indicators. The aggregation method follows the UNDP's adjusted HDI, which itself is based on Panigrahi and Sivramkrishna (2002). Around 72 per cent of the India's poor population and half of the total Indian population (poor and non-poor) are living in just six states of India (U.P including "Uttarakhand, Bihar including Jharkhand, Madhya Pradesh, including Chhattisgarh, Maharashtra, West Bengal and Orissa"). Out of the seven most deprived districts, two districts belong to U.P (Bahraich and Budaun). Most of the deprivation is observed in literacy (female) and infant mortality. However, there seems to be a general association between high poverty and high child mortality, low female literacy, low overall literacy, lower electrification and lower access to toilet facilities along with postal services. The study concludes that persistent poverty (also vulnerability) has an association with multiple deprivations, even in a joint manner.

Mohanty (2011) measures MD poverty and establishes its linkages with "child survival among the abject poor, moderate poor and non-poor households in India", using NFHS-3 (2005-06) data. The MD poverty dimensions include: Education ("in terms of years of schooling, child never attended school, and child continued or discontinued schooling"); Health ("consist of child below 5 years severely underweight and women age 15-49 years anaemic"); and Wealth includes housing conditions ("floor, wall, roof, window, persons/room, access to improved water, type of cooking fuel, electricity, and separate kitchen") and consumer durables ("connecting motorcycle, car, landline telephone, mobile, TV, pressure cooker, refrigerator, computer, sewing machine, watches, bicycle, and radio"); size of land holdings ("as to no land, marginal, small, medium/large holdings"), and agricultural accessories (such as thresher, tractor, water pump). Child survival is defined in terms of infant and under-five mortality rates (IMR and U-5 MR). Identification of poor is

based on union approach and the complete analysis is based on descriptive statistics, principal component analyses and the life table methods. Notably, “around 50 per cent of the country’s population is poor and approximately 20 per cent are abject poor” (poor in two or all three dimensions), the extent of which is highest in Bihar and lowest in Kerala. Child survival indicators (IMR and U-5 MR) are significantly higher among the abject poor compared to the non-poor and poor, whereas they are equivalent among the three dimensions of MD poverty at least at the national level. Based on the findings, the study concludes that MD assessment of poverty is useful in various ways, particularly in the identification of abject poor that signals the poverty trap. On the suggestion part, MD poverty should include process and outcome indicators like healthcare utilization, health and health inequality.

TABLE 2-3 SUMMARY OF INDIAN STUDIES ON MULTIDIMENSIONAL POVERTY

Authors/ Agencies	**Objectives**	**Background** (Global, Country-specific, slums, Urban area, children, women etc.)	**Indicators & Dimensions** (with Rationale and Dataset used)	**Rationale for Deprivation and Poverty cut-offs** (Approach to identify MD poor -Union, Intersection and/or Dual cut-off)	**Weighting Criteria** (equal, differential)	**Methodology** (A-F, Counting approach, etc.)	**Unit of Account** (Households, Individuals, state, country etc.)	**Most Deprived Indicators and Dimensions /Results**	**Limitations**	**Suggestions**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Banerjee et al. (2014)	1. To calculate MPI for India while taking into account different variables of standard of living, health and education 2 To link the overall MD poverty with female deprivations.	Indian states based on NFHS-1 (1992-93), NFHS-2 (1998-99), and NFHS-3 (2005-06)	Three dimensions: 1. Standard of Living including Water, Sanitation, Electricity, Assets, Main floor material, Cooking fuel, 2. Health consists of Nutrition, and Mortality. 3. Education includes School attendance and Years of Schooling	Dual cut-off; one for deprived dimensions and second for poverty cut-off. MD poverty status is confined when the sum of deprived indicators (weighted) is exceeding 30 or more.	Each dimension is equally weighted and each indicator within the same dimension is equally weighted.	Alkire and Foster (2011a) including Headcount, Intensity of Poverty and MPI	Households	Bihar, poor state over the period 1992-93 to 2005-06, due to poor living standard, and improper access to health facilities. 2 High MD poor in Tamil Nadu and U.P due to lack of proper health facilities.	No discussion about intensity of poverty. Not a detailed analysis of results.	No concrete suggestions.
Alkire and Seth (2013)	Compares the fit in poverty estimation based on fourth Indian BPL census methodology, (denoted as SECC-poor) with the Alkire and Santos (2010) based Global MPI (define as MDP-poor)	Indian BPL Methodology	Using NFHS 3, SECC-poor is based on SECC methodology(exclusion, inclusion and scoring), and the benchmark method (MDP-poor) as per Alkire and Santos (2010)	Refer to column 3	Refer to column 3	Refer to column 3	Household	54.9 % of the rural population as' MDP-poor, around 8.4 % of households that would be automatically excluded from the SECC.	Some of the exclusion and inclusion criteria in SECC are not appropriately found in NFHS-3. Either they are dropped or some closest proxies are selected.	BPL methodology be based on proposed benchmarking MDP measures
Alkire and Seth (2009)	Test how fit India's 2002 BPL census methodology using NFHS-3 (2005-06) data	Indian BPL Methodology	Food security, type of house, land ownership, sanitation, assets, education, labour, occupation, child status,	Following the 2002 Indian BPL census and Alkire and Foster (2011), estimates are based on their criteria.	Same as BPL census	Minimum and maximum welfare score is 0 (0*13) and 52 (13*4) respectively.	Households	Around 12 per cent of the poor and 33 per cent of extreme poor can be misclassified as	In NFHS-3 data, three aspects are not covered so it is not included in the study.	BPL census methodology can be strengthened with more relevant

	matches with Alkire and Foster (2011) in the identification of poor with the same set of dimensions as proposed in BPL census.		indebtedness, clothing, reason for migration, preference of assistance.			Poverty cut-off is fixed equivalent to 10 per cent above the BPL estimates during 1999-2000.		non-poor if employing BPL census (pseudo-BPL method) in respect of Alkire and Foster (2011) methodology.		choice of indicators that can guide the policy in a more effective way.
Bennett and Mitra (2013)	Alkire and Foster (2011a) method generate a number of statistical hypotheses such as choices of dimensions representing the deprivation, no. of dimensions to be treated as MD poverty lines and its robustness, poverty orderings across subgroups. The study shows that such hypotheses can be tested based on a minimum p-value approach.	Urban India	NSSO's 60th round (2004) on health and morbidity. Seven dimensions; 1. Monthly per capita consumption expenditure 2. Educational attainment levels 3. Source of drinking water 4. Type of housing structure 5. Sanitation facility 6. Available of drainage facilities, and 7. Main source of cooking.	Dimensions are chosen to represent the standard of living and the capabilities of the households to improve their position', with a notable omission is health.	Equal weights	MD poverty across two major religious groups of urban India (Hindus and Muslims)	Households	1. Except in cases of sanitation and drainage, the incidence of poverty is lower for Hindus compared to Muslims. 2. Robustness analysis says poverty among Muslims is higher.	Omission of health dimensions due to non-availability in the dataset.	As long as *poverty cut-off* >=4, income is not sufficient to differentiate the poverty between Hindus and Muslims, and then more dimensions are needed to support the relevance of studying MD.
Sarkar (2012)	Find the discrepancy between unidimensional and MD Poverty. Unidimensional poverty is very significantly influenced by household size, GDP and MPCE recall error, and how these will effect on MD is one of the	Compute the MPI for rural India considering five consecutive thick NSSO rounds, namely 43rd (1986-87), 50th (1993 – 1994), 55th (1999 – 2000), 61st (2004 – 2005), and 66th (2009 –	MPI includes four dimensions Education, Income, Food Consumption, and Living Standard.	Indicators deprivation cut-off as; highest educational attainment in household, with cut-off primary schooling, MPCE with national poverty line, calorie consumption (2400 Kcal) and protein consumption (58.4 gms), employment (labourers), land (1 acre agricultural land and /or 0.5 acres irrigated land),	Equal weights across dimensions and Equal weights to indicators within dimensions.	MPI is estimated based on Alkire and Foster (2011) approach including *HCR*, Intensity of Poverty and MPI. Unidimensional poverty; consumption expenditure based poverty line corresponds to the calorie requirement of	Household	Income contributes highest, followed by education, and food consumption across all period of study. Both types of poverty seem to be highest among the SC/ST. Economies of scale is not always		

	objectives of the study.	2010). Social groups of India (SCs, STs, OBCs, and others).		electricity (no access), and cooking fuel (firewood and chips, coke and coal, dung cake, or charcoal).		2400 kcal and 2100 kcal for rural and urban India respectively.		increasing the MD poverty.		
Dotter and Klasen (2014a)	To develop a relative multidimensional poverty (R-MDP) measure and compare it with Global MPI.	NFHS 3 (2005-06) dataset.	Since based on Global MPI so the same three dimensions and ten indicators.	For education and standard of living dimension (except assets and electricity), indicators thresholds are fixed at the median of the distribution in the reference population - state (RMP_1) or state and urban/rural (RMP_2)	Based on Global MPI.	Alkire and Foster (2011), with choice of dimensions.	Household	1 RMP_1 finds higher poverty incidence than Global MPI. 2 With RMP_2, significantly lower poverty incidence is found in Bihar, U.P, Assam, Jharkhand and Chhattisgarh. 3 Both RMP_1 and RMP_2 find Madhya Pradesh to be the poorest instead of Bihar. 4 Poorer states are comparatively less deprived in education using RMP_1 and RMP_2.	As often and for this study, the MDP faces a limitation of data availability, particularly to add individual level deprivation. Since poverty is different from inequality, the deprivation cut-off, particularly for education dimension, is normatively defined, by the provision of constitution or policy support.	Relative MD poverty appears to reflect urban poverty better and can therefore be considered unbiased.
Abraham and Kumar (2008)	To measure MD poverty and analyse vulnerability to MD poverty across rural and urban areas of India.	15 Indian states including Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal	Based on 50th (1993-94) and 55th (1999-00) rounds of NSSO. Six Indicators: Consumption (poverty line); Education: no education; Sanitation: no latrine; Access to water sources: having drinking water facilities within the premises or near to it; source of energy for cooking: if using leaves/ Straw/ Firewood, and chips; Dwelling: households having per capita	Rationale of deprivation cut-offs: no education, as levels of educational attainment represent different levels of well-being. no latrine, 'fairly commonsensical', having drinking water facilities within the premises or near to it. Leaves/straw/firewood, and firewood and chips are not cleaner energy. Per capita floor area below 20 square metres represents achievements for shelter and personal	The Borda ranking process, every dimension is given an *equal weight* and seen as contributing equally to overall well-being.	For vulnerability measurement, a fuzzy logic based approach suggested by Qizilbash (2002) is adopted. *HCR* vulnerability = population having membership function value >0.7/ total population	15 Indian States	Andhra Pradesh and Rajasthan, that are performing fairly well in terms of income poverty but badly in terms of MD poverty. Regions like urban Andhra Pradesh/ Karnataka/Gujarat and rural Kerala/ West Bengal were not poor but were at the same time highly vulnerable to	The choice of indicators to represent the identified dimensions is limited as it is often governed by the availability of data.	Traditional, consumption-based poverty will be complemented with MD poverty measures, particularly with a feature of vulnerability to poverty. Non-income poor states should bring into the radar of policy makers if they are poor in other dimensions of

			floor area below 20 square metres.	space.				poverty.		poverty like Andhra Pradesh and Rajasthan.
Jayaraj and Subramania n (2010)	MD deprivation in the Indian context, based on ordinal data.	India	Based on data from the NFHS-1 (1992-93) and NFHS-3 (2005-06), with eight dimensions including 1. *Water* no access to a source of drinking water on its premises 2.*Electricity*: no access to electricity 3.Clean fuel: no access to "clean" fuels (kerosene, liquid petroleum gas, bio-gas, or electricity) 4.Decent Shelter: no access to a "*pucca*" house 5.Sanitation and privacy: no access to description of toilet (including a pit latrine) 6.Knowledge: If 6 or > years old and is illiterate 7.Mobility: no access to bicycle 8. Source of elementary entertainment: no access to even a radio as a source of entertainment.	The selection of dimensions is based on intrinsic plausibility, the availability of data, and the possibility of inter-temporal comparability. Five categories of poor: *Not Deprived*, if failure of access even in a single dimension. But if deprived in one or two, called *Mildly Deprived*, if in three or four, called *Moderately Deprived*, if in five or six, called *Considerably Deprived*, and if in seven or all eight, then *Severely Deprived*.	Equal weight	Sensitising both the identification and the aggregation problems to the range of deprivation, in addition, presents a graphical device called the 'D'-curve and a measure 'M' based on this curve. Class of indices of social exclusion by Chakravarty and D'Ambrosio (2006)	Households	MD poverty in India has definitely declined between 1992-93 and 2005-06. Most deprived dimensions include access to clean fuel, followed by access to *pucca* housing or by access to a toilet facility. West Bengal, was among the poorer states (7th from bottom) in 1992-93, but it has slipped a further two places to fetch up 5th from the bottom in 2005-06.	MD deprivation is assessed only in terms of headcount. In addition, more importance is given to resource based indicators only.	A classification of population by their extent of deprivation would furnish a reasonably adequate answer to the policy makers' persistent demand to know who the poor are and what their number. Money-metric poverty be supplement with MD poverty.
Mehta (2003)	To identify chronic MD poverty in India at the district level.	About 379 districts in 15 large states of India.	Using data from Indian 1991 census, CMIE (2000) and Bhalla and Gurmail (2001), the study estimates deprivation in terms of illiteracy, low levels of agricultural productivity, and poor infrastructure	Illiteracy- access to information, Infant mortality- means of accessing good health), Low levels of agricultural productivity- poor resource base, and Poor infrastructure - denial of prospects	With equal weights for all indicators. Aggregation method is following the UNDP's adjusted HDI that itself is based on Panigrahi and	Three sets of indices were estimated, namely set 1 (income, education in terms of female literacy and health), set 2 (income, education in terms of female literacy, health, and development of infrastructure), set 3(income, literacy	Household s	Out of seven most deprived districts, two belong to U.P (Bahraich and Budaun). Most deprived indicators are literacy (female) and infant mortality.		Persistent poverty (also vulnerability) has an association with multiple deprivation even in a joint manner.

			including electricity, toilet facilities and postal and telegraphic communications (denial of prospects out of income growth)	out of income growth.	Sivramkrishna (2002).	of 11-13 aged, health, and development of infrastructure).		However, there seems to be general association between high poverty, high child mortality, low female literacy, low overall literacy, lower electrification and lower access to toilet facilities along with postal services.		
Mohanty (2011)	Measures state of MD poverty and establish its linkages with child survival among the abject poor, moderate poor and non-poor households in India, using NFHS-3 (2005-06) data.	Large Indian states, for both rural and urban areas	Education (including years of schooling, child never attended school, and child continued or discontinued schooling), Health (consist of child below 5 years severely underweight and women age 15-49 years anaemic), and Wealth (includes housing conditions, Consumer durables, Size of land, Agricultural accessories). The child survival is defined in terms of IMR and U-5 MR. These indicators are contextual, illustrative and subject to the availability of data.	Union approach.	Principal component analyses.	Identification of poor is based on union approach and the complete analysis is based on descriptive statistics, principal component analyses and the life table methods.	Household	MD poverty estimates are robust. Around 50 per cent of the country's population is poor and approx. 20 per cent are abject poor (poor in two or all three dimensions), the extent to which is highest in Bihar and lowest in Kerala. The child survival indicators (IMR and U-5 MR) are significantly higher among abject poor compared to the non-poor and poor, whereas it is equivalent among three dimension of MD poverty at least at national level.	The estimates of mortality could not be made available for smaller states due to small sample size and limited availability of data counts. The deprivation in the wealth dimension is derived in composite form using PCA. It can better be considered individually.	MD poverty is useful in identification of abject poor that signals poverty trap. MD poverty should include indicators like 'health care utilization, health and health inequality'.

2.6 Summing up

One can easily conclude that research on unidimensional poverty is more voluminous than on MD poverty. This chapter first reviews the literature on unidimensional poverty in U.P, across regions and SRGs. Its primary task is to identify the population subgroups that are exceptionally poor in U.P and reasons associated with their impoverishment. Nevertheless, a close examination of mentioned studies reveals a clear dearth of studies on disaggregated estimation of poverty in U.P, particularly across SRGs and districts of the state. Second, the chapter critically reviews five global studies and ten Indian studies that represent the applied research on MD measures of poverty across the globe and in India. For MD poverty, most studies use education, health and standard of living as the dimensions of poverty. Surprisingly, there is not a single study conducted so far on U.P's MD poverty, especially at the disaggregated level using the latest NFHS data. The present study is an attempt to fill this gap.

CHAPTER 3

Multidimensional Poverty: *Concept and Essence*

3.1 Introduction

This chapter raises various arguments favouring or motivating to study MD poverty. The first broad point of reasoning is because poverty by its concept (theoretical or normative) is MD in nature. This viewpoint is also supported by findings drawn from participatory studies, the consensus on the dimensions of poverty, the advancement in the relevant data sources and computational techniques that supports MD assessment of poverty. The second point of reasoning emerges with substantial mismatches between unidimensional and MD poverty estimates, and the anti-poverty policy recommendations by MD poverty in particular.

3.2 Multidimensional Poverty: The Concept

The conceptual basis of poverty—whether it is understood in terms of basic needs, well-being, capabilities and freedom, human rights, or some other form of generally agreed consensus as specified in MDGs and SDGs— establishes the fact that the poor are often deprived of multiple needs substantial for a living[17].

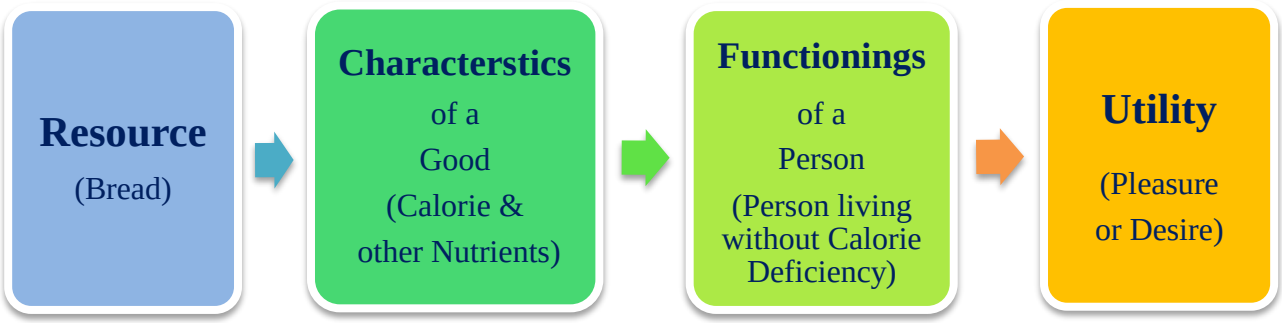
The Basic Needs Approach (BNA) of poverty was initiated particularly in developing countries during the mid-1970s and formalised with a proposal of the International Labour Organisation (ILO)'s 1976 World Labour Conference. The approach was the opposite of pro-growth policies adopted by various countries as an early development strategy, which left behind the poor, in particular, under great leaps of miseries, specifically unemployment and basic needs (ILO 1976). Proponents of BNA recognise that "what the poor need is not money incomes alone, but essential goods and services to give everyone the opportunity to lead full lives - that is, basic goods and services" (Stewart 2006). The basic needs at that time were often expressed in concrete form and described in terms of examples including the required amount of food, shelter and clothing, access to education, health care services, and other essential services such as safe drinking water, sanitation etc. (ILO 1976, Ghai 1977, Streeten et al. 1981, Stewart 1985, 1989). Moreover, emphasis was also laid upon non-material needs

[17] The multifaceted nature of poverty is widely acknowledged in the literature (Narayan et al. 1999, Narayan et al. 2000, Narayan 2009, Leavy and Howard 2013, Ghatak 2015).

such as employment, participation, political rights, cultural flourishing and so on (Ghai 1977, Hicks and Streeten 1979, ILO 1976, Stewart 1985, 2006). These basic needs were identified based on participatory exercises (people's involvement), government consultations, and the process of defining the quality of life/full life (Stewart 2006). Largely, BNA received undisputed support, acceptance and partnership with the World Bank and, finally, a common consensus was developed to eliminate poverty in this concrete form derived through BNA.

The BNA includes a blend of material as well as non-material needs. However, in practice, it typically includes a specific list of needs–access to education (to achieve functional literacy), access to health care services (at least primary), food requirements (to avoid malnutrition), and clean water, clothing and shelter (in reasonable quality). The opponents of BNA argue that it is materialistic to the extent of commodity fetishism (Sen 1993) and overemphasize the consumption patterns of the poor. Moreover, the downtrend in the BNA largely occurred due to other immediate concerns in the supporting countries, primarily related to economic stability and adjustments. However, after a recovery from the lost decade of 1980s, attention towards poverty reduction has now again emerged in the form of the capability approach described by Amartya Sen.

The capability approach of Sen is built on four elements: goods/commodities/resources, characteristics, functionings, and utilities. The first element "commodities" can be understood in terms of its characteristics (or, desirable properties). In his famous work on "Commodities and Capabilities", Sen (1985) explains the approach with the help of an example. Let us consider a commodity such as bread. Observe that it has many characteristics, of which yielding nutrition is one (which can be subdivided into categories like calories, protein etc.). Besides yielding nutrition, bread as a commodity can serve the purpose of gaining pleasure and to provide support for a social meeting, get-together over food and drinks, meeting the demand of social conventions or festivals, etc. In this way, having possession of commodities (like bread) gives the owner access to its characteristics.



Note that only possession of resources (bread in this case, or in general, can be equated with income) does not guarantee the possession of its characteristics. For instance, two people, named Person 1 and Person 2, possess an adequate amount of bread. However, Person 2 has a parasitic disease that wastes nutrients and makes the absorption of nutrients difficult. Now viewing poverty in terms of minimum bread consumption makes both people non-poor. Given the personal characteristics and circumstances of Person 2, he/she is less able to meet nutritional norms, or rather cause nutritional deficiency even with the similar and adequate amount of bread consumed as that of Person 1. Hence the question arises, is it odd to call Person 2 'non-poor'? Looking at poverty only in terms of resources (or income) after all may find it difficult to call him poor. It is therefore argued that the measurement of poverty would be premature to limit it to the characteristics of goods possessed[18].

Sen's primary point of reasoning starts with a third component, functioning, that is referred to as "achievement of a person: what he or she manages to do or to be. It reflects as it were, a part of the 'state' of that person" (Sen 1985). The argument is simply that the adequacy of the economic means cannot be judged independently of the actual possibilities of converting incomes and resources into the capability to function[19]. For example, possession of bread is different from consumption and absorption of bread. Having bread gives a person the capability to function in a desirable manner, such as living without nutritional deficiency. However, the practical difficulty is that the conversion of bread and its characteristics into personal achievements of functioning (say nutritional achievements) depends on a variety of

[18] Sen highlighted that in the income space, the relevant concept of poverty has to be inadequacy (not as a matter of below an externally fixed poverty line but to attain minimum acceptable capabilities) rather than lowness.

[19] Note that capability to function reflects what a person can do or can achieve whereas functionings reflects the personal features in terms of what a person is doing or achieving.

factors[20] (personal and social). In other words, a characteristic is a feature of a good, whereas a capability to function is a feature of a person in relation to good. As in the case of the considered example, Person 2 has a parasitic problem that makes him/her unable to achieve the capability of avoiding nutrient deficiency even with an adequate amount of bread. Therefore, it is argued that the possession of good with the corresponding characteristic is only instrumentally valued. What is intrinsically important for poverty analysis is the functioning of a person: what the person succeeds in doing with the commodities and characteristics at his/her command (Sen 1985). Sen finally argues that the identification of the poor in terms of resources (including economic means/income) cannot be adequate and independent of the capability to function derived from those resources. In many of his writings, the central argument while underlying poverty is capability failure, and resource in the form of income is a way to determine that capability failure, not a way to underline poverty itself**.** It is also distinct from the utility in terms of happiness or desire fulfilment through consumption.

The practical difficulty that is often faced while assessing poverty as per capability approach is the identification of relevant functionings as it can vary from "elementary physical ones as being well-nourished, being adequately clothed and sheltered, avoiding preventable morbidity, etc., to more complex social achievements such as taking part in the life of the community, being able to appear in public without shame, and so on" (Sen 2006, 110). Moreover, the relevant choice of deprivations can vary according to society under consideration. To be more specific, Sen (2006) poses that "We could, of course, debate about the exact ways in which normative judgments should take note of such social variations, but the primary exercise of diagnosing deprivation cannot but be sensitive to the way various types of hardships are viewed in the society in question. To deny that connection is not so much to be super-objective, but to be super-dense". As a way out, Sen (2006) also recommends that the choice of parameters for poverty identification should concentrate on the failure of certain basic general functionings and the corresponding capabilities rather than on particular commodity bundles so as to reach certain minimally acceptable levels.

Collecting various examples of basic capability and functioning from Sen's writing, it can be inferred that it primarily includes longevity, adequacy of basic clothing, ability to be

[20] Such as metabolic rates, body size, age, sex (and, if a woman, whether pregnant or lactating), activity levels, medical conditions (including the presence or absence of parasites), access to medical services and the ability to use them, nutritional knowledge and education, and climatic conditions.

housed and sheltered, basic education (assessed in terms of adult literacy rates), and ability to avoid morbidity and undernourishment (Sen 1985, 2006). Amongst them, morbidity and undernourishment have received a lot of attention in the development literature (Sen 1985). However, for wealthier countries, functionings like longevity, nourishment, basic health, avoiding epidemics, being literate, etc. may not be appropriate as these may vary less across person-to-person, whereas ability to entertain friends, be close to people one would like to see, take part in the life of the community, etc. can sound appropriate (Sen 1985). Moreover, data are relatively scarce for evaluating important functionings, most probably due to lack of demand for such data. That is why most poverty evaluating exercises (at least in India) primarily focus on resources. Based on participatory studies and literature review on generally agreed dimensions of poverty, this difficulty can be solved to some extent. The forthcoming section will try to seek answers on the relevant dimensions to assess the MD measure of poverty.

3.3 Multidimensional Poverty: The Essence

This section highlights various arguments that explain why it is essential and desirable to consider MD aspects of poverty. In another sense, it explains the essence of studying MD poverty. There are various reasons that are associated with generating profound interest in studying MD poverty. Some of them are universal irrespective of time and some point out that at least in the present era of advancement in statistical and computational techniques, the estimation of MD poverty is feasible. Besides normative arguments in terms of conceptual foundations of poverty discussed in the above section, many other references illustrate the multifaceted nature of poverty.

3.3.1 Participatory Research Recognises Multidimensional Poverty

The famous "Voices of the Poor" study by Deepa Narayan and her team analyses the common threads related to the experience of poverty borne by about 60000 people in around 60 countries. The first volume of the study entitled "Can Anyone Hear Us?" brings together the voices of over 40,000 poor people from around 47 countries (Narayan et al. 1999). The second study entitled "Crying out for Change" includes voices of over 20,000 poor people through fieldwork in around 23 countries (Narayan et al. 2000). The uniqueness of the study is that it brings forward various characteristics of poverty by the view and experience of its protagonists that are the poor people themselves.

Narayan et al. (1999) conclude that poverty is MD. In fact, their study highlights the persistence of poverty in terms of various interlocking dimensions. It clearly states that poverty is not just lack of one thing, and "the bottom line is lack of food". The study also points out four other broad dimensions that matter for poverty, including basic infrastructure (rural roads, transportation, and water); psychological dimensions (powerlessness, voicelessness, dependency, shame, and humiliation), literacy in the sense that poor people treat education as an escape route from poverty, and finally, assets in terms of physical, human, social, and environmental to counter the vulnerability. The deprivation in health and illness is considered a source of destitution. In all, the most prominent problem for the poor is securing food and sources of livelihood. In fact, lack of money is only one part and poor people value assets more than income. Narayan et al. (2000), on the other hand, survey the dimensions of poverty in the sense of well-being and quality of life. Their study categorically defines poverty in terms of material well-being (food, assets, and work), psychological well-being (power, independence, dignity, community harmony—cultural celebrations and social relationships, and happiness), and bodily well-being (health, safe physical environment such as roads, transport, electricity, drinking water, and other health care facilities).

We also have two recent online worldwide surveys to gather views about the prior needs of people across the globe. The first survey was published by the United Nations Development Group (UNDG) in a report entitled "A Million Voices: The World We Want" that includes perspective from over one million people (UNDG 2013). This survey was engineered in the form of a successor framework to the MDGs beyond 2015 or primarily in response to SDGs. The second survey, entitled "We the Peoples" or popularly known as 'MY World' survey, includes voices from around 7 million people across 194 countries (United Nations 2015). These surveys asked to vote for six out of sixteen topics. People have clearly said that the fundamental areas covered in the MDGs, such as education, health, water and sanitation, gender equality, remained critically important (UNDG 2013). In both surveys, good education and better healthcare remained among the top priorities, followed by better job opportunities, an honest and responsive government, affordable and nutritious food, protection against crime and violence, and access to clean water and sanitation.

3.3.2 General Consensus on the Dimensions of Poverty

For a long time, studies have widely acknowledged that poverty is a multifaceted phenomenon. Various scholars specify a list of deprivations that are mostly agreed upon, in

addition to basic needs as per BNA, and basic capabilities and functionings pinpointed by Sen[21]. In addition, the debate between proponents and sceptics of poverty at least agrees on the fact that poverty is MD[22]. However, the practical difficulty remains in the identification of relevant choices of dimensions, as it varies from elementary physical ones to more complex social achievements, and is very much dependent on society under consideration. Fusco (2003) explains that the phenomenon of poverty is actually polysemic which can be defined in various alternative ways and each way depicts particular facets of poverty. A broader perspective on poverty is always welcomed, provided it complements different definitions of poverty rather than antagonising them. Thorbecke (2007) points out that the broader the definition of poverty, the more difficult it is to measure in the sense that the broadly based MD concept of poverty imposes severe restrictions on the number and type of attributes that constitute poverty. In a way out, Alkire (2008) asserts that "the problem is not that poverty researchers refuse to select dimensions. On the contrary, in an increasing number of situations, researchers or practitioners do indeed choose dimensions. The problem is that they do not make explicit their reason for choosing the dimensions they do".

Keeping this view in consideration, the present study not only reviews the generally agreed dimensions of poverty specifically relevant in the Indian and U.P context but also highlights the reasons for their consideration. Besides economic hardships and minimum food requirements, consensus seems to have emerged, at least, on the indicators related to health care, educational attainment and access to basic services. In addition, the final choice of dimensions and indicators for the UP-MPI is determined on the basis of five factors suggested by Alkire (2008) namely, experts' opinion, participatory studies, constitutional provisions (national policies), international consensus, and data availability. The discussion on the search of relevant dimensions and indicators is as follows:

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[21] For example, Kanbur (1987) states that among all the explored dimensions of poverty, nutrition is among the most agreed. However, disparities in opinion mostly exist for non-nutritional dimensions. Stewart (1989) mentioned that there is general agreement among the core needs that includes food, water, health, education, and shelter. Furthermore, Kakwani and Silber (2007) recognise hunger, ill health, malnutrition, unemployment inadequate shelter, lack of education, vulnerability, powerlessness, social exclusion and so on, and Rensburg (2007) identifies lack of primary school or health center and inability to access safe drinking water or adequate sanitation. The Government of India reports agreed dimensions of poverty (urban) in the form of 'inadequate provision of housing and shelter, water, sanitation, health, education, social security and livelihoods along with special needs of vulnerable groups like women, children, differently able and aged people' (Government of India 2012b, pp. 17).

[22] For example, the debate between Alkire and Foster (2011b), Lustig (2011), and Ravallion (2011) point out a number of disagreements on various aspects of MD poverty, but they all strongly agree on one elementary point that poverty is MD.

Dimension 1: Education

It is widely agreed that education, in general, plays a significant role in the overall development of human beings, and hence shapes the development trajectory of a nation as a whole. In fact, education in the form of investment, human capital, skill, and talent is widely recognised as a driver of economic growth, but what is less recognised is the fact that education, literacy, reasoning, and learning are also important for the quality of life (Stiglitz, Sen, and Fitoussi 2009). Nevertheless, a massive amount of studies highlight that education is primary in influencing the well-being of an individual, and link it with poverty reduction[23]. For states like U.P, it is widely recognised that lack of education in general, and low participation in schools, in particular, intensify the possibility of poverty traps and illiteracy across the regions (Kozel and Parker 2003, Parker and Kozel 2005, Mehrotra 2006a, Government of India 2014d). Moreover, it is also estimated that even one year of schooling has a significant contribution by opening economic opportunities in rural areas whereas, in urban areas, a high level of education is needed (Kozel and Parker 2003). Primarily, the following points govern the choice of education as one of the dimensions of UP-MPI:

I. Education Follows Expert's Opinion as Dimension of Poverty

Most experts argue that education has a vital role to play in the well-being and overall development of every human being. It was basically Sen (2003) with his magnificent speech on the importance of basic education, who highlighted six remarkable contributions of basic education to society.

A. Education helps in making a more secure and fairer world by reducing the scope for devastation, in the sense that it can prevent human insecurity (in the forms of diseases like AIDS) as well as physical insecurity (against violence, terrorism, and genocide). Stiglitz, Sen, and Fitoussi (2009) also highlight that the neglect of education has non-economic consequences too as it can deprive people from participating in religious activities and can lead to "riot and debauchery".

B. Education helps in attaining gainful employment, particularly in the globalizing world. Quality education and enhanced learning outcomes induce economic growth

23 Including World Bank (1990), Bruno, Ravallion, and Squire (1998), World Bank (2000), Nayak (2002), Parker and Kozel (2005), Bhatta and Sharma (2011), UNESCO (2014), (Duraisamy and Malathy 1995, Duraisamy and Malathy 2003, Malathy 2000, 2007, Malathy and Duraisamy 2008, Malathy 1994) and many others.

(Hanushek and Woessmann 2012), and higher economic growth increases the possibility of higher wages and earnings in agriculture and urban informal sector, which, in turn, reduces poverty (Ravallion 2001). UNESCO (2014) estimates that if students in low-income countries leave school even with the necessary reading skills, then it will reduce global poverty by 12 per cent. Evidence shows that education helps in increasing earning potential by getting a formal-sector job[24], particularly for people with secondary education (Banerjee and Duflo 2004), and even to the farmers during the green revolution (Foster and Rosenzweig 1996). Stiglitz, Sen, and Fitoussi (2009) consider the role of education in attaining better cognitive functionings that expand individuals' freedoms, along with monetary virtues (higher earnings, income and wealth) and non-monetary virtues (greater subjective well-being, enjoy better health).

C. Education increases the ability of people to understand legal rights. It is a necessary requirement for the people at the bottom of the ladder to understand and invoke the legal rights to which they are entitled to demand and use, and prevent misuse of their legal rights. Sen (2003) highlights that education in this way leads to a reduction in deprivation of the more vulnerable groups, especially women who are often not aware of their legal rights and cannot raise a voice in matters related to property, land, biased judgment and unjust treatment. Banerjee and Duflo (2011) also point out that education can help people read newspapers and bulletin boards to find schemes and government programmes available to them.
D. Education opens the door for political participation and in turn to the expression of demand. Sen (2003) argues that education could increase the social participation and security of people belonging to the lower segment of the society with their voices heard in politics. Their greater participation can lead to a reduction in political influence and increase the likelihood of equal and fair treatment to all. Most of the studies discuss its importance with particular reference to women.
E. Education helps in better understanding of the world in general. Sen (2003) concludes his speech by saying that basic education is not just to attain skills but also to

[24] People with higher levels of education have better access to higher paying jobs, such as managerial and professional specialty occupations (Mosisa 2003), and they are relatively more aware of the job market opportunities (Jatav and Sen 2013, Möllers and Buchenrieder 2011, Ranjan 2009). Becker (1992) states that 'the earnings of more educated people are almost well above average, although the gains are generally larger in less developed countries' (p.86).

understand the world in a better way along with realising freedom, reasoning, and peace. Government of India (2016a) also acknowledges various merits of literacy for an individual, such as social benefits regarding better knowledge and participation in health and family planning, promoting gender equality by breaking social barriers such as purdah system. It also breaches caste barriers by establishing a consensus over Dalit's, tribal and minorities' education.

II. Participatory Studies Recognises Poor People Value Education

Indeed, the significance of basic education has been recognized by the poor and deprived families too as per Sen (2003). Narayan et al. (1999) also report that, although it is often difficult for poor people to invest in education, they value education for their children, at least until school level. Banerjee and Duflo (2011) also get some evidence related to the effect of household size[25]. Precisely, the evidence shows that education has some value in U.P, as Narayan (2009) discusses an event of opening of primary and secondary schools in Lalitpur district that was widely celebrated, and shows that society in the district is now weighing education and literacy.

III. Constitutional Provisions and National Policies Directs Universal Education

Since independence, the constitutional dedication tries to ensure a free and compulsory[26] education for all children up to the age of 14 years, primarily until the elementary level. Special mention was there for a universal elementary education in the constitution, and the national policies of India as well. During the adoption of the constitution, it was mandated that:

[25] With eighteen-country data set, they find that children born into large families do tend to have less education. However, they do not reject the possibility that poor families, choosing to have many children, also do not value education as much. In such cases, large household size is a prominent cause of languishing education, over and above, an intergenerational poverty trap. Nevertheless, in the end, they mention that there is no sufficient evidence to believe that larger families are not able to provide sufficient education, as well as health opportunities to their children.

26 UNESCO and UNICEF (2013) explain the difference between free and compulsory education. Free education implies that the 'government will provide access to education without any direct fees. This,of course, does not mean that families will not be responsible for other indirect costs, such as uniforms and transportation'. Compulsory education refers to the 'mandatory number of years of education that each student must complete and includes primary school and, increasingly often, secondary education'.

> *"The State shall endeavour to provide, within a period of ten years from the commencement of this Constitution, for free and compulsory education for all children until they complete the age of fourteen years."* ----------Article 45, Directive Principles of State Policy, The Constitution of India (Government of India 1949).

The Government of Uttar Pradesh (2014a) agrees that during that time, the educational facilities in the state were not in accordance to achieve this target within ten years, and the deadline for this target was revised number of times. Not only in U.P, at the national level also, targets seem to be missed out as the number of national policies still aim to achieve this goal, as follows. The Indian Education Commission (1964-1966), popularly known as the Kothari Commission, also emphasised fulfilling the above constitutional mandate of "seeking to provide free and compulsory education for all children up to the age of 14" (Government of India 1968, 1970). The commission also stressed on increasing the educational level of citizens, particularly children with a time frame that is, a provision of five years of effective primary education by 1975-76 and seven years by 1985-86. The National Policy on Education, 1986 (modified version, 1992) also stated that "it shall be ensured that free and compulsory education of satisfactory quality is provided to all children up to 14 years of age before we enter the twenty-first century" (Government of India 1992). It aims to target elementary education through three aspects: universal access and enrolment, universal retention of children up to 14 years of age; and a substantial improvement in the quality of education to enable all children to achieve essential levels of learning. Moreover, the Sarva Shiksha Abhiyan (SSA), having been in operation since 2000-2001, aims to achieve "universal enrolment of all children in the age group 6-14 years in elementary education, ensuring all children to learn at grade appropriate level" by 2010, was yet to be achieved (Government of India 2016a).

Finally, with the intention of making education a fundamental right, the Constitution of India was revised through the 86th Amendment (Article 21A) in 2002, stating that "The State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may, by law, determine" (Government of India 2002a, 2007a). In response to article 21A, the Right of Children to Free and Compulsory Education Act, 2009 (popularly known as Right to Education Act (RTE)) was passed in 2009 and took effect on 1st April 2010 (Government of India

2009d). The RTE act mandates to have an elementary education even after fourteen years of age, as stated:

> *"Provided further that a child so admitted to elementary education shall be entitled to free education till completion of elementary education even after fourteen years"*

The Government of Uttar Pradesh (2014b) also accepts that "basic education is the basic need and the 'Fundamental Right' of the citizens of a nation", and points out that even after the implementation of SSA and RTE, the state is not able to attain the target of universalisation of elementary education, and still making continuous effort. Drèze and Gazdar (1997) also state that even after so many years of constitutional implementation of free and compulsory education, U.P is far behind the target. That is why the low level of education has been highlighted as the biggest social failure in the state along with the limited role of women and failure of public services.

IV. International Consensus on Education

The second and third MDGs aimed to achieve universal primary education, in terms of both enrolment and completion of primary schooling for all girls and boys, by 2015. Nevertheless, these goals are yet to be achieved and were finally carried forward with a new setting and a new deadline (by 2030) in terms of SDGs. Now, SDGs target to achieve "complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes" for all boys and girls by 2030 (Goal 4.1, United Nations General Assembly (2015)). In addition, international institutes like UNESCO, UNICEF and others with various frameworks stress on ensuring universal education, particularly for girls, children in poverty, and/or suffering from distinguished disadvantages and belonging to ethnic minorities (UNESCO and UNICEF 2013, UNESCO 2000).

V. Existing Data Provide Adequate Information on Agreed Indicators of Education

The shortage of relevant data to assess MD poverty was pointed out by many, including Sen (2006)[27]. However, recent studies also recognise that worldwide as well as in India, the coverage of the required type of data to assess MD poverty has expanded greatly[28]. In India, there is NFHS, which is India's version of DHS. It is a large-scale comprehensive survey that provides information on a wide range of topics related to infant and child mortality, and nutrition, along with levels and years of schooling. At present, there are four rounds of NFHS, conducted respectively, in 1992-93 (NFHS-1), 1998-99 (NFHS-2), NFHS-3 (2005-06), and the latest in 2015-16 (NFHS-4). It is only the latest NFHS survey (NFHS-4) that provides a unique opportunity to estimate poverty for all 640 districts across India (IIPS and ICF 2017a, b).

Following the preceding discussion, it can normatively be agreed that the importance of basic education for a household can be determined on two accounts: First, how many necessary years of education the adult members of the households acquire; and second, how many children (aged 6-14) are currently attending school. NFHS data provides sufficient information on the chosen set of two indicators

Indicator 1: Years of Schooling

This indicator contains two levels of discussion. First is about the level of enrolment and second is related to the years of schooling. The choice of enrolment to represent deprivation in school enrolment depends on the current state of school enrolment. For a society wherein a large proportion of students graduate from the secondary or tertiary level of schools, the choice of indicators representing the deprivation in school enrolment even at the tertiary level may be less informative. Stiglitz, Sen, and Fitoussi (2009) also explain that, in the case of China, the level of enrolment until basic education may not serve the purpose, as there is widespread basic education but limited access to higher education. However, for India, even

[27] Sen (1985) reports two primary reasons for it. Firstly, there is a lack of demand for such data. Secondly, the weakness in the theory of well-being may also be responsible for the underdevelopment of such databases. He considers expanding the database an important agenda for this field of study in the long run.

[28] To assess MD poverty, the most favoured type of data is of the kind that is considered joint deprivation across households for all the considered dimensions. Worldwide, four internationally recognised and nationally representative household surveys are available that meet this requirement, namely DHS, MICS, the Living Standard Measurement Survey (LSMS), and the Core Welfare Indicators Questionnaire (CWIQ). The coverage of these relevant microdata sources has expanded greatly. Alkire et al. (2015) graphed the number of countries that have filed at least one of these surveys and pointed out that the number of such countries increased from 5 in 1985 to around 127 in 2010.

the count of literacy may be comparatively informative due to widespread illiteracy, even with the presence of a developed system of higher education.

Basu and Foster (1998) bring a new approach to measure literacy in terms of effective literacy that captures the intra-household externality arising from the presence of at least one literate member[29]. The authors seek to explain that the presence of even a single literate member can generate intra-household externality (like increase in the likelihood of children to become literate), but they opine that the extent of externality is much higher when there is the presence of a literate female member. In the sense that literate household members create a positive externality or a sort of public good for illiterate members (Basu and Foster 1998). They divided the illiterates into two types: one who is illiterate but living in the proximity of at least a literate member, called as proximate illiterate, whereas a second situation is where an illiterate person is not having a literate member around called as isolated illiterate. Instead of this distinction, they argue that the approach of effective literacy should be considered to better predict the literacy level in society. This approach is more relevant for the assessment of literacy in developing countries. By following the concept of effective literacy, as per the definition of proximate literacy given by Basu and Foster (1998), the present study considers households deprived in years of schooling where no household member has completed at least six years of schooling.

Indicator 2: Child School Attendance

Studies are particularly recognising the individual preference for child education. First, children are, in many ways, least equipped to cope with poverty[30]. Second, child education in the initial years of schooling is essential, as it shapes the possibility of generating human capital and once lost, will not be recovered even in the later years of schooling[31] (Thorbecke 2007). Third, schools are essential for greater subjective well-being, to participate more

29 This view is also supported by UNESCO and UNICEF (2012), Mishra (2005), and others.

30 Narayan et al. (1999) state a few facts that justify why a child should be the domain for some of the indicators of MD poverty. First, children are amongst the most vulnerable class that have minimal power or influence over the social process, governing their lives, and have little ability to protect themselves from abuse. Second, they often lack basic rights, frequently face exclusion from education and healthcare, and face child labour, abuse, and homelessness. Third, child labour is also one of the major causes for children leaving school, particularly among poor households. Extremely concerned is when children not only work but also are often forced into the riskiest forms of employment.

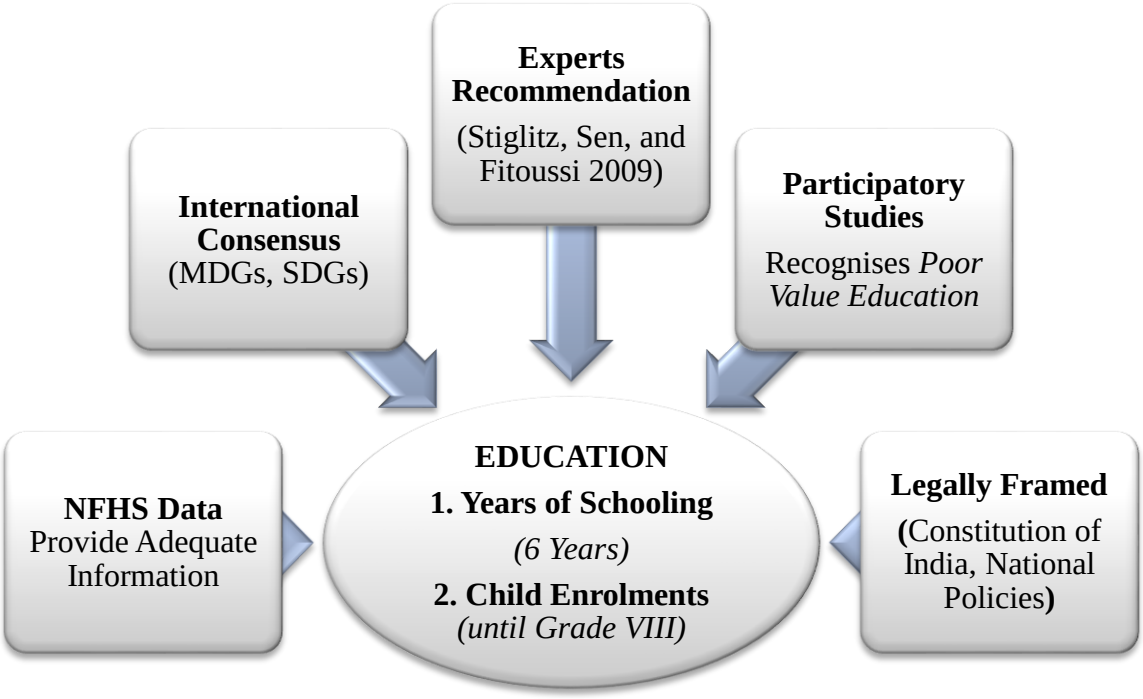
31 Banerjee and Duflo (2011) stress that children (7-14 years of age) must go to school at least till the primary levels, and for that, the crucial requirement is the availability of schools. They mention that schools across the globe exist as the majority of the counties are providing free primary education to their children, but the concern remaining is child absenteeism.

actively in society, and to enjoy better health (Stiglitz, Sen, and Fitoussi 2009). Therefore, the second choice of indicator for education dimension is child school attendance until the age of his/her school going age.

Here, the primary concern is that when a child is at the age of compulsory education, he/she should be in school. However, the question arises as to how much level of education is essential. Many argue that primary education is essential, but it is not sufficient. Rather, a long list of studies conclude that at least the lower secondary level is essentially required[32]. In U.P, Jeffrey, Jeffery, and Jeffery (2005) discuss that schooling beyond Grade V has particular importance regarding social reproduction and change, improvement in skills, knowledge, employment chances, and social standing. In fact, rural societies of U.P regard an 'educated' (*parhe likhe*) person as someone with at least an Eighth Class pass and someone with just a Grade V pass as 'uneducated' (*unparh*)'. Specific to the top employment perspective, they assert that possession of Grade VIII is at least required to secure low-ranking private salaried jobs, whereas a Grade X is at the minimum required for most forms of government work. Therefore, it seems appropriate to set a deprivation cut-off for child school attendance when a single school-aged child in the household is not attending school until grade VIII (refer to Fig. 3-1).

[32] Lower secondary education is required to witness the power of education to save lives (UNESCO 2014), to attain a stable job and sustain out of poverty (Narayan 2009, McCulloch, Timmer, and Weisbrod 2007). Also, after secondary schooling, the chances of poor households remaining in poverty are reduced by 16 per cent in Uganda (Lawson, McKay, and Okidi 2006), by 24 per cent in the case of Vietnam (Baulch and Dat 2011), and also in Indonesia (McCulloch, Timmer, and Weisbrod 2007).

FIG. 3-1 SUMMARY OF EDUCATION DIMENSION AND FINAL CHOICE OF INDICATORS



Dimension 2: Health

Many studies consider health as valuable as other beings of life and justify the considerations of considering health as one of the dimensions of MD poverty, as follows:

I. Health Follows Experts' Recommendation as Dimension of Poverty

It is obvious that being healthy not only determines the length of life but it also improves the quality of life one is living. A typically poor individual generally experiences health problems since his/her birth and is more prone to health risks as they grow older. It is not just because of inadequate living but also the phenomenon of malnutrition that characterizes the reality of poverty. In this sense, plenty of research studies consider ill health as one of the core dimensions of poverty[33]. In fact, ill-health reduces the earning potential as well as increases the cost of living, which nowadays has been recognised as the leading cause of poverty in India (Government of India 2017c) as well in U.P (Ajwad 2007, Government of Uttar Pradesh 2014b), particularly in rural areas (Government of Uttar Pradesh and UNDP 2008). Moreover, Kakwani and Subbarao (1990) with sufficient evidence, claim that India is far behind other countries in South Asia in terms of health

33 See Smith (1999), Gordon et al. (1999), Mohanty and Pathak (2009), Mohanty (2012), Mohanty and Srivastava (2012), and refers to the large list of studies cited in Gordon et al. (2000).

outcomes such as infant mortality, life expectancy, etc. despite having equivalent income levels.

Specific to health indicators that are essential to monitor, Sen (1985) stresses on considering morbidity and undernourishment and refers to them as "some important functionings", "basic constituents of well-being", factors depicting the "quality of life" that are much absent in poor developing countries and even neglected by economic literature. However, deprivation in health or bodily well-being is often confused with consumption intake or levels of income. Sen, while referring to James Grant, states:

> "*Children from disadvantaged backgrounds—are forced to lead miserable and precarious lives and to die prematurely. That predicament relates in general to low income, but not just to that" (Sen 1998, pp. 2)*

II. Constitution, National Policies and Plans Emphasis on Health Deprivations in India

The Constitution of India, by Article 47, directs the state to regard *"the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties"* (Government of India 1949), and by Article 39 (e) "*securing that the health and strength of workers, men and women, and the tender age of children are not abused and that citizens"* (Government of India 1949). These two articles of the constitution thus direct the state to preserve the right of its citizens towards better nutrition and secure a healthy life, particularly for children. Moreover, the 12th five-year plan document of the Government of India states:

> *"Nutrition constitutes the foundation for human development, by reducing susceptibility to infections, reducing the related morbidity, disability and mortality burden, enhancing cumulative lifelong learning capacities and adult productivity. There can be no doubt that improvement in the nutritional status of both children and adults must have high priority in any strategy for human development. Nutrition status of the most vulnerable age group of children is both a sensitive proxy indicator of human development and also a key determinant of the effectiveness of national socio economic development strategies"* (Government of India 2013c, 197).

Since independence, three National Health Policies (NHP[34]) have been framed to direct the provision of health services in India. The primary target of the first NHP-1983 was "Health for all by the Year 2000 A.D", specific to some of the relevant indicators requiring "urgent attention", namely nutrition, immunisation programmes, maternal and child health services, school health programme and occupational health services, etc. With the NHP-2017, the focus is on the removal of malnutrition along with micronutrient deficiencies.

In addition to under-nutrition, NHPs also lays a specific focus on controlling child mortality (refer to Table 3-1). NHP-1983 aims to strengthen children's immune system and improve child mortality rates. A particular emphasis is given to cover the overall child population under vaccination against communicable diseases. Fortunately, after the policy, the rate was reduced but not up to the required rate. In fact, during the initial years of 1980s, high birth rates along with high mortality rates resulted in more desire for children necessitated the initiation of awareness programmes with a particular focus on the less privileged sections of society. Thus, the NHP 2002 focuses further on improving immunisation coverage with a greater emphasis on quality and safety. Moreover, the catalytic role of (empowered) women was recognised because of inadequate access to health facilities. Actually, at that time, shortage of health facilities not only affected the health of women in particular but it also adversely affected the health and general well-being of the entire family, children in particular. Afterwards, during 2017, enhanced provisions for reproductive morbidities and the health needs of women beyond the reproductive age group (40+) were added along with the earlier services covered for maternal and child health. Nevertheless, child mortality has occupied a prominent place in the Indian health policy framework, as the focus has remained to minimize from 106 in 1985 to merely 28 by 2020 (refer to Table 3-1). Therefore, from the aforementioned policy objectives and targets set for the future, it can be argued that under-nutrition and child mortality are still considered as the major aspects of health deprivation in India.

34 It includes NHP-1983, NHP- 2002, and NHP-2017. Refer to Government of India (1983), Government of India (2002b), and Government of India (2017c), respectively.

TABLE 3-1 TARGETS FOR DIFFERENT INDICATORS IN NHP-1983, 2002 AND 2017

Indicator	NHP-1983			NHP-2002			NHP-2017		
	1985	1990	2000	2005	2010	2015	2017-18	2020	2025
Child Mortality									
IMR (per 1000)	106	87	<60	-	30	-	-	28 by 2020	-
U-5 MR*	20-24	15-20	10	-	-	-	-	-	23
Immunisations Status(% coverage)									
TT (pregnant women)	60	100	100	-	-	-	-	-	-
TT (children-10 years)	40	100	100	-	-	-	-	-	-
TT (children-16 years)	60	100	100	-	-	-	-	-	-
DPT (children < 3)	70	85	85	-	-	-	-	-	-
Polio (infants)	50	70	85	#	-	-	-	-	-
BCG (infants)	70	80	85	-	-	-	-	-	-
DT (new school entrants 5-6 years)	80	85	85	-	-	-	-	-	-
Typhoid (new school entrants 5-6 years)	70	85	85	-	-	-	-	-	-

Note: 1. * In NHP-1983, U-5 MR is represented by pre-school child mortality (1-5 years).
2. In NHP 2015, the aim is to reduce premature mortality from cardiovascular diseases, cancer, and diabetes or chronic respiratory diseases by 25% by 2025.
3. # denotes elimination.

Source: Government of India (1983, 2002b, 2017c)

III. International Consensus on Health

It is accepted worldwide that *"*enjoying the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief and economic or social condition" (OECD and WHO 2003). Moreover, "beyond its intrinsic value to individuals, health is also central to overall human development and to the reduction of poverty*"* (OECD and WHO 2003). MDGs also lay particular importance to health: three out of eight goals are specific to the health dimension (United Nations 2003), namely to reduce child mortality (under five); to improve maternal health by reducing Maternal Mortality Ratio (Goal 5, Target 6); and to combat HIV/AIDS, malaria and other diseases (Goal 6, Target 7). Nevertheless, these three goals are directly or indirectly associated with the first MDG, which is "eradicate extreme poverty and hunger". As far as Indian achievement regarding the targets of MMR and U-5 MR is concerned, it is almost within reach[35] (Government of India 2017d). However, the target of U-5MR for U.P (28) is far behind (Government of Uttar Pradesh 2014b).

35 In the year 1990, the MMR of India is 556 (WHO et al. 2015) and the target of MDG for MMR (139) was already achieved by 2011-13 (Government of India 2017d). For U-5MR, the target of MDG (126 in 1990) was to reduce it by 43, which is also achieved by 2013 (Government of India 2017d).

IV. Existing Data Provides Satisfactory Information on Reasonable Indicators of Health

The NFHS data provides sufficient information on the chosen set of two indicators, namely, undernutrition and child mortality, representing health dimensions of poverty. In fact, that makes the final selection of the third and the fourth indicators for UP-MPI as follows:

Indicator 3: Under-nutrition

Under-nutrition is often measured at two levels. One is for adult members, and another is for children[36]. Adult nutrition can be determined by Body Mass Index (BMI)[37] score. As per WHO (2004), value of BMI below 18.5 reflects mild underweight and is the deprivation cut-off for adult under-nutrition. However, for children, the state of under-nutrition can be judged by three measures: stunting, wasting and underweight[38]. Studies provide a diversified view regarding the precise measure of child under-nutrition amongst these three. At large, stunting seems to be winning this battle, but that is case specific[39]. If the issue of discussion is what really matters for children is good nutrition in early childhood, then the quality of nutrition can appropriately be judged by child height. As many studies point out, poor nutrition, especially during early childhood, can lead to stunting, which has serious and lasting problems that even continued to a child at age three or until adulthood[40] (Martorell 1999, Dercon 2005, Thorbecke 2007). Moreover, stunting precisely reflects chronic conditions as it has comparatively long-term consequences in response to poor diet and repeated illness (Richard et al. 2012, Khara and Dolan 2014, Waterlow 2011, Banerjee and Duflo 2011),

36 This bifurcation is essential, with specific monitoring of child undernutrition, as it has long-term consequences, whose effects can be intergenerational too (Subramanian et al. 2009, Barker 1997, Banerjee and Duflo 2011, Bhargava, Guntupalli, and Lokshin 2011).

37 It is defined as weight in kilograms divided by height in meters squared. Note that NFHS provides height and weight information for female members only. So, adult undernutrition here is basically referring to female undernutrition.

38 Alkire and Santos (2010) statistically explain these three nutritional indicators for children. The 'weight-for-age, weight-for-height and height-for-age, measured in standard deviations (SD) from the median of the reference population (z-scores). Children who are two or more SD below the mean of the reference population are considered underweight, in wasting and stunting correspondingly'.

39 While comparing stunting with wasting and underweight in terms of better predictor of undernutrition, a sufficient list of studies favours stunning, including Black et al. (2008), Victora et al. (2008), Victora (1992), Waterlow (2011), Richard et al. (2012), Khara and Dolan (2014).

40 In this context, there is a long-standing debate on 'Why South Asians are Small?'. Banerjee and Duflo (2011) doubted that it might be because parents in these countries did not get as much nourishment as in other parts of the world. However, specific to the Indian context, it is largely asserted that children are very badly nourished. Nevertheless, the cause of shorter heights of Indian is itself a debate, as Panagariya (2013) stated genetics, and Spears (2012, 2013b) and Coffey et al. (2013) considered open defecation.

lower educational performance and cognitive functions, less earnings and productivity, poorer cognitive outcomes, premature mortality due to increased risk of cardiovascular and obstructive lung disease (Dercon 2006, Victora et al. 2008). In fact, studies provide evidence on both sides: better-nourished children are taller that supports them in higher earning, development of brains and capabilities to develop. On the other hand, adults that are now earning higher got good nourishment during their childhood[41] (Coffey et al. 2013)

These facts help in accepting stunning as a better measure of child undernutrition. Moreover, in the original version of Global MPI (Alkire and Santos 2010, Banerjee and Duflo 2011), child malnutrition is measured in terms of wasting. However, in the revised version of Global MPI by UNDP-2014, it was replaced with stunting, with the stated reason being that stunting is a better indicator of chronic malnutrition (UNDP 2015). For the present study, a household is considered deprived in nutrition if there exists an adult household member (woman of age 15–49 in particular, as per NFHS) who is malnourished (BMI less than 18.5) or a child under age 5 who is stunted (as per height-for-age z score calculated using WHO standards).

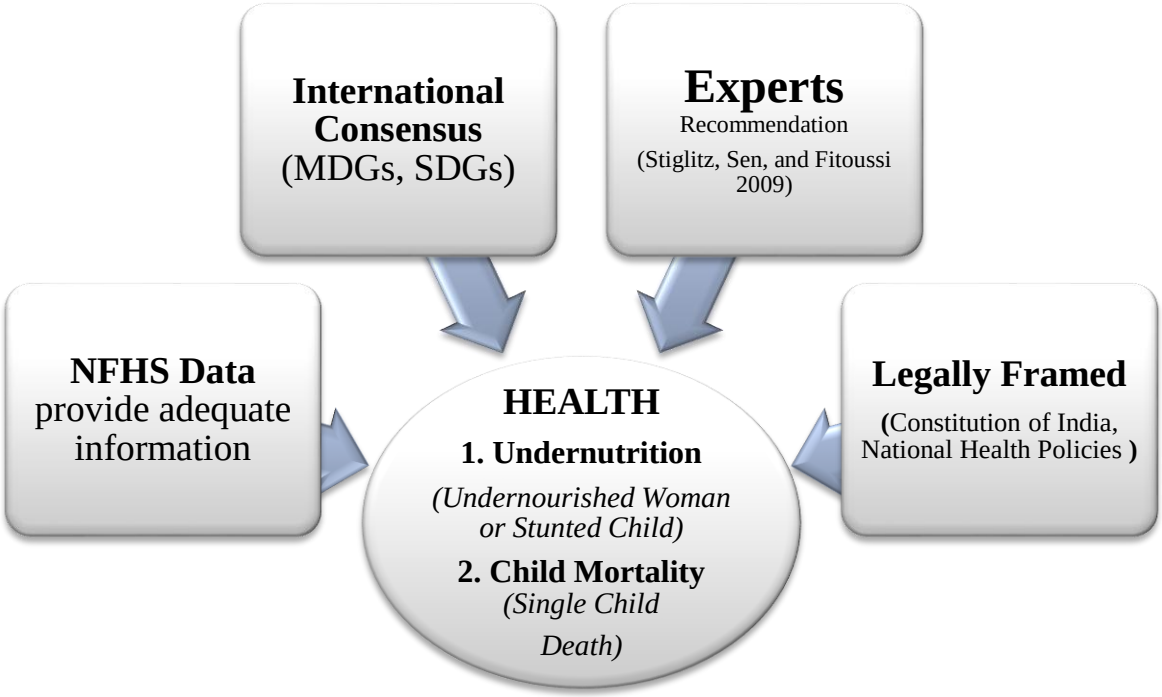
Indicator 4: Child Mortality

The health status of a baby who has not yet opened eyes can be predicted by pre-birth treatment, maternal nutrition, and healthcare facilities. Thus, the longevity of a child's life can reflect important information about the health status/deprivation of the household. Speaking of mortality, Sen (1998) provides various reasons to believe that it has more value as a measure of health deprivation in comparison to others. Stiglitz, Sen, and Fitoussi (2009) also foreground the importance of child mortality in the sense that "it reflects the effects of economic and social conditions on the health of mothers and newborns, as well as the effectiveness of health systems", and it is commonly included in all evaluations of living standards, being inversely related to per capita GDP. Moreover, in order to comprehend the human development measures, Ranis, Frances Stewart, and Samman (2006) exclusively consider U-5 MR for two reasons: first is to focus on health alone as is often advocated, and secondly, U-5 MR provides much more accurate information for changes over time (compared to life expectancy) and it covers the wider concept of health (over IMR).

41 Banerjee and Duflo (2011) in this reference discuss how height plays a big role, particularly by presenting the case of Olympian failure by the South Asian, and provide evidence that taller people do earn more, in both poorer and richer countries.

Similarly, Stiglitz, Sen, and Fitoussi (2009) find that mortality statistics are "better-measured and less subject to error than other health measures". Therefore, for the present study, a household is considered deprived if any child has died in the household within the last five years of the survey (refer to Fig. 3-2).

FIG. 3-2 SUMMARY OF HEALTH DIMENSION AND FINAL CHOICE OF INDICATORS



Dimension 3: Standard of Living

There can be various dimensions of poverty, but the standard of living (SOL) is the one that is most agreed and widely used (Silber 2011). In fact, some of the primary studies like Stiglitz, Sen, and Fitoussi (2009), stress on considering SOL as the starting point for any well-being measure. Moreover, SOL has conceptual advocacy as being a dimension of poverty[42]. Indian constitution also has provisions for SOL**,** as Article 47, directs the state to regard *"raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties"* (Government of India 1949). The

42 Most of the measures following BNA are considered poverty in terms of minimum SOL, that includes personal consumption of food, shelter and clothing, and access to essential services such as safe drinking water, sanitation, health, education and transport, and many more basic needs (Stewart 2006, ILO 1976).

national studies in India are also favouring SOL as one of the dimensions of poverty[43]. A study by Bhojvaid et al. (2014), which specifically aims to evaluate the indicators of SOL for U.P, finds that water quality or scarcity, poor sanitation, and indoor air pollution caused by cooking smoke are often related to deprivation in the region.

It is clear from the above discussion that the choice of indicators for education and health dimensions for UP-MPI is determined by different factors, namely, experts' opinion, participatory studies, constitutional provisions (national policies), international consensus, and data availability. However, the final selection of indicators for the SOL dimension is based on Alkire and Santos (2010) and UNDP (2014). Nevertheless, the present study makes changes (replacement and addition) in some of the indicators as per the availability of data and existing notions of deprivation in the state. The choice of indicators for the SOL dimension is as follows:

Indicator 5: Access to Electricity

Access to electricity is essential for every human being. In the contemporary era, the basic level of living cannot be attained without electricity. It is, in fact, a first choice while considerations for development programmes and poverty alleviation strategies across the globe as well as in India. SDGs also accept the need for reliable electricity accessibility for both rural and urban areas in its Goal 7 (United Nations Secretary General 2015). There is hardly any debate in considering a household deprived if there is no access to electricity.

Indicator 6: Access to Safe Drinking Water

> *"Water and Sanitation is one of the primary drivers of public health. I often refer to it as Health 101, which means that once we can secure access to clean water and to adequate sanitation facilities for all people, irrespective of the difference in their living conditions, a huge battle against all kinds of diseases will be won"* - Dr LEE Jong-wook, Director-General, WHO

Globally, around 13 per cent of the world's population lacks access to improved water sources (typically meaning a tap or a well) and about one-fourth do not have access to safe

[43] The Hashim Expert Group (HEG) considers residential vulnerability with stress in the absence of essential civic services, including electricity, water supply, sanitation and sewerage as some of the criteria to identify BPL households in urban areas of India (Government of India 2012b).

drinking water.[44] Availability of safe drinking water is one of the necessities of life for every being in existence. Better-off households can have or manage to have the availability of safe drinking water on their premises. The economically deprived households, in particular, face severe problems with access to water for drinking and other purposes. There is less conflict in considering the view that access to safe water is at least required for drinking purposes to prevent severe and deadly diseases. Plenty of research studies have found that access to safe drinking water and sanitation can have a significant impact on health, or rather a reduction in mortality worldwide[45]. In India also, lack of safe drinking water is considered one of the major causes of the high incidence of deadly diseases and mortality (Government of India 1983), where its availability and accessibility (along with sanitation, and sewage facilities) may more strongly be related to avoidable morbidity and mortality (Government of India 2014d). Specifically, in U.P, Kozel and Parker (2003) find that although in many parts of rural areas, public access to tap water is made available to poor sections and lower castes, they are still discouraged from using these sources. In urban areas, many communities witnessed a lack of access to clean, potable water and public toilets. The discussion above reflects the essence of safe drinking water whose unavailability can make anyone deprived. Now the question remains, what are the sources of drinking water that could be considered safe?

Classification of Safe Drinking Water Sources

Dotter and Klasen (2014b) consider water sources as unsafe for drinking if they are not protected (such as open or unprotected wells or spring, or surface water like a river, dam, pond, etc.) or they are irregular (such as bottled water or a tanker truck). However, they consider protected well or spring (and the use of rainwater) under the clean water category. Similarly, Kovacevic and Calderon (2014) list sources such as piped water into dwelling, plot

44 Refer to WHO and UNICEF, Progress on Sanitation and Drinking Water, 2010, available at http://whqlibdoc.who.int/publications/2010/ 9789241563956_eng_full_text.pdf.

45 Banerjee and Duflo (2011) on the basis of Cutler and Miller (2005) and Bryce et al. (2005) findings highlight that the introduction of piped water, better sanitation and chlorination of water sources in the United States during 1900 and 1946 leads to around half the total mortality reduction in major cities, three quarters of the infant mortality reduction, and two thirds of the child mortality reduction. Fewtrell and Colford Jr (2004) estimated that across developing countries, water quality interventions (specifically point-of-use treatment) reduced diarrhoeal illness to a significant level. World Health Organization (2004) statistics find that improved water supply reduces diarrhoea morbidity by 6% to 25%, can lead to a reduction of diarrhoea episodes by 35% and 39%, can reduce trachoma morbidity by 27%, can reduce morbidity from ascariasis by 29% and hookworm by 4%.

or yard; public tap/standpipe; borehole/tube well; protected dug well; protected spring; and rainwater collection under the improved category, whereas others like unprotected well, unprotected spring, water provided by carts with small tanks/drums, tanker truck-provided water, and bottled[46] water or surface water taken directly from rivers, ponds, streams, lakes, dams, or irrigation channels are not included under improved water sources. Based on WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP, afterwards), MDGs consider piped water, public tap, borehole or pump, protected well, protected spring or rainwater as improved sources of water supply, whereas vendor-provided water, bottled water, tanker trucks or unprotected wells and springs are not included as improved sources of drinking water (United Nations 2003). MDG considerations are based on the assumption that improved sources are more likely to provide safe water, and they do not factor in actual access to safe drinking water. However, "access and volume of drinking water are difficult to measure, so sources of drinking water that are thought to provide safe water are used as a proxy" (United Nations 2003).

Indicator 7: Access to Improved Sanitation

"Toilets are More Important than Independence" – M K Gandhi

Adequate sanitation facilities are essential for living as they help in escaping avoidable diseases and have a significant impact on health outcomes in households and communities as a whole. Government of India (2012a) recognizes the importance of sanitation in the sense that "*besides, restoration of dignity, privacy, safety and social status, sanitation has strong bearings on child mortality, maternal health, water quality, primary education, gender equity, reduction of hunger and food security, environmental sustainability, global partnerships and ultimately poverty alleviation & improvement of overall quality of life*".

The Government of India (2017a) guidelines for the Swachh Bharat Mission (Gramin), along with others, point out mainly four ill impacts of inadequate sanitation. First, it is responsible for deadly diseases such as diarrhoea, and others[47]. Second, inadequate

[46] If secondary source is not an improved source or if there is no information on the secondary source.

[47] Inadequate sanitation infrastructure results in diseases caused by viruses, bacteria (such as cholera and E. Coli) and parasites (e.g., cryptosporidiosis) (Stiglitz, Sen, and Fitoussi 2009), even one gram of feces can

sanitation facilities adversely impact children, particularly those under five years of age, as they are more prone to diseases like diarrhoea that are responsible for killing around 1.5 million children across developing countries every year. For girls, safe and hygienic sanitation facilities are essential, particularly during menstruation that can even influence their school attendance or even result in dropouts. Third, poor sanitation along with poor waste management leads to direct and long-term consequences of environmental degradation as "untreated sewage flowing directly into water bodies affects coastal and marine ecosystems, contaminating soil and air, exposing millions to disease" (Government of India 2017a). Fourth, poor sanitation can also reduce the pace of the economy. The Government of India (2017a) cited a World Bank study, which estimates that lack of adequate sanitation would cost the Indian economy around 6.4 per cent of its GDP for the year 2006.

It is crucial to note that inadequate sanitation affects all, but the impact on the poor is disproportionate (World Bank 2010). For example, Spears (2012) and Kumar and Vollmer (2013) show that inadequate sanitation is causing severe health consequences in rural India. It also found that health facilities in rural areas are rarely or poorly available, which lead to either losing higher earnings or paying extra medical costs for day labourers who are under higher risk of inadequate sanitation. Considering sanitation as an essential part of living, the BPL census also took the availability of latrine facilities with water as an indicator for identifying the poor, in which open defecation was considered a symbol of deprivation (Government of India 2009a). Based on the above discussion, it is crucial to consider inadequate sanitation as one of the indicators for UP-MPI. However, the question remains: how do we define adequate sanitation?

Improved or Adequate Sanitation and its Classification

In a very narrow sense, adequate sanitation means a provision of facilities and services for the safe disposal of human waste (Government of Uttar Pradesh 2014b). However, JMP defines adequate sanitation facilities "that are not shared between households and that hygienically separate human excreta from human contact" (WHO and UNICEF 2006). The techniques that meet the criteria of adequate sanitation are considered 'improved' and those that do not are 'unimproved'. Categorically, the improved sanitation facilities are likely to include a

contain 10,000,000 viruses, 1,000,000 bacteria, 1,000 parasite cysts and 100 parasite eggs (Government of India 2017a). For a detailed list of infectious diseases that are associated with poor sanitation, refer to Feachem et al. (1983).

flush/pour-flush toilet or latrine that flushes to a sewer, septic tank or pit, a ventilated improved pit (VIP) latrine, pit latrines with the pit well covered by a slab, or composting toilets. On the other hand, open pits that are without a proper slab to cover the pit, service or bucket latrines (where excreta is manually removed), public latrines and the practice of open defecation in the bush, field or bodies of water are considered to be unimproved. In a broader scenario, the Government of India (2017a) defines safe sanitation that includes "promotion of safe disposal of human excreta, right use of toilet and avoiding open defecation as well as management of solid and liquid waste". However, the definitional criteria of JMP regarding improved and unimproved sources of sanitation are widely accepted and followed.

The Government of India (2012a) also provides a detailed list of sanitary technologies used across rural areas, categorized as per hygiene (low and high), safe reuse or disposal of human wastes (yes or no with reasons), and socio-cultural acceptability status. Simple pit toilets and single pit pour-flush have low hygiene, no safe reuse or disposal of human waste, and are acceptable with health risks. Nevertheless, pit toilets are effective in preventing feces from contaminating the water supply without piped water (Franceys, Pickford, & Reed, 1992). On the other hand, pour-flush toilets with twin pits, eco-san toilets, septic tank toilets, and biogas plants linked with toilets have high hygiene, safe reuse or disposal of human waste, and are socio-culturally acceptable without health risk. The Swachh Bharat (Clean India) Mission considers safe sanitation technologies such as twin pit, septic tank with soak pit, eco-san, bio-toilets amongst others (Government of India 2014a).

Indicator 8: Safe Cooking Fuel

A number of studies show various reasons for not using traditional cooking fuel. Viswanathan and Kavi Kumar (2005) report some significant consequences of using traditional cooking fuels, such as "arduous and time-consuming nature of fuel collection", "difficult to control combustion process", "inefficient heat exchange", and "serious health threat". These reasons can be broadly categorised into two parts, which are discussed as follows:

First, exposure to Indoor Air Pollution (IAP): Many studies claim that combustion of solid fuels including biomass (wood, charcoal, agricultural residues, and animal dung) and coal leads to significant exposure to IAP, which is very likely responsible for a number of problems. It may cause acute respiratory problems (Desai, Mehta, and Smith 2004, Duflo, Greenstone, and Hanna 2008, United Nations 2003, IIPS and Macro International 2007),

particularly among children and is responsible for major causes of death among children under five years of age (Bruce, Perez-Padilla, and Albalak 2000, Viswanathan and Kavi Kumar 2005). In fact, an adequate number of studies evaluate the more adverse impact of IAP due to the burning of unprocessed bio-fuels on women (Batliwala 1984, Agarwal 1986, World Bank 2001, Viswanathan and Kavi Kumar 2005, Watts et al. 2017, Government of India 2013b), particularly in rural areas (Saghir 2005, Barnes and Toman 2006, Khandker, Barnes, and Samad 2010). However, a comprehensive evaluation in this respect is made by Laxmi et al. (2003) which shows that women have to bear a significant drudgery due to the use of biofuels. They have to travel around 2.5 km to collect wood (costing time is about 50 hours/month/household). That is why Anenberg et al. (2013) argue that such practices will hamper social and economic progress, as women and children, in particular, have to spend a significant amount of time per day on it.

Second: It has severe health consequences: Numerous studies highlight that 'dirty' or unprocessed solid cooking fuels produce smoke, responsible for various health hazards (World Bank 2002a, b) and even leads to fatal diseases among women and children such as "asthma, bronchitis, chest infection, tuberculosis, adverse pregnancy outcomes, cancer, eye irritation" (Bruce, Perez-Padilla, and Albalak 2000, Mishra and Robert D Retherford 1997, Parikh, Biswas, and Karmakar 2003). In fact, Smith (1998) estimates that IAP results in around five lakhs of premature deaths per year, including children under five years of age and women in India. Mishra, Retherford, and Smith (1999) find that the use of biomass fuels for cooking substantially increases the risk of tuberculosis in India[48]. During the early 2000s, IAP was responsible for around two million excess deaths in developing countries and for some four per cent of the global burden of disease (Bruce, Perez-Padilla, and Albalak 2000, World Health Organization 2000). However, in recent estimates, it is associated with four million premature deaths annually (Anenberg et al. 2013). In U.P alone, the NFHS-3 reports that 425 per lakh population is detected with tuberculosis, and there is a very high chance that the majority of them use solid fuels (such as wood, coal, charcoal, dung cakes, or agricultural crop waste) (IIPS and Macro International 2008).

48 Use of biomass fuel relatively increases the likelihood of prevalence of tuberculosis (by odds ratio= 3.56). However, the effect is reduced to some extent when "separate kitchen, house type, indoor crowding, age, gender, urban or rural residence, education, religion, caste or tribe, and geographic region" are statistically controlled.

Classification of Safe Source of Cooking Fuel

Individually, a few studies provide reasons as to why a particular source of cooking should be treated as improved or unimproved. For example, wood, being a resource, its degradation and depletion is an unpleasant fact. The cutting of wood to use it for cooking purposes degrades not only the environment but also depletes the availability of natural assets that harms the productivity of households along with the entire community (Narayan et al. 1999). LPG is considered the finest way of cooking, as it does not affect health adversely and having an efficient heat exchange rate[49]. Two studies, namely, Nautiyal (2013) and Jain et al. (2015), find out the positive impact of transition towards improved cooking fuels in general and LPG in particular, in the sense of cooking practices such as convenience, energy saving, safety along with improving health outcomes and decreases IAP.

Viswanathan and Kavi Kumar (2005), along with Ekholm et al. (2010) and Khandker, Barnes, and Samad (2010) specify criteria to distinguish between clean and dirty fuels on the basis of particulate and gaseous emissions causing IAP and, in turn, ill-health, and adverse impacts on forests. Accordingly, biomass fuels such as wood, agricultural residue, dung, charcoal, and coal (coke and coal) have been categorized as 'dirty' fuels, whereas liquid fuels (kerosene, and LPG), and gobar gas, and electricity are referred to as 'clean' fuels. Following the above discussion, the present study considers a household deprived in cooking fuel, if it cooks with 'dirty' or unimproved fuels.

Indicator 9: Housing

Adequate housing is one of the most effective means to alleviate poverty, as it is one of the pre-requisites for healthy living and survival. It is also one of the factors that determine the SOL in general and the quality of life in particular for the poor. Studies show that the substandard structure of the house could determine the deprivation level in the society[50].

In India (as per NFHS), information on housing structure is collected in terms of material used that is categorised into *pucca* (permanent in nature), semi-*pucca*, and *kachha* (temporary in nature). The structure is made up of either type of material and is named accordingly. The Government of India (2012b) states that *kachha* roofs and walls could be a

49 In the sense of thermal energy, Viswanathan and Kavi Kumar (2005) pointed out that cooking with open fire can capture only 15 per cent of energy, whereas cooking with LPG can account for 60 per cent.

50 For example, in the five component slum definition of UNICEF and MICS (1995), the very first component is the non-durable structure of the house. Fusco (2015), Fusco, Guio, and Marlier (2013), Narayan et al. (1999) and Stiglitz, Sen, and Fitoussi (2009) also consider housing as an essential determinant of poverty.

reliable indicator of housing deprivation, but raise concerns over *pucca* roofs and walls as these are not seen as a definite indicator of well-being. The World Bank (2010) finds an association between consumption poverty and *kachha* housing in U.P, particularly in rural areas. On account of safety, particularly during natural hazards/disasters, the *kachha* house represents a very precarious condition of living across the globe (Dwyer et al. 2004, Wilhelmi and Hayden 2010), and also in India (Feroz 2012, Yenneti et al. 2016). Studies arrive at the unanimous result that people living in inadequate housing conditions (like *kachha*) are comparatively more vulnerable to natural hazards or disasters, which itself is growing due to climate change. If we look at the minimum requirement for housing that is "contingencies of strong winds, rain, and fire" as pointed out by Jayaraj and Subramanian (2010), the Government of India (1998, 1993a) clears that "*kachha* dwellings provide the least shelter and are the most susceptible to the ravages of both natural calamities and social upheavals".

The considerations of *kachha* house type to represent housing deprivation are also supported by the ground reality. Sharma and Gupta (2012), conduct poverty-ranking exercises that show that the poorest of the poor possess *kachha* houses. Kozel and Parker (2003) find that in U.P, poor households are not equipped with safe drinking water, adequate sanitation facilities, and lighting and usually live in temporary housing. The Government of India (n.d.) conducted a pilot survey to design a concept for rural housing for Indira Awas Yojana (IAY) and other similar schemes. The survey shows that in Central India, at least a *pucca* house is considered an essential requirement. Considering all of the above, the present study considers the presence of the *kachha* house types a fair proxy for deprivation in housing.

Indicator 10: Assets

In literature, the recognition of assets in poverty analysis grew out of the livelihood approach during the 1990s[51]. However, since age, possession of assets had many roles to play, such as generating income, representing wealth and status, security against shocks, and easier access to credit (Hulme and McKay 2005, Ghatak, Morelli, and Sjostrom 2002). Among them, security against shocks is the most cited need and economic assets are the most concerned type of assets, particularly among the poor. Nevertheless, the voices of poor study by Narayan et al. (1999) show a number of cases where poor people speak extensively about the

51 Refer to studies cited in Hulme and McKay (2005), Narayan (2009) and Ellis (2000), and others.

need for assets, over economic assets and income. These assets include physical, human, social, and environmental assets.

This leads to a discussion on the types of assets that matter to the poor. It can be accepted that it is not a single asset but the accumulation of assets (housing and savings) which helps in reducing the level of vulnerability for the poor (Narayan 2009). In fact, the livelihood approach broadly categories assets into five classes, namely human assets (the education, skills and health of household members); physical assets (farm equipment or a sewing machine); social assets (the social networks and associations to which people belong); financial assets and its substitutes (savings, credit, cattle and others); and natural assets (Hulme and McKay 2005, Ellis 2000). Although assets are comparatively better measure of deprivation than income or consumption as they are less likely to fluctuate in the short or even in the medium term. However, the question remains as to which type of assets matter for the poor? Hulme and McKay (2005) explain that the answer to this question depends on the type of poverty (chronic/transitory to structural/stochastic) one is assessing.

For an acute measure of poverty, which is aimed by UP-MPI, there is a need to categorise a broad sense of assets and then define the criteria for its deprivation accordingly. However, after reviewing the number of combinations to set the criteria for asset deprivation, the present study perceives that the asset classification presented in the revised version of Global MPI since the 2014 HDR as the most relevant choice (Kovacevic and Calderon 2014, UNDP 2014, 2015, 2016). It includes three classes of assets, namely information assets (TV, telephone, radio), mobility assets (bike, motorbike, car, truck, animal cart, motorboat), and livelihood assets (refrigerator, arable land, livestock). A household is deprived in the asset, if it does not own at least one asset related to access to information and does not have at least one asset related to mobility or at least one asset related to livelihood. The present study follows similar criteria to define asset deprivation. However, there is a deliberate addition of 'tractor' to mobility assets, which is one of the most preferred assets of this kind in rural areas of the state. Nevertheless, there is a need to review the literature that could have explained the relevance of these assets, as follows:

In lucid terms, Stiglitz, Sen, and Fitoussi (2009) explain that "information is a public good; the more we are informed about what is happening in our society, the better will our democracies be able to function". In fact, social participation, as per Sen's capability approach, is termed as basic functionings, which requires the availability of equipment like televisions, videocassette recorders, automobiles and so on (Sen 1999). The exposure to mass

media (television, radio or cinema), at least in these modern times, can help the household through government programmes on health and family welfare, education and communication (IIPS 1995, Narayan et al. 1999)[52]. The lack of information increases the chances of exploitation, misrepresentation and corruption, as well as mistrust between government and beneficiaries (Banerjee and Duflo 2011). Viewing information assets individually, U.P government has considered TV as an essential source of entertainment and information (Government of Uttar Pradesh, 2014). The relevance of television for the poor can be understood when we see that even the remotest villages in India have some buying options for television or radio. For some, phones can be a criterion for affluence but for some (particularly during recent times) it is an essential requirement[53].

Livelihood assets, as the name suggests, are supportive, productive and protective assets. Many point out that these assets (mainly, land[54] and livestock[55] and rarely refrigerator[56]) are not just valued functionally but can control vulnerabilities as they are crucial means of liquidation, particularly during distress and crises such as financial crises, natural disasters, and idiosyncratic shocks like divorce, illness, or death (Moser 1998a, Moser 1998b, Government of Uttar Pradesh 2014b, Narayan et al. 1999, Alsop 2007, Hulme and McKay 2005), which is often neglected by poverty analysis (Chambers 1989).

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[52] The NFHS reports also explains the relevance of information assets. Quite a long time ago, the Government of India is using electronic mass media sources to spread the messages on family welfare. To understand the effectiveness of such programs, NFHS collects information on various mass media sources (like TV and radio) and asks the respondents 'whether they had heard such messages on radio or television in the month prior to the survey' (IIPS 1995). The NFHS-1 report suggests that 'there is substantial scope for electronic media to play a more significant role in reaching potential users of family planning in the future'. Moreover, the AIDS prevention program also has a provision for using mass media (especially electronic) to generate awareness about AIDS and ways to prevent its spread. The NFHS-1 report finds that 'television is the most important source of knowledge about AIDS in most states', whereas 'newspapers are an important source of AIDS information in every state' (IIPS 1995).

53 For future studies, or in the sense of improvement in the classification of information assets, it is recommended that since the cost of phones is decreasing so the phone should be replaced with internet availability (Government of India 2009a).

54 In rural U.P, ownership of land is directly and significantly related to a decline in consumption poverty (Kozel and Parker 2003, Arora and Singh 2015, 2017), and are frequently cited as a criterian for ranking households on the ladder of life in Narayan (2009).

55 The earnings from livestock production are considered a valuable source of livelihood for poor farm households in U.P (World Bank 2010).

[56] Refrigerators enable small businesses to store and sell perishable materials such as food items, pharmaceuticals (Nawrotzki, Hunter, and Dickinson 2012).

3.3.3 Unidimensional View of Poverty is Incomplete

Historically and in fact up to recent times, income and/or consumption deprivation constitutes the regular idea of poverty. There is no doubt in saying that the unidimensional notion of poverty provides useful information about one's deprivation but it often lacks the overall or rather true sense of hardship borne by the poor. Sen (2006), while writing the preface of 'Inequality Reexamined', mentioned:

> *"[D]emand for equality in terms of one variable entails that the theory concerned may have to be non-egalitarian with respect to another variable, since the two perspectives can, quite possibly, conflict. We are deeply diverse in our internal characteristics (such as age, gender, general abilities, particular talents, proneness to illness and so on) as well as in external circumstances (such as ownership of assets, social backgrounds, environmental predicaments, and so on). It is precisely because of such diversity that the insistence on egalitarianism in one field requires the rejection of egalitarianism in another"* (Sen 2006, pp ix-x).

On the other hand, it is also widely argued that the unidimensional approach to poverty, although has a long history and attained a "high degree of sophistication", but it is inherently incomplete (Fusco 2003). Poverty alleviation policies, which are manifested on the basis of consumption or income parameters, are accused of ignoring vulnerability aspects of poverty, pointed by Narayan et al. (1999) based on Chambers (1989) observations. Similarly, Haughton and Khandker (2009) note that these measures often ignore some of the critical aspects related to empowerment and protection of poor from unwanted risk, and do not address weaknesses in essential public delivery such as inadequate availability of schools or corrupt health services. Moreover, Stiglitz, Sen, and Fitoussi (2009) consider market-based measures of income, consumption and wealth as an inadequate proxy for human well-being for three reasons. First, it is difficult to link the amount of these measures to an individual due to the intrahousehold variation of resources across the members. Second, a large sum of factors, which determine the human well-being, cannot be expressed in monetary terms. Third, the most obvious claim favouring MD poverty in the sense that these resources are meant to transform well-being differently across different individuals. Specifically, it can be true that "people with greater capacities for enjoyment or greater abilities for achievement in valuable domains of life are better-off even if they command fewer economic resources" (Stiglitz, Sen, and Fitoussi 2009, pp. 144). Furthermore, the normative arguments, and the

findings drawn from the participatory studies and the reviewed literature, fundamentally argue that the unidimensional notion of poverty is incomplete in itself.

3.3.4 Mismatches between Unidimensional and Multidimensional Poverty

A substantial proportion of mismatches between the unidimensional and MD Poverty approaches raises concerns regarding income or consumption being used as a proxy to determine the MD aspect of poverty. It is obvious that these monetary notions of poverty (income or consumption) do not capture each and every aspects of human deprivation that are typically required to quantify poverty. Undoubtedly, it captures certain aspects of it but it does not seem to capture everything.

More worrying is the fact that frequently it ignores the core hardships that essentially determine the person as poor. For example, Laderchi, Saith, and Stewart (2003) observe that in India, around 43 per cent of children and more than half (60%) of adults who were capability-poor (using education or health as an indicator) were not income poor, and more than half of the nutrition-poor children (53%) and adults (63%) were not income poor. Again in the Indian context[57], Bisiaux (2013) identifies differences in poverty estimation based on three different approaches of poverty — monetary approach of Ravallion, primary good deprivation approach of Rawls and lack of capabilities propounded by Sen). The study concludes that there is marginal evidence of a complete match between the three chosen approaches to poverty. Sen's lack of capability approach is much broader in perspective as it counts each one as poor whereas Ravallion's monetary poverty and Rawls's primary good approach capture around 50 per cent and 73 per cent of the population as poor respectively. Moreover, monetary poverty is least able to capture the three definitions even considering the restricted definition of Sen's poverty.

Beyond Indian estimates of poverty, studies also trace the global tendencies of poverty mismatches. For example, Alkire and Santos (2010), suggest that income becomes a poorer proxy for MD poverty (in terms of MPI) particularly among high poverty countries since income does not capture access to basic services. There is, in fact, a long list of studies available in Alkire et al. (2015) that determine significant mismatches between monetary

[57] Using the microdata from two slums in Delhi —Timarpur and Okhla Mandi— in the capital city of India.

poverty and non-income deprivations[58]. These facts bring to light or even strongly argue that monetary poverty, which is largely advocated by an assumption of close proximity to non-monetary deprivations, actually misidentifies them. Considering monetary indicators as a proxy for MD assessments of poverty may not serve the purpose, particularly in current times when multiple indicators surveys are flourishing. When available data permit to quantify multiple and income deprivation simultaneously, income poverty measures must complement the multiple dimensions of poverty.

3.3.5 Multidimensional Poverty Recommends Structural Socio-economic Policies

MD assessment of poverty has a direct bearing on policy guidance as it suggests long-term structural measures to alleviate poverty. At least, from the Indian point of view, MD poverty measurement is essential as well as desirable since poverty in India is deeply linked to economic, social, cultural, and political factors that often interact and demand long-term structural measures to alleviate it (Parker and Kozel 2005).

Traditionally, unidimensional measures (income/consumption based) consider an entity as poor based on the shortfall in a monetary indicator. The underlying theory is the utilitarian approach that follows criteria of utility associated with income/consumption as a proxy of well-being. Many criticise the approach as being narrow, reductionist, incomplete, limited, and imprecise as far as true sense of poverty is concerned. Particularly, it ignores the plurality and diversity in complexities of deprivation faced by the poor. Nevertheless, the primary advantage of unidimensional measures is its simplicity of computation (Fusco 2003, Cerioli and Zani 1990). However, studies examining anti-poverty strategies suggested by unidimensional measures, arguing that these measures provide information suited for transfer policies (like, how poor reached the poverty line) that is effective to alleviate poverty only for the short-term, whereas MD measures recommend structural socio-economic policies that

[58] For example, Laderchi (1997) identified mismatches in income and Sen's capability approach (including health, schooling, and child nutrition) of poverty measures based on Chilean 1992 data. Fusco, Guio, and Marlier (2010) and Whelan, Richard Layte, and Bertrand Maître (2004) analyses the mismatches between persistent income poverty and persistent material deprivation across nine European countries using community household panel data. Kaztman (1989) highlighted the mismatch between income and household experiencing unsatisfied basic needs in Montevideo and Uruguay. Bradshaw and Finch (2003) pointed out the mismatches and overlaps in three definitions of poverty (income poor, subjective poor, and materially deprived) using the Poverty and Social Exclusion Survey of Britain, with a conclusion that 'it is not safe to rely on one measure of poverty—the results obtained are just not reliable enough'.

could break even the intergenerational mechanism of poverty and alleviate poverty for the long-term (Dagum 2002, Fusco 2003, Cerioli and Zani 1990).

3.4 Summing up

This chapter presents conceptual and essential arguments in favour of MD assessments of poverty. Poverty is a multifaceted phenomenon–normatively, conceptually and empirically, which is now being well recognised in terms of consensus drawn on the dimensions of poverty and advancement in computational and relevant data sources. The three most agreed dimensions of poverty are education, health and SOL. NFHS in India provides sufficient information on these dimensions of poverty. Based on experts' opinion, participatory studies' findings, constitutional provisions (national policies), international consensus, and data availability, the present study identifies years of schooling and child school attendance, and under-nutrition and child mortality as suitable indicators for education and health dimensions, respectively. The SOL dimension is measured based on six indicators, namely, electricity, sanitation, water, housing, cooking fuel, and assets.

The discussion on the essence of MD poverty further includes a comparison between traditional and MD approaches of poverty, which reveals that the unidimensional notions of poverty stand incomplete in representing a true sense of poverty. There is an immense proportion of mismatches, which reveals that the unidimensional approach of poverty is not a sound proxy for MD aspects of derivations, and policy recommendations based on it are incapable of guiding long-term anti-poverty strategy as the MD approach does. These two types of poverty measures may be non-complementary in an analytical sense (due to mismatches) but as far as policy suggestions are concerned, they are complementary.

CHAPTER 4

Data and Methodology

4.1 Introduction

This chapter discusses the sources of data, the design of the study, distribution of samples, and the methods to estimate the unidimensional and MD poverty in U.P. The chapter also discusses the estimation procedure for identifying the factors that determine the unidimensional poverty. Broadly, the estimation of poverty is divided into two steps: identification of poor and aggregation of poor. Based on the existing choice of data sources, notions of unidimensional and MD poverty have been discussed. Accordingly, the study is designed with the purpose of comparing the aggregated and disaggregated attributes of unidimensional and MD poverty in the state.

4.2 Data Sources

The choice of data set used to estimate poverty depends on its notion. In India, there are primarily two large-scale household surveys, which could be used to measure poverty. One is the Consumption Expenditure quinquennial surveys[59], provided by the National Sample Survey Office (NSSO), Ministry of Statistics & Programme Implementation, Government of India. In fact, the official estimates of poverty in India are based on the household's Monthly Per-Capita Consumption Expenditure (MPCE[60]), estimated through these surveys. For unidimensional estimation of poverty, the present study also uses the unit level data of Consumption Expenditure Surveys (henceforth CES) provided by NSSO. So far, there are nine quinquennial surveys[61]. However, the unit level records of CES are publically available

59 NSSO primarily includes two types of surveys, quinquennial and annual. The former one was surveyed mainly once in a five year, and covered the thick (much larger) sample, most often covered the subjects on consumption expenditure and employment & unemployment. The latter are largely thin (small sample) rounds that include a variety of subjects related to education, health care, migration, conditions of tribal, land & livestock, debt & investment, domestic tourism, and others.

60 It is considered an important measure of the level of living (Government of India, 2014a).

61 The first quinquennial CES was conducted in the 27th round during October 1972 - September 1973. Subsequently, the 2nd, 3rd, 4th and 5th quinquennial CES were conducted in the 32th (July 1977-June 1978), 38th (January to December, 1983), 43rd (July 1987 to June 1988) and 50th rounds (July 1993 to June 1994) of NSSO. The 6th survey was conducted with the 55th round during July 1999 to June 2000. The 7th and 8th quinquennial surveys were held in the 61st and 66th round during July 2004 to June 2005, and July 2009 to June 2010, respectively. The latest, is the 9th quinquennial surveys on these subjects that are conducted in the 68th round during July 2011 to June 2012.

from the 3rd quinquennial survey (1983) onwards with its 38th round. Subsequently, the 50th, 61st, and 68th rounds were surveyed during the year 1993-94, 2004-05 and 2011-12, respectively. During the period, three more quinquennial (thick) rounds were available (43rd for 1987-88, 55th for 1999-2000 and 66th for 2009-10) but they were declared abnormal years. The former and the latter rounds were surveyed during the drought period and the middle one differs due to a sudden change in survey design[62]. Finally, the unidimensional estimation of poverty spans the last three decades (1983 to 2011-12), using the unit level records of four quinquennial CES of NSSO (38th, 50th, 61st, and 68th) and classifying the study period into three phases: first decade (1983 to 1993-94); second decade (1993-94 to 2004-05) and the contemporary period (2004-05 to 2011-12).

The second source of data to measure poverty is the National Family Health Survey (NFHS), primarily conducted by the International Institute of Population Studies (IIPS), Mumbai, which is India's Demographic and Health Surveys (henceforth DHS[63]). NFHS is also a large-scale nationally representative survey that provides information on household characteristics related to: housing structures, access to sanitation, water sources, and assets. It also includes information related to individual characteristics such as level of education, and health status in the form of infant and child mortality, nutrition, maternal and child health, reproductive health, nutrition, anaemia, utilisation and quality of health, family planning services, and others. Moreover, "the NFHS data are particularly conducive to reckoning the magnitude of a population's access to various resources and functionings such as water, housing, literacy, and the like" (Jayaraj and Subramanian 2010). That is why this study uses NFHS records to estimate MD poverty in U.P. At present, there are four rounds of NFHS, conducted respectively, in 1992-93 (NFHS-1), 1998-99 (NFHS-2), 2005-06 (NFHS-3), and the latest in 2015-16 (NFHS-4). The raw data of these four rounds are obtained from https://dhsprogram.com/data/ with a request to accomplish the objectives of the present work. These four rounds of NFHS covered the period of more than two decades (1992-93 to 2015-16) that is supposed to be a significant interval to assess the changes in MD poverty. Nevertheless, it is only the latest NFHS-4 that provides a unique opportunity to estimate

62 To see the issues in 43rd round (1987-99), refer Himanshu (2005), for 55th round (1999-2000), refer Datta (2006), Dhongde (2007), and Deaton and Kozel (2005), and for 66th round (2009-10), refer Shaw (2013).

63 The DHS are the nationally-representative household surveys that collect rich sources of information on topics like population, health, HIV, and nutrition through more than 300 surveys in over 90 countries. For more details, refer to the website: https://dhsprogram.com/

poverty for all the 640 districts across India (IIPS and ICF 2017a, b), including 70 districts of the state.

One can debate the choice of NFHS data for measuring MD poverty particularly over CES of NSSO. However, for the present study, the deliberate consideration of NFHS for this purpose is determined by two reasons. First, for the estimation of MD poverty, one of the essential dimensions is health. Health deprivation can be represented in many ways, but the most frequent form is child mortality and under-nutrition. CES does not provide information on child mortality whereas NFHS provides so. Nevertheless, both surveys can provide information on nutrition, but with a different notion. CES collects information on the quantities of food consumption of the households. One can get the proximate nutrition intake of the household by converting the nutritional factor in terms of calorie, fat, and protein. On the other hand, NFHS collects information directly on the height and weight of the adults that is often used to calculate the BMI, a measure of body fat among adults (discussed in the previous chapter). In fact, NFHS data provide height and weight information for children that allow measures of stunting and wasting for children, which are considered an anthropometric measure of child under-nutrition (refer discussion above). Food consumption based nutrition intake is not a better option to capture nutritional information; therefore, it makes sense to look directly at the nutritional achievements. Thus, on comparing both the datasets, it can be argued that information provided by NFHS is a better predictor of nutritional deprivation. In this context, Sen rightly states[64]:

> "[The] nutritional functionings may be rather badly approximated by information regarding food purchases (or even food consumption), because of variations in the relation between commodities and functionings due to such factors as metabolic rates, body size, etc. There is the further problem that with inequalities within the family, the market purchase data may be rather remote from individual consumption. There is, thus, a good case for looking directly at nutritional achievements" *(Sen 1985).*

Second, on the household's living standard characteristics, the quinquennial CES can provide information mainly on the primary source of energy for cooking and lighting, along

64 Along these lines, Sukhatme (1977), Srinivasan (1983), Scrimshaw (1977), Stiglitz, Sen, and Fitoussi (2009) argue that food intake is not that much a perfect determinant of undernutrition, as it is largely dependent on the ability to make nutritive use of that intake. Stewart (1989) argue that the matter concern should be to achieve 'good nutrition, not access to certain quantities of food'.

with owned and hired status of the dwelling by the household. NFHS can provide detailed information, for example, on sources of sanitation, drinking water, cooking fuel, electricity, materials used in the construction of floor, wall and roof, and multiple assets, including information assets (TV, radio, internet, phone), mobility assets (tractor, car, bicycle, motorbike, animal cart), and livelihood assets (livestock, land, electronic appliances) and others. These two dimensions are the foundations for any MD poverty exercise, and so the deliberate consideration for NFHS is reasonable.

4.3 The Study Design

The design of the present study is decided by the categorisation of data, particularly population subgroups, and its sample size. The estimation of unidimensional and MD poverty is patterned in such a way that both estimates can be compared to the possible extent across SRGs, regions and districts of the state. Besides, they are based on different sets of data as discussed above. The categorisation of population subgroups (social, religious, regions and districts) is based on the relevance of policy guidance. The literature reviewed in chapter 2, and the four facts highlighted in the section '1.2 Motivation For The Study' define the motivation to study poverty in U.P. Accordingly, the estimation of unidimensional and MD poverty is designed, of course, but the format of the concerned dataset ultimately direct us as follows:

4.3.1 District-wise Regional Classification of Uttar Pradesh

In the case of unidimensional poverty, there are two major difficulties while assessing poverty trends at the district level. The first pertains to the availability of unit-level data that can capture disaggregated poverty trends unbiasedly. It is only from the 61st round of NSSO (carried out during July 2004-June 2005) that the sampling design defines rural and urban parts of the districts as strata for selection of sample villages and urban blocks respectively (Chaudhuri and Gupta 2009). The second problem is associated with the base of the MPCE, which is used as a reference period to estimate the poverty line. Before 2004-05, the poverty line was defined by MPCE using Uniform Reference Period (URP[65]). The Planning Commission decided to adopt consumption expenditure based on a Mixed Reference Period

65 MPCE is calculated for food and non-food items. URP based food and non-food components of MPCE are recorded on month-long recall period basis (Government of India 2014b, c)

(MRP[66,67]). The current study, therefore, estimates poverty across 70 districts of the state (refer to Fig. 4-1) for only the contemporary period (2004-05 and 2011-12).

To capture the regional consumption poverty profile, the district level data provided by CES is classified into the four economic regions (WR, CR, SR, and ER) as shown in Fig. 4-1. As discussed in the previous section, the consumption estimation of poverty spans the last three decades (1983 to 2011-12), using the unit level records of four quinquennial CES (38^{th}, 50^{th}, 61^{st} and 68^{th}). However, in the first two surveys, 38^{th} (1983) and 50^{th} (1993-94), the estimates are available for undivided U.P representing the area of the state before the bifurcation of Uttarakhand[68]. Besides any district identification in these rounds, there is regional classification, which divides the then U.P into five regions (WR, CR, SR, ER and Himalayan region). To match the estimates of 61^{st} (2004-05) and 68^{th} (2011-12) rounds that were conducted after the bifurcation of U.P, the present study separated the Himalayan region from both 38^{th} and 50^{th} rounds[69]. In the 61^{st} (2004-05) and 68^{th} (2011-12) rounds, U.P is represented by 70[70] districts. The WR includes 26 districts; the CR consists of 10 districts, including the capital of the state (Lucknow) and the leading financial centre (Kanpur); the SR (Bundelkhand Region) embraces 7 districts, and the ER includes 27 districts. The geographical location of districts along with their respective regions is delineated in Fig. 4-1

In the case of MD poverty, the initial three rounds of NFHS data do not allow district-wise and region-wise estimates as the sample selection is not so designed. Fortunately, the recent NFHS-4 provides district-wise data, as the selection of sample design is stratified by separating each district into rural and urban areas. Moreover, this is the first time that any NFHS has covered all Indian districts (IIPS and ICF 2017b). Most of the crucial indicators in the district module include information on women's characteristics, marriage, fertility, contraception, reproductive health, children's immunizations, and treatment of childhood

66 For MRP, low-frequency items such as clothing, bedding, footwear, education, medical (institutional), durable goods are recorded on last one-year recall period, and the rest of the items were recorded on a month-long recall period (Government of India 2014c).

67 The poverty line based on URP considered only calorie norms, but adoption of the MRP made this poverty line broader in scope, as it included the 'adequacy of actual private expenditure per capita near the poverty lines on food, education, and health by comparing them with normative expenditures consistent with nutritional, educational and health outcomes' (Government of India 2009b, 2).

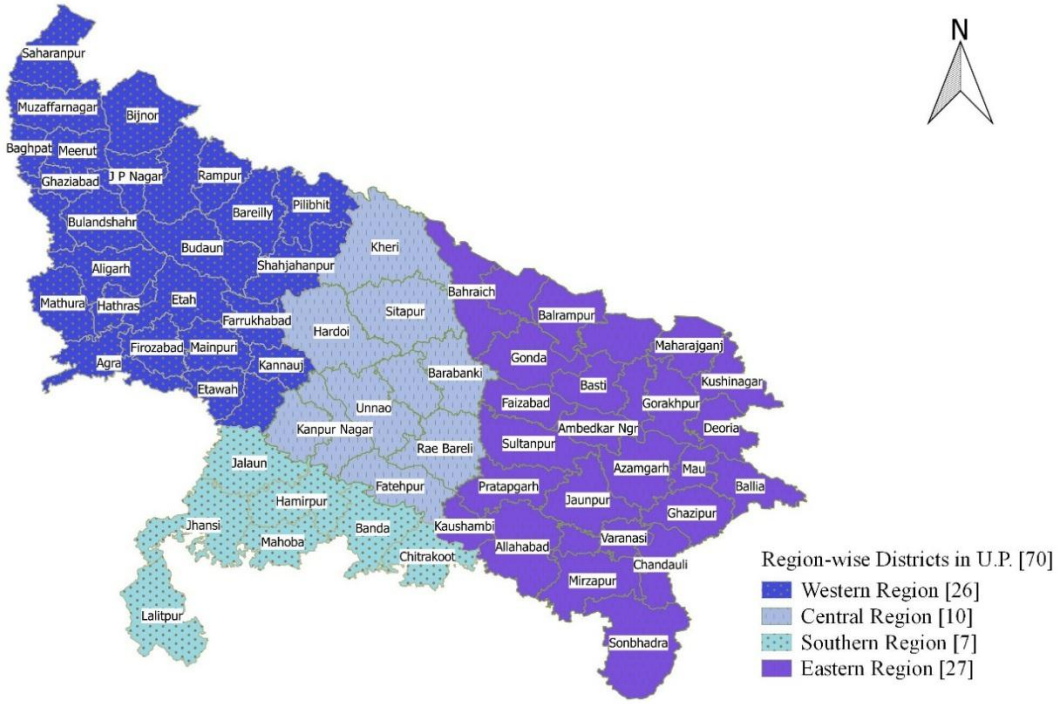
68 The northern hilly region or the Himalayan region of then Uttar Pradesh was carved out on 9th November 2000 to form a new state 'Uttarakhand'.

69 In 50th round (1993-94), all the districts in the Himalayan region are part of Uttarakhand except 'Bareilly', whereas Hardwar district that was part of Uttarakhand were included in the WR of U.P.

70 In order to make NSS rounds comparable, Kashiramnagar district that was carved out of the Etah district in 68th round is considered as a part of Etah district only.

illnesses (IIPS and ICF 2017a, b). This district level information is very much in demand to identify the geographical clustering of MD poverty, particularly for larger states like U.P, which covers almost 16.5 per cent of the Indian population. NFHS-4 has collected information for all 70[71] districts of the state and based on unit level records; the present study estimates district-wise MD poverty in the four regions of the state as delineated in Fig. 4-1.

FIG. 4-1 REGION-WISE LOCATION OF DISTRICTS IN UTTAR PRADESH



Note: Figures in parentheses represents the number of districts

4.3.2 Classification of Social and Religious Groups

NSSO' CES and NFHS rounds classify social groups into four subgroups - STs, SCs, OBCs[72] and 'Others' (literary, upper caste) - and religious groups into Hindus, Muslims and 'Others'. Out of these, the subgroups STs and 'Others' religious group have been excluded, as their sample size was negligible in U.P (refer to Table 4-2). However, overall poverty in the state is estimated by clubbing all categories of social or religious groups. Initially, the target was to

71 In order to make estimates of MD poverty comparable to consumption poverty, Kashiram Nagar district, which was carved out from the Etah district in NFHS-4, is considered part of the Etah district only.
72 Note, during 38th and 50th NSSO rounds, and NFHS-1, OBCs are a non-established constitutional category so their estimates are included in 'others' social groups.

evaluate the district level poverty among SRGs, but it was found that bifurcation of sample households across districts and among SRGs provided a relatively small sample size, which could possibly affect the reliability of poverty estimates. In fact, for some districts, the bifurcated sample size for various SRGs is found to be nil. To avoid this problem, district-wise poverty has been estimated only at the aggregated level.

4.4 Distribution of Households across Regions and Subgroups

Comparing four considered NSSO rounds, the region-wise distribution of households (estimated) in U.P shows that more than two-thirds of the households are residing in WR and ER only (Table 4-1). However, the majority of the rural households are located in ER (41% in 1983 and 43% in 2011-12) whereas nearly half of the urban households belong to the WR. In fact, both WR and ER occupy the dominant share in both rural and urban areas. The third major region (CR) holds about 18 per cent of rural households over the three decades, whereas, in urban areas, its contribution has declined from 24 per cent in 1983 to 20 per cent in 1993-94 and is currently around 22 per cent. The least populated SR contributes just about 5-6 per cent in both rural and urban areas.

TABLE 4-1 REGION-WISE DISTRIBUTION OF HOUSEHOLDS IN UTTAR PRADESH (IN %)

Regions	Rural				Urban			
	1983	1993-94	2004-05	2011-12	1983	1993-94	2004-05	2011-12
Western	35.26	35.35	34.28	34.60	47.65	49.45	50.93	50.44
Central	18.46	18.04	17.77	17.98	24.32	20.14	22.04	21.86
Southern	5.60	5.12	4.92	4.84	4.84	5.91	5.56	5.22
Eastern	40.70	41.47	43.00	42.57	23.17	24.47	21.45	22.46

Note: 1st Decade :1983 to 1993-94, 2nd Decade:1993-94 to 2004-05, and Contemporary period: 2004-05 to 2011-12.
Source: Calculations from various CES rounds of NSSO, Government of India.

Table 4-2 depicts the distribution of households across religious and social groups. It shows that on an average, eight households out of ten in rural areas and six households out of ten in urban areas are Hindus. On the contrary, the representation of Muslim households in rural areas is around 13 per cent during the first decade. However, it has increased to 15 per cent during the later periods of study. In urban areas, their representation seems to be declining significantly during the first decade (from 36 per cent in 1983 to 29 per cent in 1993-94), but it has increased to 33 per cent during the second decade and 34 per cent in the

contemporary period. In the case of social groups, bifurcation of OBCs from 'others' social group after the 50th round[73] reveals two facts. First, half of the households in U.P belong to OBCs in both rural and urban areas (certainly in 2011-12). Also, it is only the 'others' whose population contribution is declining during the contemporary period (from 19% to 17% in rural, and from 41% to 36% in urban). Besides, the share of SCs in rural areas is almost double of that in urban areas. As discussed, since sample households for 'others' religious groups and STs are very limited, so they are not considered separately in this analysis.

TABLE 4-2 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS ACROSS SRGS IN UTTAR PRADESH

Category	Rural				Urban			
	1983	1993-94	2004-05	2011-12	1983	1993-94	2004-05	2011-12
	Social Groups							
STs	1.3	0.8	0.5	1.3	0.7	0.7	0.5	0.7
SCs	22.4	24.1	25.4	26.6	12.3	13.6	13.7	13.9
OBCs*	**(---)**	**(---)**	54.6	55.5	**(---)**	**(---)**	45.4	50.1
Others	76.3	75.2	19.4	16.6	87.0	85.4	40.5	35.6
	Religious Groups							
Hindus	86.6	86.1	84.7	84.4	62.6	69.4	65.8	65.0
Muslims	12.9	13.3	15.0	15.3	35.7	29.4	32.7	33.8
Others	0.5	0.6	0.2	0.3	1.8	1.2	1.5	1.2

Note: 1. Same as in Table 4-1
*2. *In social groups, estimates for OBCs are included in 'others until 50th NSSO round (1993-94).*
Source: Calculations from various CES rounds of NSSO, Government of India.

4.5 Methodology

4.5.1 Estimation of Unidimensional Poverty

Sen (1997) suggests two steps for estimation of poverty—identification and aggregation of poor. Identification of poor deals with dividing the overall population into poor and non-poor with the help of the poverty line[74], while the aggregation relates to the assessment of the

73 Actually, this bifurcation was started from 55th quinquennial round that was surveyed during 1999-2000.
74 Since the present study focuses on consumption notion for unidimensional poverty based on MPCE surveyed through CES of NSSO, therefore, identification of the poor is carried out with the help of a well-defined cut-off line of consumption expenditure below which a household is considered as poor. This cut-off line is technically known as the poverty line.

magnitude of poverty with the help of a measure or index. These steps are described as follows:

4.5.1.1 Identification of Unidimensional Poverty

In India, the official estimate of the poverty line is defined as the critical threshold of MPCE considered necessary for a subsistence level of living. It is the "reference poverty line basket (PLB) of household goods and services consumed by those households at the borderline separating the poor from the non-poor" (Government of India 2009c, b). Any household consuming less than the prescribed amount of PLB is treated as poor. The poverty line is usually estimated by the Expert Groups constituted by the Planning Commission of India (henceforth PCI[75]) based on MPCE surveyed through CES, from time to time.

The first Indian official poverty line was drawn by the nine-member Working Group (constituted by the then PCI in July 1962) using the norms of balance diet prescribed by the Nutrition Advisory Committee of the Indian Council of Medical Research (ICMR) in 1958. Later on, a Task Force under the chairmanship of Dr. Y. K. Alagh was set up in July 1977 to project the minimum need and effective consumption demand (Government of India 1979). This group first time devised the official poverty line basket anchored to minimum calorie requirements of 2,435 (rounded off to 2,400) Kcal per capita/day in the rural areas, and 2095 (rounded off to 2,100) Kcal per capita/day in the urban areas. These average calorie estimates provided the benchmark of required calorie intake for a representative Indian. The minimum cost to acquire this calorie intake was estimated to be Rs. 49.09 per capita/month in rural areas and Rs 56.64 per capita/month in urban areas as observed from the 28th round of NSS consumer expenditure data.

Following it, the first panel of experts was (re)constituted under the chairmanship of Prof. D. T. Lakdawala (LEG) in September 1989 that submitted its report in July 1993 (Government of India 1993b). The LEG considered Task Force's 1973-74 poverty line as a common threshold to compare poverty over time while updating it for price changes for both rural and urban areas. For rural (urban) areas, the national rural (urban) poverty line of Task Force (Rs. 49.09 in rural and Rs 56.64 in urban) was disaggregated into state-specific poverty lines using inter-state price differentials measured by Fisher's Index. These state-specific poverty lines of base year (1973-74) were then updated for subsequent years (1977-78, 1983,

75 Now, NITI Ayog.

and 1987-88) using state-specific price indices especially constructed by taking weighted average of the commodity group-wise price index[76] with their respective weights in the national consumption basket of the poor in 1973-74 (Government of India 1993b, 2014d). In March 1997, the PCI accepted the LEG methodology for official poverty estimation, and later updated and released the poverty line for the years 1993-94 and 2004-05 (Government of India 2007d). These poverty lines are based on URP[77] norms of MPCE (refer to Table 4-3).

To review the official estimates of poverty, one more expert group, headed by Prof. S. D. Tendulkar, was constituted in December 2005 that submitted its report in 2009 (Government of India 2009b). The Tendulkar Expert Group (TEG) consciously decided to move away from anchoring the poverty line basket to a calorie intake norms (Government of India 2009b). TEG basically adopted the LEG 2004-05 urban poverty line (that was Rs. 538.60) as PLB and converted it into MRP based consumption[78]. The group was guided by the belief that urban living standard is generally regarded as better and preferable to its rural counterpart. TEG devised poverty line is equivalent to per-capita total expenditure corresponding to all-India urban BPL population (or, headcount ratio) of 25.7 percent (which was estimated to be Rs. 578.8 per person/month). Actually, the shift from MPCE estimates on URP (adopted by LEG) to those on MRP in the TEG methodology significantly raised the all-India urban poverty line level of MPCE from 538.60 to Rs 578.80. Moreover, urban equivalent poverty norm led to an upward adjustment in the rural poverty line relative to its LEG counterpart. Later on, poverty estimates for 1993-94 and 2004-05 were realised by Government of India (2011c) in January 2011, and subsequently for 2011-12 in July 2013 (Government of India 2013a).

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[76] For rural areas, it is based on Consumer Price Index of Agricultural Labourers (CPI-AL) of food, fuel and light, clothing and footwear and miscellaneous items, and for urban areas, it is based on Consumer Price Index of Industrial Workers (CPI-IW) of food, fuel and light, housing, clothing, bedding and footwear and miscellaneous items.

[77] Refer to Section 1.5 'Key Terms and Concepts used in the Study'.

[78] The NSSO has decided to shift the recalled period of MPCE from URP to MRP. Prior to 50th NSSO round (1993-94), only URP reference point were used to compute MPCE. It is from 55th NSSO rounds from where MPCE is based on MRP. However, this round provides MPCE based on MRP only. Thus, it breaks the continuity of comparison of MPCE based on URP as reference point. However, since the 61st NSSO round (2004-05), both URP and MRP based estimates of MPCE were available. TEG opined MRP-based estimates of consumption expenditure as the basis for future poverty line.

Due to methodological changes, the poverty line designed by TEG is not directly[79] comparable to those of LEG. However, to meet the first objective of the present study in reference to identifying the historical roots of poverty, the poverty profile spanning the last three decades has to be studied (1983 to 2011-12), based on the comparative poverty line. In the present case, the comparable poverty line can be estimated using forward (LEG based) and backward (TEG based) approach of poverty line upgradation.

Forward Approach: The LEG poverty line is available for the years 1983 to 2004-05. Using the forward approach, comparability issue can be resolved once LEG's based poverty line is estimated for 2011-12 (refer to Table 4-3). An attempt has been made in this direction to update the poverty line for U.P for the year 2011-12 based on LEG methodology. It requires commodity group-wise estimates of CPI-AL and CPI-IW for U.P at base price of 1973-74[80] (refer above note or Government of India (1993b)), which is published by the Chandigarh/Shimla office of Labour Bureau, Ministry of Labour and Employment, Government of India. By collecting offline and online data from the above source, the LEG based 2011-12 poverty line for at least[81] rural areas of U.P is estimated at approximately at Rs. 679.6. However, this exercise stands inappropriate, conceptually and methodologically, on the following grounds:

First, the three decades old PLB become outdated. It was observed that the divergence between the common set threshold (Task Force's 1973-74 poverty line) and the actual calorie consumption grew too large to be ignored. The calorie consumption patterns changes over time due to changes in needs (tastes), changes in the consideration of self-respect, and relative price changes associated with those needs (Subramanian 2012). Mehta and Venkatraman (2000) also find that "the people have willingly chosen to sacrifice their calorie intake in order to improve their quality of life and quality of food". For more details, refer Patnaik (2004).

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[79] Noteworthy, this poverty line was predetermined, as it occurred to be the 2004-05 urban poverty line devised by the LEG (EPW 2014), which itself was an updated version of the Task Force's urban calorie norm (2,100 Kcal per capita/day) realised in 1973-74 (Subramanian 2011).

[80] The LEG poverty line is based at 1973-74 prices and poverty line given by or on the basis of LEG for 1983, 1993-94, and 2004-05 is also based at 1973-74 prices (Government of India 1993b, 2007d).

[81] Since, LEG poverty line for urban areas are based on both CPI-IW and urban non-manual employees, where later one was discontinued with effect from January 2011 (Government of India, 2011), therefore, urban poverty line for the period 2011-12 based on LEG cannot be evaluated.

Second, crude price adjustment leads to implausible results. Deaton (2003, 2008) shows that CPI-AL based rural poverty line updation understated the price rise for the rural population and hence understated the extent of rural poverty. As a result, the "proportion of total urban BPL population being higher than its rural counterpart in certain major states" (Government of India 2009b).

Third is under or no representation of basic needs (health and education). During early 90s, when LEG was constituted, it was assumed that the basic social services, such as health and education, would be provided by the state (Government of India 1993), hence LEG poverty line was unamended against them (Bisiaux 2013). While private expenditure on basic living (clothing, shelter, education, and healthcare) has increased disproportionately, particularly recently, their unamendement to the poverty line estimates obviously lose faith in the levels of poverty prevailing in any society.

Fourth, updated urban poverty line cannot be evaluated. Since, LEG poverty line for urban areas is based on both CPI-IW and urban non-manual employees, where later one was discontinued with effect from January 2011 (Government of India, 2011); therefore, urban poverty line for the period 2011-12 based on LEG cannot be evaluated.

Backward Approach: The TEG poverty line is available for the years 2004-05 and 2011-12. However, for the years 1983 and 1993-94, TEG based poverty line is constrained by the availability of data. As TEG poverty line is based on MRP of MPCE, which was started only after 1993-94 NSSO surveys.

With no choice but a partially comparable poverty trend is estimated to identify the historical roots of poverty in the state with the following adjustment. It has been perceived from Table 4-3 that for the year 1983, LEG poverty line is the only option available. Moreover, because it is based on the URP of MPCE, LEG poverty line can only be used for the year 1993-94 as a directly comparable option. Also, if consider the LEG poverty line for the year 1993-94 and 2004-05, then poverty profile can directly be compared to the first decade (1983 to 1993-94) and the second decade period (1993-94 to 2004-05). However, for the contemporary septennial period (2004-05 to 2011-12), the TEG's methodology will be suitable to capture the required change. Accordingly, the period of the study for unidimensional poverty has been classified into three phases: first decade (1983 to 1993-94), second decade (1993-94 to 2004-05) and contemporary period (2004-05 to 2011-12). The

poverty estimates for the years 1983, 1993-94 and 2004-05 are highlighted with (*) to represent the comparable estimates over time. However, 2004-05** and 2011-12** are not directly comparable with previous periods as they are based on MRP consumption level and TEG poverty line.

To find critical districts where poverty is alarming, as aimed by the present study, there is a need to have district-wise poverty lines. However, the PCI did not separately estimate district-wise poverty line. Therefore, U.P's poverty line is used to estimate district-wise poverty.

TABLE 4-3 POVERTY LINES FOR RURAL AND URBAN U.P AS PER LEG AND TEG METHODOLOGIES

Years	Poverty Line		Period in Years	Nomenclature
	Rural	*Urban*		
1983*	83.85	110.23	10.5	1st Decade Period
1993-94*	213.01	258.65		
1993-94*	213.01	258.65	10.5	2nd Decade Period
2004-05*	365.84	483.26		
2004-05**	435.14	532.12	7	Contemporary Septennial Period
2011-12**	768.00	941.00		

*Note: 1. * Based on LEG, **Based on TEG*
2. For 1993-94, TEG also provides the poverty line that is, 244.30 for rural and 281.30 for urban.
Source: Compiled from Government of India (2013a, 2009b, 1993b).

4.5.1.2 Aggregation of Unidimensional Poverty

Usually, the official aggregation of poverty in India is represented by Headcount Ratio (*HCR*), which measures the incidence of poverty in terms of the proportion of poor concerning the total population. Mathematically, it can be expressed in the following order:

Poverty among the households is estimated based on their average MPCE. Suppose that there are total *n* households in U.P, and for each household *i*, MPCE is represented by y_i. If the MPCE is arranged in ascending order with poverty line *z*, then vector *y* denoting the distribution of consumption expenditure can be expressed as:

$$y = (y_1 \leq y_2 \leq y_3 \ldots\ldots\ldots \leq y_m \leq y_z \leq y_{m+1} \leq \ldots\ldots\ldots\ldots y_n)$$

where out of *n* households, *m* are below the poverty line (*z*).

Mathematically, *HCR* can be formalized as:

$$HCR = \frac{1}{n}\sum_{i=1}^{m} i, (y_i < z) = \frac{m}{n}, where\ m < n$$

Here, *i* represents a poor household only when its Y_i is below *Z*.

Let us say that the TEG brings out *HCR* of 29.4 per cent during 2011-12. It simply infers that out of the total population in U.P, 29.4 per cent people consume below the specified poverty line and thus they are poor.

Though *HCR* is the simplest and most commonly used measure of poverty, yet it is inadequate because "it ignores how poor the poor are, and, therefore, has the absurd property that it remains unchanged when a previously poor unit becomes even poorer" (Kanbur 1987). However, Sen (1976) points out that an adequate measure of poverty should possess three essential dimensions, namely, the number of poor, depth of poverty (how poor are the poor) and relative deprivation (inequality between the poor). Moreover, the essential requirement of the present study is to consider a measure by which poverty can be additively decomposed across its population subgroups.

Foster, Joel Greer, and Erik Thorbecke (1984) propose a class of poverty indices (denoting *FGT*, afterwards) that are additively decomposable, subgroup consistent[82] and satisfies all the above requirements of poverty aggregation. Formally,

$$FGT_{(y_i;\alpha)} = \frac{1}{n}\sum_{i=1}^{m}\left(\frac{z - y_i}{z}\right)^{\alpha},$$

where, α is a non-negative sensitivity parameter

When α =0, *FGT* (y_i, 0) is the *HCR* that represents the incidence of poverty; when α =1, *FGT* (y_i, 1) is the Poverty Gap Ratio (*PGR*) that measures the depth or intensity of poverty, and at α =2, *FGT* (y_i, 2) is the Square Poverty Gap Ratio (*SPGR*) that accounts for relative deprivation or severity of poverty. The higher the value of the parameter α, the higher is the sensitivity of the poverty measures to inequality among the poor. In this sense, *FGT* class of poverty indices can be summarised as *HCR* that gives information on frequency; *PGR* that adds information on average shortfall from the poverty line, and *SPGR* that includes

82 There are six basic and advanced measures for aggregating poverty such as *HCR*, Income Gap Ratio (IGR), Poverty Gap Ratio (*PGR*), Squared Poverty Gap (SPG), Sen-Shorrocks-Thon Measure (SST), Watts Measure, Clark-Hemming-Ulph-Chakravarty Class of Measures (CHUC). The Watts and CHUC are perfect measures because these satisfy all the axioms. However, these measures do not produce sound policy implicated outputs. The SST measure does not satisfy subgroup consistency axiom that is essential for decomposition. The *HCR*, *PGR* and SPG are considered asuitable measure for the proposed study. For detailed explanation, refer to Foster and Shorrocks (1991), Kakwani (1980), (Kakwani 1993, 2000) and Sen (1997).

information on the distribution by concentrating on the poorest of poor (Foster, Greer, and Thorbecke 2010). Furthermore, it is suggested that *HCR* should complement *PGR* and *SPGR* as these three measures can provide an overall picture of poverty in any society because they target nearly poor (near to the poverty line), moderately poor or poorer and severely poor or ultra-poor population of society respectively.

Furthermore, to supplement the poverty profile, contribution of subgroups to overall poverty is also assessed, which is the function of the subgroups' share in households and the level of poverty. Let us say, the share of SCs in total households of U.P is about 25 per cent, and their *HCR* is 45 per cent, against a state average of 33 per cent. Then, their share to overall poverty is 34 per cent (25% × 45% / 33% = 34%). Moreover, to identify the disparity in poverty, absolute and relative poverty risk is also evaluated. As these risks provide the probability that the member of a given group will be poor in relation to the average probability (absolute risk), or to the corresponding probabilities of the reference group members (relative risk) in the state. Continuing with the previous example, the absolute risk for SCs is -36 per cent (1- 45% / 33% = - 36%). It implies that on an average, the SCs are 36 per cent more likely to be poor in U.P. Alternatively, it can also be interpreted in terms of poverty-population disproportion. As the contribution of SCs to overall poverty is 34 per cent and their share in total population is 25 per cent, so, absolute poverty risk is (1-34% / 25%) = (-) 36 per cent. In this sense, assessment of poverty risk is important as:

> *"Whenever the contribution to poverty of a region or some other group exceeds its population share, this suggest that there is a seriously unequal distribution of poverty in the country, with some region or groups bearing a disproportionate share of poverty"* - (Alkire et al. 2015, 163)

Furthermore, the comparison of poverty risk between the two most dominant subgroups or most often compared subgroups (for example, SCs and OBCs) is also important as far as the disparity in poverty is concerned. Assuming *HCR* of OBCs is 33 per cent, then relative poverty risk indicates that OBCs are 27 per cent (1-33% / 45%= +27%) less likely to be poor than SCs, whereas SCs are 36 per cent (1-45% / 33% = -36%) more likely to be poor than OBCs. For all intents and purposes, by the property of additive decomposability of *FGT* indices (Foster, Joel Greer, and Erik Thorbecke 1984), the consumption poverty profile of U.P is expressed into three mutually exclusive stratifications, namely, regions (WR, CR, SR

and ER), major religions (Hindus, and Muslims), and major social groups (SCs, OBCs and 'Others').

4.5.1.3 Factors affecting Unidimensional Poverty (Survey Logistic Regression)

To examine the proximate factors underlying the consumption poverty differences at the inter-regional level as well as among SRGs in rural and urban areas of the state during 2004-05 and 20011-12, binary logistic regression is applied. The dependent variable (BPL_i) representing the probability of being poor is determined by the following equation:

$$\text{Prob}(BPL_i) = \frac{\exp(\alpha + \beta x'_i)}{1 + \exp(\alpha + \beta x'_i)}$$

where α is the intercept term and β represents the coefficient for explanatory variables, x'_i. To interpret the coefficients in terms of log Odd Ratio, the above equation is transformed as:

$$Log_e \left[\frac{\text{Prob}(BPL_i)}{1 - \text{Prob}(BPL_i)} \right] = \alpha + \beta x'_i$$

The regression estimates have been expressed and interpreted in terms of percentage change in odds. For positive coefficient values, the percentage change in odds can be obtained as (Odd Ratio-1) ×100, and for negative coefficient values, the percentage change in odds is equal to (1- Odd Ratio) ×100. The percentage change in odds is represented by OR(%). Regression models are estimated with 90 (*), 95(**), and 99 (***) per cent confidence interval (CI) representing coefficients would be significantly different from zero at 10, 5, and 1 per cent levels of significance, respectively.

The parameters used in the logistic regression have been estimated by modelling BPL variable (1 if the household is BPL, 0 otherwise) on selected set of explanatory variables (x'_i), such as, household size, total land possessed by the rural households (in hectares[83]), region of the household (WR, CR, SR, and ER), religion of the household (Hindus and Muslims), social group of the household (SCs, OBCs, and 'Others' representing upper caste), education level of the head, type of occupation (based on the means of livelihood) and

83 Since access to land is one of the important means to move out from poverty in rural areas, this variable is considered only for the rural households.

principal sector of employment (agriculture & allied, industry and services[84]). These explanatory variables are expected to effect the household positions to remain or fall below the poverty line in the state (Arora and Singh 2015, Bajpai and Volavka 2005, Drèze and Gazdar 1997, Government of Uttar Pradesh and UNDP 2008, Kohli 1987, Kozel and Parker 2003, World Bank 2010, Pandey and Reddy 2012, Perry et al. 2006). Detailed description of these variables is presented in Chapter 6.

Usually, the simple logistic procedure is performed on data based on random samples. However, NSSO uses stratified multi-stage survey design in both the NSSO rounds (61st & 68th), where "the first stage units are the 2001 census villages in the rural sector and urban frame survey blocks in the urban sector and the ultimate stage units are households in both the sectors" (Government of India 2006, 2014c). For such sample design, Anthony B. An (2002) suggests a survey logistic procedure. STATA *svy: logit* command is therefore used after setting the survey sampling design to estimate the models appropriately. Nevertheless, with such procedures, statistics such as *Pseudo* R^2, *Log-likelihood* are not available, and *LR* chi^2 and *Z-statistics* are replaced with *F-statistics* and *T-statistics*, respectively. Also, for goodness-of-fit, the commonly used *Hosmer–Lemeshow test* cannot be used after taking sampling design and weights (Archer and Lemeshow 2006, Archer, Lemeshow, and Hosmer 2007). So, the *F-adjusted mean residual goodness-of-fit test* proposed by the Archer and Lemeshow (2006) is used. The estimates of the model have been expressed and interpreted in terms of percentage change in odds (refer to Fig. 6-1, Fig. 6-2, Fig. 6-3, Fig. 6-4, Appendix Table A-0-8, Table A-0-9, Table A-0-10, and Table A-0-11). Mean values of the variables are shown in the Appendix Table A-0-4, Table A-0-5, Table A-0-6, Table A-0-7).

Though the study has selected similar sets of explanatory variables to examine the inter-regional and subgroup poverty differences in the state, to preserve the regional and subgroup heterogeneity, separate regressions have been estimated for different locations and subgroups. In fact, nine different regressions have been estimated, as per the four economic regions (WR, CR, SR, and ER), three social groups (SCs, OBCs and 'others' social group) and two major religious groups (Hindus and Muslims) each for rural and urban households for the contemporary period (2004-05 and 2011-12). Furthermore, the study also estimates

84 NSSO surveys report households' principal sector of employment in terms of National Industrial Classification (NIC). But in both the NSSO rounds (66th and 68th), different NIC classifications (NIC 2004 and 2008, respectively) have been followed. However, to match these classifications, estimates are harmonized as per the sector-wise classifications.

regression for rural and urban households in aggregation, by incorporating 'region', 'social' and 'religion' as explanatory variables to predict whether poverty varies significantly across regions, social and religious groups in the rural and urban areas of the state. However, to understand the macroeconomic determinants of poverty, the district-wise information is collected[85] for the year 2011-12, in which the recent 68th round of CES was surveyed. After scrutiny of previous studies and the available data in these reports, four explanatory variables have been selected. The first one is the sectoral contribution of district domestic product, which is expressed in terms of the contribution of agriculture & allied, secondary and service sectors. The other three are rural road connectivity (proxy by percentage of villages linked with roads to total villages in the district), rural electrification (measured as a percentage of electrified villages to total inhabited villages in the district) and industrialisation (measured in terms of a number of small-scale industries in the district). Note that the information for these four macroeconomic determinants is exogenously considered.

4.5.2 Estimation of Multidimensional Poverty

The MD measures of poverty follow similar steps of estimation—identification and aggregation but that is just by name. Here, these two steps require a much more detailed explanation. In total, it includes six step. Among them, identification comprises four steps such as choice of dimensions and indicators, choice of weights for dimensions and indicators, aggregation of deprivation counts, and selection of poverty cut-off. The aggregation of poverty is based on two steps. First, is an estimation of the poverty index, and second relates to its decomposition by dimensions and indicators, and across subgroups. Each step is discussed in detail as follows:

4.5.2.1 Identification of Multidimensional Poverty

Step 1: Choice of Dimensions and Indicators

Based on the discussion in the previous chapter, following ten indicators are selected to measure the UP-MPI.

85 District-wise information is collected from district-wise development indicator reports and statistical abstract published by Economics & Statistics Division of State Planning Institute, Government of Uttar Pradesh.

Dimension 1: Education

Education dimension includes two indicators as follows (refer to Fig. 3-1):

Indicator 1: Years of Schooling

A household is considered deprived in years of schooling where no household member has completed at least six years of schooling.

Indicator 2: Child School Attendance

A household is considered deprived in child school attendance when a single school-age child in the household is not attending a school up to grade 8. The NFHS data provides sufficient information on the chosen set of two indicators.

Dimension 2: Health

Health dimension includes two indicators as follows (refer to Fig. 3-2):

Indicator 3: Undernutrition

A household is considered deprived in nutrition if there exists an adult household member (woman of age 15–49 in particular, as per NFHS) who is malnourished (BMI less than 18.5) or a child under age 5 who is stunted (as per height-for-age z score calculated using WHO standards).

Indicator 4: Child Mortality

For the present study, a household is considered deprived if any child has died in the household within the last five years of the survey. More clarification on the indicator's deprived definition will be discussed in the subsequent section. .

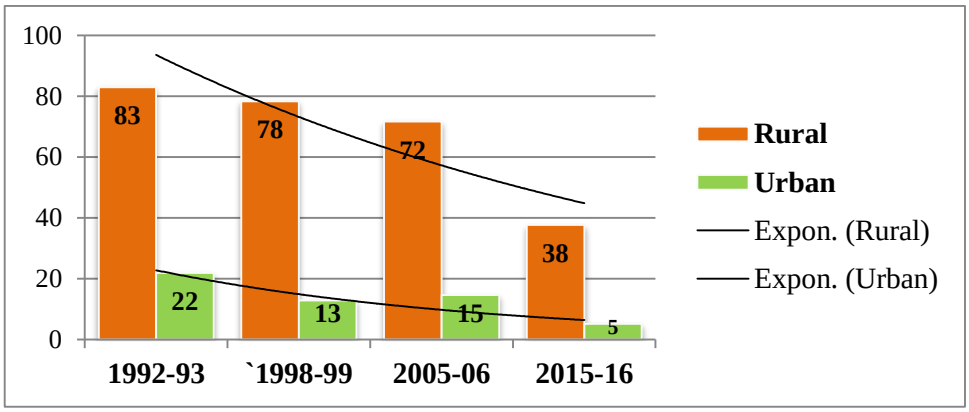
Dimension 3: Standard of Living

As discussed, the choice of indicators for education and health dimensions is determined by various factors, namely, experts' opinion, participatory studies, constitutional provisions (national policies), international consensus, and data availability. However, the final selection of indicators for the SOL dimension is based on discussion in the previous chapter, and primarily Alkire and Santos (2010) and UNDP (2014). Nevertheless, the present study makes changes in some of the indicators as per the availability and comparability of data, as follows:

Indicator 5: Access to Electricity

A household is considered deprived in electricity if the dwelling has no access to it, as per the information collected by NFHS[86]. The electricity statistics of U.P shown in Fig. 4-2 indicate that non-accessibility of electricity remains high in the state. Furthermore, there are sharp urban-rural differences in access to electricity, that shrink over time (17% in rural and 78 % in urban during 1992-93, and 62% in rural and 95% in urban in 2015-16). Nevertheless, just access could not determine the existing deprivation in electricity (Government of Uttar Pradesh and The World Bank 2006, World Bank 2010), particularly in the state like U.P, where not even a single household in both rural and urban areas reported a 24-hour availability of electricity (refer Table 4-4). In fact, the most frequent hours of electricity supply in rural areas of the state is just 5-10 hours whereas, in urban areas, it is higher than 15 but less than 24 hours. However, the current government of the states claims that they are "supplying power for 18 hours to rural areas, 20 hours in tehsil towns and Bundelkhand and 24 hours in district headquarters, cities and industries" and "plans to supply for 24 hours across all areas and for 10 hours to agricultural consumers (whose feeder segregation is underway) by October 2018" (Government of India and Government of Uttar Pradesh 2017). Nevertheless, there is no option to collect hourly data on electricity as per NFHS. The present study therefore considered a household deprived in electricity if the dwelling has no access to it.

FIG. 4-2 PERCENTAGE OF HOUSEHOLDS HAVING NO ACCESS TO ELECTRICITY IN UTTAR PRADESH



Source: Calculation from various NFHS

86 There can be some comparability issues across four NFHS surveys and definition of deprivation in electricty. As in NFHS-1 and NFHS-2, there is no direct question on access to electricity (yes/no). Rather asked about 'what is the main source of lighting for your household?'. It includes electricity, along with kerosene, gas, oil, and others. Whereas in NFHS-3 and NFHS-4, information on access to electricity is collected in dichotomous form (yes/no) directly. Assuming that households may not confuse electricity with other sources of lighting, then all the four NFHS rounds collect estimates on access to electricity with a similar style.

TABLE 4-4 AVERAGE HOURS PER DAY OF ELECTRICITY SUPPLY IN RURAL AND URBAN UTTAR PRADESH

PSMS Rounds	No Connection	*Household having electricity for*				
		Less than 5 hours	*5–10 hours*	*10–15 hours*	*15 + hours*	*24 hours*
Rural						
I: 1999/2000	71.9	3.3	12.7	7.9	4.3	0
II: 2002	76.7	2.7	13.7	4.7	2.3	0
III: 2007/08	71.5	2.1	17.5	7	1.9	0
IV: 2009/10	66	24		10		0
Urban						
I: 1999/2000	16.4	1.3	10.2	24.5	47.6	0
II: 2002	19.3	0.4	13.6	23.6	43.1	0
III: 2007/08	15.4	1.5	17.6	26.6	38.9	0
IV: 2009/10	16	21.1		63		0
Uttar Pradesh						
I: 1999/2000	61.2	2.9	12.2	11.1	12.7	0
II: 2002	65.2	2.2	13.7	8.5	10.4	0
III: 2007/08	60.4	2	17.5	10.9	9.3	0
IV: 2009/10	55.6	2	21.5	12.1	8.9	0

Source: Compilation from PSMS reports. PSMS-1 (Government of Uttar Pradesh 2002), PSMS-II (Government of Uttar Pradesh and The World Bank 2006), PSMS-III (Government of Uttar Pradesh 2011), PSMS-IV (Government of Uttar Pradesh 2014b).

Indicator 6: Access to Safe Drinking Water

Following the WHO/UNICEF JMP definition and based on NFHS classification (refer to Table 4-5), the present study considers improved/safe water sources as piped into dwelling, piped to yard/plot, public tap/standpipe, tube well or borehole, protected well, protected spring and rainwater; whereas sources like unprotected well, unprotected spring, tanker truck, cart with small tank, bottled water[87] and other form a group of unsafe/unimproved water sources. Accordingly, a household is deprived in drinking water if it does not have access to safe drinking water sources or if a source of drinking water is located at 30 minutes or more walk from home, roundtrip.

Notably, across the four NFHS rounds, the classification of water sources differs (refer to Table 4-5). The significant difference is in well and surface water types. In NFHS-1, well water is divided into residence and public, whereas in NFHS-2, these two are further subdivided into the covered and open well. In NFHS-3 and NHFS-4, well classification is

[87] Because the quality of bottled water is not known, households using bottled water can more appropriately be classified according to the source of water used for cooking and handwashing. However, the figures for bottle water hardly matter for U.P as less than 0.5% of the households are using bottled water.

completely modified and condensed only into protected and unprotected wells. Moreover, in NFHS-1 and 2, surface water is divided into spring, river/stream, pond/lake, and dam, but in NFHS-3 and NFHS-4, surface water is collected in aggregation. Here, it is not an issue for comparability, as a complete classification of surface water is considered an unsafe source of drinking water. Moreover, for U.P, use of sources like spring, rainwater, tanker and bottled water almost nil. Accordingly, for NFHS-1, any household having surface water sources (spring, river, stream, pond, lake or dam) as the main source of drinking water is considered deprived. Also, households using public taps, public hand pumps and public wells, and taking time more than half an hour in collecting water (go, get and come back in one trip) are considered deprived. For NFHS-2, consideration of deprivation was added for households using well water if they are using open well either in residence/yard/plot or public. For NFHS-3 and NFHS-4, the criteria for deprivation are almost similar, except for households using the Community RO plant.

The NFHS estimates in Fig. 4-3 bring out that around 98 per cent of households in U.P had access to safe drinking water sources during 1992-93 to 2005-06. However, in 2015-16, due to significant increases in bottled water sources, this proportion declines to 95 per cent. These statistics reveal that now there is less concern about the households' having access to safe sources of drinking water, as majority of the households are using safe sources of drinking water.

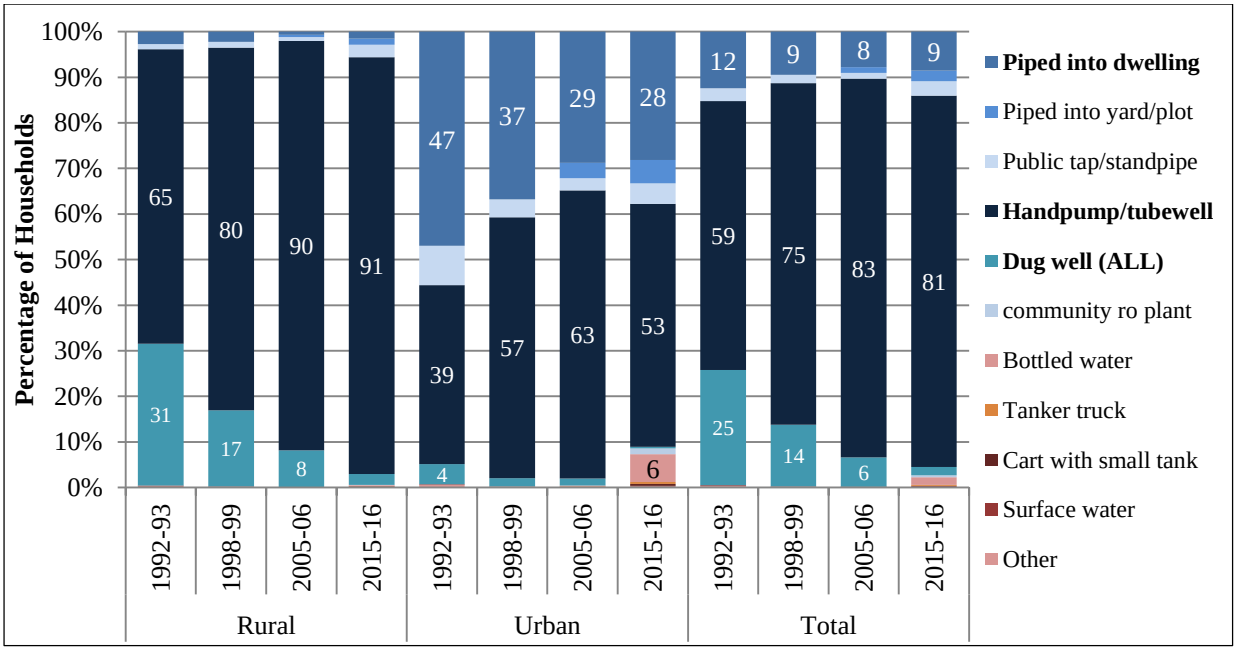
TABLE 4-5 CLASSIFICATION OF WATER SOURCES IN DIFFERENT NFHS

Water Sources	NFHS-1: 1992-93	NFHS-2:1998-99	NFHS-3: 2005-06	NFHS-4: 2015-16
Piped Water	into dwelling/yard/plot	into dwelling/yard/plot	into dwelling	into dwelling
			to yard/plot	to yard/plot
	public tap/standpipe*	public tap/standpipe*	public tap/standpipe*	public tap/standpipe*
Ground Water/ Tube Well or Borehole	hand pump in yard/plot	hand pump in yard/plot	-	-
	public hand pump*	public hand pump*	-	-
	-	-	tubewell or borehole*	tubewell or borehole*
Well Water	well in residence/yard/plot	covered well	protected well*	protected well*
		open well		
	public well*	covered well*	**unprotected well**	**unprotected well**
		open well		
Surface Water	**spring @**	**Spring**	protected spring*	protected spring*
			unprotected spring	**unprotected spring**
	river, stream	**river, stream**	**other surface water @**	**other surface water @**
	pond, lake	**pond, lake**		
	dam	**Dam**		

Rainwater	rainwater* @	rainwater* @	rainwater* @	rainwater* @
Tanker Truck	**tanker truck @**	**tanker truck @**	**tanker truck**	**tanker truck**
Bottled Water	bottled water @	**other**	**bottled water @@**	**bottled water @@**
Cart With Small Tank	**other**		**Cart with small tank @**	**Cart with small tank @**
Community RO Plant			**other**	Community RO plant
Other				**other**

*Notes: 1. Bold items represent deprived categories, * denotes deprivation subject to time to collect water, @@ deprivation depends on secondary water sources*
2. @ denotes water sources almost non-existing in U.P.

FIG. 4-3 MAIN SOURCES OF DRINKING WATER (DETAILED) IN UTTAR PRADESH



Note: Major water sources are highlighted in bold.
Source: Calculation from various NFHS.

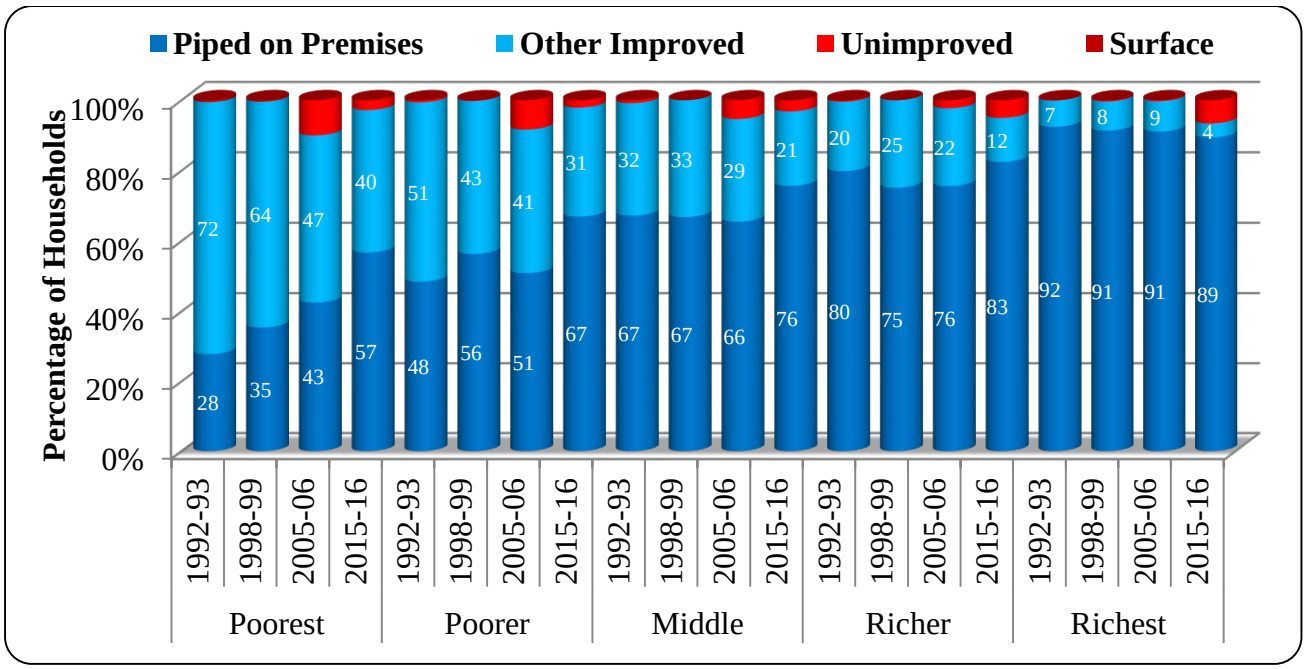
Improvement in Safe Drinking Water Deprivation Criteria

On the improvement side of this indicator, monitoring of 'piped water at home' can be done to understand the more comprehensive nature of deprivation in this respect. In fact, the JMP of UNICEF and WHO (2015) on water and sanitation, categorises 'water ladder' in broader and relevant terms, into surface water, unimproved water, piped on-premises and other improved sources.

Fig. 4-4 illustrates the proportion of households in terms of the water ladder as per the wealth quintile in U.P. It clearly shows that the proportion of households having piped sources of drinking water within the premises (dwelling, yard, or plot) increases, as wealth standards improve (from poorest to richest). It is essential to highlight here that the

classification of water sources enhanced from NFHS-3 (see Classification of Water Sources in Different NFHS) and the categorisation of unimproved sources becomes much clearer afterwards. That is why there is a glittering share of unimproved sources (red colour shades in Fig. 4-4 for the years 2005-06 and 2015-16). In fact, the massive amount of unimproved source increases during 2015-16 because of sudden increases in the usage of bottled water. Even the wealthy households witnessed an increase in unimproved sources during 2015-16 because of bottled water. Nevertheless, the present study deliberately considers a household deprived in drinking water if it does not have access to improved drinking water sources (based on NFHS) or if a source of drinking water is located at 30 minutes or more walk from home, roundtrip.

FIG. 4-4 WATER LADDER BY QUINTILE IN UTTAR PRADESH



Source: Water ladder definition as per JMP of UNICEF and WHO (2015)

Indicator 7: Access to Improved Sanitation

The considerations of improved and unimproved sources of sanitation for the present study are based on NFHS classification. There can be some compatibility issues across different NFHS rounds regarding deprivation in sanitation indicator (see Table 4-6). NFHS-1 and NFHS-2 classify toilet facilities broadly into flush toilets, pit toilets, others and no facility. Amongst themselves, flush and pit toilets are further divided into own, shared and public. However, NFHS-3 and NFHS-4 have a much broader perspective on flush toilets stressing its connectivity to the piped sewer system, septic tank, pit latrine, somewhere else and don't know where. Moreover, a division of pit toilets into 'with slab' and 'without slab' along with

ventilated improved pit /biogas latrine and open pit also improve the classification. Separate assessment of twin pit/composting toilets and dry toilets further makes the classification of sanitation facilities as per the need of an hour. The assessment of shared toilets is carried forward by a separate query from the NFHS-3 round. Based on the information collected, a household is considered deprived in sanitation if it does not have access to improved sanitation (as per JMP guidelines, discussed in the previous chapter) or the household sanitation is improved but shared with other households. Accordingly, as per the definition of improved sanitation, households having flush, and pit toilets are considered non-deprived whereas those having shared or public flush and pit toilets along with 'other' or no facility are considered deprived in NFHS-1 and NFHS-2. Specific to NFHS-3 and NFHS-4 classification, the present study considers a household deprived in sanitation if it is using any of the open lit, pit latrine without slab, or composting toilets that are rudimentary or unimproved sources of sanitation, and non-deprived if it is using any of the flush to piped sewer system, flush to septic tank, flush to pit latrine, ventilated improved pit latrine, and pit latrine with slab that are considered as improved sources of sanitation. Notably, the NFHS-3 considers twin pit, composting toilet under the improved category[88]. However, the proportion of households in U.P having composting toilet is very less (less than 1 %).

TABLE 4-6 CLASSIFICATION OF TOILET FACILITIES IN DIFFERENT NFHS

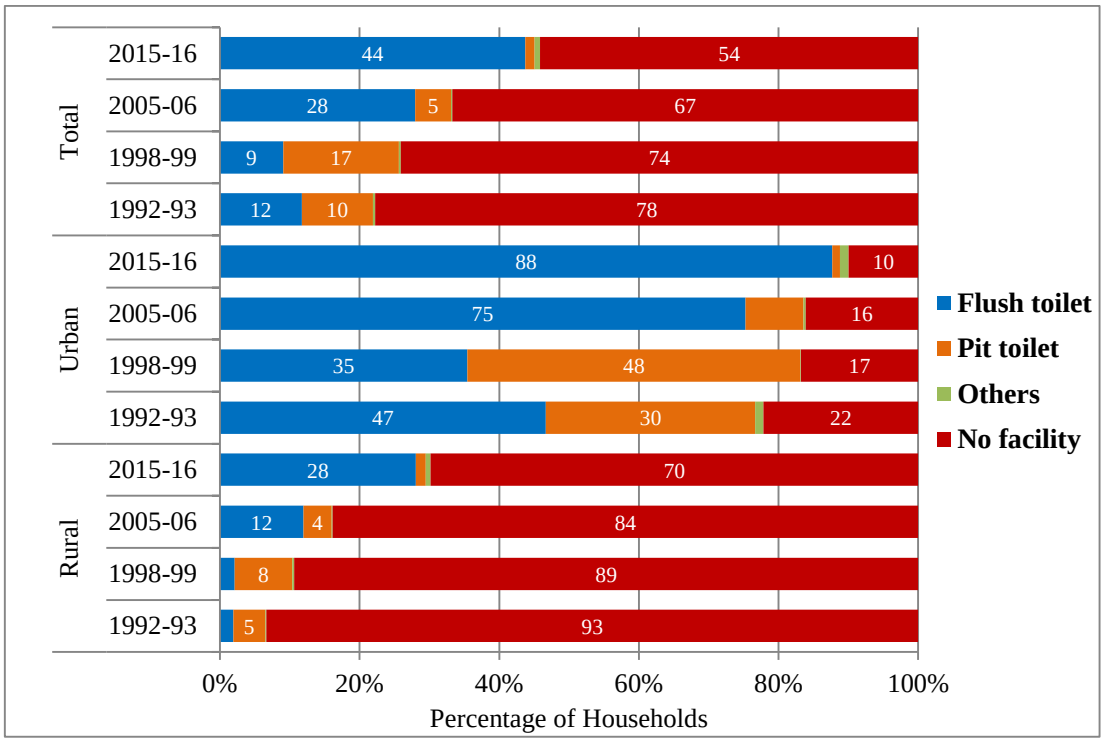
Toilet Facilities	*NFHS-1: 1992-93*	*NFHS-2:1998-99*	*NFHS-3: 2005-06*	*NFHS-4: 2015-16*
Flush	Own, **Shared, Public**	Own, **Shared, Public**	*Flush/pour flush to*: piped sewer system, septic tank, pit latrine, **somewhere else, don't know where**	*Flush/pour flush to*: piped sewer system, septic tank, pit latrine, **somewhere else, don't know where**
Pit (single)	Own, **Shared, Public**	Own, **Shared, Public**	Ventilated improved pit /biogas latrine, with slab, **without slab/open pit,**	Ventilated improved pit /biogas latrine, with slab, **without slab/open pit,**
Twin pit, composting	**(-)**	**(-)**	**Twin pit, composting**	**Twin pit, composting**
Dry	**(-)**	**(-)**	**Dry**	**Dry**
No facility/ Bush/Fields	**No facility/ Bush/Fields**	**No facility/ Bush/Fields**	**No facility/ Bush/Fields**	**No facility/ Bush/Fields**
Others	**Others**	**Others**	**Others**	**Others**

Note: Bold items represent deprived categories.

[88] As per NFHS-3, improved sanitation include toilet facilities with a "flush or a pour-flush that is connected to a sewer system, septic tank or pit latrine, a ventilated improved pit latrine, a biogas latrine, a pit latrine with slab, and a twin pit, composting toilet" (IIPS and Macro International 2007, pp. 37).

More concerning about sanitation is open defecation ('no facility/bush/fields' as per Table 4-6). The WHO and UNICEF (2014) report that around one billion people practise open defecation globally, and India continues to be the single largest country that includes the highest number of people practising it (around 597 million). The NSSO survey on *Swachhta* (sanitation) Status conducted during May-June 2015 reports that around 52.1 per cent of the rural population and 7.5 per cent of the urban population in India are practising open defecation (Government of India 2016d). Within U.P, such proportion is even more in rural (65.9 %) but less in urban areas (6.4%). The NFHS estimates for U.P in Fig. 4-5show that open defecation is widespread in rural areas, during two decades ago (93% in 1992-93) and now (70% in 2015-16). In fact, when the Government of India initially set a target of universal household sanitation coverage by 2012 during the launch of the Total Sanitation Campaign (TSC) scheme in 1991, U.P was lagging behind in achieving this target along with many other states of the country (Government of Uttar Pradesh 2014b). Now, the government of India has replanned the target and aims to eliminate open defecation by 2019; the condition of open defecation shown in Fig. 4-5 exemplifies the reality. For a detailed literature review on open defecation-related to its statistics, consequences, obstacles, and ways out, refer Text Box 7-1).

FIG. 4-5 BROAD DIVISION OF SANITATION FACILITIES IN UTTAR PRADESH



Source: Calculation from various NFHS.

Indicator 8: Safe Cooking Fuel

The discussion in the previous chapter brings out that biomass fuels such as wood, agricultural residue, dung, and charcoal, and coal (coke and coal) are 'dirty' fuels, whereas liquid fuels (kerosene, and LPG), gobar gas, and electricity are often considered 'clean' fuels. Hence, a household using 'dirty' or unsafe sources of cooking is considered deprived.

The NFHS classification of cooking sources is presented in Table 4-7 with unsafe sources highlighted in bold. NFHS classifies cooking sources initially (NFHS-1) into nine categories as presented in Table 4-7. In NFHS-2 'crop residues' was added and in NFHS-3 'straw/shrubs/grass' was added. In NFHS-4, 'no food cooked in the household' was also introduced in the cooking fuel classification.

TABLE 4-7 CLASSIFICATION OF COOKING SOURCES IN DIFFERENT NFHS

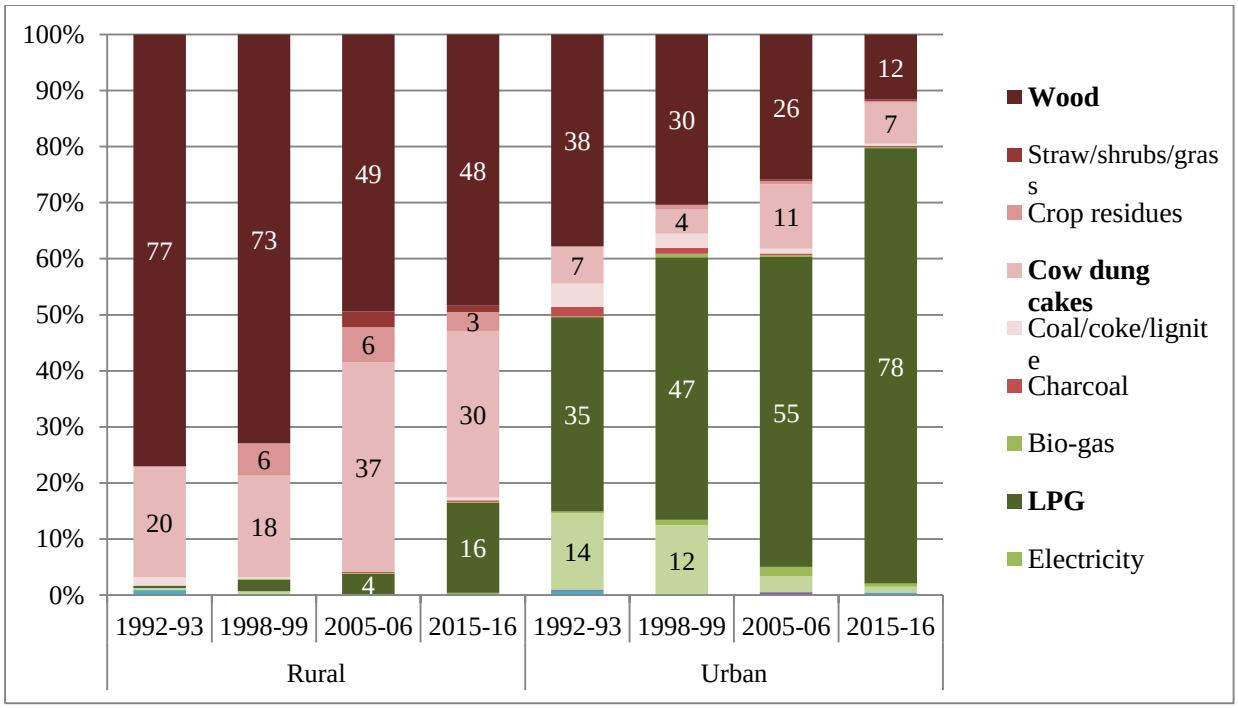
Cooking Fuels	NFHS-1: 1992-93	NFHS-2:1998-99	NFHS-3: 2005-06	NFHS-4: 2015-16
Wood	**Wood**	**Wood**	**Wood**	**Wood**
Straw/shrubs/grass	-	-	**Straw/shrubs/grass**	**Straw/shrubs/grass**
Crop residues	-	**Crop residues**	**Crop residues**	**Crop residues**
Cow dung cakes	**Cow dung cakes**	**Cow dung cakes**	**Cow dung cakes**	**Cow dung cakes**
Coal/coke/lignite	**Coal/coke/lignite**	**Coal/coke/lignite**	**Coal/coke/lignite**	**Coal/coke/lignite**
Charcoal	**Charcoal**	**Charcoal**	**Charcoal**	**Charcoal**
Kerosene	Kerosene	Kerosene	Kerosene	Kerosene
Electricity	Electricity	Electricity	Electricity	Electricity
LPG	LPG	LPG	LPG	LPG
Bio-gas	Bio-gas	Bio-gas	Bio-gas	Bio-gas
Others	**Others**	**Others**	**Others**	**Others**

Note: Bold items represent deprived categories

Fig. 4-6 shows the rural-urban gaps in the use of safe cooking fuel in U.P. In rural areas, more than 96 per cent of the households were using solid or unsafe cooking fuels (represented in red shades) whereas, in urban areas, around half of the households were using it until 1992-93. However, share of the unsafe cooking source has reduced drastically to 19 per cent in urban areas but marginally to around 81 per cent in rural areas until 2015-16. Notably, the above figure also highlights that the decline in its share is prolonged in rural areas (just one percentage point decline between 1992-99 and 1999-2006). The sub-classification of cooking fuels shows that commonly used cooking fuels in rural areas are the wood and cow dung cakes, whereas, in urban areas, it is LPG and kerosene. The proportion of rural households using wood as a primary cooking fuel has decreased drastically

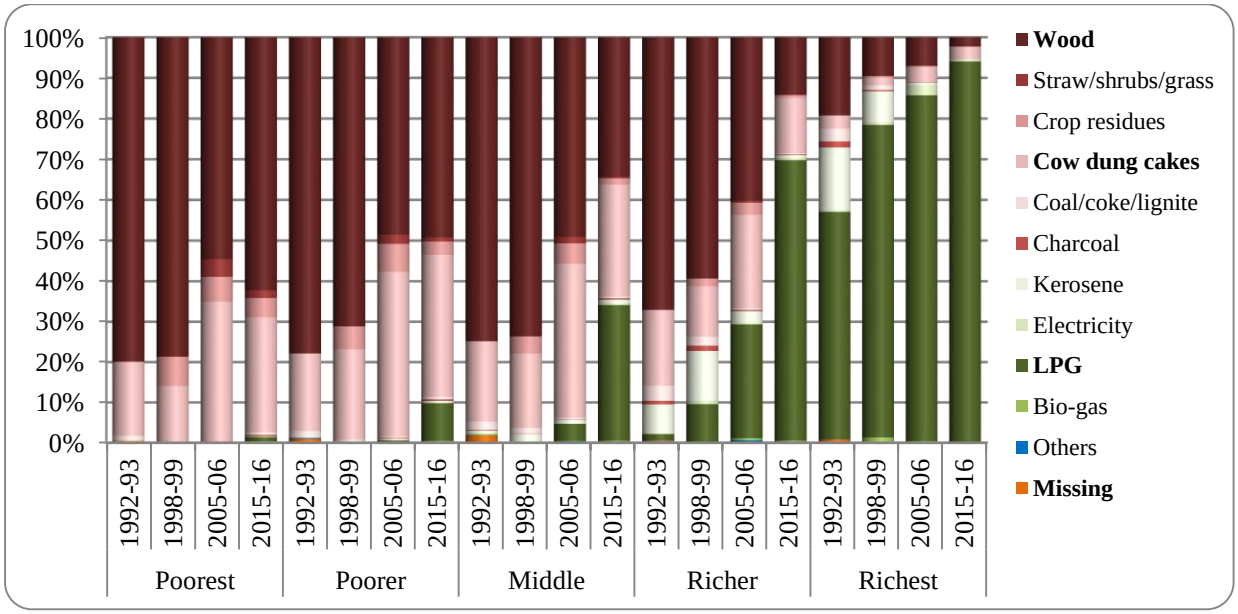
during1999-2006 (around 24% points). It was largely replaced by 'cow dung cakes', another solid cooking fuel. Fig. 4-7 illustrates that as wealth quintile increases, the transition towards safe cooking fuels also increases (shaded in green).

FIG. 4-6 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY COOKING FUELS IN RURAL AND URBAN AREAS OF UTTAR PRADESH



Note: Major cooking fuels are highlighted in bold.
Source: Calculation from various NFHS.

FIG. 4-7 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY COOKING FUELS & QUINTILE IN UTTAR PRADESH



Note: Major cooking fuels are highlighted in bold.
Source: Calculation from various NFHS.

Indicator 9: Housing

The presence of a *kachha* house is considered a fair proxy for deprivation in housing[89]. The classification of *pucca* and *kachha* housing structure collected by NFHS in terms of material used is shown in Table 4-8.

According to NFHS-1, "houses made from mud, thatch, or other low-quality materials are called *kachha* houses; houses that use partly low-quality and partly high-quality materials are called semi-*pucca* houses; and houses made with high-quality materials throughout, including the floor, roof, and exterior walls, are called *pucca* houses" (IIPS 1995, IIPS and Macro International 2007). However, it does not specify what the low-quality, partly low-quality and partly high-quality, and high-quality materials are. In fact, the initial two NFHS (NFHS-1 and NFHS-2) do not have observations specifically on the main material of the floor, roof and exterior walls; these surveys rather directly provide estimates on the type of house. However, in NFHS-3, observations on the main material of the floor, roof and exterior walls along with the type of house are presented separately. Cross-tabulation of floor, roof and exterior walls material with the type of households bring out the classification of *pucca* and *kachha* house type as illustrated in Table 4-8. Houses having finished floors (or bricks/stone floors), along with finished roofing and walls (exterior) are considered *pucca*, whereas houses having natural floors (or raw wood planks/palm/bamboo floors), with natural or rudimentary roofing and walls, are considered *kachha*. Houses that use partly low-quality (as defined for *kachha* houses) and partly high-quality materials (under *pucca* houses) are called semi-*pucca* houses.

89 Alkire and Santos (2010)'s Global MPI and the revised version of MPI in the HDR (UNDP 2016) consider flooring as one of the indicators and define deprived as if households are using mud/clay/earth, sand and dung, and those categories as 'others' as the main material of the floor. However, the present study considers the structure of complete house as one of the indicators of UP-MPI, firstly due to the support of surveyed literature in the previous chapter and secondly due to the format of housing variable provided by NFHS (see Table 4-8).

TABLE 4-8 CLASSIFICATION OF PUCCA AND KACHHA HOUSE TYPE AS PER FLOOR, ROOF AND WALLS MATERIAL

Type of House	Main Material of the		
	Floor	**Roof**	**Exterior Walls**
Pucca	**Finished floor** • Parquet or polished wood • Vinyl or asphalt • Ceramic tiles • Cement • Carpet • Polished stone/ marble/granite **Rudimentary floor** • Brick • Stone	**Finished roofing** • Metal/gi • Wood • Calamine/cement fiber • Asbestos sheets • Rcc/rbc/cement/concrete • Roofing shingles • Tiles • Slate • Burnt brick	**Finished walls** • Cement/concrete • Stone with lime/cement • Burnt bricks • Cement blocks • Wood planks/shingles • Gi/metal/asbestos sheets
Kachha	**Natural floor** • Mud/clay/earth • Sand • Dung **Rudimentary floor** • Raw wood planks • Palm/bamboo	**Natural roofing** •No roof •Thatch/palm leaf/reed/grass •Mud •Sod/mud and grass mixture •Plastic/polythene sheeting **Rudimentary roofing** •Rustic mat •Palm/bamboo •Raw wood planks/timber •Unburnt brick •Loosely packed stone	**Natural walls** • No walls • Cane/palm/trunks /bamboo • Mud • Grass/reeds /thatch **Rudimentary walls** • Bamboo with mud • Stone with mud • Plywood • Cardboard • Unburnt brick • Raw wood/reused wood

Source: Compilation from NFHS-3

The proportion of households living in *kachha* house presented in Fig. 4-8 depicts two concerning facts. First, a high proportion of households in U.P are living in poor quality (*kachha*) of houses compared to the Indian average, in both rural and urban areas. Secondly, housing is a necessity of life; yet a majority of the rural population in general and U.P, in particular, are living in poor housing conditions. Nevertheless, over time trends give a sign of some relief that within U.P (also in overall India), the gap between the proportion of rural and urban households living in *kachha* type of house, which was around 40 percentage points during 1992-93 (rural: 65%, urban: 20%) has reduced to 10 percentage points (rural: 11%, urban: 1%) during 2015-16. Moreover, Fig. 4-9 illustrates the association between types of house and wealth quintile that clearly shows that as the share of wealth possessed increases, the ownership for the *pucca* house also increases in U.P.

FIG. 4-8 HOUSEHOLDS LIVING IN KACHHA TYPE OF HOUSES IN INDIA AND UTTAR PRADESH

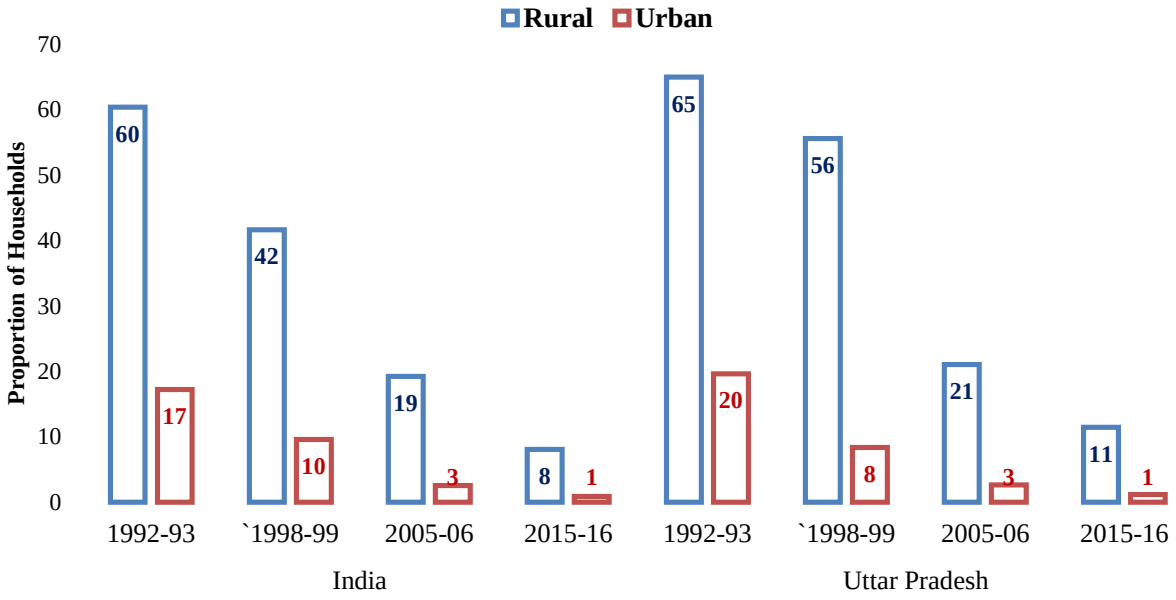
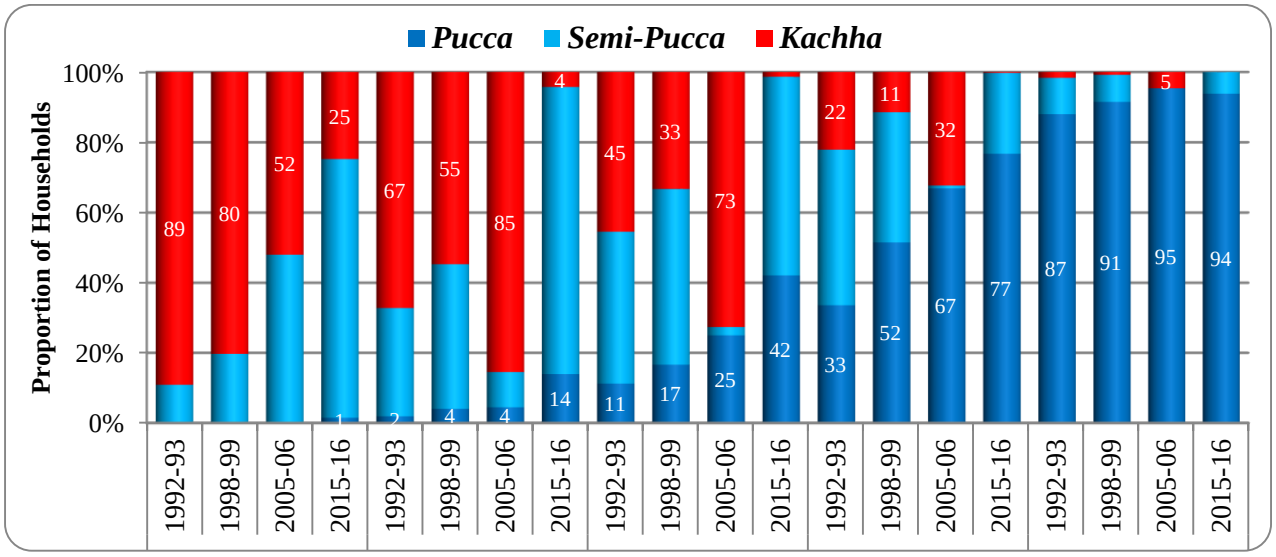


FIG. 4-9 TYPE OF HOUSES BY QUINTILE IN UTTAR PRADESH



The present study, based on NFHS data, includes only those households that possess any type of house. However, there may be some people who do not have any house (homeless), but NFHS surveys do not present information on such people. Nevertheless, they are the most eligible contenders for 'being poor' as far as housing deprivation is concerned. The level of housing deprivation may be more than what is estimated by any household survey data like NFHS if data on homeless population are included. In fact, the Government of India (2007c) highlights that it is homeless that are most vulnerable, particularly in urban areas. Due to the non-availability of data, the homeless population is not considered in the present study.

In fact, the current Prime Minister of India in his address to the Joint Session of Parliament on 9th June, 2014 announced "By the time the Nation completes 75 years of its Independence, every family will have a *pucca* house with water connection, toilet facilities, 24x7 electricity supply and access" (Government of India 2016c, b). These commitments are for both rural and urban areas as specified under Pradhan Mantri Awas Yojana (PMAY)–Housing for All program/Mission, which has both Gramin (rural) and Urban elements (Government of India, 2016a, 2016b). In addition to the above facilities, the minimum size of the house has increased to 25 sq.mt. (from 20 sq.mt.) with hygienic cooking space. In fact, the PMAY guidelines define a *pucca* house as one which is "able to withstand normal wear and tear due to usage and natural forces including climatic conditions, with reasonable maintenance, for at least 30 years" (Government of India 2016b). PMAY aims to cover one crore households living in *kachha*/dilapidated houses in three years (2016-17 to 2018-19). I hope that by 2022, all Indians should have a *pucca* house at least with said facilities so that deprivation in this respect can be eliminated.

Indicator 10: Assets

The present study considers the three classes of assets (information, mobility, and livelihood) as prescribed by 2014 HDR to define asset deprivation. However, the criteria of HDR is settled at a global level. There is a need to see the compatibility of NFHS regarding assets (see Table 4-9). The NFHS collects data on information assets (phones —mobile and others, radio/transistor, and television — black & white and colour), mobility assets (bicycles, motorbikes/scooters, cars and animal carts), and livelihood assets (refrigerator, arable land and livestock).

A few discrepancies need to be addressed. First, a motorboat is included in HDR's MPI, but in Indian NFHS data, it is not available. Second, a tractor was not included in the HDR's MPI, but the present study is deliberately adding it. There are some comparability issues across NFHS rounds too. For example, in NFHS-1, ownership of cow, buffalo, and bull was surveyed individually, whereas, in NFHS-3 and NFHS-4, it is measured in aggregation. Nevertheless, that is not a matter of concern, as in NFHS-2, specific categories of livestock (cow, buffalo, bull, goat, sheep, camels, horses/donkey/mulls, chicken/ducks) were not surveyed as in other NFHS. Now matching these estimates is a matter of concern, and so ownership of livestock in aggregation is created, and any household not having even a single animal is considered deprived in livestock ownership.

TABLE 4-9 COMPARABILITY ACROSS NFHS ON ASSETS

Assets	Sub-types of Assets		1992-93	1998-99	2005-06	2015-16
Information Assets	Telephone	Mobile	×	✓	✓	✓
		Others	×		✓	✓
	Radio		✓	✓	✓	✓
	Television	B & W	✓	✓	✓	✓
		Coloured		✓	✓	✓
Mobility Assets	Bicycle		✓	✓	✓	✓
	Motorbike/Scooter		✓	✓	✓	✓
	Car		✓	✓	✓	✓
	Tractor		✓	✓	✓	✓
	Animal Wheel Cart		✓	✓	✓	✓
Livelihood Assets	Refrigerator		✓	✓	✓	✓
	Agricultural Land		✓	✓	✓	✓
	Cow		✓	Any Livestock	Cow/Buffalo/ Bull	Cow/Buffalo/Bull
	Buffalo		✓			
	Bull		✓			
	Goat		✓		✓	✓
	Sheep		✓		✓	✓
	Horses/Donkey/Mulls		×		✓	✓
	Chicken/Ducks		×		✓	✓

Table 4-9 shows that in NFHS-1, data on information assets were available only for radio and TV. However, in the following NFHS, data on all the three information assets are available. That makes sense, as telephones during 1992-93 were not a common asset as they are now. Accordingly, if households own any of the information assets (television/radio for NFHS-1, and radio/television/telephone for other NFHS), then they are considered non-deprived. Appropriately, a household is considered deprived only when there is neither radio nor TV in case of NFHS-1, and neither radio nor television and telephone in case of other NFHS. Information is considered missing if the household response is missing for any of the information assets (see Table 4-10). Similarly, if households own any one of the mobility assets (bicycle, motorcycle, car, or animal cart), they are considered non-deprived. The household is only considered deprived in mobility assets when there is no ownership of any mobility asset. Information is considered missing in this case when the household response is

missing in more than two of the mobility assets. In the case of livelihood assets, households are considered deprived if there is neither ownership of refrigerator nor agricultural land and livestock. If households own any of the considered livelihood assets, they are considered non-deprived. The information is considered missing when the household response is missing for more than one of the livelihood assets. Finally, the household is considered deprived if it is deprived in information assets as well as in mobility or livelihood asset. To elaborate, household is considered deprived in asset only when it does not own at least one asset related to access to information (radio, TV, telephone) and at least one asset related to mobility (bike, motorbike, car, truck, animal cart, tractor) or livelihood (refrigerator, arable land, livestock). Based on NFHS data, the proportion of households reporting non-missing information (either of assets classification) is presented in Table 4-10. It shows that the proportion of missing values in asset sub-indicators (information, mobility, and livelihood) is almost negligible.

TABLE 4-10 PERCENT OF NON-MISSING VALUES IN ASSET INDICATORS (UNWEIGHTED)

Types of Assets	NFHS Rounds			
	I	**II**	**III**	**IV**
Information	99.93	99.99	99.98	100.00
Mobility	99.95	99.97	99.96	99.83
Livelihood	99.91	99.97	99.93	100.00
Overall Assets	99.93	99.97	99.96	99.99

Clarification on Indicator's Deprivation, Non-eligible Population, and Treatment of Missing Observations[90]

For years of schooling indicator, the present study considers a household deprived where no household member has completed at least six years of schooling. Of course, that is among those who are old enough to achieve six years of education. In India, as per UNESCO statistics, the entrance school-aged is six years, and theoretically, any person having age 12 and plus can achieve 6 and plus years of schooling. Now in the response of treating non-eligible and missing observations in this indicator, the present study follows a rule. If it is

90 The details on this part can be obtained from Alkire and Santos (2015) and Kovacevic and Calderon (2014).

observed that at least one member of the household has six or more years of education, then, regardless of the number of other members with missing data, the household is classified as non-deprived. If more than 1/3 of the household members have missing information on years of education, and the people for which it is observed that the years of education have less than six years, then the household is given a missing value in this indicator. Table 4-11 shows that the proportion of missing samples in this indicator in all the four NFHS is less than one. Notably, a household is only considered deprived in years of schooling when there is information on at least 2/3 of household members, and they report less than six years of schooling.

For the indicator of child school attendance, deprivation cut-off is set at the level where even a single school-aged child in the household is not attending school until grade 8. In India, as mentioned earlier, the age of commencing primary school is 6 years and the constitutional commitment is to provide free and compulsory education for all children until the age of 14. However, it is argued by Alkire and Santos (2015) and Kovacevic and Calderon (2014) that there should be a provision to allow for one year of late enrolment[91]. So, now for child school attendance indicator, if there is any single child aged 7-14 who is not attending school up to grade 8, then that household is considered deprived, regardless of information on other members of the household. However, this indicator also follows another rule regarding eligible, non-eligible and missing observations. First, this indicator is not applicable to households having no child of school-aged (7-14 years). Secondly, if all the school-aged children in a household have missing information in enrolment, the observation is considered missing. Third, a non-deprivation status is only assigned when there are at least two-thirds of the household's children 7-14 aged report information on school enrolment, and they are attending school. Otherwise, a missing value will be assigned to this indicator. As in the previous indicator, Table 4-11 also reports that the proportion of missing samples in this indicator among all the four NFHS is less than one per cent.

For nutrition**,** a household is considered deprived if there exists a woman (15–49 of age) who is underweight (BMI less than 18.5) or a child under age five who is stunted (as per height-for-age z score calculated using WHO standards). However, this indicator also follows a rule. First, the non-eligible population refers to households having no child below the age of five and no women in the age group of 15-49. Second, the observation is coded missing if

91 It is basically to avoid mismatch between the birthdate and the school start date.

nutritional information for both women and children in a household is missing but that household has some applicable members (that is with children less than 5 and/or women aged 15-49). Table 4-11 indicates that the proportion of missing samples in undernutrition indicator among all the four NFHS is exceptionally high. However, over time, the proportion of missing information in this indicator is declining.

For child mortality, the present study considers a household deprived if any child died within the last five years of the survey. A non-eligible population, in this case, can be of two types: first is a household with no women in the reproductive age group (15-49), and second when the household does not have any child. However, if there is eligible population in the household (having at least single women in the reproductive age (15-49)) but the household did not respond to the mortality question, then such households are coded missing; otherwise the household is considered non-deprived. Table 4-11 depicts that the proportion of missing samples in child mortality indicator between the first two NFHS is exceptionally high, whereas, in the next two NFHS, it remains less than one.

For six SOL indicators (electricity, sanitation, water, housing, cooking fuel, and assets), there is no rule for the eligible and non-eligible population as it applies to the entire household. However, in the first five indicators above the list, only if households respond to any question related to these indicators, possession (non-possession) of which is treated them as non-deprived (deprived) in the concerned indicator. Moreover, if there is no response to the concerned question, then observation is treated as missing for the concerned indicator. However, in the asset indicator, since it is composed of three different types of assets (information, mobility, and livelihood) which itself is based on sub-categories of assets so this simple rule will not work. So, households are categorised as deprived if they do not own at least one asset related to access to information (radio, TV, telephone); one asset related to mobility (bike, motorbike, car, truck, animal cart, tractor); and at least one asset related to livelihood (refrigerator, arable land, livestock). Missing value is assigned when they lack information on more than one information asset or livelihood asset or more than two mobility asset (refer to Table 4-11).

The NFHS-4 data reveals that in four out of ten indicators, namely, child school attendance, electricity, sanitation, and water, none of the households reports missing information (see Table 4-11). In four of the remaining indicators (years of schooling, child mortality, cooking fuel and assets), more than 99 per cent of the households' have the

responses. The exception is under-nutrition, in which less than 90 per cent of the sample households provide information among all the NFHS.

TABLE 4-11 PERCENTAGE OF NON-RESPONSE RATE (UNWEIGHTED) BY INDICATORS OF UP-MPI

Dimensions	Indicator	*NFHS Rounds*			
		I	II	III	IV
Education	Child School Attendance	0.33	0.61	0.05	0.00
	Years of Schooling	0.17	0.04	0.11	0.13
Health	Undernutrition	17.51	17.92	15.47	10.92
	Child Mortality	7.84	6.78	0.98	0.49
Standard of Living	Electricity	0.00	0.00	0.04	0.00
	Sanitation	0.03	0.02	0.17	0.00
	Drinking Water	0.07	0.08	0.03	0.00
	Housing	0.32	0.40	0.20	8.53
	Cooking Fuel	0.90	0.01	0.01	0.06
	Assets	0.07	0.03	0.04	0.01

Note: Non-response rate is the percentage of missing sample.

The overall retention of the sample for UP-MPI is based on the following considerations: First, from the interviewer visits, only completely interviewed households are selected. In addition, among them, only the usual residents were selected. A household is excluded from the analysis if there is missing information on any of the ten considered indicators. Table 4-12 reveals that in all the four NFHS, there is a marginal reduction in the original sample to be used to compute UP-MPI. However, more than 86 per cent of the original sample is being utilised in any case. The recent NFHS-4 shows that around 88 per cent (weighted, 90%) of the sample households in U.P have information on all the ten indicators. In rural areas, it is even more (89%) compared to urban (86%). Also among SRGs, Table 4-13 reveals that there is a marginal reduction in the original sample to be used to compute UP-MPI. However, except for WR (NFHS-4), in none of the cases, not less than 85 per cent of the original sample is being utilised. To balance this missing information, the present study follows an adjustment procedure for re-sampling of weights to account for the non-eligible households and missing observations as suggested by Alkire and Santos (2015) and Kovacevic and Calderon (2014).

TABLE 4-12 SAMPLE SIZE AND PERCENT OF SAMPLE USED TO COMPUTE UP-MPI BY AREAS

NFHS rounds	R/U/T	Sample Size	Per cent of Sample Used to Compute UP-MPI	
			Unweighted	***Weighted***
NFHS-1	Rural	42,267	89.13	89.58
	Urban	10,357	89.81	90.13
	Total	52,624	89.27	89.70
NFHS-2	Rural	38,174	91.84	91.69
	Urban	9,589	87.05	86.81
	Total	47,763	90.88	90.69
NFHS-3	Rural	33,630	90.82	90.82
	Urban	22,649	90.46	88.71
	Total	56,279	90.68	90.31
NFHS-4	Rural	2,95,341	88.66	90.71
	Urban	1,03,594	86.40	88.16
	Total	3,98,935	88.07	90.07

Notably, both Table 4-12 and Table 4-13 report that sample size in the new NFHS-4 is exceptionally high. It is because, in this NFHS, the sample design is so selected that it allows precise district-wise estimates for all the 640 districts in India, which is for the first time in any survey of this kind. That is why the report of the survey highlights that "NFHS-4 figures and those of earlier NFHS rounds may not be strictly comparable due to differences in sample size, and NFHS-4 will be a benchmark for future surveys" (IIPS and ICF 2017b).

TABLE 4-13 SAMPLE SIZE AND PERCENT OF SAMPLE USED TO COMPUTE UP-MPI BY SUBGROUPS

NFHS Rounds	Subgroups (Social/ Religious/ Regions)		Sample Size	Per cent of Sample Used to Compute UP-MPI	
				Unweighted	*Weighted*
NFHS-1	Social	SCs	9,310	90.2	90.7
		Others	42,754	89.0	89.5
	Religious	Hindus	38,674	88.9	89.4
		Muslims	7,529	85.1	85.4
NFHS-2	Social	SCs	9,292	93.3	93.1
		OBCs	13,830	91.5	91.5
		Others	18,292	89.7	89.3
	Religious	Hindus	38,722	91.8	91.6
		Muslims	8,623	86.7	86.8
NFHS-3	Social	SCs	12,802	90.8	90.0
		OBCs	27,649	90.7	90.6
		Others	15,253	90.5	89.9
	Religious	Hindus	43,244	91.5	91.2
		Muslims	12,458	88.0	86.7
NFHS-4	Social	SCs	92,490	88.6	90.6
		OBCs	2,15,258	88.7	90.4
		Others	84,163	85.6	88.4
	Religious	Hindus	3,17,398	88.2	90.2
		Muslims	79,711	87.6	89.5
	Regions	Western	1,76,740	78.8	81.4
		Central	50,974	95.9	95.9
		Southern	32,220	96.0	95.7
		Eastern	1,39,001	95.2	95.4

Defining the Indicators' Deprivation Cut-Offs

Mathematically, considering the indicator's deprivation cut-offs as z_i, a person i is considered deprived ($I=1$) in the particular indicator if his/her achievement in that indicator (x_i) is below the cut-off, that means, $x_i < z_i$. For example, in $Years\ of\ Schooling$, a person is

considered deprived when no member of its household has completed six years of schooling. Here, z = six years of schooling, x = *achievements in the years of schooling*, i = *person concerned*, and $I = 1$, if a person is deprived, that means his $x < z$.

After step one, which includes, choice of dimensions, indicators, and their corresponding deprivation cut-offs, the next step is to define the weight for indicators.

Step 2: Choice of Weights for Indicators

There is no doubt in saying that weights are the most critical step in the estimation of MD poverty. The primary issue in selecting a weighting scheme is that it requires value judgment to recognize the importance of indicators concerned that creates an inconvenience in selecting an appropriate weighting scheme. Studies find various types of weighting structure in practice. Decancq and Lugo (2013) review around 43 studies and discuss eight different methods of weighting along with their merits and demerits[92]. Their study clarifies two points: first, out of 43 studies, about half of them use equal weighting methods that recognise it as the "most commonly used approach for weighing in multidimensional indices of wellbeing"; second, no weighting scheme is up to the mark. The HDI, one of the most widely used composite index, also uses the equal weighting scheme across dimensions. Moreover, the original version of Global MPI developed by Alkire and Santos (2010), and the revised version of MPI in the Human Development Report since 2014 (UNDP 2014) also use equal weighting across dimensions.

The commonly used method also represents the generally accepted consensus, which is required for any normative judgments. Sen (1999) suggests that for normative judgments, the only option that can resolve it is through "reasoned evaluation". Moreover, to have a social agreement, these reasons may have consensuses through "public discussions and a democratic understanding and acceptance".

Categorically, the applicability of equal weighting across dimensions widens due to its simplicity as "all indicators are equally important" (Decancq and Lugo 2013), and easy interpretability, reasonability and commonly adopted argument (Alkire and Roche 2012). In fact, an equal weighting scheme is supported by experts' opinion. Chowdhury and Squire (2006) ask various experts from the field to weight each component of HDI. They find that

92 It includes frequency, statistical, most-favourable under data-driven approach, equal or arbitrary, experts' opinion, and price based under normative approach, and self-stated and hedonic in the hybrid category.

average weight emerged from the survey is not statistically different from the equal weighting scheme that is currently being used.

The above discussion reveals that equal weighting is easy to understand, defendable, and commonly used among all problematic methods. Therefore, the present study uses equal weighting across dimensions for the UP-MPI, where each of the three dimensions obtains an equal relative weight (1/3 or 33.33% as $\frac{total\ weight\ (1\ or\ 100\%)}{no.of\ \ dimensions(D)}$), that is distributed equally across indicators of the concerned dimension $\left(\frac{dimension's\ weight}{no.of\ \ indicators(d)}\right)$. Table 4-14 shows the weight assigned to each indicator as per the described method. Therefore, both the indicators in health and education dimensions obtained the weight of 1/6 or 16.67 %, and all the six indicators in SOL get an equal weight of 1/18 or 5.56% $\left(\frac{33.33\%}{6}\right)$. Mathematically, for the indicator x , weight can be defined as w_x , by $\sum_{x=1}^{x=d} w_x = 1$.

TABLE 4-14 DIMENSIONS, INDICATORS, DEPRIVATION CUT-OFFS AND WEIGHTS USED IN UP-MPI

Dimensions	Indicators	Deprived If	Weights
Education	Years of Schooling	No household member has completed at least six years of schooling	1/6 or 16.67%
	Child School Attendance	A school-age child (up to grade 8) is not attending school	1/6
Health	Child Mortality	Any child has died in the household within the last five years	1/6
	Undernutrition	A household member (for whom there is nutrition information) is malnourished, as measured by the BMI for adults (women ages 15–49 as surveyed in NFHS) and by the height-for-age z score calculated using WHO standards for children under age 5.	1/6
Standard of Living	Electricity	The household has no access to electricity	1/18 or 5.56%
	Drinking Water	The household does not have access to safe sources drinking water or if the source of safe drinking water is located 30 minutes or more walk from home, round trip	1/18
	Sanitation	The household does not have access to improved sanitation (as per JMP guidelines), or if improved, it is shared	1/18
	Cooking Fuel	The household cooks with unsafe sources of cooking fuel such as dung, wood or charcoal	1/18
	Housing	The household lives in a *kachha* type of house	1/18
	Assets	The household does not own at least one asset related to access to information (radio, TV, telephone) and not having at least one asset related to mobility (bicycle, motorbike, car, truck, animal cart, tractor) or at least one asset related to livelihood (refrigerator, arable land, livestock).	1/18

Step 3: Aggregation of Deprivation Count or Score

The aggregated weights of deprived indicators are called Deprivation Count and denoted as 'C_i'. It can be mathematically expressed as follows:

$$C_i = \sum(deprivation\ count)\text{, or}$$

$$C_i = \sum_{x=1}^{x=d} w_x * I_x$$

If a household is deprived, then $I = 1$, if non-deprived, then $I = 0$. w_x represents the weight of the indicator. For example, if *Household a* is deprived in nutrition, child school attendance, drinking water, and cooking fuel, then its deprivation count is as follows:

$$C_a = \left[(w_{undernutrition} * 1) + (w_{attendance} * 1) + (w_{water} * 1) + (w_{fuel} * 1) \right]$$

$$C_a = \left[\frac{1}{6} + \frac{1}{6} + \frac{1}{18} + \frac{1}{18} \right] = .444 \text{ or } 44.4\%$$

If *Household* b is deprived in nutrition only, and then its deprivation count is, as follows:

$$C_b = \left[(w_{undernutrition} * 1) \right] = 1/6 = .167 \text{ or } 16.7\%$$

If *Household c* is deprived in child mortality and years of schooling, its deprivations count is:

$$C_c = \left[(w_{mortality} * 1) + (w_{schooling} * 1) \right] = \left[\frac{1}{6} + \frac{1}{6} \right] = 33.3\%$$

Step 4: Select Poverty cut-off

The identification of poor is based on the choice of poverty cut-off, denoted as '*k*'[93]. It represents deprivation in the proportion of weighted indicators that is required to consider a household poor.

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93 Actually, there are three types of criteria to define k. Type one is Union criterion, where, $k = \min\{w_x\}$, such that even a deprived in single indicator is counted as MD poor. Type two is Intersection criterion, where $k = \sum w_x$, such that deprived in all the indicators is only counted as MD poor. Type 3 is an Intermediate criterion, which is followed by the present study, where k is so selected that it counts MD poor more than what is in union criteria (any single indicator) and less than intersection (deprived in all). As far as UP-MPI is concerned, k lies between 5.56% to 100%. This 5.56 is actually $\min\{w_x\}$ by Union criteria, appropriately representing deprivation in any of the SOL indicators, and even then a person is considered MD poor. This single deprivation may be due to something other than poverty. Union criteria also predicts a very high number

$$Poor = C_i \geq k$$

In a simple sense, if C_i, a deprivation count or a weighted sum of deprivation is equal to or more than k, poverty cut-off, then the household is considered poor. Let us say that $k \geq 33.3\%$ is selected, then in the above example (Household a, b, and c), where $C_a = 44.4\%, C_b = 16.7\%$, and $C_c = 33.3\%$, *Household a* and *Household c* are MD poor as their deprivation count is higher than or equal to poverty cut-off.

As far as UP-MPI is concerned, the choice of k can vary from 0.056 (or 5.56%) to 1 (or 100%), where k equivalent to 0.056 means that deprivation in 5.6 per cent of the weighted indicators is required to be considered MD poor. Note that by k =.056, if a person is deprived in any one of the SOL indicators, then he/she is considered MD poor. Until k is below 16.7 per cent, deprivation in only SOL is considered to define a MD poor.

The choice of k should be based on both empirical and normative judgments. Normative argument is the sense that k should be selected in such a way that it is at least beyond the level that represents deprivations by choice. For example, a household may often practice open defecation by choice due to lack of awareness about its ill effects, but is otherwise affluent Or, a person in a household becomes very thin due to week-long fasting but otherwise is comfortable in other indicators. Here, the goal is to capture genuine deprivations to consider a person MD poor. Therefore, it is argued that as the k represents the multiple deprivations, the likelihoods that these deprivations are chosen by chance should be avoided. By normative argument, it can be said that k should be to the minimum of deprivation in two smallest indicator weight (applicable to SOL indicators) that is, at least k = min (0.12 or 12%). Looking at the education and health dimensions, it can be said that a single indicator in both the dimensions may not be a perfect proxy to represent deprivations in these dimensions, the choice of k should be at least to a minimum of the sum of deprivations in complete education or health dimension. If this argument stands fit, then k should be 33.3 %. Moreover, the empirical evidence suggests that the choice of k should lie

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of poor that may be politically constrained. On the other hand, k=100% is when $\sum w_x$ as per Intersection criteria. It will count someone poor only when he/she is deprived in all the ten considered indicators. The major difficulty in intersection criteria is that it often identifies a very narrow slice of population as poor. This provides the justification for following Intermediate criterion, which is more sensible and reasonable as it gives each dimension a sense of importance.

between 0.2 to 0.4 (Alkire and Santos 2010). At the extreme limit (k >0.4) shows zero poverty levels in the less poor countries and this exercise stands irrelevant in those countries. Alkire and Santos (2010) suggest that the range of plausible values of k is quite limited (0.2 to 0.3, or 0.4 for the poorest countries). The dominance analysis will show some light on the effect of k value on the sensitivity of UP-MPI estimates, particularly the ranking of poor across SRGs and regions, which will be discussed in Chapter 8.

4.5.2.2 Aggregation of MD poverty

As discussed earlier, aggregation refers to the construction of an index of poverty to determine how poor the society is. However, in the case of MD poverty, it is more comprehensive. Nevertheless, the aggregation of MD poverty includes two steps. The first step is the computation of UP-MPI, and second, relates to its decomposition by dimensions and indicators, and across subgroups, as follows:

Step 5: Computation of UP-MPI

Following the Alkire and Foster (2011a) method, the present study estimates the UP-MPI based on two components[94]. First, is the proportion or incidence of MD poor, and second is the intensity of their deprivation. The first component is technically called MD Headcount Ratio (denoted as H[95]), that is mathematically represented as:

$$Headcount(H) = \frac{Poor}{Total\ Population(n)}$$

For example, considering households, *a*, *b* and *c* example, out of these three households, step 4 depicts that households *a* and *c* are MD poor. Let us say, households *a*, *b*, and *c* have 3, 4, and 5 members respectively. Since the present study considers the household as a unit of analysis, so once a household is identified as MD poor, all of its members are also considered poor. Accordingly,

$$H = \frac{[3]_a + [5]_c}{[3]_a + [4]_b + [5]_c} = .6667, or\ 66.67\%.$$

94 Actually, the computation of UP-MPI is similar to MPI developed by Alkire and Santos (2010), aggregation of which is based on Alkire and Foster (2011a) methodology. Purposely, Alkire and Santos (2010) estimated the Global MPI, and to distinguish it with that of U.P's MPI, the present study defines it in terms of UP-MPI.

95 Generally, headcount ratio is denoted as *HCR*. However, the present study estimates the ratio for both unidimensional and MD poverties. In order to distinguish between the two, the headcount ratio in unidimensional (consumption based) poverty is denotes as *HCR*, where in case of MD poverty, as one of the components of UP-MPI, it is denoted by *H*.

It means, around 67 per cent of the population is MD poor. The second component, intensity, is also called breadth of poverty, and it is denoted by *A.* It is the average deprivation score of the MD poor people that can be mathematically expressed as:

$$Intensity(A) = \frac{\sum_{i=1}^{n} C_i(Poor)}{Poor},$$

$C_i(Poor)$ is the censored deprivation count of poor,

$Poor$ is the total number of poor,

n is the total population

In the above example, since two households (*a* and *b*) are MD poor, so by censoring[96], only their deprivation count is included in the calculation of intensity. Accordingly,

$$A = \frac{[.444*3]_a + [0*4]_b + [.333*5]_c}{[3]_a + [5]_c} = 0.375$$

It shows that the poor population is deprived in 37.5 per cent of the weighted indicators, on average. Finally, the UP-MPI is the product of *H* and *A*, as below;

$$UP - MPI = H * A = 0.667 * 0.375 = 0.25$$

Thus, in this case, the value of UP-MPI is 0.250. It represents the share of the population that is MD poor adjusted by the intensity of the deprivation. This adjustment is required. Since *H* shows the proportion of MD poor (as in the example, 66.7%), and it ignores how deprived are the poor (intensity). Again consider the above example, note this 66.7 percentage value of *H* is adjusted by *A*, equals to 0.375, to get UP-MPI to be 0.250, that is why it is often called Adjusted Headcount Ratio. Instead, it can be interpreted in many ways. According to Alkire and Foster (2011a), it is the "total number of deprivations experienced by the poor". As per Alkire and Santos (2015), on the other hand, it can be interpreted as "the proportion of weighted deprivations that the poor experience in a society out of all the total potential deprivations that the society could experience". Say, if the entire population is deprived in all the indicators, then it's value will be 1 or 100 per cent. If in terms of the above example, 66.7 per cent of the population which is poor, is deprived in all the considered indicators for

96 It is a process of refining the poor out of the overall population, and consider deprivation of only the poor. In the present case, MD poor (household a and c) are those whose deprivation count is equal to or more than poverty cut-off. So, by censoring, non-poor are ignored (Household b is ignored), and deprivation count of only Household a and c is considered to estimate intensity. Alternatively, considering all cases (poor and non-poor), and if the number of deprived in a particular indicator is estimated with respect to the overall population, irrespective of being poor or non-poor, then it is termed as raw headcount ratio for that indicator.

instance, then it's value will be 66.7%. However, the poor in the above example are actually deprived in 37.5 per cent of the weighted indicators on average, so the concern population is deprived in 25 per cent of the total potential deprivations it could experience overall.

Step 6: Decomposition of UP-MPI

Next step is the decomposition of UP-MPI, first by dimensions and indicators, and then by population subgroups. In the former sense, these estimates provide information regarding the contribution of dimensions and indicators in overall MD poverty. In the latter sense, it means a contribution of a subgroup in the overall MD poverty.

Decomposition by Dimensions and Indicators

Literally, decomposition by indicators means the contribution of the indicator in the overall MD poverty. In that sense, it can be obtained as the product of the censored headcount ratio of the indicator (H_x) and the weight of that indicator (w_x) with respect to overall MD poverty. For example, the contribution of years of schooling ($contribution_{schooling}$) is:

$$contribution_{schooling} = \left(\frac{H_{schooling} \times w_{schooling}}{UP - MPI} \right).$$

Here, H_x, the censored headcount ratio of the indicator is simply the proportion of the poor that are deprived in the indicator (x) with respect to the overall population.

In general, the dimensional contribution is the sum of the contribution of each indicator in the dimension. To elaborate, the contribution of any dimension ($Contribution_{Dim}$) can be assessed as the sum of the contribution of the total number of indicators (d) in the dimension with respect to overall MD poverty ($UP - MPI$). Mathematically, it can be expressed as:

$$Contribution_{Dim} = \sum_{x=1}^{d} \frac{1}{d} \left[\frac{(H_x \times w_x)}{UP - MPI} \right]$$

For instance, the contribution of the education dimension can be estimated as below:

$$Contribution_{edu} = \frac{1}{2} \left[\frac{(H_{schooling} \times w_{schooling}) + (H_{attendance} \times w_{attendance})}{UP - MPI} \right]$$

Decomposition by Population Subgroups

Let us say that, with all intent and purpose, MD poverty decomposition seems to be useful for rural and urban areas, which requires the following procedure. Firstly, segregate the population by areas and compute the $UP-MPI_{rural}$ and $UP-MPI_{urban}$. Secondly, count the number of rural population (n_{rural}) and urban population (n_{urban}) and estimate the share of rural population in the total population ($\frac{n_{rural}}{n}$) and share of urban population in the total population ($\frac{n_{urban}}{n}$). Now, verify that, $UP-MPI=\left(\frac{n_{rural}}{n}UP-MPI_{rural}+\frac{n_{urban}}{n}UP-MPI_{urban}\right)$

.

Accordingly, the contribution of rural areas to UP-MPI= $\left(\frac{\frac{n_{rural}}{n}UP-MPI_{rural}}{UP-MPI}\right)\%$

Note that, decomposition of MD poverty by population subgroups can deliver useful statistics for policy guidance, provided it follows two prerequisites. First, there should be an appropriate choice of subgroups to decompose. As in the present study, UP-MPI estimates are decomposed for social groups, religious groups, and across regions of rural and urban U.P, as reviewed literature, and various official data suggest that there exists a noticeable poverty difference across them. Second, to perform decomposition, data must be representative of those groups. As discussed earlier, the present study uses four rounds of NFHS, and even after excluding missing information, Table 4-12 and Table 4-13 reveal that in all the four NFHS, not less than 85 per cent of the original sample is being utilised.

4.6 Summing up

The present study is designed to examine the poverty profile in U.P by dividing the state into three mutually exclusive stratifications, namely, regions (WR, CR, SR and ER), major religions (Hindus, and Muslims), and major social groups (SCs, OBCs and 'Others'). For unidimensional (consumption) measures of poverty, it uses unit level records of four quinquennial rounds of CES of NSSO (38th, 50th, 61st, and 68th), spanning the last three decades' period (1983 to 2011-12). Aggregation of consumption poverty in terms of *HCR*, *PGR* and *SPGR* represents the nearly poor, moderately poor and severely poor, respectively. The consumption poverty profile is supplemented with poverty risk (absolute and relative) to identify the disparity in poverty. Lastly, for consumption poverty, binary logistic regression is

applied to identify the proximate factors underlying the poverty differences in the state during 2004-05 and 20011-12. For MD measures of poverty, it attempts to construct the UP-MPI based on three dimensions—education, health, and SOL, represented by ten indicators such as years of schooling, child school attendance, under-nutrition, child mortality, electricity, safe drinking water sources, improved sanitation, unsafe cooking fuel, housing structure, and assets. The MD poverty profile is supplemented by the decomposition of UP-MPI by dimensions and indicators, and by three mutually exclusive stratifications/population subgroups. District-wise estimates of poverty (consumption and MD) are also mapped for all 70 districts of the state.

CHAPTER 5

Unidimensional Poverty in Uttar Pradesh:
Aggregated and Disaggregated Analysis

5.1 Introduction

This chapter discusses the poverty profile in U.P by assessing the consumption poverty levels in terms of *HCR*, *PGR* and *SPGR*. It also includes an estimation of poverty risk in absolute and relative terms. Estimates are presented for three mutually exclusive stratifications on the basis of regions (WR, CR, SR and ER), religious groups (Hindus and Muslims) and social groups (SCs, OBCs and 'others'), spanning the last three decades (1983 to 2011-12). Poverty estimation is based on the unit level records of the four quinquennial CES of NSSO (38^{th}, 50^{th}, 61^{st} and 68^{th}) classifying the study period into three phases: the first decade (1983 to 1993-94); second decade (1993-94 to 2004-05) and the contemporary period (2004-05 to 2011-12). It also examines critical regions and districts in rural and urban U.P where poverty is severely concentrated.

5.2 Trends in Incidence, Intensity and Severity of Poverty in Uttar Pradesh

Table 5-1 shows the trends in incidence (*HCR*), intensity (*PGR*) and severity (*SPGR*) of poverty in the state during the last three decades. It brings out a noteworthy fact that whichever poverty line (LEG or TEG) is used and at whatever level, poverty in terms of all the three measures (*HCR, PGR, and SPGR*), has declined in both rural and urban areas of the state during the period under study. Nevertheless, the decline in poverty varies across the areas, regions and decadal periods. Comparing poverty reduction across rural and urban areas by LEG poverty line, it is observed that during the first decade, all the three levels of poverty in urban areas have experienced a faster decline compared to their rural counterpart[97]. However, during the second decade, rural areas registered a faster decline in poverty than the

[97] In urban areas, decline in the first decade in *HCR* by 1.56% points p.a., *PGR* by 0.53 % points p.a. and *SPGR* by 0.23% points p.a., whereas in rural counterpart, *HCR* by 0.48% points p.a., *PGR* by 0.22 % points p.a. and *SPGR* by 0.12 % points p.a.

urban areas[98]. Furthermore, the TEG poverty line also reveals that rural areas had experienced a comparatively faster decline in poverty during the second decade as well as in the contemporary period[99]. In this context, World Bank (2010) asserts that although the overall growth of urban areas in the state is higher, due to more pro-poor agricultural growth and comparatively higher growth of real wages in rural areas, rural poverty has reduced at a faster pace[100]. Moreover, the Government of Uttar Pradesh (2014b) reports that employment programme such as Jawahar Rozgar Yojana, in particular, served the poor and socially deprived sections of rural areas.

The population of the state has been interpolated and extrapolated for the years 2004-05 and 2011-15, respectively to estimate the actual number of poor[101]. Although about 1.46 crore people of the state were able to get rid of poverty during 2004-12, about 5.92 crore people still need to be uplifted, as estimated during 2011-12. Nevertheless, around 80 per cent (4.76 crore[102]) of total poor people of the state during 2011-12 reside in the rural areas, and the Government of Uttar Pradesh (2012) considers "economic backwardness, illiteracy and limited mobilization" amongst the primary causes of rural poverty. Moreover, the high dependency of rural households on the agriculture sector along with lack of non-farm diversification also intensifies rural poverty.

Regarding the incidence of poverty, Table 5-1 shows that only in the initial year 1983, poverty in urban areas is higher than that in rural areas, and in the subsequent years, this trend completely reversed as rural areas witnessed higher level of poverty. However, it is surprising that during early 80s, urban poverty in the state was higher than rural poverty[103].

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[98] In rural areas, *HCR* decline by 0.89% points p.a., *PGR* by 0.39 % points p.a. and *SPGR* by 0.17 % points p.a.and in urban areas, *HCR* by 0.54% points p.a., *PGR* by 0.20% p.a. and *SPGR* by 0.09 % points p.a.

[99] In second decade, fall in *HCR* is by 1.09% points p.a., *PGR* by 0.58% points p.a. and *SPGR* by 0.29% points p.a. whereas in the contemporary period , fall in *HCR* is by 1.76% points p.a., *PGR* by 0.50% points p.a. and *SPGR* by 0.17% points p.a.

[100] At the Indian level, rural poverty has been measured extensively (Jha 2000, 2002b, a, Jha and Sharma 2003, Jha 2007).

101 For the year 2004-05, population as on 1st March 2005 has been used (as 17.96 crore) for estimating the number of persons below the poverty line. Interpolated between 2001 and 2011 population census, that is coming out to be 7.38 crore, in total. However, for the year 2011-12, population as on 1st March 2012 has been used for estimating (as 19.99 crore) number of persons below the poverty line (2011 Census population extrapolated), which is around 5.92 crore in aggregation. These figures are aggregates across rural and urban areas of all the four regions.

102 Out of 5.92 crore consumption poor in U.P, around 80 per cent (4.76 crore) of them live in rural areas of the state (which was around 82 per cent during 2004-05).

[103] Urban poverty in many states during 1983 was higher than in rural areas. It is not a specific case for U.P, but developed states, such as Punjab and Karnataka, have reported higher levels of urban poverty. It may be due to

Nevertheless, the percentage point difference in poverty between the rural and urban areas has declined significantly[104]. This implies that rural poverty in the state has declined faster than urban poverty during the period 1993-94 to 2011-12.

TABLE 5-1 TRENDS IN INCIDENCE, INTENSITY, AND SEVERITY OF POVERTY IN UTTAR PRADESH

Years	Headcount Ratio (*HCR*)		Poverty Gap Ratio (*PGR*)		Square Poverty Gap Ratio (*SPGR*)	
	Rural	*Urban*	*Rural*	*Urban*	*Rural*	*Urban*
1983*	48.11	52.44	12.9	14.87	4.85	5.8
1993-94*	43.1	36.07	10.64	9.28	3.64	3.37
1993-94**	54.73	43.28	15.57	11.7	5.92	4.47
2004-05*	33.31	30.13	6.33	7.05	1.81	2.33
2004-05**	42.71	34.06	9.16	7.8	2.77	2.53
2011-12**	30.39	26.17	5.68	5.29	1.61	1.51
Periods	***Decline in Poverty (% points per annum)***					
1983* to 1993-94*	-0.48	-1.56	-0.22	-0.53	-0.12	-0.23
1993-94* to 2004-05*	-0.89	-0.54	-0.39	-0.2	-0.17	-0.09
1993-94** to 2004-05**	-1.09	-0.84	-0.58	-0.35	-0.29	-0.18
2004-05** to 2011-12**	-1.76	-1.13	-0.5	-0.36	-0.17	-0.15

*Note: * Based on LEG, **Based on TEG*
Source: Calculation from various CES rounds of NSSO, Government of India.

Rural-urban poverty changes can be analysed in terms of the ratio of rural *HCR* to urban *HCR* (light blue in Fig. 5-1), rural *PGR* to urban *PGR* (in orange) and rural *SPGR* to urban *SPGR* (in grey).The Figure depicts that in the earlier years, the gap between rural-urban poverty is relatively very high (more as per TEG), particularly in the year 1993-94, but in recent years, there is a drastic reduction in the gap in poverty (reached even at comparable levels in case of *PGR* and *SPGR*).

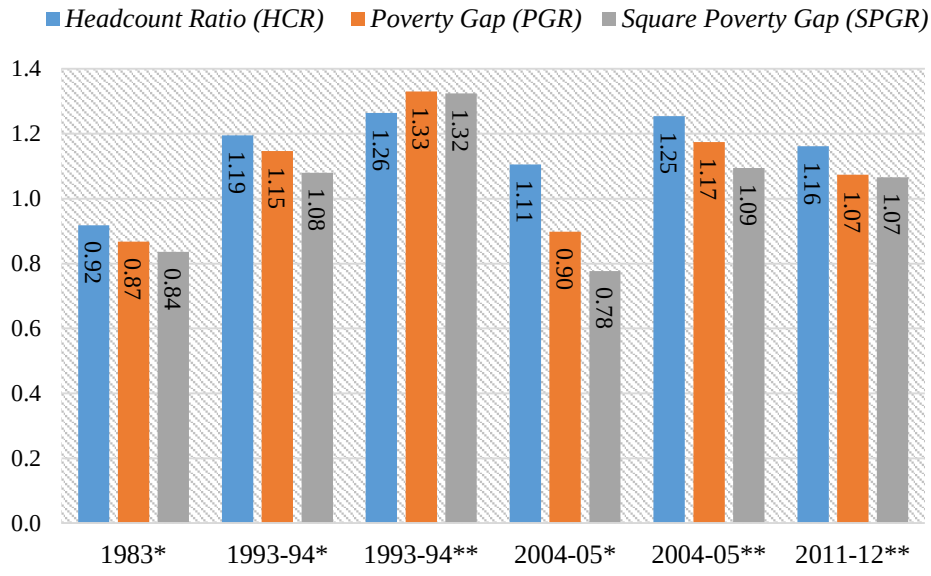
It will be quite appealing and essential if this aggregated information is analysed for various heterogeneous subgroups. It identifies the reasons associated with such a decline in poverty and may further provide targets across subgroups for policy interventions. The

considerable level of consumption inequality existed within urban areas of these states (refer to (Dev and Ravi 2007)). Actually, LEG estimated food and non-food weighted diagrams to update the poverty line, which was based on the consumption pattern of the people around the poverty line at the national level for 1973-74. It is the 40 to 60 per cent fractile group of the population. Therefore, relatively high consumption inequality within the urban areas in general, increases the proportion of people below this fractile group, and hence the poverty line.

[104] From 7.03% points in 1993-94 to 3.18% points in 2004-05 as per LEG poverty line, from 11.45% points in 1993-94 to 8.65% points in 2004-05, and to 4.22% points in 2011-12 as per TEG poverty line.

following subsections will discuss the levels of poverty across regions, districts, social and religious groups individually in succession.

FIG. 5-1 RURAL TO URBAN POVERTY RATIO IN UTTAR PRADESH, 1983 TO 2011-12



Note: * Based on LEG, **Based on TEG
Source: Calculation from various CES rounds of NSSO, Government of India.

5.3 Inter-Regional Comparison of Poverty in Uttar Pradesh

The regional estimates of poverty have been evaluated by dividing the state into four economically classified regions as illustrated in Fig. 4-1. These regions differ geographically as well as economically. The WR, CR, and ER come under the areas of Gangetic Plains, while the SR is a semi-arid region that forms a part of the southern plateau (UNDP 2011). Some natural factors also foreground the regional rigidities in the state. The Government of Uttar Pradesh (2014a) highlights that due to the scarcity of some essential natural resources and exposure to natural calamities (both are beyond human control), SR and ER are chronically backward.

On economic grounds, historically WR is a highly developed region, especially in respect of agricultural practices as it has better availability of physical infrastructure and irrigation facilities. It was for these reasons that WR was the first region in the state to adopt the green revolution. Later on, ER also joined the green revolution but its outcomes, particularly in respect of rice production, are lower than that of WR (Bajpai and Volavka 2005). Moreover, recent regional statistics reveal that WR is highly productive in the

agriculture and industrial sector[105], whereas the CR has experienced an industrial decline in recent years (Government of Uttar Pradesh and UNDP 2008). The WR and ER possessed the highest and the lowest[106] per capita Net Domestic Product (NDP) at current as well as at constant prices, respectively, whereas the SR had higher per capita NDP than both ER and CR (mainly due to its lower population density). Also, the WR (54.34%) and the ER (26.28%) have the highest and lowest credit-deposit ratio, respectively (Government of Uttar Pradesh 2014a). As per the 2011 Census, the ER is the most populated region of the state (39.95%), followed by the WR (37.20%), CR (18.01%) and SR (18.01%). However, on the urbanisation front, these four regions differ significantly. WR holds the highest urban population (31.36%), followed by CR (26%), SR (23%), and ER (12.21%) the lowest. Moreover, the larger share of the urban population in WR is concentrated in the mid-sized cities; while nearly 65 per cent of the urban population in CR is constituted by two metro-districts (Kanpur & Lucknow); and the majority of the urban population in SR and ER is located in small and medium-sized towns (World Bank 2010). Recently published composite index of development[107] by the Government of Uttar Pradesh (2014a) shows that out of 26 districts in WR, 23 districts lie in the medium range from the top, whereas in ER, just two out of 27 districts lie to that level. Comparing two relatively smaller regions, the majority of SR's and CR's districts rank in the middle and low range of development index respectively. Thus, the larger, as well as the smaller regions of the state, possess wider variation in respect of developmental indicators.

Studies considering the inter-regional disparity of poverty in U.P fundamentally argue that the process of poverty alleviation can be ameliorated if the Eastern half could be made more like the Western half (World Bank 2010, Kohli 1987), as discussed in Section 2.2. The regional pattern of poverty in rural and urban areas of U.P during the last three decades is presented in Table 5-3. The table shows that both rural and urban poverty (*HCR*) remained the lowest in the WR (excluding urban poverty in 1983 and 2004-05). However, the highest rate of decline in rural poverty (*HCR*) has been observed in the ER during the first decade (0.52% points p.a.) and the contemporary period (1.73 % points p.a.). Nevertheless, the

105 The WR and SR have the highest and lowest gross value of agricultural output per hectare of gross cropped area at current price (2009-10), total number of registered factories per lakh of population (2008-09), and number of persons engaged in registered factories per lakh of population (2008-09), respectively.
106 Despite having fertile plains, this is due to very high population density, low occupational diversification, and high land atomization (Institute of Applied Manpower Research 2011).
107 That classify districts into five levels of developments, namely; very high, high, medium, low and very low.

region still needs to continue this progress as the levels of poverty are not appropriately low (*HCR* at 35%, *PGR* at 7% and *SPGR* at 2% in 2011-12). Moreover, households of urban ER are not able to reap much reward for poverty reduction over the period, in fact, heading the poverty levels in 2011-12 (*HCR* at 33%, *PGR* at 8% and *SPGR* at 2%). In this reference, one of the recent studies by the World Bank (2010) suggests that the majority of the ER's population live in rural areas and among those who stay in urban areas, a large number of them live in small towns. Therefore, these small towns can serve as market towns for such a large rural population. However, sound marketing infrastructure and enabling institutional framework are essential for their development.

The SR is contributing positively in reducing the inter-regional disparity in poverty in the state due to its exceptionally high poverty reduction (in terms of *HCR*) during the second decade (rural:2.59% points p.a. and urban:2.85% points per annum) as well as in the contemporary period (rural:1.45% points p.a. and urban:2.13% points per annum) which is somewhat surprising, given that, historically, it has been the most impoverished region. In fact, during the first decade, the SR (both rural and urban) had possessed the highest proportion below the poverty line (represented by *HCR*). Apart, the *PGR* and *SPGR* estimates show that they were relatively far off from the poverty line, and the condition of the poorest households amongst them deteriorated, particularly in urban SR. However, in the second decade, households in both rural and urban SR experienced the highest poverty reduction at all levels (*HCR, PGR, and SPGR*). Furthermore, in the contemporary period, such a high poverty reduction continues amongst them. Also, consider the absolute poverty risk (in terms of *HCR*) across the regions[108], then households of SR, on an average, possess the highest chances of being poor (43% in 1983 and 56% in 1993-94 in rural; 81% in 1983 and 122% in 1993-94 in urban) during the first decade. However, with their drastic improvement afterwards, households of rural SR neutralised their absolute poverty risk[109] whereas their urban counterpart is just three per cent more likely to remain in poverty. Thus, it can be inferred that SR, which had historically been the most backward region of the state, has started experiencing upward economic mobility over the last three decades. Pathak (2010) also finds that rural as well as urban areas of SR have witnessed the highest poverty reduction

[108] For method to calculate absolute and relative poverty risk, refer Section 4.5.1.2.

109 Since their contribution to overall poverty (4.8%) is at par with households share (4.8%).

during 1993-94 and 2004-05, and ascribed factors such as government programmes like Swajaldhara, migration, and remittances for reducing poverty, particularly in rural areas.

The fundamental argument on inter-regional disparity by Kohli (1987) and the World Bank (2010) is reasonable. It is because households of WR (specifically of rural areas) are comparatively better off as they possess the lowest poverty levels and progress in poverty reduction during the entire study period. Households of urban WR are also capable of experiencing the lowest poverty levels certainly by 2011-12 (*HCR* at 21%, *PGR* at 4% and *SPGR* at 1%). Nevertheless, this fundamental argument can be precisely confirmed by considering the relative poverty risk (in terms of *HCR*) between these two regions (WR and ER). It reveals that households of rural ER are 59 per cent more likely to be poor than households of rural WR in 1983 and notably, such likelihoods increase further over time (67% in 1993-94, 72% in 2004-05 and 80% in 2011-12*[110]). Moreover, households of urban ER, which were just 6 per cent more likely to be poor compared to households of WR in 1983, have witnessed a drastic increase to 34 per cent in 2004-05 and 56 per cent until 2011-12*. It signifies the high disparity of poverty across the WR and ER of the state. Relatively speaking, the regional disparity of poverty needs to be addressed, as poor countries with poor regions may find ethnic or racial tensions exacerbated by income disparities leading to interregional tensions that make both regions and the country as a whole riskier to invest in (Perry et al. (2006). To further reduce the inter-regional disparity in U.P, such a high poverty reduction in rural ER and overall SR is to be sustained along with similar progress in the impoverished counterparts of ER. In a suggestive scheme for rural ER, the World Bank (2010) highlights that since the majority of the ER's population lives in rural areas and among those who stay in urban areas, the majority of them live in small towns; so these small towns can serve as market towns. However, marketing infrastructure and supportive institutional framework are essential for their development.

Notably, Table 5-3 brings out a new worrisome fact specific to the contemporary period. A significant poverty reduction in the rural areas of ER and urban areas of SR, alongside a sudden increase in poverty in the CR, left behind the CR, as the most and the second most (after ER) impoverished region in rural and urban areas of U.P, respectively. In addition, the distribution of BPL population across the region (as presented in Table 5-2) also

110 * represents not comparable figures as they are based on the TEG poverty line. The non-comparable figures will be highlighted by * marking hereafter.

confirms that both rural and urban areas of CR simultaneously witness a substantial increase in poverty (about 15% to 24% in both rural and urban) during the contemporary period[111]. Such surprise increment in poverty is proximately attributed to OBC households of rural CR and SC households of urban CR that raises a question on the effectiveness of affirmative action and policies being practised in the state (Arora and Singh 2015). World Bank (2010) also warns that since metropolitan cities of the CR continue to attract a high proportion of migrants from all over the state, soon urban management will become an issue for the region. If this warning stands true for a longer period, the government of the state should leave no stone unturned to reduce poverty in the region.

TABLE 5-2 REGION-WISE HEADCOUNT RATIO AND NO. OF POOR IN U.P, 2004-05, AND 2011-12

Regions/ U.P	**Years**	**Rural**			**Urban**		
		HCR	*BPL Population*		*HCR*	*BPL Population*	
			No. (in Crore)	*Share*		*No. (in Crore)*	*Share*
Western Region	2004-05	33.6	1.57	25.8%	33.9	0.67	50.7%
	2011-12	19.2	0.98	20.6%	21.2	0.49	42.8%
Central Region	2004-05	37.5	0.91	15.0%	23.9	0.20	15.0%
	2011-12	42.2	1.13	23.7%	30.2	0.28	24.2%
Southern Region	2004-05	44.7	0.30	5.0%	48.2	0.10	7.3%
	2011-12	30.2	0.23	4.8%	26.9	0.06	5.1%
Eastern Region	2004-05	51.9	3.29	54.2%	41.3	0.35	27.0%
	2011-12	34.6	2.43	51.0%	33.2	0.32	27.9%
Uttar Pradesh	2004-05	42.7	6.07	100.0%	34.1	1.31	100.0%
	2011-12	30.4	4.76	100.0%	26.2	1.16	100.0%

Notes: 1. For the year 2004-05, population as on 1st March 2005 has been used for estimating number of persons below the poverty line. (Interpolated between 2001 and 2011 population census).

2. For the year 2011-12, population as on 1st March 2012 has been used for estimating number of persons below the poverty line. (2011 Census population extrapolated).

111 Moreover, distribution of BPL population also shows that ER holds the highest share in rural areas (54% in 2004-05 and 51% in 2011-12), and WR in urban areas (51% in 2004-05 and 43% in 2011-12).

TABLE 5-3 REGION-WISE POVERTY AND ITS DECOMPOSITION IN UTTAR PRADESH, 1983 TO 2011-12

Subgroups	Headcount Ratio					Poverty Gap Ratio					Square Poverty Gap Ratio				
	1983*	1993/94*	2004/05*	2004/05**	2011/12**	1983*	1993/94*	2004/05*	2004/05**	2011/12**	1983*	1993/94*	2004/05*	2004/05**	2011/12**
Rural															
Western	34.1	29.3	24.1	33.6	19.2	8.3	6.1	3.9	5.9	2.8	3.0	1.8	1.0	1.5	0.6
	(25.0)	*(24.0)*	*(24.8)*	*(26.9)*	*(21.8)*	*(22.7)*	*(20.2)*	*(21.1)*	*(22.2)*	*(17.1)*	*(21.6)*	*(17.9)*	*(18.4)*	*(19.1)*	*(13.3)*
Central	54.9	50.2	30.1	37.5	42.2	16.2	13.8	5.6	8.5	8.6	6.6	5.0	1.6	2.6	2.6
	(21.1)	*(21.0)*	*(16.1)*	*(15.6)*	*(24.9)*	*(23.2)*	*(23.4)*	*(15.9)*	*(16.6)*	*(27.4)*	*(25.1)*	*(24.8)*	*(15.3)*	*(16.8)*	*(28.8)*
Southern	68.9	67.4	38.9	44.7	30.2	21.7	20.2	7.3	10.6	6.7	8.8	8.1	2.0	3.3	2.1
	(8.0)	*(8.0)*	*(5.7)*	*(5.1)*	*(4.8)*	*(9.4)*	*(9.7)*	*(5.7)*	*(5.7)*	*(5.7)*	*(10.2)*	*(11.4)*	*(5.5)*	*(5.9)*	*(6.4)*
Eastern	54.3	48.8	41.4	51.9	34.6	14.1	12.0	8.4	11.8	6.6	5.1	4.0	2.6	3.8	2.0
	(45.9)	*(47.0)*	*(53.4)*	*(52.3)*	*(48.4)*	*(44.6)*	*(46.7)*	*(57.3)*	*(55.5)*	*(49.8)*	*(43.2)*	*(45.9)*	*(60.9)*	*(58.3)*	*(51.5)*
Urban															
Western	53.4	31.1	28.0	33.9	21.2	15.1	7.7	6.3	7.2	4.0	6.0	3.7	1.9	2.2	1.1
	(48.5)	*(42.7)*	*(47.3)*	*(50.6)*	*(40.9)*	*(48.5)*	*(41.2)*	*(45.2)*	*(47.3)*	*(38.4)*	*(49.1)*	*(41.2)*	*(42.2)*	*(43.7)*	*(35.8)*
Central	43.1	33.9	24.6	23.9	30.2	12.5	9.5	6.2	6.1	5.7	5.1	4.7	2.2	2.3	1.5
	(20.0)	*(18.9)*	*(18.0)*	*(15.5)*	*(25.3)*	*(20.5)*	*(20.7)*	*(19.3)*	*(17.3)*	*(23.4)*	*(21.4)*	*(21.1)*	*(21.2)*	*(20.2)*	*(22.3)*
Southern	70.2	74.4	43.0	48.2	26.9	22.6	21.1	12.0	12.7	5.6	9.3	10.5	4.8	4.7	1.7
	(6.5)	*(12.2)*	*(7.9)*	*(7.9)*	*(5.4)*	*(7.4)*	*(13.4)*	*(9.5)*	*(9.1)*	*(5.5)*	*(7.8)*	*(13.9)*	*(11.5)*	*(10.4)*	*(5.8)*
Eastern	56.5	38.6	37.5	41.3	33.2	15.1	9.4	8.6	9.6	7.7	5.4	4.3	2.7	3.0	2.4
	(25.0)	*(26.2)*	*(26.7)*	*(26.0)*	*(28.5)*	*(23.6)*	*(24.7)*	*(26.0)*	*(26.3)*	*(32.8)*	*(21.8)*	*(23.7)*	*(25.1)*	*(25.7)*	*(36.1)*

*Notes: 1. * LEG, ** TEG*

2. Figures in parentheses represent a contribution to overall poverty.

Source: Calculation from NSSO's unit level data

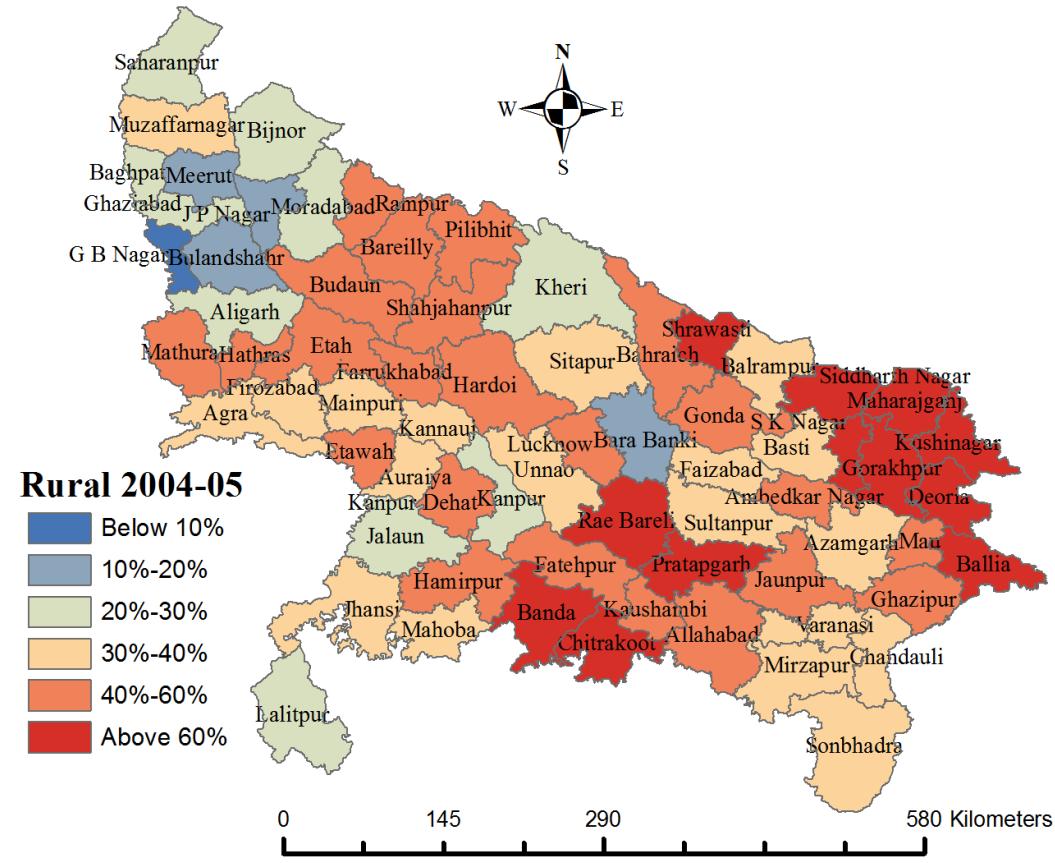
5.3 Intra-Regional Comparison of Poverty in Uttar Pradesh

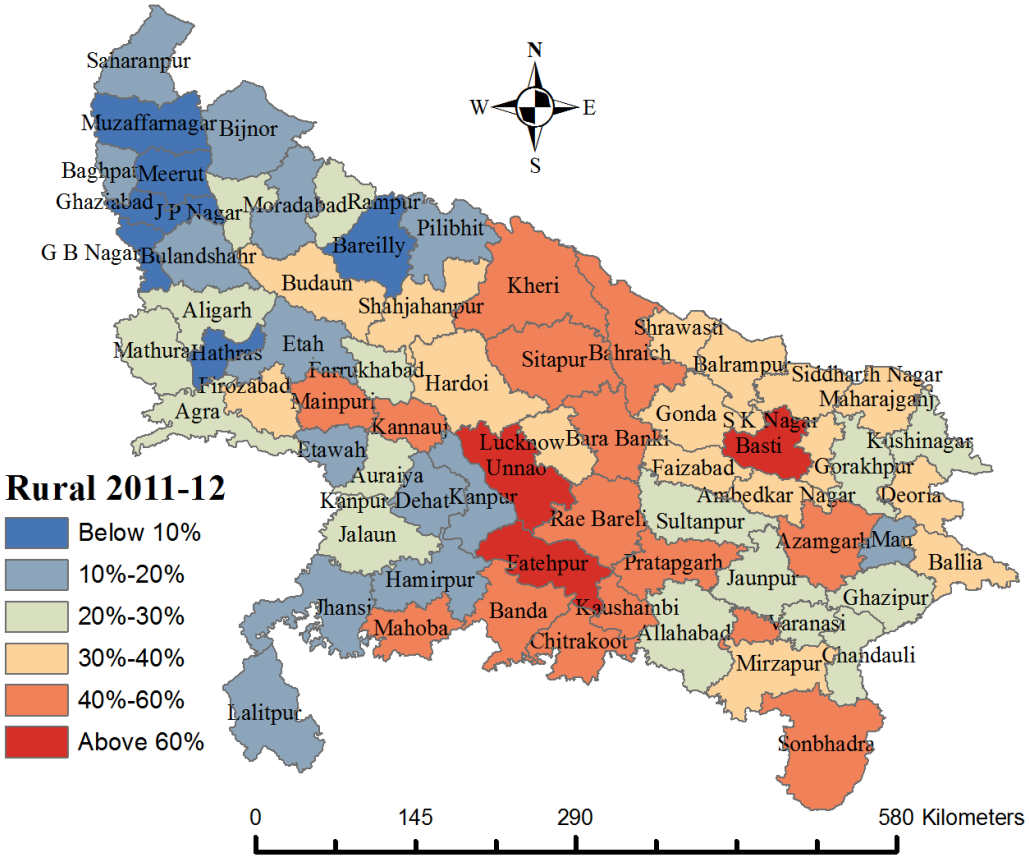
The current study estimates poverty across 70 districts of the state (see Fig. 4-1) starting from the 61st (2004-05) NSSO round and compare it with the poverty estimates provided by the latest 68th (2011-12) round. The district-level poverty has been mapped for both rural and urban areas separately (see Table A-0-1, Fig. 5-2, Fig. 5-3, Fig. 5-4, Fig. 5-5). Before that, a brief overview of performance by districts shall not be out of place. As per U.P State Development Report (Government of India 2007e), districts in the WR, specifically those located near the National Capital Region (NCR) are comparatively more productive, whereas districts clustered in the North-central areas of U.P are the worst performers in terms of poverty reduction (World Bank 2010). Moreover, the annual plan of the Government of Uttar Pradesh (2013) has reported 15 districts with the lowest composite index of development[112], out of which 13 are in the ER (Mau, Jaunpur, Ballia, Bahraich, Ghazipur, Deoria, Maharajganj, Shrawasti, Azamgarh, Balarampur, Mirzapur, Kushi Nagar, S K Nagar), one is in the CR (Hardoi) and one in the SR (Lalitpur).

The regional profile of poverty reveals that rural poverty is highly perpetuating in the contemporary period (2004-05 to 2011-12). However, district-wise poverty estimates depict that urban areas of U.P have a large number of critically high *HCR* districts (*HCR* greater than 60%) as compared to their rural counterparts in both the survey periods (61st and 68th NSS rounds). On average, a significant number of critically high *HCR* districts are concentrated only in two regions, (ER, followed by the CR) during 2011-12. A total number of 12 such districts (three in rural and nine in urban areas) have been identified. Out of these, five districts are located in the CR (Unnao and Fatehpur in rural, and Kheri, Hardoi and Barabanki in urban areas), five in the ER (Basti in rural, and Kaushambi, Ambedkar Nagar, S R Nagar (Bhadohi) and Mirzapur in urban areas), and rest of the two districts are in the urban areas of WR (Rampur) and one in the SR (Chitrakoot). While analysing both survey periods, it is found that except Kaushambi and Ambedkar Nagar, all the 12 districts witnessed a sudden rise in poverty during 2005-12 (Fig. 5-4 and Fig. 5-5). It has been found that 65% of the high *HCR* districts (*HCR* 40%-60%) are situated in the CR and ER. This foregrounds the grim poverty scenario prevailing across the CR and ER of U.P.

112On the basis of 36 development indicators related to agriculture and allied activities, industrial infrastructure, economic infrastructure and social infrastructure.

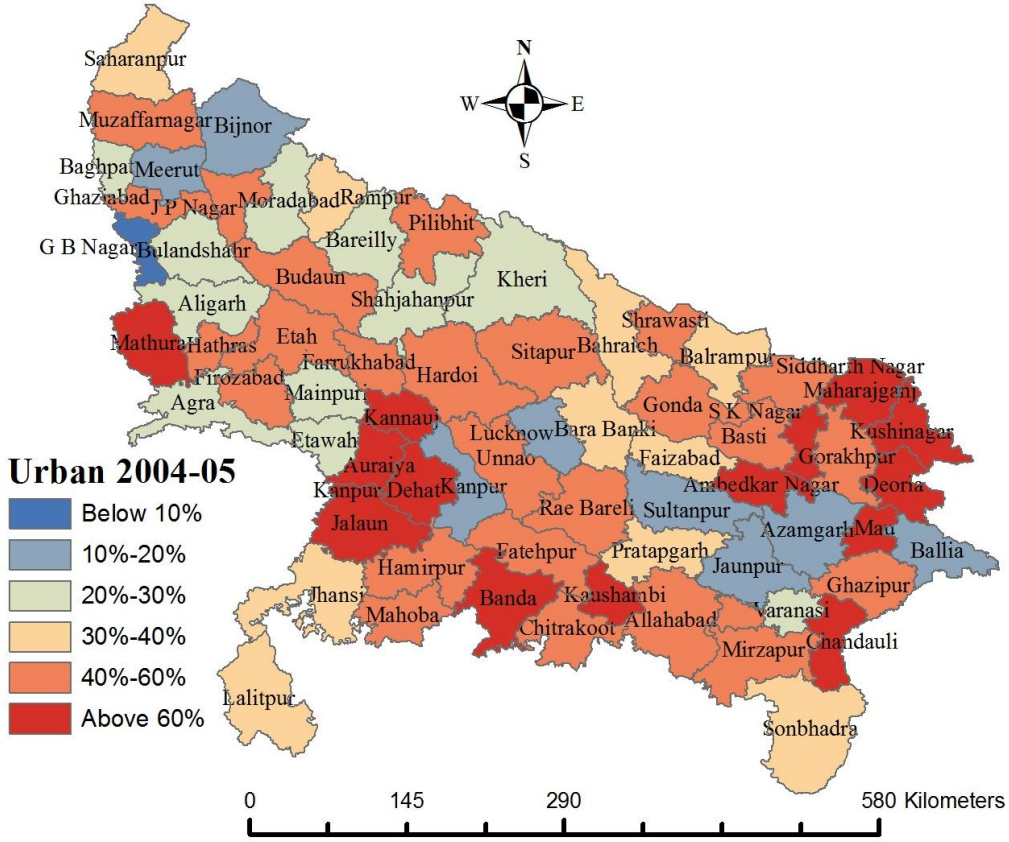
FIG. 5-2 DISTRICT-WISE POVERTY MAPPING OF UTTAR PRADESH (RURAL)

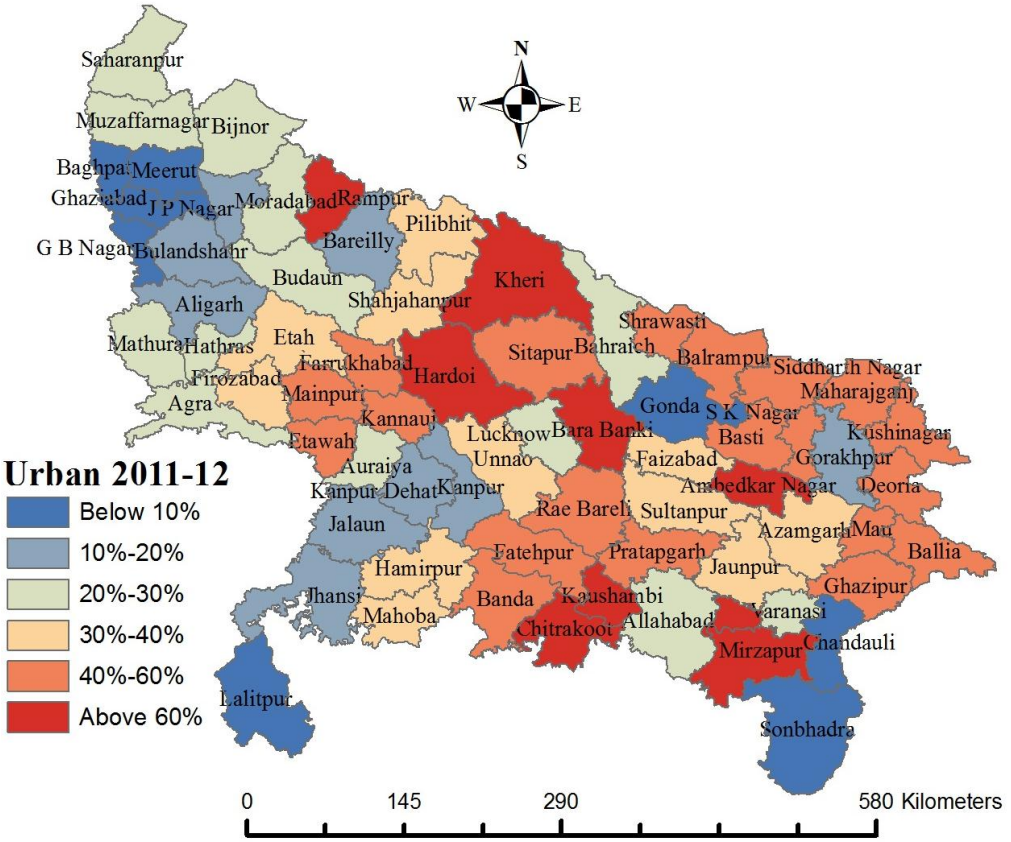




Note: Figures are HCR

FIG. 5-3 DISTRICT-WISE POVERTY MAPPING OF UTTAR PRADESH (URBAN)





Note: Figures are HCR

FIG. 5-4 COMPARISON OF RURAL POVERTY (*HCR*)—BY DISTRICTS, 2004-05 AND 2011-12

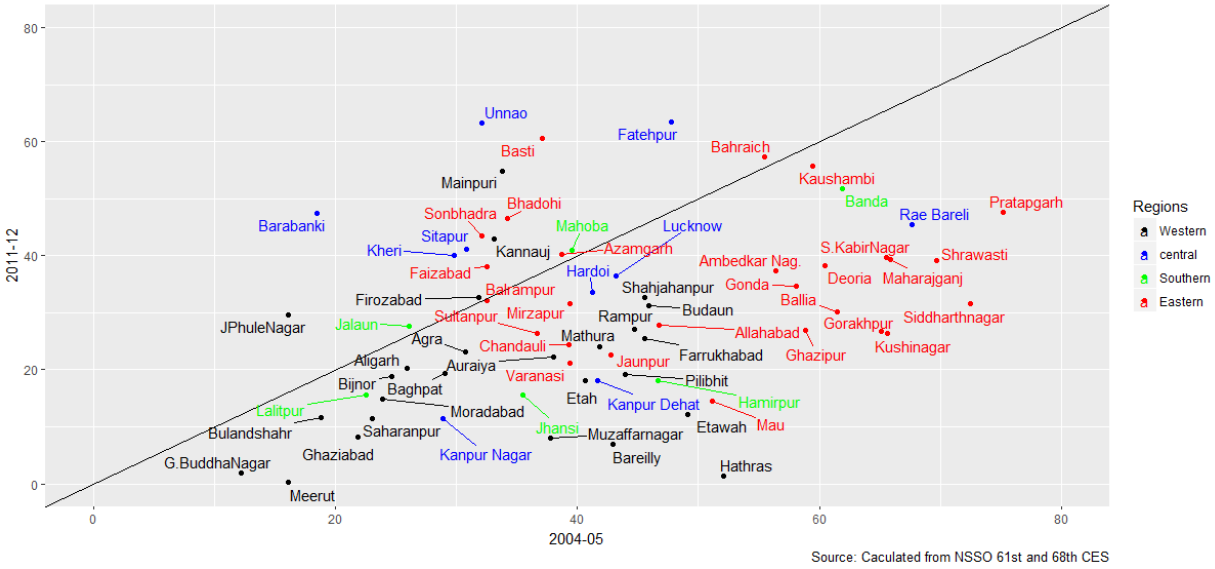
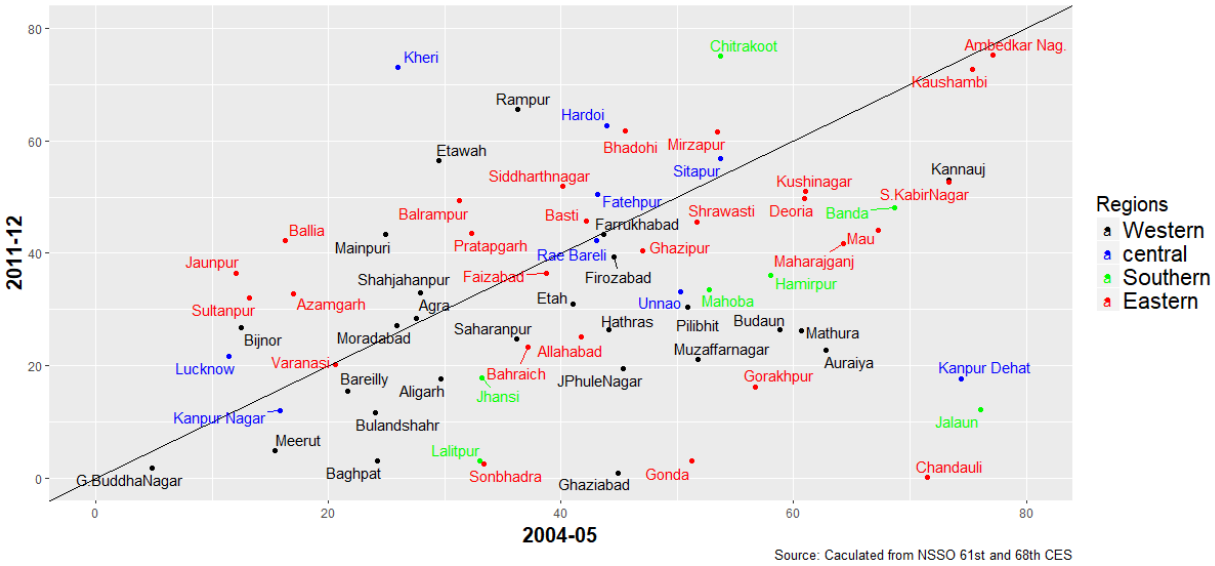


FIG. 5-5 COMPARISON OF URBAN POVERTY (*HCR*) —BY DISTRICTS, 2004-05 AND 2011-12



5.4 Poverty across Social and Religious Groups

This section examines the poverty profile among SRGs of U.P. Before that, some existing social notions should be reiterated. Earlier studies (see Section 2.3) claim that the majority of 'others' social group (formally, upper castes) households are better equipped with resources and have higher living standards compared to other social groups. However, some studies reveal that socially excluded groups (SCs, OBCs, and Muslims) are also performing better and, therefore, there is a reduction in overall poverty in the state. In this respect, Jeffery, et al. rightly states:

> *"There are elites among Muslims and Dalits in U.P countryside and a substantial stratum of wealthy Muslims in many U.P towns and cities. But rural households among Muslims, Dalits and Most Backwards Class (Poorer castes within the OBC Category) typically possess little or no agricultural land and work in exploitative, poorly paid, and insecure conditions"* (Jeffrey, Jeffery, and Jeffery 2008, pp. 1368).

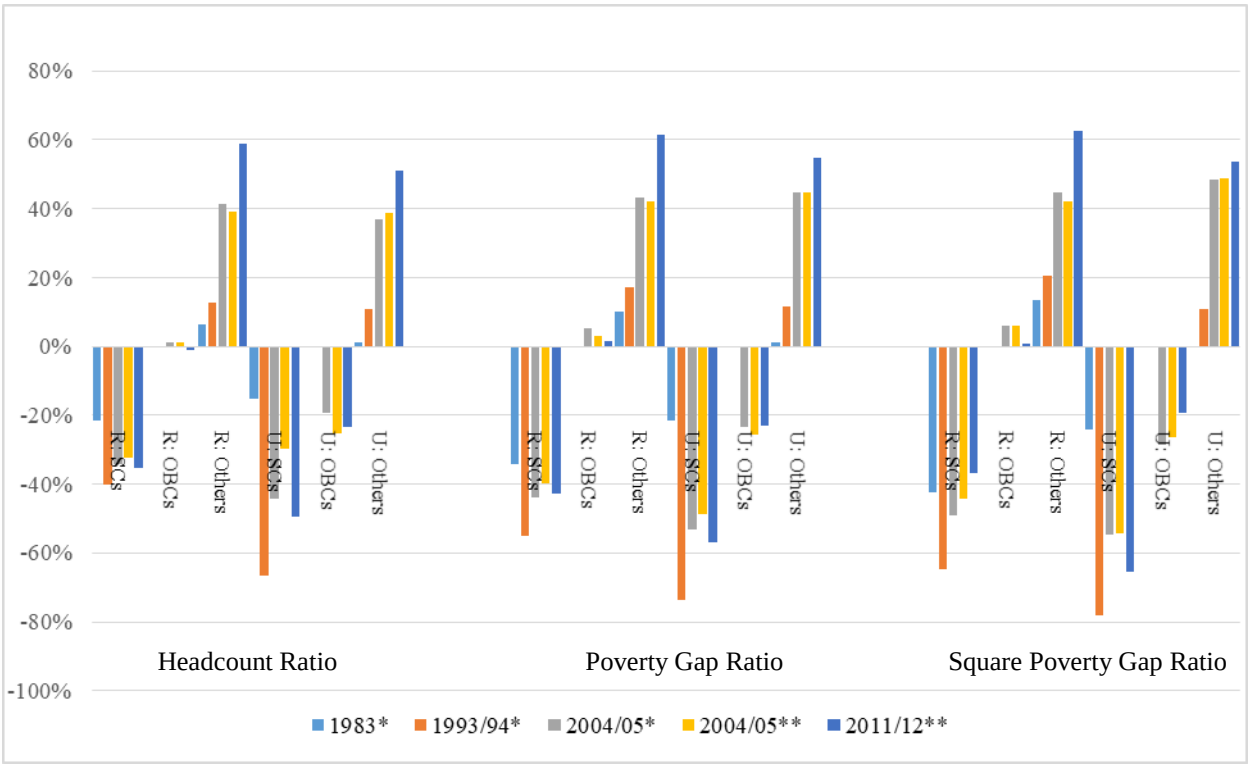
Table 5-4 shows the poverty trends across the major social groups in U.P. It brings out two issues of concern. First, SC households have the highest levels of poverty (*HCR, PGR,* and *SPGR*) among all the social groups in both rural and urban areas during the last three decades, which also signals the historical roots of poverty among them. Secondly, the bifurcation of OBCs from 'others' in the 61st round (2004-05) clarifies that households belonging to OBCs have the second highest levels of poverty whereas 'others' are the least poor amongst all in both rural and urban areas. Nevertheless, the rate of poverty reduction among SCs particularly in the second decade and the contemporary period reveals commendable progress in both rural and urban areas. Ojha (2007) also finds that the level of poverty has significantly reduced among SCs during 1999-2005, mainly due to migration towards cities, occupation diversification towards non-farm activities, casual work, and government jobs.

Besides poverty levels, estimates of absolute poverty risk among social groups bring out more facts relevant for policy concern[113] (refer to Fig. 5-6 and Appendix Table A-0-2). In rural areas, the likelihood of being poor among SCs in terms of *HCR* and *PGR* is declining significantly but only during the second decade (*HCR*: from 40% to 34%; and *PGR*: from 55% to 43%), whereas it has increased drastically during the first decade (*HCR*: from 22% to 40%; and *PGR*: from 34% to 55%) and marginally during the contemporary period (*HCR*: from 32% to 35%; and *PGR*: from 40% to 42%). However, in the case of the poorest SC households (accounted in terms of *SPGR*), the likelihood of being poor has declined consistently during the second decade (from 64% to 51%) and in the contemporary period (from 45% to 37%). On the other hand, in urban areas, the likelihood among them declines at all poverty levels during the second decade but increases sharply in the contemporary period. Thus, it is appropriate to argue that the disproportionate burden of poverty-population share on SC households has lessened significantly during the second decade, but why it could not

[113] For method to calculate absolute and relative poverty risk, refer Section 4.5.1.2.

be sustained in the contemporary period is a question that needs answering. Moreover, the assessment of relative poverty risk (in terms of *HCR*) reveals that in comparison to 'others', SC households are most likely to be poor in both rural (118%) and urban areas (112%), followed by OBCs (62% in rural and 105% in urban) in 2004-5 and such likelihood increases further among both the subgroups in 2011-12 (for SCs, 230% in rural and 206% in urban; for OBCs, 146% in rural and 153% in urban), which clearly reflects the rising disparity in poverty across social groups during 2004-05 and 2011-12. Thus, for promoting harmony, social equality and overall progress in the state, the above findings suggest target specific policy interventions, specifically for the SCs households.

FIG. 5-6 ABSOLUTE POVERTY RISK —BY SOCIAL GROUPS (1983 TO 2011-12)



Notes: 1. * *Based on LEG, **Based on TEG*
2. 'R' and 'U' denotes rural and urban, respectively.
Source: Calculation from various CES rounds of NSSO, Government of India.

Poverty trends across the two major religious groups of U.P (Table 5-5) reveal that Muslim households are relatively poor at all the poverty levels in both rural (except in the case of *HCR* and *SPGR* in 1993-94) and urban areas during the entire study period. As far as the decline in poverty is concerned, Muslim households have witnessed high poverty reduction particularly during the first decade and in the contemporary period. However, in the first decade, the rate of poverty decline among urban Muslim households outperforms their rural counterparts (in terms of *HCR*, *PGR*, and *SPGR*), whereas in the contemporary period,

at least in case of *HCR*, the rural ones are overcoming poverty faster than urban ones[114]. Considering the absolute poverty risk (in terms of *HCR*), it has been found that Muslim households in urban areas, in particular, are more likely to be poor (by 26% in 1983, 29% in 1993-94, 34% in 2004-05 and 39% in 2011-12*) which also indicates the increasing disproportion between their poverty contribution and household' share over time (refer to Fig. 5-7 and Appendix Table A-0-3). On the other hand, estimates of relative poverty risk show that in comparison to Hindus, Muslims are more likely to be poor since 1983 (by 11% in rural and 45% in urban areas), and such likelihood proportions have increased drastically particularly amongst Muslim households of urban areas (70% in 2011-12).

The contemporary changes in poverty (in terms of *HCR*) among SRGs brings out a noteworthy fact that inter-group difference in poverty have narrowed down due to high (or, at least equal) poverty reduction per annum amongst the most excluded SRGs (SCs, OBCs, and Muslims) vis-a-vis the historically privileged subgroups such as 'others' social groups and Hindus[115]. In fact, the performance of SC (rural), OBC (urban) and Muslim (rural and urban) households is appreciable, as it has enhanced the pace of poverty reduction in the state. Although there has been a significant decline in the level of poverty among SCs and Muslims, the incidence of poverty among these groups is still high. This may be because the majority of Muslims and SCs in the state have remained impoverished over a long period, which in turn perpetuates chronic poverty among them (Kozel and Parker 2003, Ojha 2007). Likewise, the World Bank (2010) points out that although SCs in U.P experienced upward mobility similar to 'others' social group, their starting point was lower than 'others' social groups.

Undoubtedly, the factors responsible for the impoverishment and discrimination of SCs are deeply embedded in history. According to Pai (2002, 2004), the social and political powerlessness of Dalits (basically, SCs) in U.P remains the root cause of their poverty and deprivation and further leads to economic inequalities in the form of skewed distribution of land

114 For urban Muslim households in the first decade, *HCR* declines by 1.89% points p.a., *PGR* by .84 % points p.a, and *SPGR* by .42% points p.a., that outperform their rural counterpart (*HCR* by .90% points p.a., *PGR* by .39 % points p.a, and *SPGR* by .20% points p.a.). In the contemporary period, for rural Muslims, *HCR* declines by 1.84% points p.a., *PGR* by .62 % points p.a, and *SPGR* by .23% points p.a., and in urban areas, *HCR* at 1.73% points p.a., *PGR* at .64 % points p.a, and *SPGR* at .29% points p.a..

115 Poverty reduction in 2005-12 among SCs—2.21% points in rural and 0.73% points in urban; OBCs—1.64% points in rural and 1.49% points in urban; and Muslims—1.84% points in rural and 1.73% points in urban, whereas among 'others' social group, it is 1.93% points in rural and 1.15% points in urban and Hindus by 1.73% points in rural and 0.89% points in urban areas.

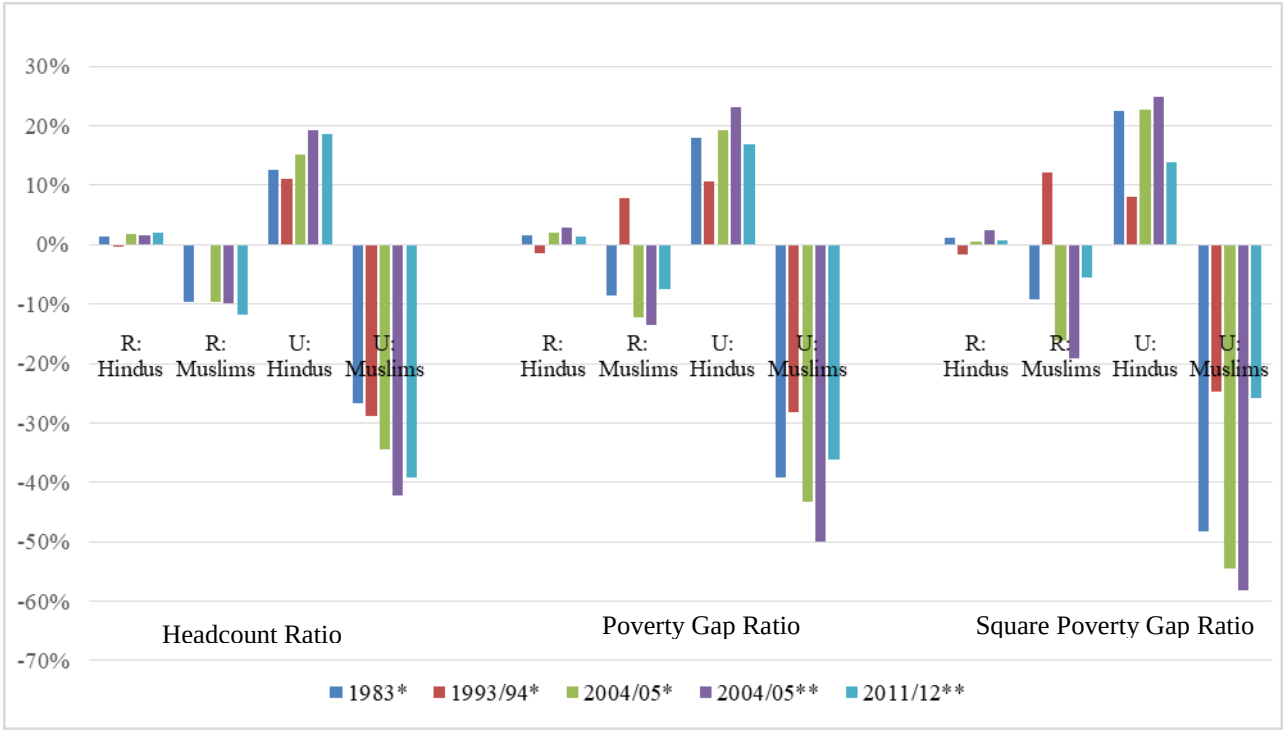
and income. Certain economic factors have also been responsible for the high incidence of poverty among them. A decline in casual wages, particularly in the urban areas of ER (World Bank 2010), possession of lesser and poor quality of land and human capital (Kozel and Parker 2003), and illiteracy among women (Mehrotra 2006b) have been primarily responsible for making SC households more vulnerable as compared to other castes in U.P. Some other factors like "improvident habits, thriftlessness, and mismanagement" have also been responsible for their impoverishment (Government of Uttar Pradesh 2013, 247). It is, therefore, suggested that such a state of affairs can be made better if they practice self-control, saving, soberness, and self-sufficiency. These ethical practices would make them capable of utilising various development schemes appropriately, resulting in their upward mobility. A World Bank (2010) study has highlighted some specific factors such as "increasing political mobilization, growth in agricultural wages, increase in labour force participation towards self-employment[116], regular salary work, improvements in the education level and empowerment" have led to some improvement in the conditions of SCs. Further, "diversification within households, strategy of male migration[117] and casual wage employment towards non-farm sector" (Ojha 2007) among SCs and international remittances[118] received by Muslims from the West Asia (World Bank 2010) have enhanced the livelihood of these two subgroups in U.P.

116SCs/STs in U.P started indulging in self-employment and left casual agriculture faster than others. They also took advantage of increased demand in the construction industry.

117 The SCs/STs in rural U.P adopt an income-enhancing strategy whereby women stayed behind to farm small and marginal holdings, while men migrate in search of better paid non-agricultural employment.

118 Migration specifically towards Middle-East provides sufficient remittances to Muslims in U.P that triggers them to move upward and escape poverty (World Bank 2010).

FIG. 5-7 ABSOLUTE POVERTY RISK —BY RELIGIOUS GROUPS (1983 TO 2011-12)



*Notes: 1. * Based on LEG, **Based on TEG*
2. 'R' and 'U' denotes rural and urban, respectively.
Source: Calculation from various CES rounds of NSSO, Government of India.

TABLE 5-4 POVERTY AMONG SOCIAL GROUPS AND ITS DECOMPOSITION IN UTTAR PRADESH (1983 TO 2011-12)

Subgroups	Headcount Ratio					Poverty Gap Ratio					Square Poverty Gap Ratio				
	1983*	1993/94*	2004/05*	2004/05**	2011/12**	1983*	1993/94*	2004/05*	2004/05**	2011/12**	1983*	1993/94*	2004/05*	2004/05**	2011/12**
Rural															
SCs	58.4	60.4	44.7	56.6	41.1	17.3	16.5	9.1	12.8	8.1	6.9	6.0	2.7	4.0	2.2
	(27.2)	*(33.7)*	*(34.1)*	*(33.7)*	*(35.9)*	*(30.0)*	*(37.3)*	*(36.4)*	*(35.5)*	*(37.7)*	*(32.0)*	*(39.5)*	*(38.2)*	*(36.8)*	*(36.5)*
OBCs#	(---)	(---)	32.9	42.2	30.7	(---)	(---)	6.0	8.9	5.6	(---)	(---)	1.7	2.6	1.6
	(---)	*(---)*	*(54.0)*	*(54.0)*	*(56.1)*	*(---)*	*(---)*	*(52.2)*	*(52.8)*	*(54.5)*	*(---)*	*(---)*	*(50.2)*	*(51.5)*	*(55.9)*
Others	45.0	37.6	19.5	26.0	12.5	11.6	8.8	3.6	5.3	2.2	4.2	2.9	1.0	1.6	0.6
	(71.4)	*(65.6)*	*(11.3)*	*(11.8)*	*(6.8)*	*(68.4)*	*(61.8)*	*(10.9)*	*(11.2)*	*(6.3)*	*(66.4)*	*(59.4)*	*(10.9)*	*(11.0)*	*(6.0)*
Urban															
SCs	60.5	60.1	43.5	44.2	39.1	18.1	16.1	10.8	11.6	8.3	7.2	6.0	3.6	3.9	2.5
	(14.1)	*(23.2)*	*(19.7)*	*(17.7)*	*(20.3)*	*(14.8)*	*(24.2)*	*(20.9)*	*(20.3)*	*(21.3)*	*(14.9)*	*(24.7)*	*(21.3)*	*(21.1)*	*(22.3)*
OBCs#	(---)	(---)	36.0	42.7	32.3	(---)	(---)	8.7	9.8	6.5	(---)	(---)	3.0	3.2	1.8
	(---)	*(---)*	*(54.3)*	*(56.9)*	*(61.9)*	*(---)*	*(---)*	*(55.9)*	*(56.8)*	*(61.6)*	*(---)*	*(---)*	*(57.7)*	*(57.2)*	*(60.2)*
Others	51.9	32.2	19.0	20.9	12.8	14.7	8.2	3.9	4.3	2.4	5.8	3.0	1.2	1.3	0.7
	(85.4)	*(76.2)*	*(25.5)*	*(24.8)*	*(17.4)*	*(84.8)*	*(75.5)*	*(22.6)*	*(22.3)*	*(16.4)*	*(84.8)*	*(74.9)*	*(20.4)*	*(21.0)*	*(16.7)*

*Notes: 1. * LEG, ** TEG*

2. Figures in parentheses represent a contribution to overall poverty.

3. # Figures of OBCs in 1983 and 1993-94 are included in 'others'.

Source: Calculation from NSSO's unit level data

TABLE 5-5 POVERTY AND ITS DECOMPOSITION BY RELIGIOUS GROUPS IN UTTAR PRADESH (1983 TO 2011-12)

Subgroups	Headcount Ratio					Poverty Gap Ratio					Square Poverty Gap Ratio				
	1983*	1993/94*	2004/05*	2004/05**	2011/12**	1983*	1993/94*	2004/05*	2004/05**	2011/12**	1983*	1993/94*	2004/05*	2004/05**	2011/12**
Rural															
Hindus	47.5	43.3	32.7	42.0	29.8	12.7	10.8	6.2	8.9	5.6	4.8	3.7	1.8	2.7	1.6
	(85.5)	*(86.6)*	*(83.2)*	*(83.2)*	*(82.8)*	*(85.6)*	*(87.6)*	*(82.8)*	*(82.6)*	*(83.5)*	*(85.5)*	*(88.3)*	*(82.3)*	*(82.1)*	*(84.2)*
Muslims	52.7	43.2	36.5	46.9	34.0	14.0	9.8	7.1	10.4	6.1	5.3	3.2	2.1	3.3	1.7
	(14.2)	*(13.3)*	*(16.5)*	*(16.5)*	*(17.1)*	*(14.0)*	*(12.3)*	*(17.0)*	*(17.1)*	*(16.5)*	*(14.1)*	*(11.6)*	*(17.4)*	*(17.7)*	*(15.8)*
Urban															
Hindus	45.9	32.1	25.6	27.5	21.3	12.2	8.3	5.7	6.0	4.4	4.5	3.1	1.8	1.9	1.3
	(54.4)	*(61.8)*	*(55.9)*	*(53.2)*	*(53.0)*	*(50.5)*	*(62.0)*	*(52.8)*	*(50.7)*	*(53.9)*	*(47.7)*	*(63.3)*	*(50.1)*	*(48.4)*	*(56.5)*
Muslims	66.4	46.5	40.5	48.4	36.4	20.7	11.9	10.1	11.7	7.2	8.6	4.2	3.6	4.0	1.9
	(44.8)	*(38.0)*	*(43.9)*	*(46.5)*	*(46.9)*	*(48.9)*	*(37.6)*	*(47.0)*	*(49.1)*	*(46.1)*	*(51.8)*	*(36.3)*	*(49.7)*	*(51.4)*	*(43.5)*

*Notes: 1. * LEG, ** TEG*

2. Figures in parentheses represent a contribution to overall poverty.

Source: Calculation from NSSO's unit level data

To judge the overall performance of SRGs across regions of the state, inter-regional variations in poverty amongst them is presented in Table 5-6. Such insight is also helpful to find out the subgroups (particularly in the CR) within which a high increase in incidence of poverty has reduced the pace of poverty reduction in the overall region. The table shows that across social groups, the lowest level of poverty was experienced by 'others' social group, followed by OBCs and SCs in all the four regions and both rural and urban areas of U.P during 2011-12. However, across religious groups, Muslims were found to be comparatively poorer in all the regions of U.P (except in the ER) during 2011-12.

Three observations can be made from Table 5-6. First, rural CR and urban ER have emerged as critically high *HCR* regions, wherein more than 60 per cent of Muslim and SC households were found below the poverty line during 2011-12. Second, socially advantaged groups ('others' social groups) are performing well in backward regions (SR), while socially disadvantaged groups (SCs and Muslims) are doing well in developed regions (WR). Third, the increase of rural and urban poverty in the CR is attributed to the poverty among OBCs in rural areas and SCs in urban areas of the region. Moreover, three population subgroups of the urban SR—SCs, OBCs, and Hindus—have also reduced the pace of poverty reduction in that region. In the context of these observations, it is suggested that to increase the pace of poverty alleviation in the state, these high poverty regions along with their impoverished population subgroups need to be given first priority in the strategic planning and development.

TABLE 5-6 REGION-WISE INCIDENCE OF POVERTY BY SOCIAL AND RELIGIOUS GROUPS IN UTTAR PRADESH

Groups	Western			Central			Southern			Eastern		
	61st	*68th*	*Change*	*61st*	*68th*	*Change*	*61st*	*68th*	*Change*	*61st*	*68th*	*Change*
Rural Uttar Pradesh												
SCs	44.8	26.5	*-(2.63)*	71.4	49.8	*-(3.09)*	47.4	45.4	*-(0.27)*	68.9	47.5	*-(3.06)*
OBCs	32.1	20.1	*-(1.71)*	36.7	43.3	*(0.94)*	43.2	29.1	*-(2.01)*	51.2	34.1	*-(2.44)*
'others'	19.9	8.6	*-(1.61)*	36.9	24.2	*-(1.81)*	20.7	4.75	*-(2.27)*	32.0	11.6	*-(2.91)*
Hindus	30.5	17.9	*-(1.80)*	42.8	38.9	*-(0.56)*	39.1	29.9	*-(1.31)*	51.9	34.8	*-(2.44)*
Muslims	42.0	24.4	*-(2.51)*	83.1	63.6	*-(2.79)*	45.0	39.0	*-(0.86)*	51.4	33.1	*-(2.61)*
Overall	33.5	19.1	*-(2.06)*	37.5	42.1	*(0.66)*	44.6	30.2	*-(2.06)*	51.9	34.5	*-(2.49)*
Urban Uttar Pradesh												
SCs	44.8	30.1	*-(2.10)*	40.9	52.1	*(1.59)*	31.8	38.3	*(0.93)*	63.1	60.8	*-(0.33)*
OBCs	42.7	26.7	*-(2.29)*	57.2	37.1	*-(2.89)*	29.0	33.5	*(0.64)*	47.0	37.3	*-(1.39)*
'others'	22.1	11.0	*-(1.59)*	37.6	19.3	*-(2.61)*	17.5	4.3	*-(1.89)*	19.2	9.6	*-(1.37)*
Hindus	25.2	17.2	*-(1.14)*	42.6	19.2	*-(3.34)*	18.8	26.7	*(1.11)*	37.2	30.0	*-(1.03)*
Muslims	49.2	29.7	*-(2.80)*	67.0	45,0	*-(3.14)*	38.9	36.2	*-(0.37)*	50.1	40.8	*-(1.33)*
Overall	33.8	21.2	*-(1.81)*	23.9	30.2	*(0.90)*	48.2	26.8	*-(3.04)*	41.2	33.1	*-(1.16)*

Note: 61st and 68th represent estimates for the year 2004-05 and 2011-12, respectively.
Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05, and 2011-12.

5.5 Summing up

Although U.P has witnessed poverty reduction over the study period; the high number of rural poor in general and stagnant urban poverty reduction in particular show the reality of poverty in the state. A regional assessment of poverty reveals that comparatively poorer regions (SR and ER) have witnessed a faster decline in poverty levels, but the sudden increase in poverty in the rural and urban areas of the CR raises a policy concern. Across SRGs, SCs and Muslims, who are historically poor, have experienced progress in poverty reduction. However, absolute and relative poverty risks reveal not much sign of reduction in inter-groups differences in poverty. Based on the inferences drawn, it is suggested that the prolonged and impoverished structure of poverty faced by households of ER and Muslim or SCs in all the regions groups them under the rubric of chronic poverty, which demands region-specific and group-specific development programmes for alleviating overall poverty in the state.

CHAPTER 6

Determinants of Unidimensional Poverty:

Logistic Regression Analysis

6.1 Introduction

This chapter outlines some of the factors that influence the incidence of poverty in the state, by modelling logistic regression on a specific set of explanatory variables discussed in the methodology section in Chapter 4. To highlight the effects of a change in place of residence, two separate regressions have been carried out, each for rural and urban areas (refer to Fig. 6-1, Fig. 6-2, Fig. 6-3, Fig. 6-4, Appendix Table A-0-8, Table A-0-9, Table A-0-10, and Table A-0-11). Mean values of the variables are shown in the Appendix Table A-0-4, Table A-0-5, Table A-0-6, Table A-0-7). In fact, nine different regressions have been estimated, as per the four economic regions (WR, CR, SR, and ER), three social groups (SCs, OBCs and 'others' social group) and two major religious groups (Hindus and Muslims) each for rural and urban households for the contemporary period of the study (2004-05 and 2011-12). Besides micro determinants, the study also estimates four macroeconomic determinants of poverty.

6.2 Micro Determinants of Poverty in Uttar Pradesh

To simplify the interpretation, coefficient values have converted into per cent changes in odds[119] for a unit change in the explanatory variables. The F-adjusted mean residual goodness-of-fit test shows that particularly in rural areas (p=0.99 for 2011-12), regional-specific models[120] and for two subgroups (namely, SCs[121] and Muslims[122]) had a good fit

119 For positive coefficient values, percentage change in odds can be obtained as (Odd Ratio-1) *100, and for negative coefficient values, percentage change in odds is equal to (1-odd ratio) *100. The percentage change in odds are represented by OR(%).

120 During 2004-05 and 2011-12, for rural WR: p=.44 and p=.98; rural CR: p=.14 and p=.48; rural SR: p=.14 (2004-05); rural ER: p=.23 and p=.19 respectively.

121 For SCs of rural areas, 2004-05: p=.27, 2011-12: p=.72.

122 For Muslims, 2004-05: p=0.90, 2011-12: p=.77 in rural areas, and 2004-05: p=.0.32, 2011-12: p=.46 in urban areas.

with the data for both the surveys (2004-05 & 2011-12). Moreover, the recent survey (2011-12) data show that the model appears adequate specifically for OBCs (rural and urban) and Hindus (rural)[123]. Notably, the previous survey (2004-05) witnessed a good fit in case of 'others' households for both rural and urban areas, but that is not the case with the recent survey. The following deductions have emerged from the regression exercise, which has been discussed separately for each significant explanatory variable.

Household Size: It is most evident that larger households are associated with poverty (Ray 2000, Gang, Sen, and Yun 2002, Krishnaji 1984, Lipton and Ravallion 1994, Lanjouw and Ravallion 1995). It may be because as the size of the household increases, the burden on the pools of resources will increase, thereby reducing the chances of moving out of poverty; provided no child labour is allowed[124]. Therefore, the hypothesis is that larger the household size; lower would be the ability of a household to move out of poverty and vice versa. The regression analysis confirms this hypothesis as the chances of being poor are statistically significant and positively associated with household size keeping all other factors constant (refer to Appendix Table A-0-8 to Table A-0-11). Even adding one more household member leads to a significant increase in poverty likelihoods for all the regions and SRGs, but the magnitude of poverty likelihoods varies across the subgroups. The households residing in the WR, SR and CR in rural areas witness a higher likelihood of being poor with an additional family member, whereas in rural ER such likelihood is relatively less (odds ratio for rural WR:56.8%, rural CR: 59%, rural SR: 84.1%, urban CR: 66.9%, urban SR: 51.4% all at 99% CI). Nevertheless, even though the rural areas of SR witness the highest odds of being poor during 2011-12 (odds ratio for rural SR: 84.1%), this region experiences a maximum reduction in poverty incidence during 2005-12. Among SRGs, the likelihood of being poor was more pronounced among SCs in both rural and urban areas, Muslims in rural areas, and Hindus in urban areas during 2011-12 (odds ratio for rural SCs: 46.3%, urban SCs: 67%, rural Muslims: 51.8%, urban Hindus: 54.9%). Policy interventions like education for women (Schultz 1989) and family planning (Cleland et al. 2006) may be effective in reducing the household size.

[123] For OBCs, rural: p=.22, urban: p=.78, and for Hindus, rural: p=.56.
[124] According to Basu and Van (1998), poverty is a compelling cause for child labour.

Land Possessed by the Rural Households (in Hectares): Usually, the possession of land as a resource is considered one of the critical factors for alleviating poverty among rural households. Access to cultivated land to a rural household reflects its socio-economic status to a great extent. Moreover, there is a positive association between the size of the land possessed and the average MPCE in the rural areas (Government of India 2007b). Table 6-1 confirms that in U.P, as the size of landholding increases, the incidence of poverty decreases on an average.

There may be cases where an uneven distribution of landholdings leads to an unfair distribution of poverty among SRGs in general and across regions in particular. Diwakar (2009) finds the difference in ownership of land as one of the prime causes of inter-regional inequality and poverty in the state. Besides, on the basis of Stokes (1980), Bajpai and Volavka (2005) highlight that historically (under British rule), WR and ER had different systems of landholdings, where the former enjoyed the Bhaichara system that allowed the practice of peasant proprietorship and provided tenants with an opportunity to invest in land and improve productivity, and the latter possessed the Zamindari system of tenancy that "stratified rural society into layers of tenants, subtenants and renter landlords". It seems to be the reason, why ER possesses a higher share of marginal land holdings.

To evaluate the contemporary scenario in this respect, Table 6-1 shows that as the size of land holding increases, the incidence of poverty decreases particularly across the two major regions (WR and ER). Moreover, better performance of marginal and small landholders in SR results in high poverty reduction in the region, whereas the existence of high incidence of poverty even amongst the semi-medium landholders in CR and SR, and medium landholders in SR during 2011-12 may raise questions on the usage, quality, and productivity of land in these regions. Fortunately, in WR and ER, the majority of the classes of landholders experience a steep decline in poverty incidence, which makes WR and ER 'consistently better-off' and 'recently better-off' regions of the state, respectively. The regression analysis (refer to Appendix Table A-0-8) reveals that amongst all the regions of the state, the likelihoods of being poor fall significantly with the increase in the size of land holdings except in SR during 2011-12 (odds ratio for WR:-56.7%, CR:-39.3%, ER: -54.7 at 90% CI). However, in WR, and CR, the association between the two falls short during 2005-12, and in ER, the likelihood of being poor remains at the high level during 2005-12. It suggests that ownership of landholdings can be an effective means to fight poverty, particularly in rural ER.

TABLE 6-1 INCIDENCE OF POVERTY ACROSS REGIONS BY LANDHOLDINGS IN RURAL UTTAR PRADESH

Land Ownership	*Western*		*Central*		*Southern*		*Eastern*		Uttar Pradesh	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Landless	46.7	47.1	35.2	71.9	(**)	(**)	66.2	32.0	51.5	46.9
Marginal	39.2	20.9	43.4	45.1	60.1	40.6	57.1	37.0	48.7	33.3
Small	20.2	6.9	31.1	25.9	51.4	19.3	38.5	24.1	31.9	17.5
Semi-Medium	10.1	9.9	13.3	36.7	18.5	27.6	20.7	12.4	15.5	18.0
Medium	10.5	0.0	2.7	0.0	12.1	21.5	16.5	0.0	10.4	5.6
Large	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	(**)	0.0

Notes: 1. Land ownership is in hectares, and incidence of poverty are in percentages.
2. 61st and 68th represent estimates for 2004–05 and 2011–12, respectively.
3. (**) are excluded because of small sample size.
4. Categories of land holding are as follows—landless: less than or equal to 0.002; marginal: more than 0.002 but less than or equal to 1.000; small: more than 1.000 but less than or equal to 2.000; semi-medium: more than 2.000 but less than or equal to 4.000; medium: more than 4.000 but less than or equal to 10.000; large: more than 10.000 (Government of India 2015).
Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

Table 6-2 also reveals that as the size of landholdings increases, the incidence of poverty among the SRGs decreases. However, the SCs and Muslims are the most disadvantaged among SRGs in this respect. Notably, even the semi-medium landholders among SC households witnessed a significant increase in the incidence of poverty during the study period. The regression estimates do not reveal a significant association between the likelihood of being poor and the size of landholding among SCs and Muslims in rural U.P during 2011-12. However, for the rest of SRGs, such a relationship is found to be statistically significant (odds ratio for OBCs: -47.7%, 'others': -63.6%, Hindus: -45% at 95% CI). It suggests that land ownership may not be effective in reducing poverty levels amongst the SCs and Muslims in particular.

TABLE 6-2 INCIDENCE OF POVERTY AMONG SRGS BY LAND OWNERSHIP IN RURAL UTTAR PRADESH

Land Ownership	Social Groups						Religious Groups			
	SCs		*OBCs*		*Others*		*Hindus*		*Muslims*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Landless	57.5	47.4	44.4	53.6	52.9	15.2	50.0	41.3	56.1	58.2
Marginal	58.8	41.3	48.2	33.2	30.8	17.1	48.3	33.3	50.5	33.8
Small	41.5	25.5	32.7	19.3	24.3	8.6	32.4	16.5	26.6	26.9
Semi-Medium	30.6	64.0	18.2	14.8	9.1	0.7	16.2	19.0	8.0	2.4
Medium	(**)	(**)	9.6	13.3	12.5	0.2	8.2	1.5	(**)	(**)
Large	(**)	(**)	(**)	(**)	2.0	0.0	(**)	0.0	(**)	(**)

Notes and Source same as in Table 6-1.

***Age of Household Head*:** A study conducted by the Food and Agriculture Organization (FAO) and United Nations Development Programme (UNDP) (2002) states that as the age of household head increases, the productivity of work along with experience increases. It may be because of a surge in capital accumulation, and availability of more labour due to less involvement in childcare or children being older. So, the increment in an age beyond a certain limit can reduce the chances of being poor. The negative regression coefficients reveal the same. However, the increase in the age of the household head results in a marginal decline in likelihoods of being poor among SRGs and across larger regions (WR and ER), but this applies specifically to rural households (see Fig. 6-1 to Fig. 6-4).

Regions: This variable describes the location of households to identify the geographic determinants of poverty. Considering WR under reference, the analysis reveals that the regional profile of poverty can be compared significantly, particularly across the rural areas (see Appendix Table A-0-8 and Table A-0-10, and Fig. 6-1 and Fig. 6-2). However, in urban areas, it can only be compared for the year 2011-12 (refer to Fig. 6-3 and Fig. 6-4). Besides the incidence of poverty (refer to Chapter 5, Section 5.3), the regression estimates also confirm that WR is a comparatively better off region and the CR is the most impoverished region during 2011-12 in both rural and urban areas (odds ratio for rural CR: 278.2%, SR: 248%, ER: 160.7%; for urban CR: 153.1%, SR: 128.2%, ER: 152.7% with WR as reference category). In fact, there is a significant decline in likelihoods of being poor during 2005-12 in SR and a substantial increase in such likelihoods in CR of rural areas, that rank the SR as the finest performer (still with a considerable likelihood) while it raises a question on policy concern for the latter region. For urban areas, regression estimates also confirm that the probability of being poor marginally increases in SR during 2005-12, but nothing can be predicted significantly for CR and ER when taking WR as a reference category.

Among SRGs, besides the incidence of poverty (refer to Chapter 5, Section 5.4), the regression analysis also confirms that the CR is the most impoverished region amongst all the SRGs (excluding rural and urban OBCs) during 2011-12 in both rural and urban areas. Furthermore, it is found that during 2005-12, Muslim (rural) and SC (rural and urban) households in the ER witnessed a significant increase in poverty as compared to households in the WR.

Religion and Social Groups: Comparing poverty across religious groups, Section 5.4 in the previous chapter shows that during the contemporary period (2004-05 to 2011-12), both

Hindu and Muslim households did equally well in reducing rural poverty, whereas Muslim households are doing comparatively better in urban areas. However, the regression coefficients depict that there is no significant difference in the likelihood of being poor, not only in rural but also in urban areas, across the two major religious groups (turn to Appendix Table A-0-9 and Table A-0-11). Across the social groups, Table 5-4 in the previous chapter shows that the SCs and OBCs have witnessed a high reduction in poverty incidence over the contemporary period, yet a substantial proportion among these social groups remains poor. The regression results reveal that SC households possess the highest likelihoods of being poor, followed by OBCs in both rural and urban areas with reference to 'others' (refer Fig. 6-1 and Fig. 6-2). Unfortunately, further increment in poverty likelihoods among them during 2011-12 makes these two socially deprived subgroups more impoverished (odds ratio for rural SCs, 2004-05:128.3%, 2011-12: 156.5%; for rural OBCs, 2004-05:63.1%, 2011-12: 84%; for urban SCs, 2004-05:107%, 2011-12: 190.5%; and for urban OBCs, 2004-05:45%, 2011-12: 60.4% with 'others' as reference category). Across the regions, such likelihoods are found statistically significant for larger regions (2011-12, odds ratio for urban WR, SCs: 158.9%, OBCs: 60.4%; for urban ER, SCs: 400%, OBCs: 162.3%; for rural WR, SCs: 105%, OBCs: 80.5%; and for urban ER, SCs: 176%, OBCs: 93% with reference to 'others'). The poverty-population estimate shows that ER has the highest share in rural poverty. It may be because, in rural parts of ER, the share of SC and OBC in the total population is highest, and these subgroups have a high incidence of poverty, nearly half of the total rural poor of the state are concentrated in this region only (Table 5-2). On the other hand, at the aggregated level, the better-off urban WR is primarily attributed to the 'others' only as the regression estimates reveal that the other two social groups (SCs and OBCs) in the region witnessed an increase in poverty likelihoods (refer to Fig. 6-3 and Fig. 6-4).

***Educational Level of Household Head*:** Usually, education is considered one of the principal means to fight poverty. To analyze the association between general education levels and poverty, a seven-grade classification has been created. Table 6-3 and Table 6-4 depict that there exists a high incidence of poverty among illiterates, irrespective of their region, caste, and religion. Nevertheless, as the household heads' educational attainment increases, the incidence of poverty decreases in general, but it shows more decline after attaining the 'Primary to Middle' educational level, except in CR and SC households in rural areas. Notably, even the 'graduate and above' SC household heads suffer from comparatively higher levels of poverty, followed by Muslims in rural areas and OBCs in urban areas. Table

6-3 draws three notable observations across regions. First, at each classified level of education (excluding the 'Graduate and above'), in general, urban households are poorer compared to their rural counterparts, which is also revealed by the regression estimates (refer to Fig. 6-1 to Fig. 6-4). Second, except for CR, other regions witnessed a significant decline in the incidence of poverty among the majority of educational levels during 2005-12 in both rural and urban areas. However, regression estimates establish either a statistically insignificant association between educational level and likelihoods of being poor or an increase in such likelihoods among the majority of the regions in both rural and urban areas.

TABLE 6-3 POVERTY INCIDENCE ACROSS REGIONS BY EDUCATION OF THE HOUSEHOLDS' HEAD

Levels of Education	***Western***		***Central***		***Southern***		***Eastern***		**Uttar Pradesh**	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Rural Households										
Not Literate	45.09	24.59	44.39	53.29	52.69	42.04	60.32	40.83	52.17	37.56
Below Primary	37.20	15.93	46.90	53.04	51.74	20.91	45.76	44.98	43.85	36.16
Primary to Middle	26.16	20.48	31.32	36.03	37.99	33.84	51.59	32.53	37.50	29.33
Sec. to Higher Sec.	17.47	8.18	19.79	18.88	26.07	17.46	34.03	13.81	25.15	12.76
Graduate and above	11.16	4.93	31.25	21.87	13.76	8.92	24.71	12.89	20.15	10.82
Urban Households										
Not Literate	57.77	38.21	52.71	50.20	81.95	62.93	67.39	56.77	60.35	45.47
Below Primary	46.48	33.89	43.36	9.57	71.86	23.91	58.69	66.13	51.01	38.94
Primary to Middle	32.43	17.12	27.74	44.13	40.52	28.49	45.45	31.83	34.62	27.28
Sec. to Higher Sec.	13.04	9.60	11.97	17.19	17.96	20.63	29.67	15.01	16.16	13.33
Graduate and above	5.05	3.90	2.31	0.84	4.58	3.17	7.12	4.86	4.75	3.40

Note: 1. Incidence of poverty is in percentages.
2. 61st and 68th represent estimates for the year 2004-05 and 2011-12, respectively.
3. Classification of 'Without formal schooling' and 'Diploma' are excluded as their sample size is small.
Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05and 2011-12.

Third, a significant increase in poverty incidence among 'Primary to Middle' and 'Sec. to Higher Sec.' educated heads of household in urban areas of CR and increasing poverty likelihoods for the most of regions in both rural and urban areas show that even the educated households are trapped in poverty (see Appendix Table A-0-8 to Table A-0-11). In this reference, Tilak (2004, 2007) highlights that though the role of secondary and higher education is not well recognized by the Indian government in economic development and poverty reduction; given the importance of post-elementary education, alongside literacy and elementary education, considerable attention needs to be paid towards the development of sound and comprehensive education policies.

TABLE 6-4 POVERTY INCIDENCE AMONG SRGS BY EDUCATION OF THE HOUSEHOLDS' HEAD

Levels of Education	Social Groups						Religious Groups			
	SCs		*OBCs*		*Others*		*Hindus*		*Muslims*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Rural Households										
Not Literate	60.33	43.23	50.5	37.52	38.59	21.17	52.36	37.41	50.89	38.71
Below Primary	58.48	39.51	45.37	41.18	25.07	11.72	44.81	37.35	40.6	31.01
Primary to Middle	51.00	44.73	37.33	27.46	24.08	12.22	36.33	29.34	46.54	29.7
Sec. to Higher Sec.	46.78	19.51	24.9	15.49	15.00	3.26	24.61	12.35	31.18	18.05
Graduate and above	49.13	33.72	10.62	8.74	18.92	8.01	20.43	10.68	(**)	15.33
Urban Households										
Not Literate	57.96	61.86	63.62	44.56	54.84	34.41	56.08	49.12	63.24	42.82
Below Primary	63.73	53.85	52.3	40.89	39.2	17.82	46.96	29.91	56.09	56.83
Primary to Middle	44.34	28.7	38.11	31.93	24.39	17.04	35.65	25.18	34.46	32.6
Sec. to Higher Sec.	26.77	19.44	19.96	15.18	10.14	9.99	16.64	12.21	15.24	19.55
Graduate and above	15.53	2.88	8.16	10.26	2.54	0.87	3.93	3.22	12.95	4.45

Note: 1. Incidence of Poverty is in percentages.
2. 61st and 68th represent estimates for the year 2004-05 and 2011-12, respectively.
3. Classification of 'Without formal schooling' and 'Diploma' are excluded as their sample size is small.
Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05and 2011-12.

Occupation of the Household (Household-Type): It is assumed that formal sector employment, mainly regular wage/salary earners, are protected by labour laws that safeguard their minimum wages and provide job security. Therefore, poverty incidence among them is assumed to be not so high. On the other hand, casual labourers predominantly engaged in an informal sector whose primary source of earnings is bound by temporary contracts, which lack job security and social protection. The self-employed, in general, are assumed to be better-off because they have sufficient amount to invest. However, in certain occupations (such as hair-cutting and tailoring), there are comparatively lesser returns to escape from poverty (Pathak 2010, Sundaram and Tendulkar 2003). In combination, casual labourers along with self-employed in agriculture represent the proportion of population directly dependent on agriculture.

Table 6-5 and Table 6-6 present the poverty incidence across regions and among SRGs respectively by occupation structure of household in U.P during 2004-05 to 2011-12. In rural areas, though the population engaged in agriculture declined nearly by seven percentage points during 2005-12; yet agriculture is a predominant source of employment (about 56%). This sector is characterized by small farm size, labour intensive methods and a high dependence on monsoon. Therefore, poverty among them (mainly casual agricultural labourers) is assumed to be high or unstable. In support of this argument, Pandey and Reddy

(2012) find that a 10 per cent shift of workforce from farm to the non-farm sector in rural areas would result in a 7.7 per cent reduction in rural poverty.

To clarify these hypotheses across regions, Table 6-5 draws three conclusive facts. First, although the casual labourers (agricultural, followed by non-agricultural in rural areas) are the most impoverished labour class in all the regions in both rural and urban areas of the state; they have witnessed higher poverty reduction in general. An inter-regional comparison across rural areas reveals that poverty reduction among casual agricultural labourer is greater in ER, followed by WR, whereas in case of casual non-agricultural labourers, poverty reduction is highest amongst SR, followed by ER and WR. In urban areas, casual labourers in SR and WR experienced faster poverty reduction. However, in CR, poverty incidence increased amongst them during 2005-12. Second, for both the self-employed category of occupation in rural areas, households belonging to ER have the highest incidence of poverty, whereas, in other three categories, SR has the highest levels of poverty incidence during 2004-05. However, in the case of a majority of occupational classifications in 2011-12 (except casual labourer), rural households in CR have the highest incidence of poverty. In urban areas, ER is found to be one of the highly impoverished regions among the majority of occupational categories, particularly during 2011-12. Third, in rural areas, the incidence of poverty across regions has declined remarkably in almost every occupational group over 2005-12, except in case of the majority of occupations in CR. Similarly, in urban areas, the majority of occupation classes of CR witness increase in poverty incidence (regular wage/ salary earners, casual labourers and 'others'). Finally, the regression estimates reveal that households in rural areas show a significant reduction in poverty likelihoods when they are employed as self-employed in agriculture compared to casual agricultural labourers, holding other factors constant (odds ratio for SEA in 2011-12: 41.5% with casual agricultural labourers as reference category). While in urban areas, casual labourers possess higher likelihoods of poverty compared to regular wage/ salary earners during 2011-12 (for casual labourer, odds ratio in 2004-05: 295.8%, and in 2011-12: 170.3% compared to regular wage/ salary earners).

TABLE 6-5 INCIDENCE OF POVERTY ACROSS REGIONS AND BY OCCUPATION OF HOUSEHOLDS

Occupations	*Western*		*Central*		*Southern*		*Eastern*		Uttar Pradesh	
	61st	*68th*	*61st*	*68th*	*61st*	*68th*	*61st*	*68th*	*61st*	*68th*
Rural Household Types										
SE Agri.	23.46	13.67	30.04	32.17	35.04	20.90	44.65	27.43	34.77	23.22
	(43.5)	*(45.5)*	*(51.4)*	*(46.0)*	*(61.2)*	*(49.7)*	*(49.8)*	*(42.5)*	*(48.6)*	*(44.6)*
SE Non-agri.	36.86	12.73	39.13	39.03	52.84	25.96	55.00	34.66	45.61	27.62
	(20.8)	*(16.1)*	*(15.4)*	*(12.0)*	*(11.4)*	*(13.0)*	*(18.6)*	*(19.2)*	*(18.4)*	*(16.5)*
RW/SE*	(---)	10.542	(---)	16.921	(---)	9.545	(---)	26.710	(---)	18.025
	(---)	*(6.3)*	(---)	*(4.0)*	(---)	*(4.1)*	(---)	*(5.0)*	(---)	*(5.2)*
AL	58.24	37.49	59.47	53.11	78.17	75.61	76.93	51.27	65.95	47.54
	(15.3)	*(10.5)*	*(18.1)*	*(13.8)*	*(4.8)*	*(7.6)*	*(12.9)*	*(10.4)*	*(14.2)*	*(11.0)*
NAL	49.05	34.96	54.89	64.62	68.61	45.89	68.38	51.95	59.77	48.39
	(9.7)	*(16.6)*	*(6.9)*	*(19.8)*	*(16.1)*	*(23.6)*	*(10.0)*	*(15.8)*	*(9.6)*	*(17.3)*
Others	17.95	5.41	22.42	57.30	50.21	8.96	33.08	23.56	26.08	22.70
	(10.8)	*(4.9)*	*(8.2)*	*(4.4)*	*(6.6)*	*(2.1)*	*(8.7)*	*(7.2)*	*(9.2)*	*(5.6)*
Urban Household Types										
SE	35.40	21.13	30.02	26.87	57.33	35.19	42.68	35.50	37.19	26.50
	(48.8)	*(45.3)*	*(39.5)*	*(44.1)*	*(39.8)*	*(33.0)*	*(51.4)*	*(46.8)*	*(46.8)*	*(44.8)*
RW/SE	21.68	12.37	12.43	19.05	24.15	11.72	25.19	21.31	19.58	15.68
	(35.0)	*(33.4)*	*(45.8)*	*(32.0)*	*(32.8)*	*(41.9)*	*(26.1)*	*(28.0)*	*(35.5)*	*(32.3)*
CL	63.83	37.05	65.96	68.99	89.22	57.35	73.08	68.28	68.17	49.16
	(9.3)	*(15.7)*	*(8.3)*	*(14.3)*	*(12.7)*	*(13.5)*	*(9.0)*	*(8.0)*	*(9.2)*	*(13.5)*
Others	24.41	18.20	9.27	25.31	47.49	10.86	42.53	15.66	28.33	18.38
	(6.9)	*(5.6)*	*(6.4)*	*(9.6)*	*(14.7)*	*(11.5)*	*(13.6)*	*(17.2)*	*(8.6)*	*(9.4)*

Note: 1. Incidence of Poverty is in percentages.
2. SE-Self Employed; RW/SE- Regular Wage/ Salary Earner; (N)AL-(Non)Agricultural Labour, CL- Casual labourer.
3. 61st and 68th represent estimates for the year 2004-05 and 2011-12, respectively.
*4. *RW/SE classification among rural households was introduced in the 68th round.*
5. (---) are excluded because of small or nil sample size.
6. Figures in parentheses represent population proportions.
Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05, and 2011-12.

Poverty incidence by occupation structure among SRGs also draws four conclusive facts (Table 6-6). First, the casual labourers in each category of SRGs, in both rural and urban areas, suffer from the highest incidence of poverty. Along with high levels of poverty, the occupation pattern points towards a predominance of casual non-agricultural labourers in rural and casual labourer in urban areas during 2005-12. This shift towards casualisation of the workforce is not welcomed because of the prevalence of low average daily wages. Second, for any given category of occupation, SC households experienced the highest incidence of poverty in both rural and urban areas (excluding regular wage/salary earning category among Muslims) during 2011-12. Third, across SRGs, the prevalence of poverty has

declined in every occupational category, except for the SCs (urban) in regular wage/salary earners and others categories. Fourth, across categories, the highest decline in rural poverty has been observed among self-employed non-agricultural SC labourers and agricultural labourers among other categories of SRGs. However, in urban areas, it has declined fast among self-employed Muslim and SCs, casual labourers among Hindus and 'others', and other categories of labourers among OBCs. Finally, the regression estimates reveal that Hindu and SC households have witnessed a significant reduction in poverty likelihoods when they are employed as self-employed in agriculture as compared to casual agricultural labourers in rural areas during 2011-12 (odds ratio for Hindus, SEA:-41.1%, for SCs, SEA:-61.2% compared to casual agricultural labourers).

TABLE 6-6 INCIDENCE OF POVERTY AMONG SRGS AND BY OCCUPATION OF HOUSEHOLDS

Household Types	**Social Groups**						**Religious Groups**			
	SCs		*OBCs*		*Others*		*Hindus*		*Muslims*	
	61st	*68th*	*61st*	*68th*	*61st*	*68th*	*61st*	*68th*	*61st*	*68th*
Rural Household Types										
SE Agri.	47.02	34.34	36.45	25.35	22.36	8.43	34.56	23.16	37.42	24.22
SE Non-agri.	55.37	33.14	47.76	28.7	24.36	13.03	43.85	27.02	50.08	30.03
RW/SE*	(---)	21.94	(---)	20.01	(---)	14.7	(---)	15.45	(---)	40.49
AL	68.46	55.39	65.34	43.33	54.13	14.86	66.7	49.08	62.08	32.63
NAL	66.68	47.23	52.97	50.63	53.59	41.66	60.71	46.79	54.28	54.03
Others	31.5	29.23	25.1	27.01	24.49	5.73	23.47	23.95	36.58	19.08
Urban Household Types										
SE	55.11	34.45	46.75	33.19	19.46	13.89	30.33	22.36	48.6	33.62
RW/SE	22.58	26.66	23.1	22.54	15.9	6.29	15.32	10.91	38.43	34.68
CL	73.78	57.45	64.22	46.85	71.1	40.72	71.88	48.6	62.65	49.9
Others	11.55	46.46	41.26	19.05	18.35	13.35	19.5	17.32	50.34	23.58

Note: 1. Incidence of Poverty is in percentages.
2. SE-Self Employed; RW/SE- Regular Wage/ Salary Earner; (N)AL-(Non)Agricultural Labour, CL- Casual labourer.
3. 61st and 68th represent estimates for the year 2004-05 and 2011-12, respectively.
*4. *RW/SE classification among rural households was introduced in the 68th round.*

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05, and 2011-12.

Other Factors[125]: Recent studies on poverty highlight three other factors, such as extensive healthcare expenditure, deplorable condition of amenities and remittances (internal and

[125] The principal sector of employment also determines poverty (Cervantes-Godoy and Dewbre 2010, Grewal, Grunfeld, and Sheehan 2012, Loayza and Raddatz 2010, Perry et al. 2006, Himanshu et al. 2011, Datt and Ravallion 1998a, Trivedi 2004, Trivedi et al. 2011, Trivedi, Prakash, and Sinate 2000, Lanjouw and Shariff 2004, Nayak 2012, Nayak, Behera, and Mishra 2009, Tiwana 2011, 2014b, 2016, Mishra 2015, Dubey,

external) that are essentially responsible for influencing the likelihood of being poor. The former two would probably depress living standards, whereas diaspora to avail better earning opportunities (remittance) may act as a route to escape from poverty.

Poor individuals born in low-income households generally experience health[126] problems since their birth and are more prone to health risks as they grow older. It is because of inadequate intake of calories and the phenomenon of malnutrition that characterizes the reality of poverty among them. Griggs and Walker (2008) highlight that the relationship between poverty and ill-health is bidirectional, that is, poverty leads to ill-health, and ill-health contributes to poverty. Along with the poor, middle-income households also experience the excessive burden of healthcare expenditure. The 12th five-year plan also supports the argument by claiming that the majority of the population relies on private health care provisions, which often impose a heavy financial burden. Similarly, in a state like U.P, the expenditure on medical care and hospitalisation remains a leading cause of poverty, especially in rural areas (Government of Uttar Pradesh and UNDP 2008). Moreover, Ajwad (2007) points out that ill health is one of the leading causes of expenditure volatility amongst households and they usually sell assets like jewellery to cope with the situation. However, the Government of Uttar Pradesh (2014b) reports that, just three per cent households reported selling/mortgaging of their assets: the most common reason was 'illness' (except in SR) regardless of their income groups.

Furthermore, the poor are more vulnerable to environmental problems, particularly of wretched sanitation. Even the geo-space of the dwellings possessed by the poor households adds infinite possibilities towards unhealthy life. This does not only push them to the brink of life but also compels them to lead an impecunious life. In a state like U.P, basic amenities are often absent (Government of Uttar Pradesh and UNDP 2008). In fact, the situation is even more severe where "almost one-half of U.P's towns are without sewerage and at least one-third lack safe drinking water" (World Bank 2010). Furthermore, Kozel and Parker (2003) find that at the village level, poor households (particularly, socially deprived) live in a community/colony which is located on the periphery; therefore, their access to basic

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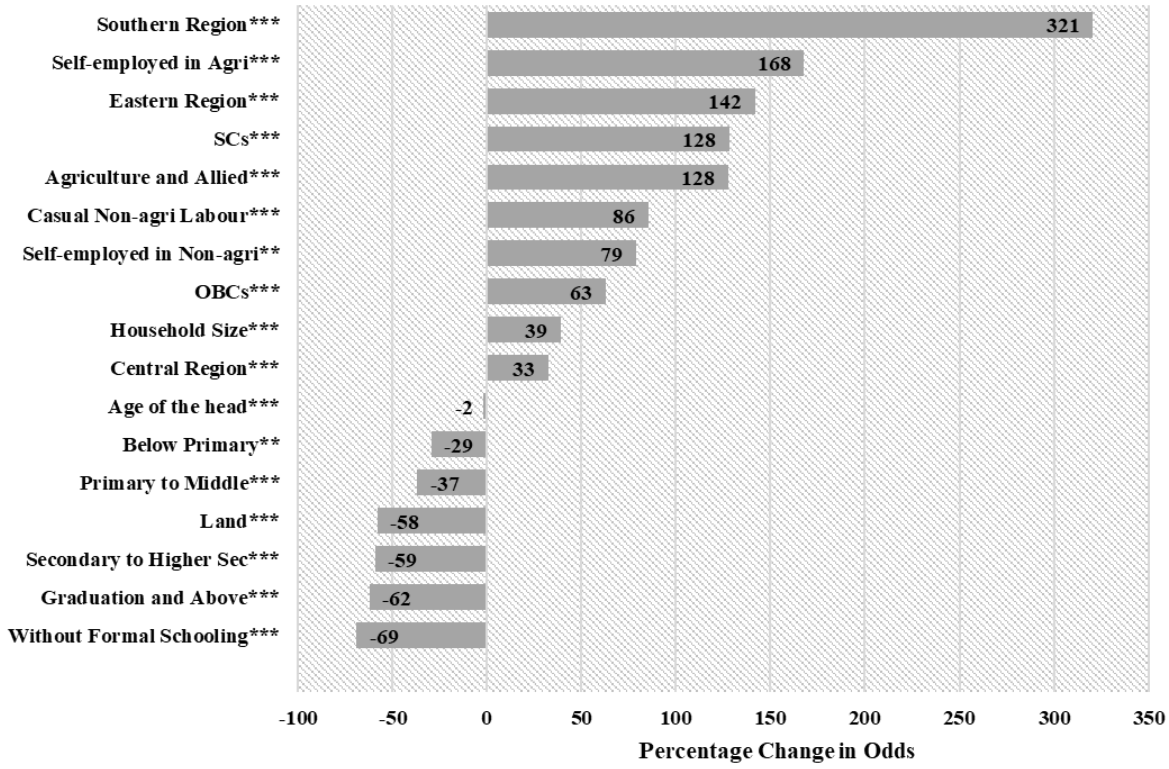
Gangopadhyay, and Wadhwa 2001, Diwakar 2000, Jha 2002a, Datt and Ravallion 2002, Datt 1999). However, regression estimates do not reveal any significant association between engagements across sectors and poverty likelihoods.

126 Out of pocket expenditure a leading vulnerability factor in India, may increase the risk of poverty. (Mohanty et al. 2014).

amenities is not as high as that for others. Even at the regional level, higher the concentration of poverty, lesser will be the tendencies of availing basic amenities in U.P. Evidently, their study states that lower-caste households in U.P are deterred and disallowed from using public tap or well, even if they are available. Region-wise statistics reveal that households residing in the rural areas of SR are comparatively more deprived in respect of inhabitable dwelling structures and access to drinking water, whereas ER and CR households are mostly deprived concerning sanitation system and access to electricity, respectively (Government of Uttar Pradesh 2014a) .

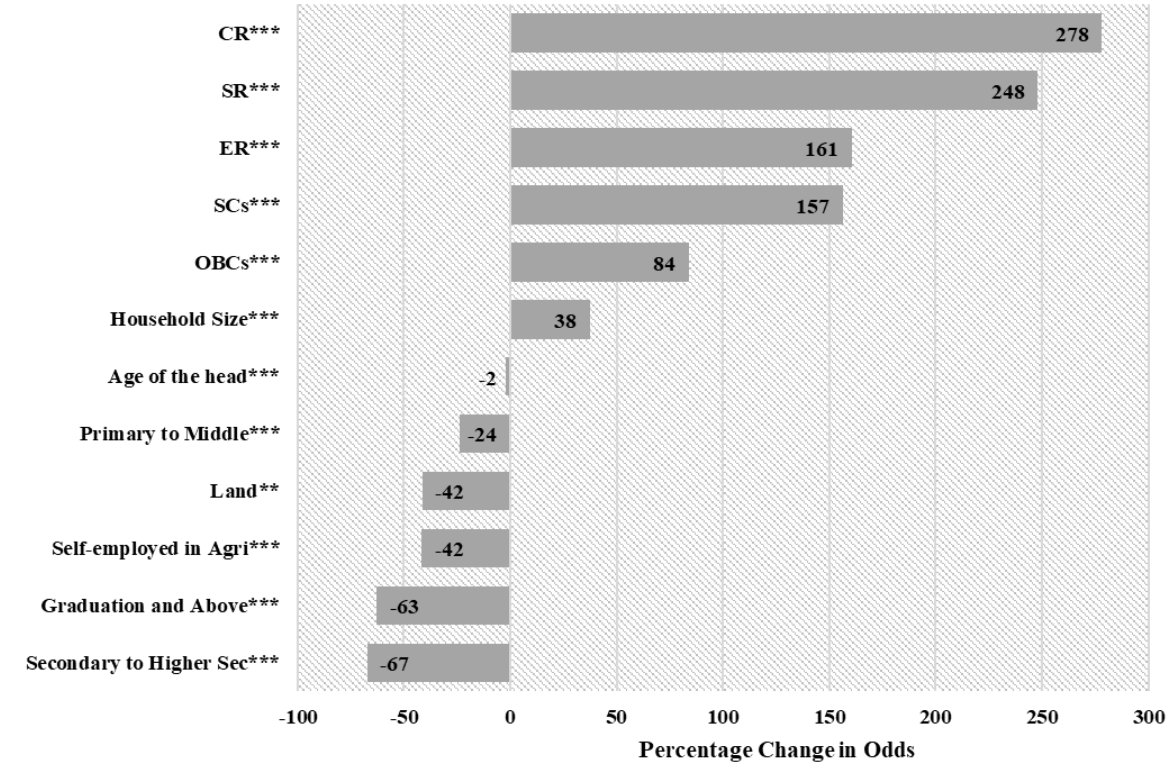
Fortunately, migration in the form of remittances acts as a major escape route for poor peasants in U.P, at least during lean periods (Lieten 1996). In fact, it provides an opportunity to earn higher income for a sufficiently large proportion of the poor population of the state, and they are getting comparatively higher yearly returns compared to the households of other states (Thorat and Jones 2011). World Bank (2011), on the basis of Wax (2008)), cites a primary study of Chandrabhan Prasad (who is a popular Dalit newspaper columnist) in which 20,000 Dalit households were interviewed within U.P and finds that "a majority of households send at least one member to the city. The resulting remittances have led to a change in spending patterns and in social and political spaces". Moreover, World Bank (2010) points out that migration specifically towards Middle-East provides sufficient remittances to Muslims in U.P that trigger them to move upward and escape poverty. Also across regions, particularly for poor households of ER, migration has emerged as a dominant source of income mainly when the majority of them are illiterate and landless households (Government of Uttar Pradesh 2012).

FIG. 6-1 PREDICTORS OF POVERTY IN RURAL UTTAR PRADESH, 2004-05



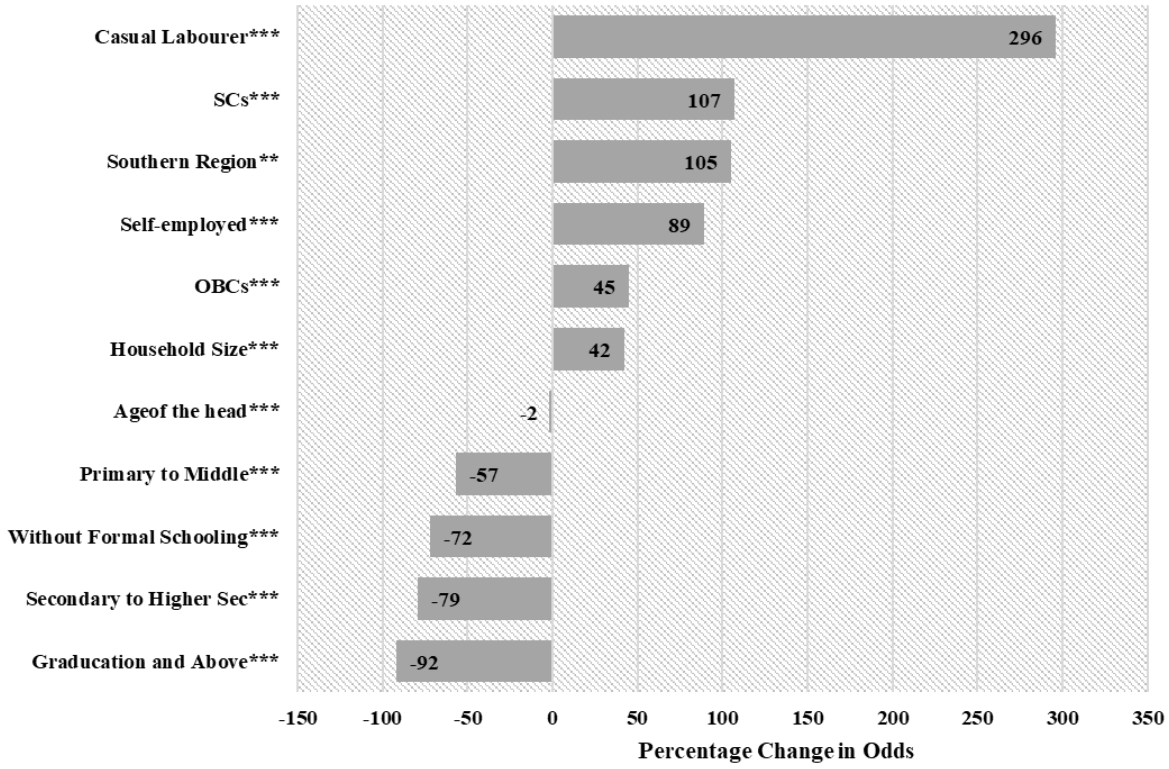
Notes: *,**,***Coefficients would be significantly different from zero at 10, 5, and 1 percent levels of significance, respectively

FIG. 6-2 PREDICTORS OF POVERTY IN RURAL UTTAR PRADESH, 2011-12



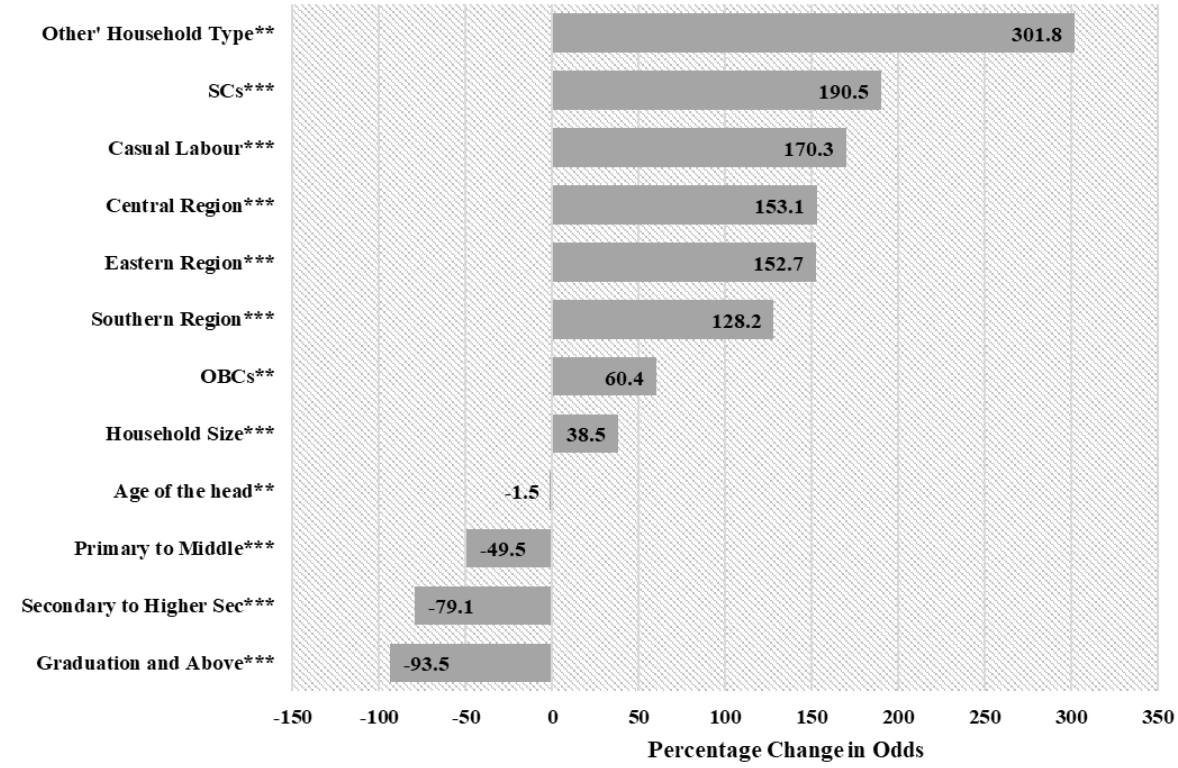
Notes: *,**,***Coefficients would be significantly different from zero at 10, 5, and 1 percent levels of significance, respectively

FIG. 6-3 PREDICTORS OF POVERTY IN URBAN UTTAR PRADESH, 2004-05



Notes: *,**,***Coefficients would be significantly different from zero at 10, 5, and 1 percent levels of significance, respectively

FIG. 6-4 PREDICTORS OF POVERTY IN URBAN UTTAR PRADESH, 2011-12



Notes: *,**,***Coefficients would be significantly different from zero at 10, 5, and 1 percent levels of significance, respectively

6.3 Macroeconomic Determinants of Poverty in Uttar Pradesh

To study the macroeconomic determinants of poverty in the state, the available data and literature review provide four factors that can influence the likelihood of being poor in the state and across regions, namely, sectoral contribution of district domestic product in term of the contribution of agriculture & allied, secondary and services sectors, rural road connectivity (proxy by percentage of villages linked with roads to total villages in the district), rural electrification (measured as a percentage of electrified villages to total inhabited villages in the district) and industrialisation (measured in terms of number of small-scale industries in the district). The regression estimates are shown in Table 6-7. The results show that poverty likelihoods in 2011-12 are not so different from those estimated in 2004-05. Therefore, a logit model has been reported for the year 2011-12 only (Table 6-7).

Contributions of Agriculture & Allied, Secondary and Tertiary Sectors*:* Various studies unanimously proclaim that sectoral composition matters significantly in poverty reduction, with growth in the agriculture sector (Cervantes-Godoy and Dewbre 2010, Perry et al. 2006) and more substantial contributions from unskilled labour-intensive sectors—construction and manufacturing) (Grewal, Grunfeld, and Sheehan 2012, Loayza and Raddatz 2010). In India, Ravallion and Datt (2002) find the prominent role of agriculture growth in reducing poverty, besides its usual contribution to overall GDP growth (Virmani 2007).

In U.P, more than half of the state income during 2011-12 is generated from services (54%), whereas agriculture & allied sector (21.5%) and secondary sector (24.5%) contributed relatively less. Also, across regions, the services share is more than half, with the highest in CR (60%) and lowest in SR (51%). The contribution of agriculture & allied sector across regions differs significantly, being highest in SR (28%) and lowest in CR (18%). The regression estimates reveal that with one per cent increase in the contribution of the agriculture & allied sector, rural poverty in the state is likely to decline by 13.3 per cent, keeping other factors constant. On the other hand, with one per cent increase in the contribution of the service sector, urban poverty is likely to fall by 2.1 per cent. The contribution of the secondary sector in overall poverty reduction is significant, but its likelihood is marginal. Across regions, poverty in rural WR is more likely to fall (-27.8%) with an even one per cent increase in the contribution of agriculture & allied sector. In urban areas, the contribution of the services sector is found significant in reducing poverty for all the regions, but highest in SR (-9.7%), followed by CR (-7.5%), WR (-4.5%), and ER

(-4.2%). However, the contribution of the secondary sector in reducing overall poverty is found statistically significant in the case of ER.

Number of Small Scale Industries per Lakh Population: A large number of studies suggest strengthening the small-scale industries for poverty alleviation in developing countries (Beck, Demiruc-Kunt, and Maksimovic 2004, Mukras 2003, Cook 2001). Also, in India, planners have recognized the role of small-scale industries in reducing poverty as they are relatively more labour intensive (Government of India 2001, Khan 2001). However, in U.P, due to poor road networks, and lack of law and order, the business opportunities for entrepreneurs, and the state's position for potential investment destination remain an issue of concern (World Bank 2010). The regression estimates also reveal that the small-scale industries have a positive impact on poverty reduction, as a one unit increase in small-scale industries results in significant decline in poverty likelihoods in the state (-3.2%), particularly in SR (-8.8%) and WR (-2.3%).

Percentage of Villages Linked with Road to Total Villages**:** Road connectivity, particularly in rural areas, is critical for poverty reduction as it provides a crucial link for economic opportunities; helps in employment generation through industrialisation (Samanta 2015); and improves access to amenities such as education, health, etc. (Binswanger, Khandker, and Rosenzweig 1993). Even at the household level, "road development contributes to higher productivity and demand for labour" (Khandker, Zaid Bakht, and Gayatri B. Koolwal 2009)

The concerning issue is that the households in the villages of U.P ranked road connectivity as the top pressing problem, along with water and electricity (Banerjee et al. 2006). Also, the road conditions are poor, and the proportion of road networks is the lowest in the state (World Bank 2010). The development statistics of U.P during 2011-12 show that around three-quarters of the villages are connected with the roads. Across regions, villages located in the WR are mostly linked to the roads (87%), followed by SR (80%), CR (75%) and ER (67%). Nevertheless, the regression estimates indicate that as the proportion of villages linked with roads increases (from 50-75%, 75-90% and to 'above 90%' with reference category 'below 50%'), the likelihoods of poverty decreases proportionately (-22%, -31%, -51% respectively), keeping other factors constant. However, these estimates are not found statistically significant across regions, ER being an exception in case of 'above 90%' category.

***Percentage of Electrified Villages to Total Inhabited Villages*:** Studies show that poverty and access to electricity are interlinked (Weiss and Khan 2006, Mukherjee and Benson 2003), also in rural SR of U.P (World Bank 2010). Moreover, the Government of Uttar Pradesh (2014a) reports that access to electricity as well as the availability of electricity for 15 or more hours per day is significantly lower in the rural areas of the state. The regression estimates reveal that with one per cent increase in electrified villages, the likelihood of poverty decreases in the state (-1.8%). The decline in the percentage change in odds is observed highest in SR (-6.6%), followed by WR (-2.9%) and ER(-1.1%).

TABLE 6-7 MACROECONOMIC DETERMINANTS OF POVERTY IN UTTAR PRADESH, 2011-12

Variables	Uttar Pradesh	*Western*	*Central*	*Southern*	*Eastern*
Contribution of Agriculture and Allied Sector in District Domestic Product (Rural area specific)					
% of Agriculture and Allied	-13.3*	-27.8*	-23.6	310.4	-4
Contribution of Secondary Sector in District Domestic Product					
% of Secondary Sector	-1.5**	-1.3	20.8	3.3	-4***
Contribution of Service Sector in District Domestic Product (Urban area specific)					
% of Services	-2.1***	-4.9*	-7.5***	-9.7**	-4.2***
Number of Small Scale Industries per Lakh Population					
Small Scale Industries	-3.2***	-2.3*	-2.9	-8.8***	3.3
Percentage of Villages Linked with Road to Total Villages (ref :< 50%) (Rural area specific)					
50-75%	-22.3**	-4	-32.6	-65	-12.4
75-90%	-30.8*	-27.4	-2.2	82.5	-9.9
>90%	-51.5***	(---)	(---)	(---)	108.4*
Percentage of Electrified Villages to Total Inhabited Villages (Rural area specific)					
% of electrification	-1.8***	-2.9*	0.2	-6.6*	-1.1*

*Note: 1. Results are expressed in per cent change in odds, and ***, **, * show coefficients would be significantly different from zero at 1%, 5% and 10% levels of significance respectively.*

2. The contribution of agriculture & allied and service sector is found statistically significant only of rural and urban samples, respectively.

6.4 Summing up

This chapter examines the factors that determine poverty levels across population subgroups, particularly among the most impoverished subgroups (SCs, Muslims and CR households) by modelling logistic regression for both the rural and urban areas of the state. SCs and Muslims are poor more or less on similar grounds, such as illiteracy, casualisation of workforce and sudden increase in poverty in overall CR in general and low engagement in self-employment agricultural occupation, large household size, marginal land holdings and backwardness of rural ER in particular to rural households. The two most unfortunate observed facts among SCs and households of CR are that even the semi-medium landholders

are highly poor and for any given category of occupation, they experience the highest poverty in both rural and urban areas during 2011-12. Moreover, a significant increase in poverty incidence among 'Primary to Middle' and 'Sec. to Higher Sec.' educated household heads' in urban areas of CR, along with increasing poverty likelihoods for most of the regions in both rural and urban areas, reveal that even educated households in the state are trapped in poverty. Therefore, poverty alleviation policies should focus on the development of education and self-employment in general, and promote family planning and improve the quality of education in particular amongst rural households, with special emphasis on SCs, Muslims and CR households. Moreover, poverty in the state may be linked to capability or human development aspects (education, health and SOL) that are multifaceted in nature, beyond consumption notion.

CHAPTER 7

Multidimensional Poverty in Uttar Pradesh:

Aggregated and Disaggregated Analysis

7.1. Introduction

This part of the study presents UP-MPI estimates for the last two decades (exactly 23 years) in terms of headcount, intensity and overall poverty, preceding its comparison with consumption poverty. To a possible extent, these results are first drawn for the state as a whole, followed by population subgroups including major SRGs and regions (WR, CR, SR, and ER) alongside districts. Overtime changes in UP-MPI are noted in terms of headcount, intensity and interaction term. It includes decomposition analysis in terms of dimensions, indicators and population subgroups. A comparison of indicators related to the education dimension, specifically, is presented in the end.

7.2. Multidimensional and Consumption Poverty: A Comparison

Pre-statistics

The recent Indian population census 2011 reveals that U.P has a population of approximately 19.98 crore population (77.73% in rural). Extrapolating population for the year 2015-16 in which the recent NFHS-4 survey was conducted, it now accounts for approx. 20.03 crore, of which 6.33 crore has been identified as MD poor as per UP-MPI[127]. These poor people are being deprived in some combination of at least two to six indicators, such as they could live in a household where a child or woman member is undernourished and deprived in a minimum three out of six SOL indicators (electricity, water, sanitation, cooking fuel, housing, and assets, see Table 4-14). Alternatively, they may live in a household that experiences child death in the last five years and no member has attained up to six years of

127 For the year 2015-16, the overall population in U.P has been extrapolated as on 1st March 2016 based on previous three population census estimates (1991, 2001, and 2011). Population projection is carried for both at regions level as well as at SRGs. The regional level population projection has been estimated for all the four regions (WR, CR, SR and ER) and then aggregated for rural and urban areas to get combined estimates for the state, which gives the number of MD poor to be around 6.33 crore. Moreover, SRGs population projections for overall U.P gives estimates of around 6.25 crore. Precisely, the MD poor population in U.P during 2015-16 lies between 6.25 - 6.33 crore.

schooling, or they might live in a household where a child in its school going age is currently not attending school. The above estimates can be expressed in terms of headcount, according to which, around 31 per cent of the population in U.P are MD poor during 2015-16. This figure was about 71 per cent in 1992-93 (see Fig.7-1). Regarding the intensity of UP-MPI, it is calculated that poor people in U.P are deprived in around 43 per cent of the ten indicators on an average. Positing UP-MPI 2015-16 with the Global MPI estimates in the 2016 HDR (UNDP 2016), it can be illustrated that U.P has MD poverty equivalent to Ghana and Vanuatu which rank 46 and 47 respectively among the poorest 102 countries worldwide (Arora, Singh, and Siddiqui 2018, Bagchi 2018).

Over the period of the last 23 years (1992-93 to 2015-16), the proportion of MD poor (headcount), as said earlier, fell from around 71 per cent in 1992-93 to 31 per cent in 2015-16, a decline of approximately 1.73 percentage points per annum (see Fig.7-1). However, breaking this period as per the NFHS reveals that UP-MPI headcount does not witness a straight way drop, instead it initially falls from 71 per cent to 59 per cent during 1992-93 to 1998-99 (around 2.03 percentage points per annum,); then rises to 66 per cent in 2005-06 (about 0.98 percentage point per annum); and thereafter again falls significantly to 31 per cent in 2015-16 (around 3.45 percentage points per annum).

Fig.7-1 depicts that MD poverty in the state complements consumption poverty. The zig-zag blue line shows the consumption poverty headcount while stacked columns show the absolute contribution of each dimension (red for education, yellow for health and green for SOL) aggregated to UP-MPI headcount[128]. For the first three years (1992-93, 1998-99, and 2005-06), UP-MPI headcount has been much higher compared to consumption poverty headcount for all the subgroups as well as for U.P overall. In fact, the percentage points gap between the two types of poverty increased, particularly during the last two survey years for all the subgroups. Alkire and Santos (2010) point out some reasons for such divergence. First, it can be the case that consumption data is weak or may be inaccurate, and the UP-MPI estimates are more appropriate and accurate to represent the existing deprivation in U.P. The latter case makes more sense as UP-MPI covers elementary but essential conditions of deprivation like basic education, surviving capacity of health, water and sanitation, electricity, unsafe cooking fuel, liveable house, and minimum of assets whereas consumption

[128] Note that the UP-MPI headcount has been converting in terms of absolute dimensional share by the three chosen dimensions (education, health, and SOL).

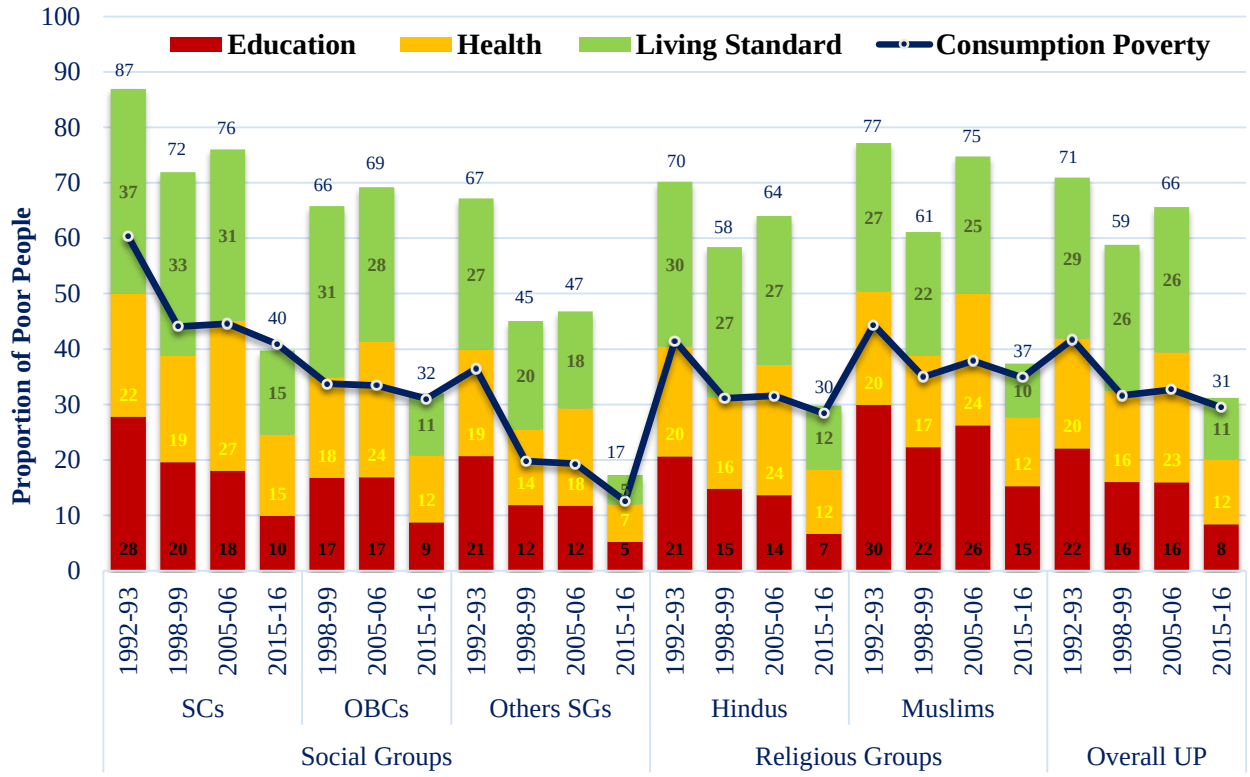
poverty mainly capturing the essential food (or some non-food as per TEG) consumption. Lastly and most importantly, different people possess different abilities to convert minimum food consumption into valuable functionings (like nutrition). Nevertheless, recent estimates (2015-16) reveal that MD poverty is approaching the 2011-12 consumption poverty headcount for all subgroups under consideration. However, it is more likely that in the year 2015-16, consumption poverty is below the MD poverty as it is already on a declining trend.

7.2.1 Social and Religious Groups Comparison

The UP-MPI headcount across social groups Fig.7-1 reveals that SCs are consistently most impoverished over the entire period and across all the dimensions (education, health, and SOL), followed by OBCs compared to 'other' whereas, across two major religious groups, it is the Muslims that account for consistent and overall higher MD poverty. Across dimensions, it can be seen that SOL contributes most of the deprivation, which is expected[129]. However, a departure/difference can be observed in 2015-16. This year, health deprivation has significant contributions in MD poverty for almost all the population subgroups.

129 It will be discussed in much greater detail in the section below.

FIG.7-1 MULTIDIMENSIONAL AND CONSUMPTION POVERTY HEADCOUNT – BY SOCIAL AND RELIGIOUS GROUPS



1. For first three years (1993-94, 1999-2000, 2004-05), consumption poverty is based on LEG poverty line.
2. Recent consumption estimates are available for 2011-12 with TEG poverty line that is used as a proxy to compare UP-MPI for 2015-16.

Sources: Consumption poverty is based on CES of NSSO, and UP-MPI is based on NFHS

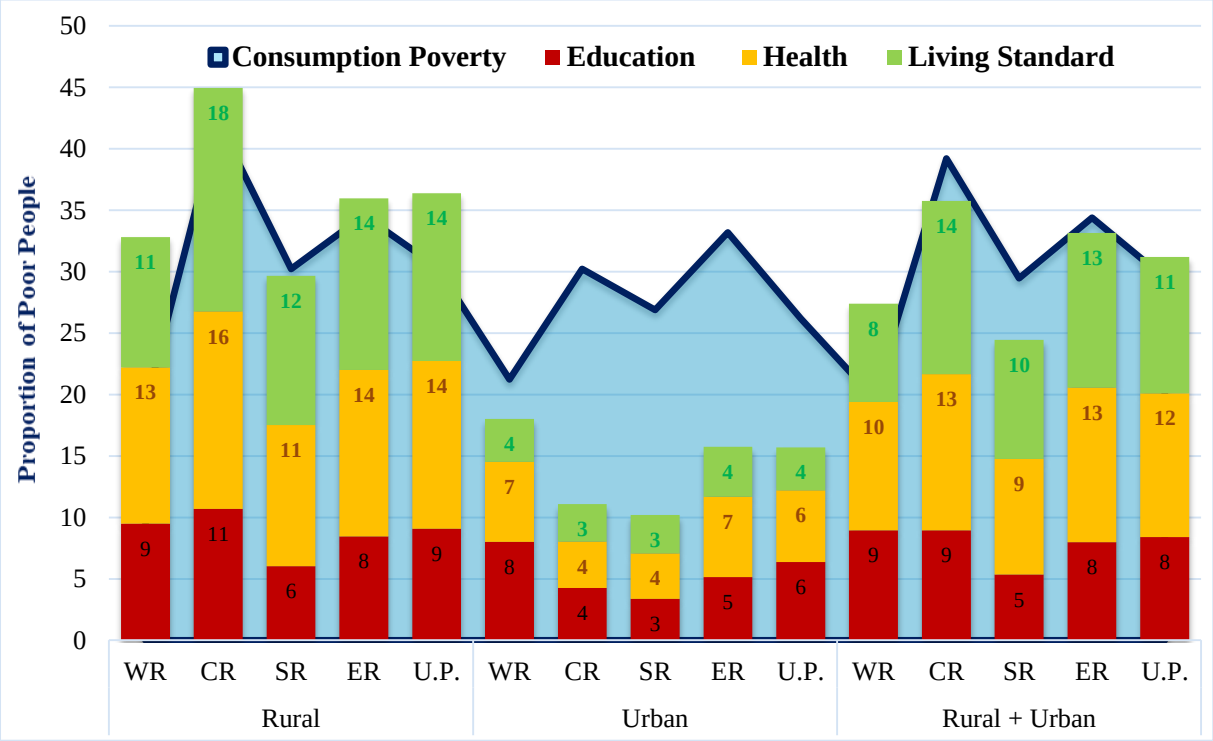
7.2.2 Comparisons across Rural-Urban Areas and Regions

The area-wise UP-MPI estimates bring out that MD poverty, at large, is concentrated in rural areas as rural areas contain around eight times more MD poor (5.63 crore in 2015-16) compared to the urban counterpart (0.70 crore). The regional analysis of MD poverty shows that the highest concentration of MD poor in rural areas is in ER (45%, 2.53 crore out of total 5.63 crore), followed by WR (30%, 1.68 crore), and CR (21%, 1.20 crore). In urban areas, around 60 per cent of MD poor is accounted for WR only (0.42 crore out of 0.70 crore), followed by ER (22%, 0.15 crore), and CR (15%, 0.10 crore). SR in both rural and urban areas holds a minimum share (less than 5%).

Regional comparison of consumption and MD poverty also supports that UP-MPI complements the consumption poverty more clearly for rural areas of U.P. For all regions (except SR), UP-MPI headcount is comparatively higher than consumption headcount, even

considering the time lag between these two poverty estimates. Note that since consumption poverty estimates are available for 2011-12 and it is already stated that they are used as a proxy to compare the UP-MPI estimates for the year 2015-16. Accordingly, the high urban consumption poverty over MD poverty should be cautiously interpreted while considering this lag period.

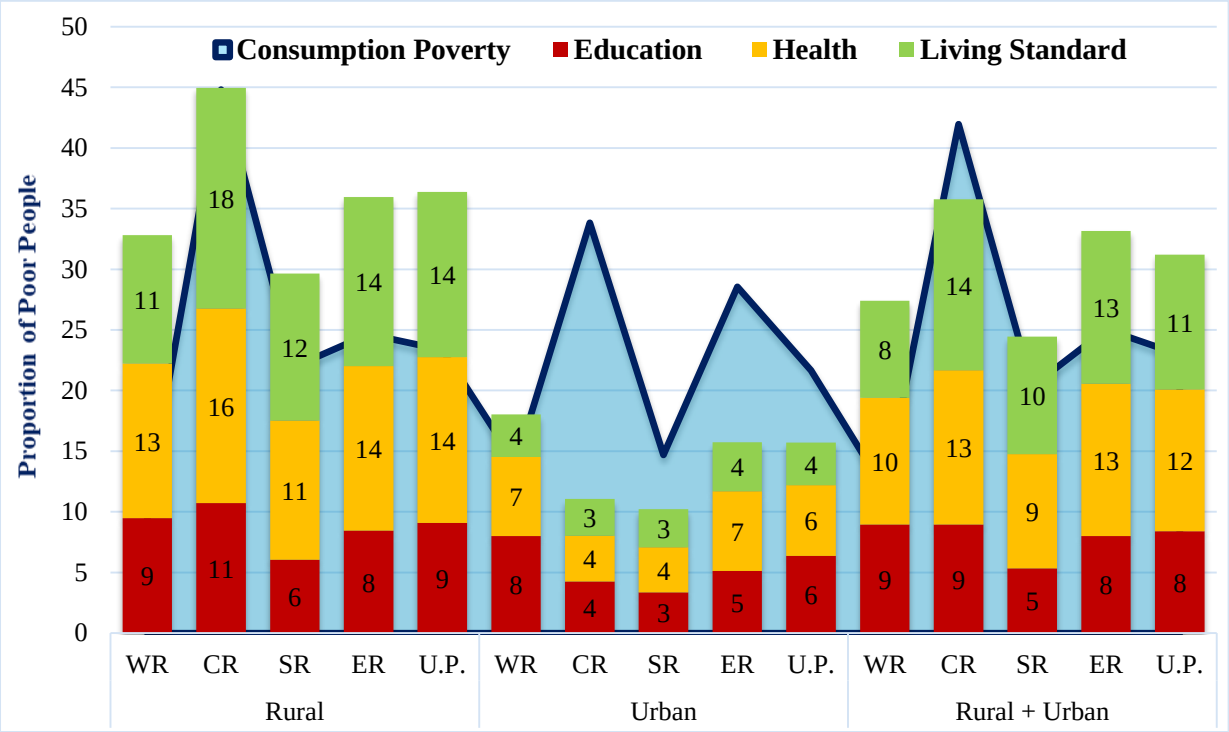
FIG. 7-2 MULTIDIMENSIONAL AND CONSUMPTION POVERTY (UNADJUSTED) – BY REGIONS, 2015-16



Notes: Same as in above Fig.7-1.
Sources: Calculated based on NFHS-4.

Alternatively, if considering the rate of changes in consumption poverty (per annum) during 2004-05 and 2011-12, to estimate consumption poverty for the year 2015-16, then it also supports the argument that UP-MPI complements the consumption poverty particularly for rural areas of U.P (refer Fig. 7-3).

FIG. 7-3 MULTIDIMENSIONAL AND CONSUMPTION POVERTY (ADJUSTED) – BY REGIONS, 2015-16



Notes: Same as in above Fig.7-1.
Sources: Calculated based on NFHS-4.

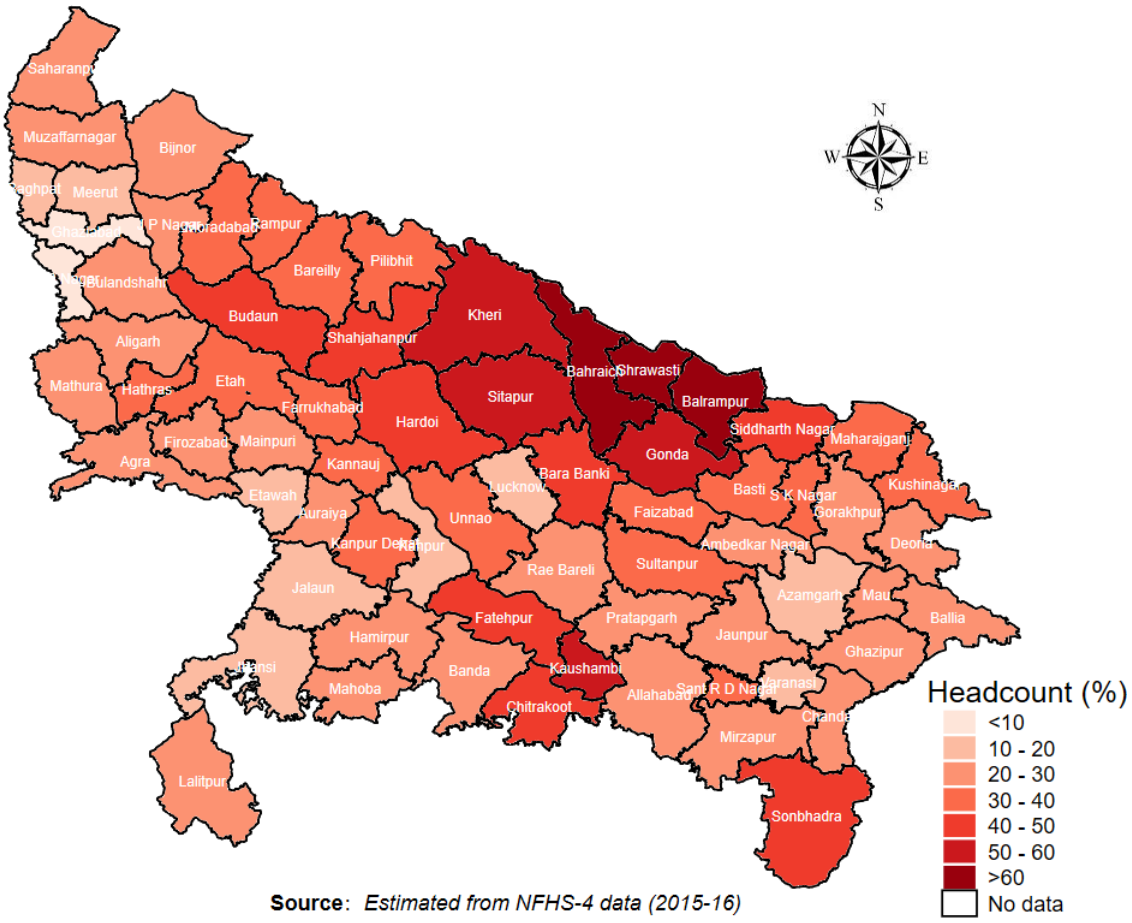
7.2.2.1 The District-wise Comparison

NFHS-4 provides information at the district level and makes it possible to estimate UP-MPI at the district level. These estimates provide a clearer picture of the concentration of poverty in the state (refer Fig.7-4, and Fig. 7-5). These figures show that the geographical clustering of poverty is stark in U.P. For U.P overall, Fig.7-4 depicts that UP-MPI (headcount) is lowest among districts located in the upper WR (surrounding National Capital Region of India) and in SR, compared to the other two regions of the state (CR and ER). However, across the upper central-eastern direction, headcount ratio in districts rises and becomes highest, as it is adjacent to the Nepal border. It may be because this region often has to face vagaries of floods and droughts.

Looking at the headcount ratio across districts individually, it is no surprise that districts with the most substantial poverty level (greater than 60%) are located in ER namely, Shrawasti (70%), Bahraich (66%), and Balrampur (63%). These districts not only hold the highest level of MD poverty in the state but also at the all-India level (Arora, Singh, and Siddiqui 2018, Bagchi 2018). For seven districts (5 in ER and 2 in CR), headcount ratio is more than 50 per cent. In around 64 per cent of districts (45/70), every fourth person is counted as MD poor (13 in WR, 8 in CR, 4 in SR, and 20 in ER). Comparing two larger

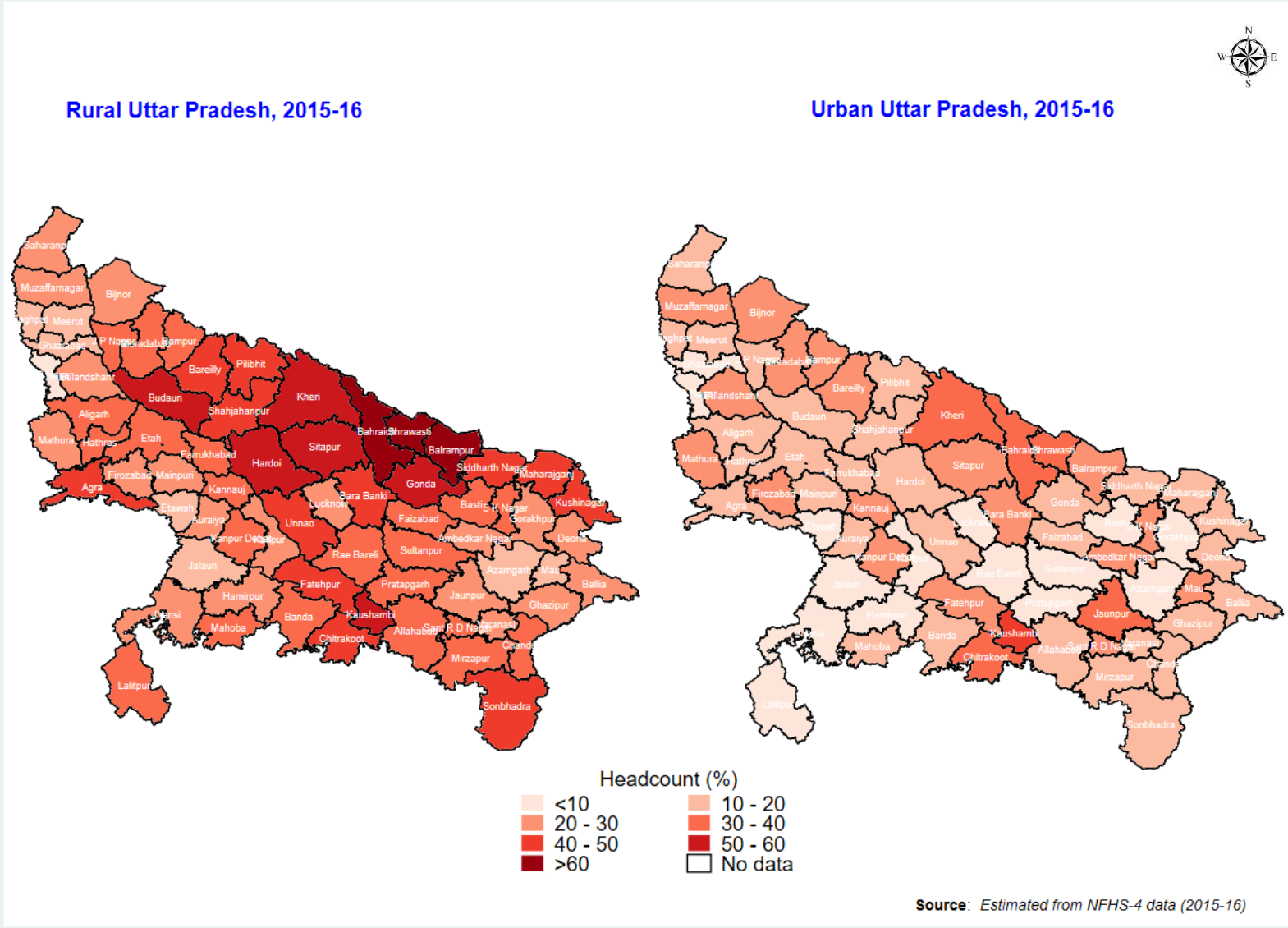
regions (WR and ER), these estimates depict that ER is far poorer compared to WR, whereas in the other two relatively smaller regions, it is the CR that stands high on poverty. The MD poverty across areas, as discussed in the above section (7.2.2), highlights that rural areas contain much more MD poor (around eight times) compared to urban counter. This creates the essence of looking at these estimates at disaggregate (district) level on account of rural and urban bifurcation, that is illustrated in Fig. 7-5. It makes more apparent that not only at the aggregated level but also at the district level; poverty in U.P is sharply concentrated in rural areas, both in absolute number of poor and poverty percentage.

FIG.7-4 UP-MPI HEADCOUNT ACROSS DISTRICTS OF UTTAR PRADESH, 2015-16



Source: *Estimated from NFHS-4 data (2015-16)*

FIG. 7-5 RURAL AND URBAN COMPARISON OF UP-MPI (HEADCOUNT) —BY DISTRICTS, 2015-16

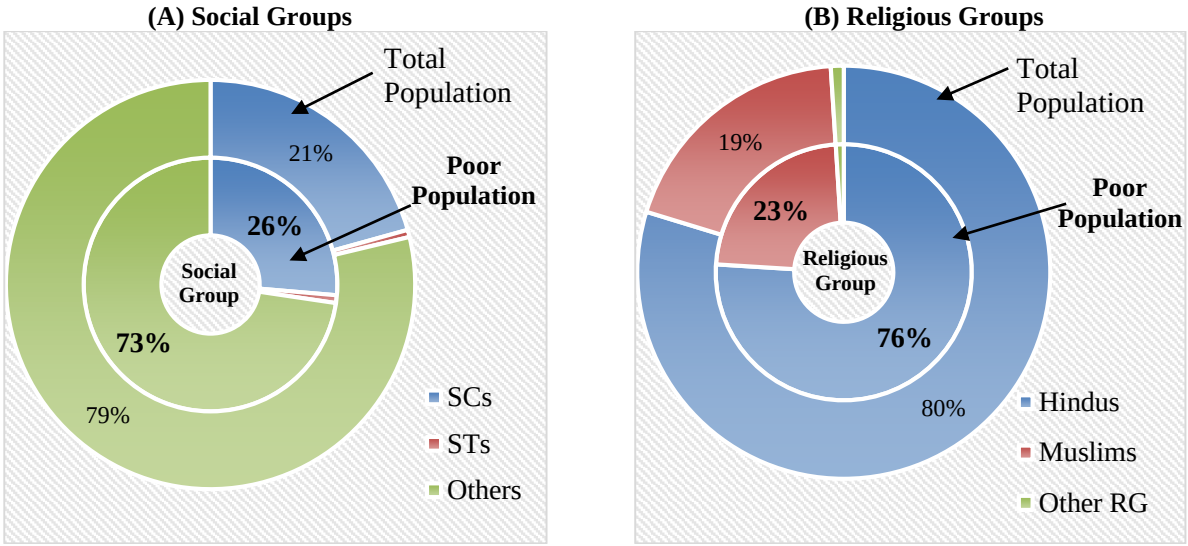


7.3 Distribution of Multidimensional Poor and Total Population

7.3.1 Social and Religious Groups

The distribution of MD poor and overall population across social groups (left pie chart) and religious groups (right pie chart) is presented in Fig. 7-6[130]. For social groups, only three classified categories can be compared, as 2011 Indian population census figures, which are used to extrapolate the poor and overall population for 2015-16, do not provide separate estimates for OBCs. Nevertheless, it points out that SCs, who contributes around 21 per cent of the overall population, have relatively higher share (26%) in overall MD poverty in U.P. STs and 'Others' in religious group have been excluded from the primary comparison of MD poverty across SRGs, as their sample size was negligible in the state.

FIG. 7-6 MULTIDIMENSIONAL POOR IN POPULATION —BY SOCIAL AND RELIGIOUS GROUPS, 2015-16



Note: 1. Estimated (extrapolated as on 1st March 2016) MD poor is 6.25 crore out of 20.03 crore total population.
2. These diagrams are a representation to the population sizes corresponding to the subgroup.
Sources: Calculated based on NFHS-4 round and 2011 Indian Census

Among religious groups, it is the Muslims, who account for around 19 per cent of the overall population of the state but contribute around 23 per cent to the overall MD poor during 2015-16. Regarding the poverty burden as a poverty-per-population ratio[131], it can be

130 Poverty-population share has been estimated for the entire period (1992-93 to 2015-16) but presented only for the recent year as there is not much variation over time, particularly when expressed in nil decimal places.
131 The poverty burden is similar to poverty risk in unidimensional sense of poverty.

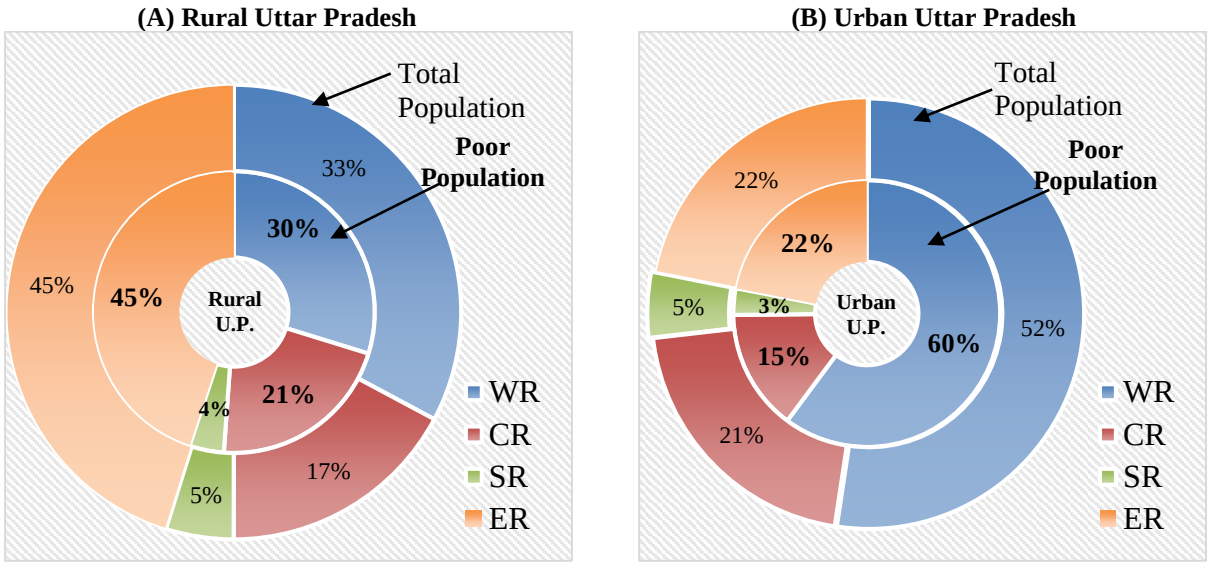
stated that these two subgroups (SCs and Muslims) bear a higher poverty burden (greater than one) compared to other subgroups. However, the poverty burden of SC and Muslims reduced during the first three periods and then increased sharply in the recent period. Fortunately, the major subgroups (Hindus and 'others' in the social category), experienced relatively less poverty burden (less than one) over the entire study period even with a declining trend.

7.3.2 Regions by Rural and Urban Areas

The region-wise and areas-wise analysis of poverty contribution has already been discussed in Section 7.2.2. However, associating it with population share brings out that CR in rural areas (left pie chart in Fig. 7-7) and WR in urban areas (right pie chart) are the regions whose poverty contribution is higher than population share, symbolising higher poverty burden borne by the region compared to other regions of the state. Noteworthy, unlike SRGs, the major poverty contributors across regions of the state possess relatively neutral (ER in both rural and urban) or higher (CR in rural and WR in urban) poverty burden but not less.

It is true that WR is historically and relatively developed region on many development aspects but due to high urbanisation, the region is highlighted with higher contribution to UP' MD poverty in relation to its population share. This fact is essential to highlight as it suggests the disproportionate share (burden) of poverty borne by the region (Alkire et al. 2015).

FIG. 7-7 MULTIDIMENSIONAL POOR IN POPULATION—BY REGIONS, 2015-16



Note: 1. Estimated (extrapolated as on 1st March 2016) MD poor population is 6.33 crore out of 20.03 crore total population.
2. These diagrams are a representation to the population sizes corresponding to the areas.

Sources: Authors calculated based on NFHS-4 round and 2011 Indian Census

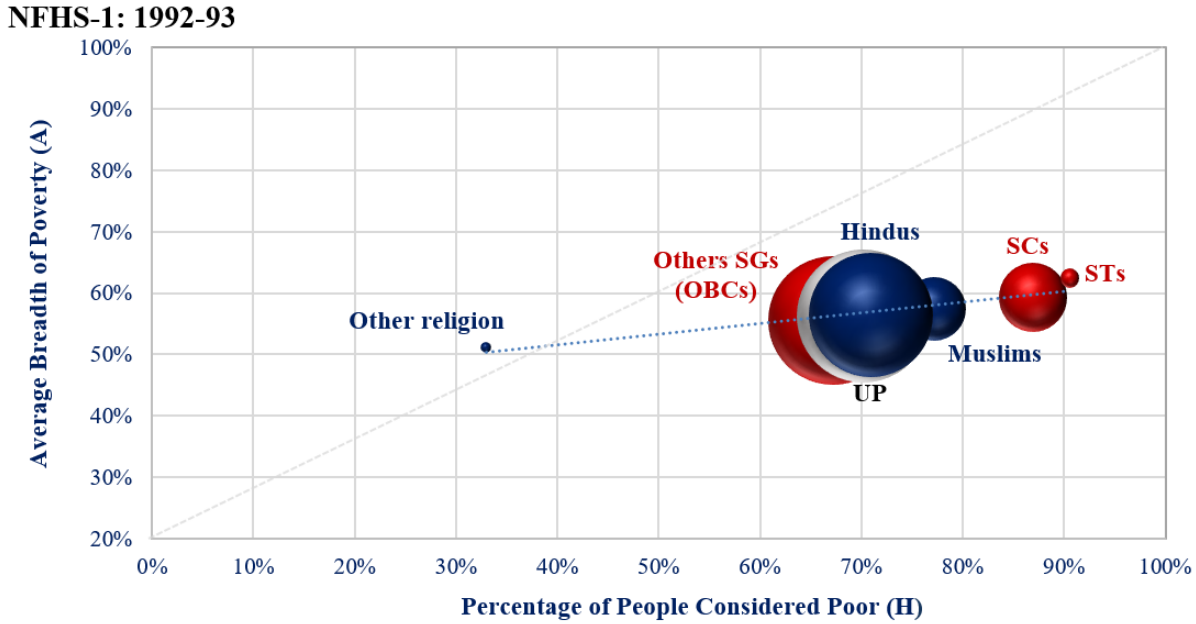
7.4 Components of UP-MPI: Headcount and Intensity

7.4.1 Social and Religious Groups

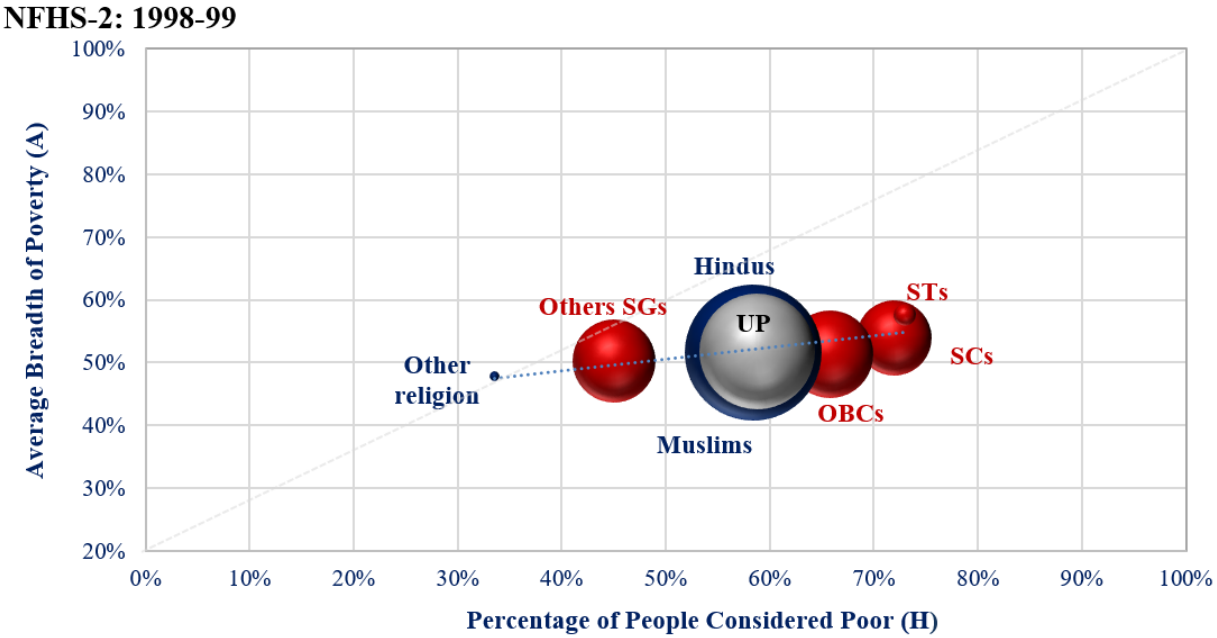
UP-MPI is the product of two components: the headcount (*H*) that represents the percentage of the population who are MD poor, and the intensity or breadth of deprivation (*A*) that shows the average proportion of weighted deprivation in which MD poor are deprived. Alkire and Santos (2010) show that the estimation of intensities of poverty along with headcount is required particularly for three reasons: Firstly, there can be subgroups whose ranking of poverty can change if intensities are considered in place of headcounts. Secondly, it is significant to point out subgroups, which have a high magnitude of both *H* and *A*, as they are amongst the most deprived. Thirdly, it is crucial to notice subgroups whose *A* is higher than *H* as they are following the unusual path of MD poverty reduction (conveniently, it is a reduction in *H* first, followed by *A*). Stating in terms of first reason, the UP-MPI headcount estimates across SRGs reveal that SCs, followed by OBCs and Muslims, in general, are comparatively poorer subgroups of the population in U.P. However, taking into considerations the intensity of UP-MPI (see Fig. 7-8), it can be witnessed that although SCs and Muslims are poorer, but intensities remain stable and high for almost all SRGs yet converge overtime and finally reaches at very marginal differences (SCs at 45%, OBCs, and Other SGs at 44%, Muslims at 47% and Hindus at 43%). Thus, it can be argued that in terms of headcount, poverty ranking across SRGs can be distinguished categorically; however, regarding intensities, they are very much comparable.

Secondly, Fig. 7-8 and correlation estimates based on it reveal that across SRGs, there is a direct and robust relationship between *H* and *A* (correlation coefficient more than 0.94 for the first three periods), implying that subgroups with higher headcount possess higher intensities of poverty but they show absolute declining trend over time (correlation coefficient around 0.77 for the year 20015-16). This suggests that intensities of poverty increase with the increase in headcount, but that is more particularly for poorer subgroups (like SCs and Muslims), whereas for relatively less poor subgroups (OBCs, 'others', and Hindus), intensities yet to remain high. In terms of third reason, it is significant to highlight that for the first decade (1992-93 to 2005-06), all subgroups follow the usual path of poverty reduction (as *H* is higher than *A*). However, recent figures show that almost all the major SRGs follow the unusual path of poverty reduction (*A* higher than *H*, lying above the diagonal line in Fig. 7-8); more surprisingly in case of 'others' social group.

FIG. 7-8 HEADCOUNT AND INTENSITY OF UP-MPI FOR SOCIAL AND RELIGIOUS GROUPS (1992-93 TO 2015-16)

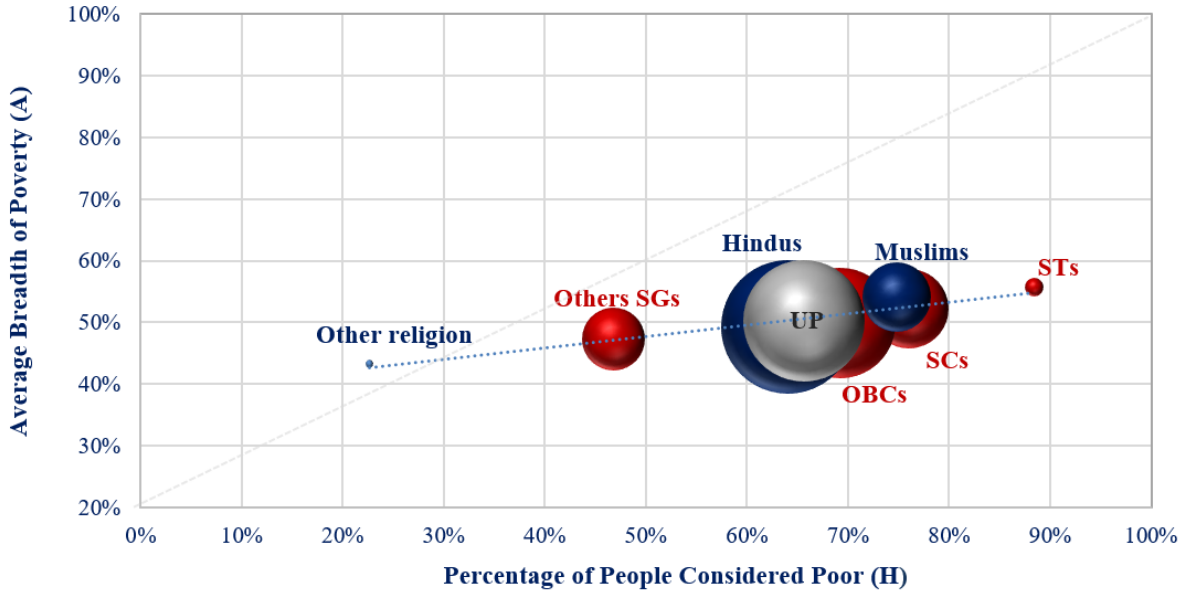


Notes: The size of the bubble represents the population size.



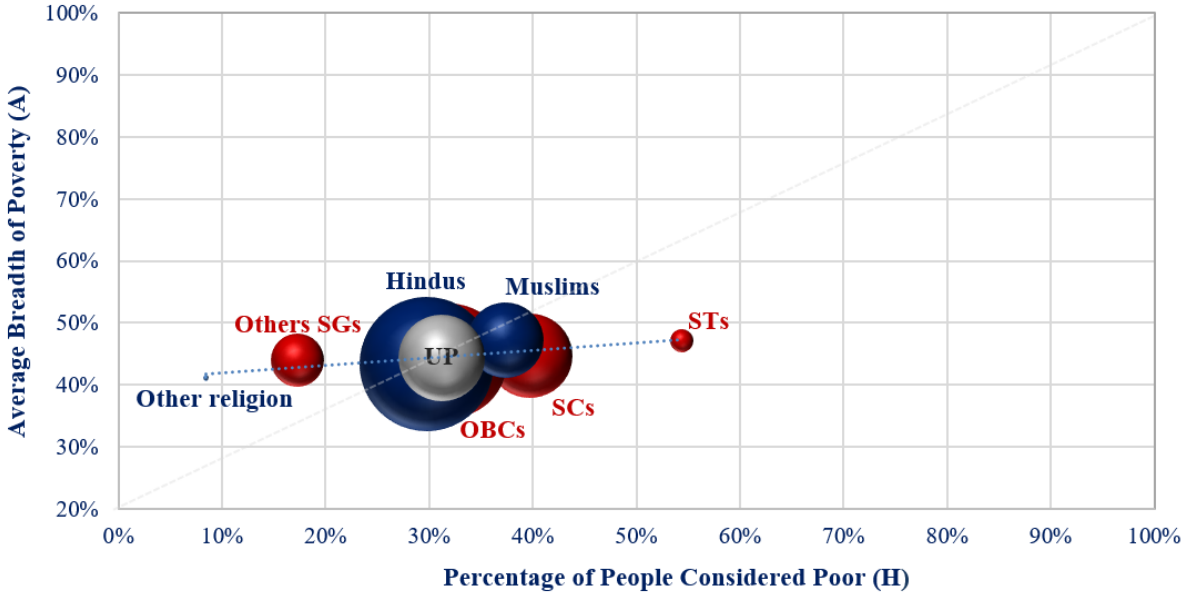
Notes: 1. Same as above.
2. Population share for OBCs is adjusted as per the sample proportion (weighted) obtained from NFHS surveys.

NFHS-3: 2005-06



Note: Same as Above.

NFHS-4: 2015-16



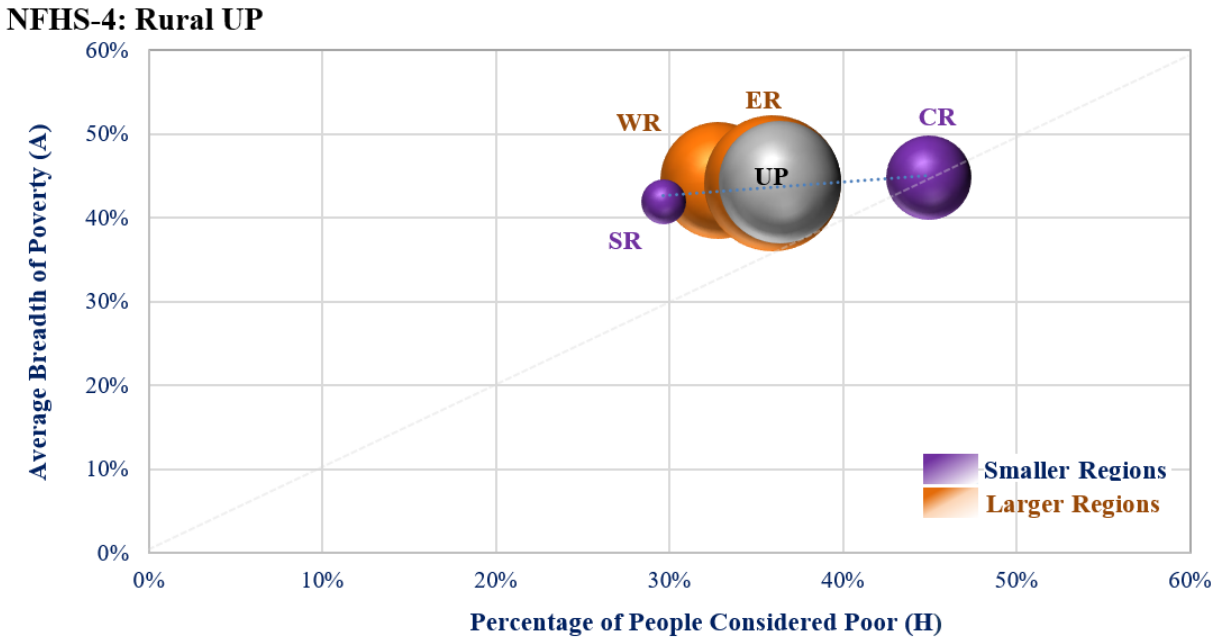
Note: Same as Above.

7.4.2 Regional Classification as per Rural-Urban Areas

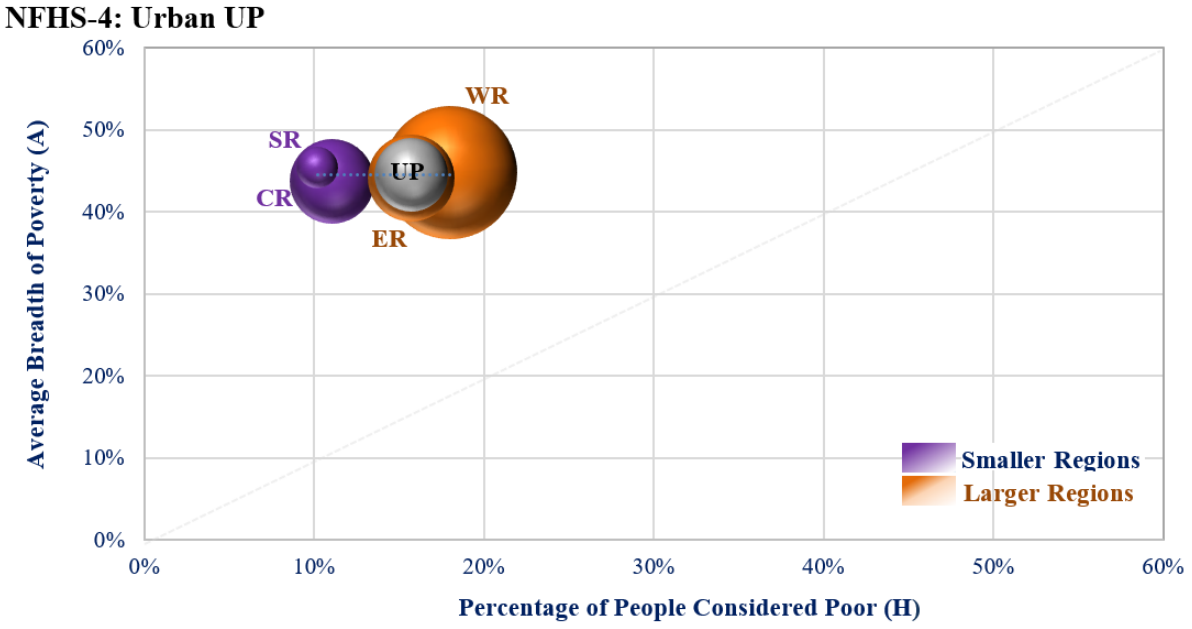
Continuing in terms of previous three reasons, regional estimates also highlight that in rural areas, CR and SR remain the poorest and least poor regions, respectively, both in terms of *H* and *A*. However, the range of intensities remains high for all (42-45%). In urban areas, however, the intensities are so comparable that their range differs by just one percentage point (44-45%). Similar to SRGs, regional classification also supports the argument that

poverty ranking can feasibly be compared in terms of headcount ratios, as intensities are intact. Furthermore, rural CR in particular (maybe WR in urban areas) possesses a relatively very high *H* and *A* that reflect CR as the most deprived region of the state. Surprisingly, all the regions in both rural and urban areas follow the unusual path of poverty reduction as their *A* is higher than *H* (lying above the diagonal line in Fig. 7-9).

FIG. 7-9 HEADCOUNT AND INTENSITY OF UP-MPI FOR REGIONS AND AREAS, 2015-16



Note: The size of the bubble represents the population size.



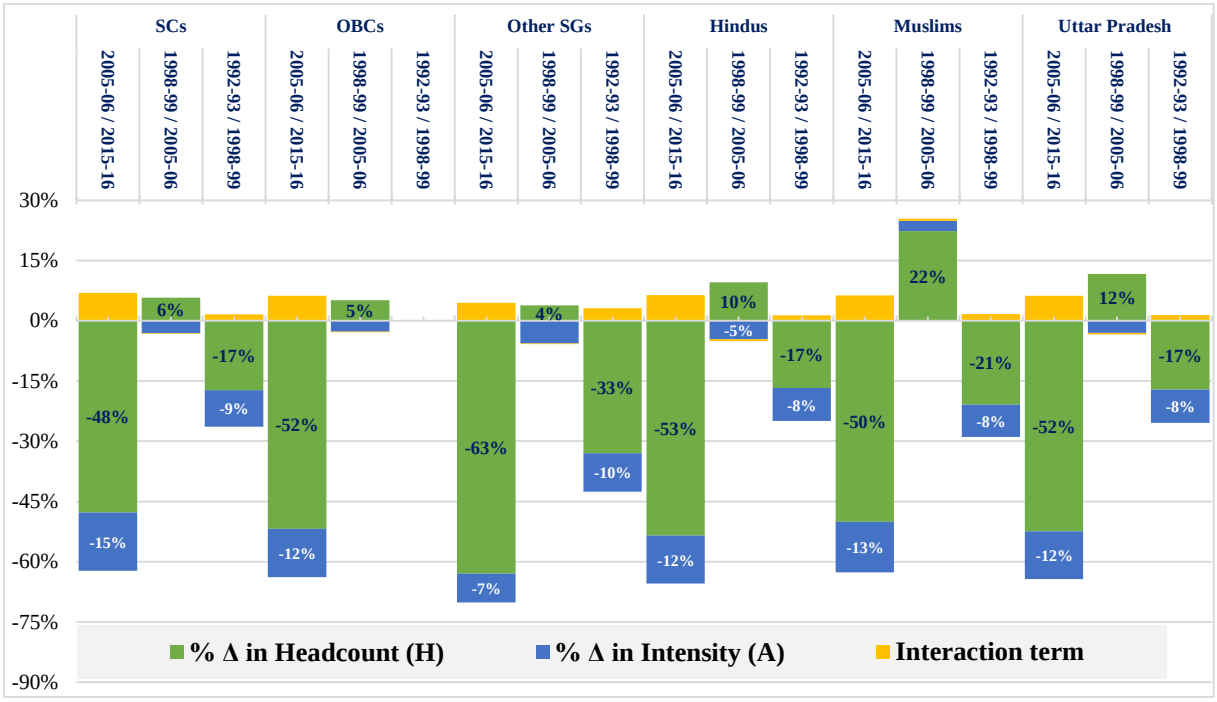
Note: Same as Above.

7.5 Changes in UP-MPI Over Time

The estimates presented in Table A-0-12 can be used to examine the changes in UP-MPI over three periods, namely 1992-93 to 1998-99, 1998-99 to 2005-06, and 2005-06 to 2015-16, along with its components (*H* and *A*) for major SRGs. It shows that MD poverty has reduced in both initial and recent periods for all SRGs, at a much higher rate, particularly in the latter period. Looking at the at MP poverty estimates across SRG in recent period (2005-06 to 2015-16), it can be observed that although MD poverty in case of historically less impoverished subgroups ('others') has been quite lower than that in the case of marginalised groups (SCs); however, the rate of decline in MP poverty is largely comparable across the social groups. For 'others', the MD poverty declined by 66 per cent (from 0.22 to .08); for OBCs by 58 per cent (from 0.35 to 0.15); and for SCs by 55 per cent (from 0.40 to 0.18). Among religious groups, Hindus recorded the highest reduction in the poverty (59 %, from 0.32 to 0.13), closely followed by Muslims (56 %, from 0.40 to 0.18). Comparing recent UP-MPI for SCs and Muslims (more or less heterogeneous subgroups) indicates that MD poverty among Muslims is much closer to that among SCs.

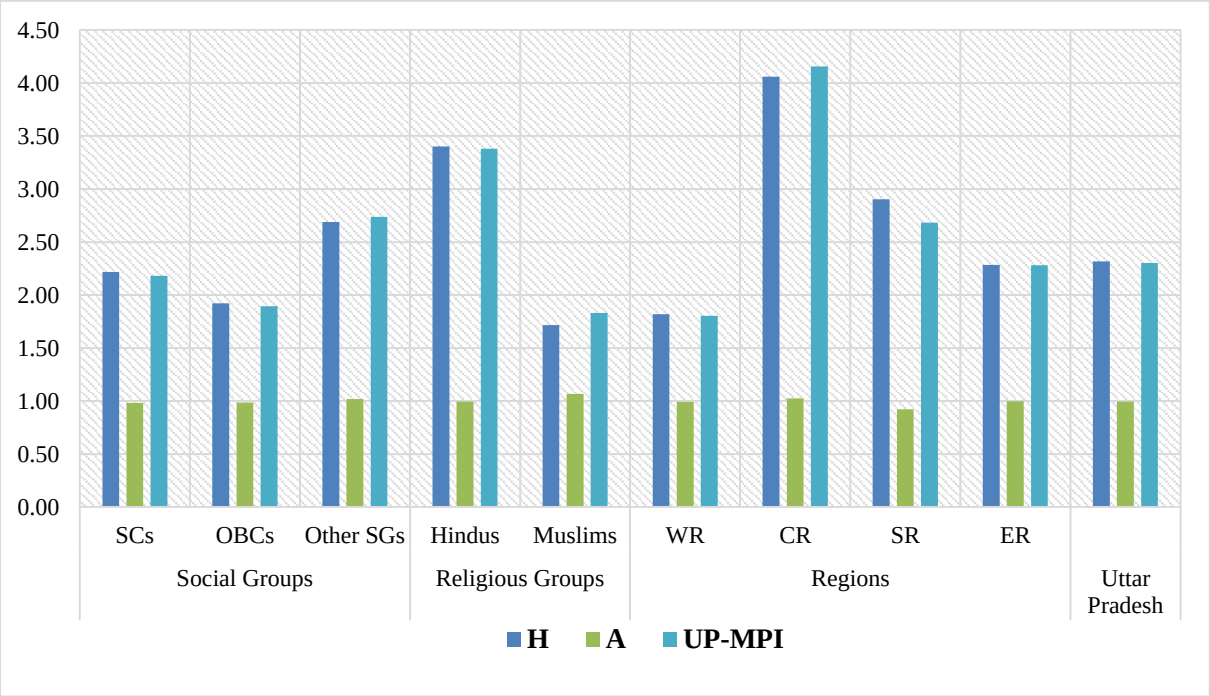
It is interesting to know which component of UP-MPI (*H* or *A* or both) contributes more to the poverty reduction. Fig.7-10 illustrates the percentage changes in UP-MPI by its components. The total percentage change in UP-MPI can be expressed as the sum of percentage change in *H* (plotted in green) and *A* (plotted in blue), excluding the interaction part (positive portion, shading in yellow) which is the product of the percentage change in *H* and *A*. This will provide the answer to why the percentage change in poverty (per annum) in the initial period was less (around 4% for SCs, and Hindus, 4.5% for Muslims, and 6.6% among 'others') compared to the current period (5.5-5.8% for SCs, OBCs, and Muslims, about 6% for Hindus, and 6.6% for 'others'). It is due to the massive decline in *H* in the recent period (4.8% in SCs, 5-5.3% in Muslims, OBCs and Hindus, and 6.3% in 'others') that there is impressive decline in overall poverty, whereas in the initial period, the role of decline in *H* is relatively less (2.8-2.9% in Hindus and SCs, 3.5% in Muslims, and 5.5% in 'others'). Furthermore, it is also possible that one of the components of UP-MPI will remain stable or rather increase while another one neutralises that with a more significant decline. The reverse case is applicable for an increase in poverty, which happened in U.P during 1998-99 to 2005-06, when intensities of UP-MPI are on a marginally declining trend whereas headcount is increasing more intensively, resulting in an increase in overall poverty across all the SRGs, particularly Muslims, with 'others' being an exception.

FIG.7-10 CHANGES IN UP-MPI IN TERMS OF *H*, A AND INTERACTION TERM, 1992-93 TO 2015-16



The changes across regions cannot be analysed as these estimates are available at one point of time provided by NFHS-4. However, regional (as well as subgroups) figures in terms of the ratio of rural UP-MPI to urban UP-MPI (light blue in Fig. 7-11) depict that poverty is much higher in rural areas compared to urban counterparts for all. In fact, for the overall U.P, it shows that rural poverty is around 2.3 times higher than that of urban areas. Surprisingly, the ratio of rural to urban poverty is four in CR, three among Hindus, and more than two among 'others'. Notable, rural-urban gap in terms of poverty headcount is also in the same order (shown in dark blue in Fig. 7-11). However, the poverty intensities across these subgroups indicate that both rural and urban areas of the state are at very high and equal levels (green in Fig. 7-11).

FIG. 7-11 RURAL TO URBAN UP-MPI RATIO, 2015-16



7.6 Contributions to UP-MPI

The relative contribution of dimension in overall UP-MPI is useful to understand which dimension among the chosen three dimensions contribute more to the overall poverty (turn to Section 4.5.2.2). However, Alkire and Santos (2010) raise two cautionary notes in this context. First, these contributions are relevant only where there exists a certain level of poverty. That means dimensional-decomposition analysis must be associated with the level of UP-MPI estimates. Second, the contribution of SOL can often be seen higher than education and health, although all three dimensions have explicitly similar weights. It may be because the SOL has a higher incidence of deprivation compared to health and education, and therefore it has higher implicit weights (greater than 33 per cent), which increases its contribution in the overall MD poverty.

7.6.1 Dimensional Contributions to UP-MPI

Fig. 7-12 illustrates the dimensional contribution to UP-MPI for major SRGs in the state. As expected, the deprivation in SOL (represented in green) makes the higher contribution to the poverty compared to the other two dimensions (education and health). However, this fact remains valid until the 2005-06 period. Afterwards, the recent NFHS-4 data brings out a notable change. Now poor people of U.P have witnessed higher deprivation

in terms of the health dimension, applicable to almost all the major SRGs under consideration (see Fig. 7-12). Exceptions to the list are the poor Muslims who are relatively more deprived in education for the entire period (1992-93 to 2015-16). Regarding the second major contributor to U.P's MD poverty, it can be seen education deprivation during 1992-93 and then health deprivation occupied the major share of deprivation among poor during 1998-99 to 2005-06, and in recent times, deprivation in SOL indicators seems to be dominating among poor for the year 2015-16.

Rural-urban differences in dimensional contribution to UP-MPI by SRGs are presented in Fig. 7-13. It shows that for poor households in rural areas, deprivation in SOL remains a major factor in general, but prevalent particularly amongst SCs and Hindus. On the other hand, deprivation in health is largely the main contributor to MD poverty in urban areas of U.P. Poor Hindu households are deprived in health dimension, whereas poor among other SRGs are recently experiencing an increase in health deprivations in urban areas. Notably, for poor Muslim households, education deprivation remains a major contributor to poverty in both rural and urban areas over the last two decades.

FIG. 7-12 CONTRIBUTION TO UP-MPI BY DIMENSIONS –SOCIAL AND RELIGIOUS GROUPS

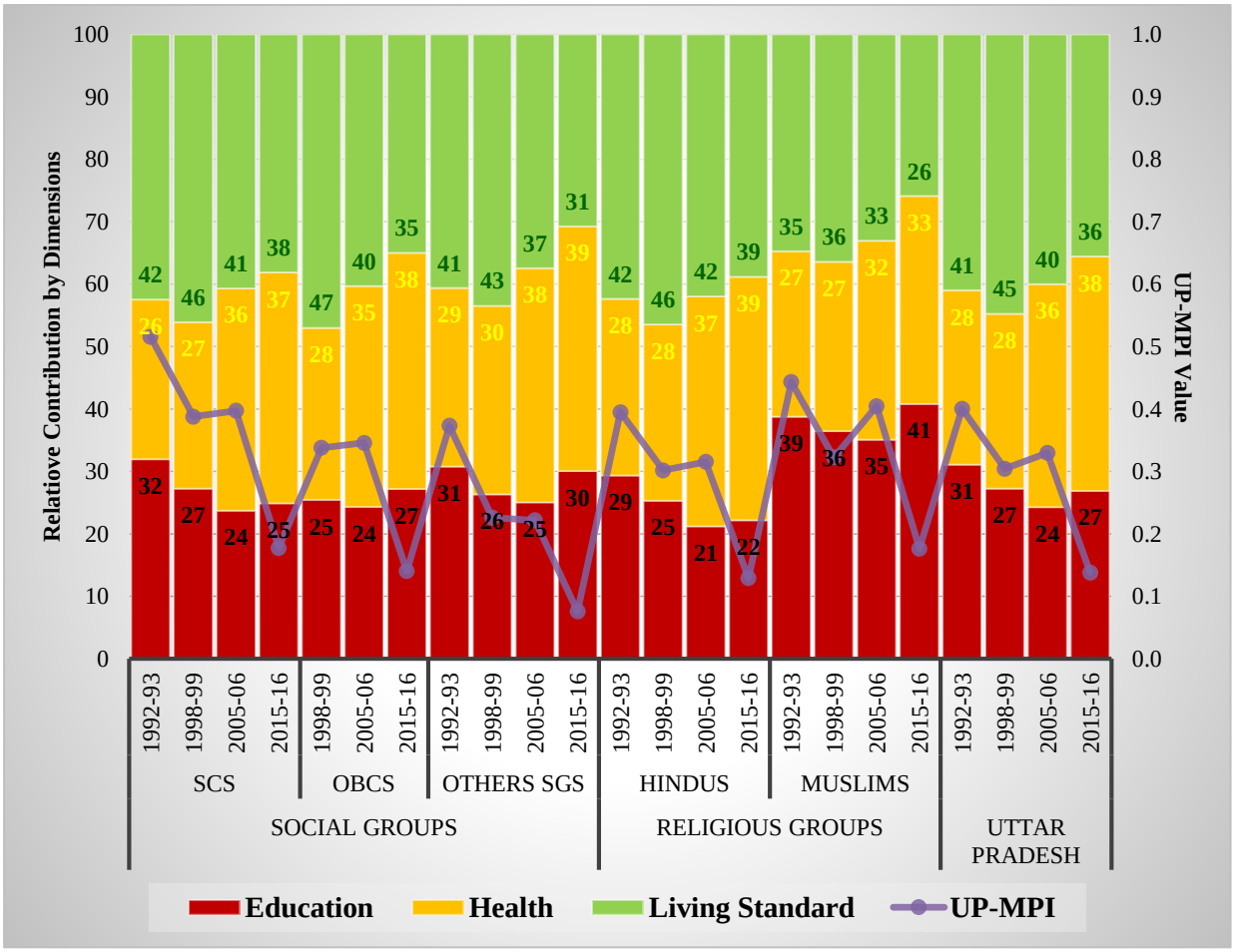
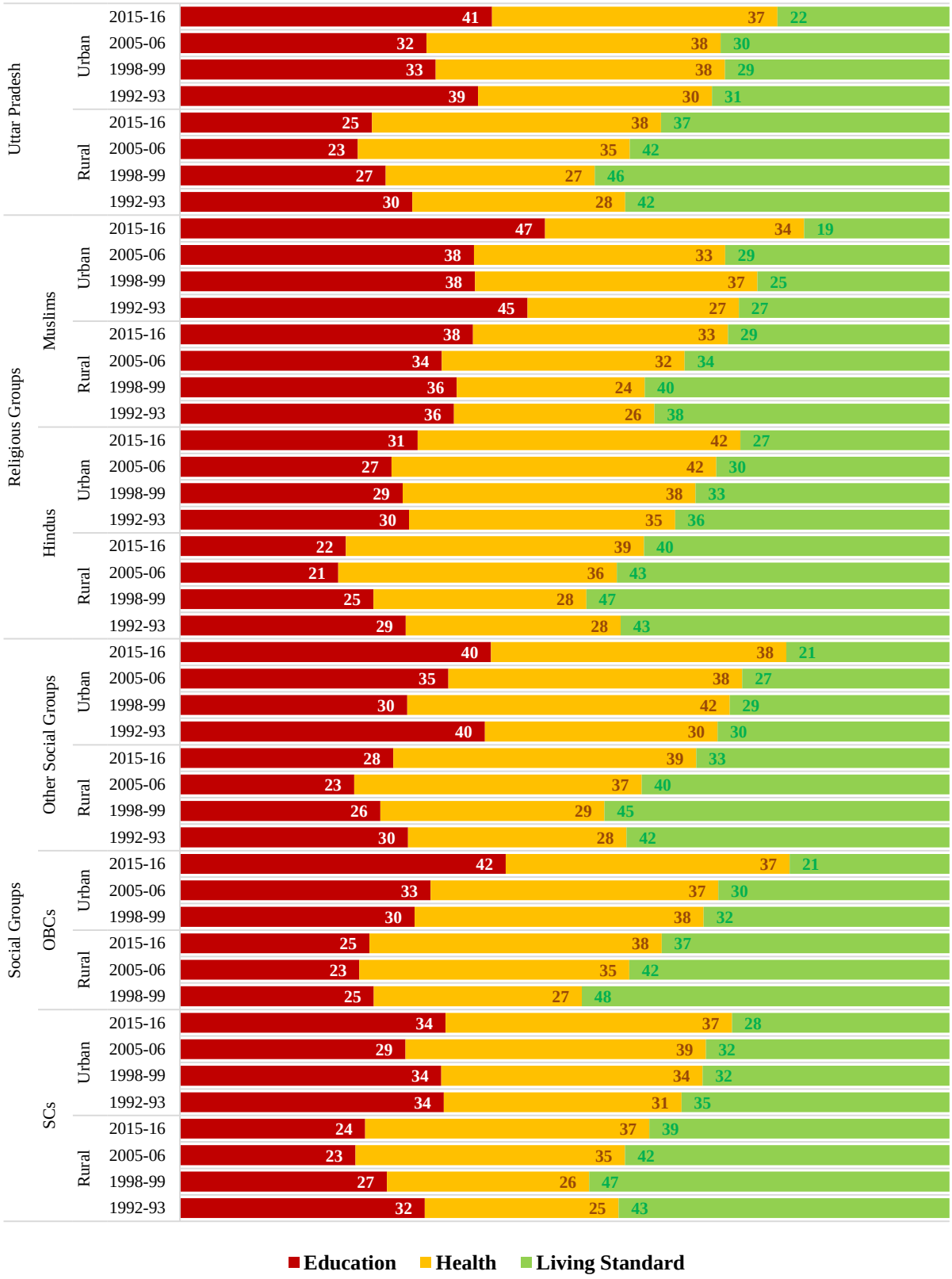


FIG. 7-13 CONTRIBUTION TO UP-MPI BY DIMENSIONS –RURAL/URBAN AND SRGS



7.6.2 Contributions of Different Indicators to the UP-MPI

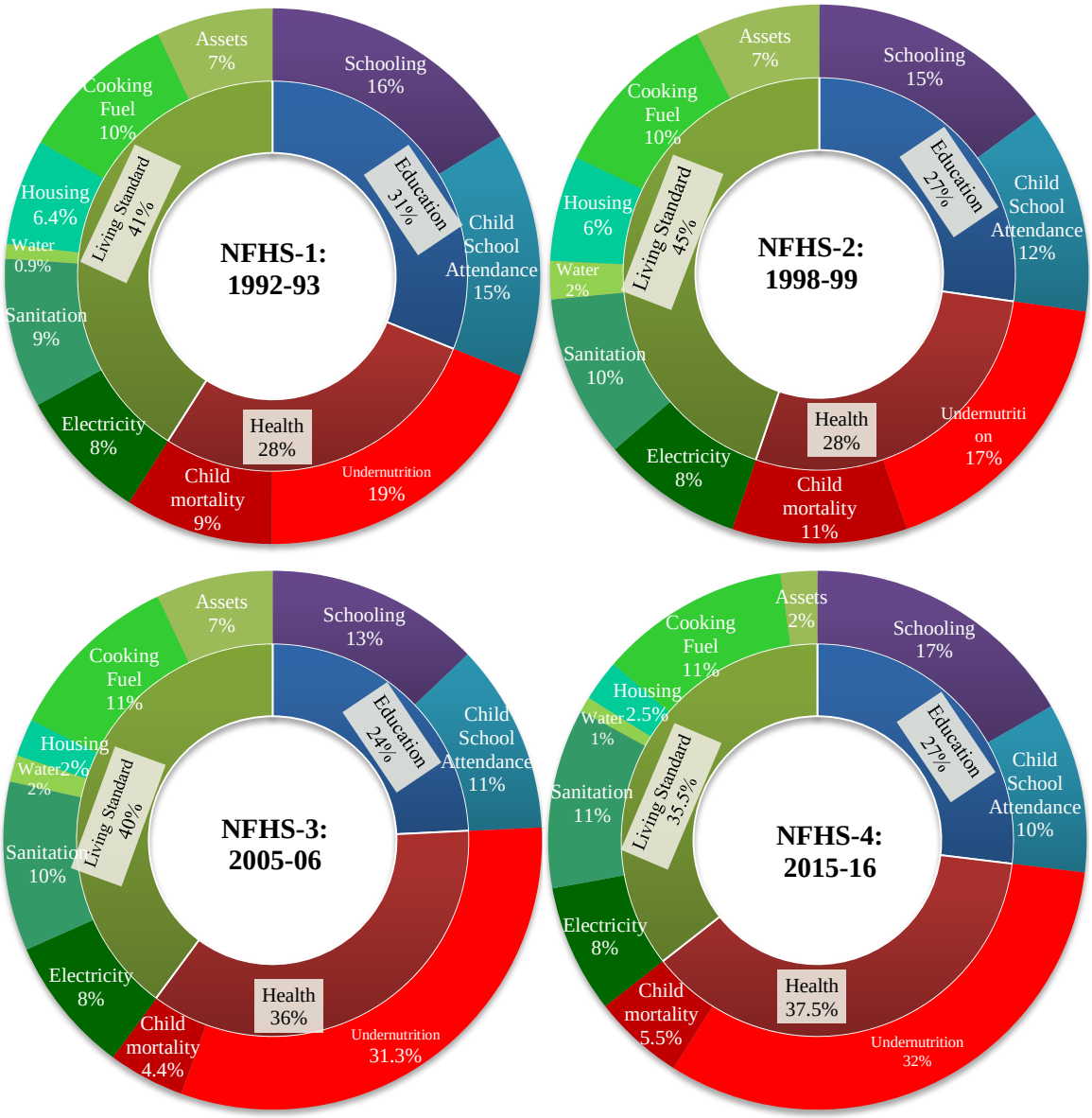
7.6.2 (a) Overall Uttar Pradesh

The above section highlights that deprivation in SOL among the poor, in general, makes the highest contribution to MD poverty among all the dimensions. In addition, Fig.7-14 illustrates the indicator-wise contribution to UP-MPI for overall U.P during the last two decades. It demonstrates that out of six indicators in SOL, it is mainly three (sanitation, cooking fuel and electricity) that largely makes the dimension a major contributor to UP-MPI (around 35.5% in 2015-16). As around 11 per cent of the MD poor are deprived because of unimproved sources of sanitation; 11 per cent are deprived because of unsafe cooking fuel, and around 8 per cent are deprived because of lack of electricity. For the rest of the three indicators, the aggregated sum of deprivation is merely six per cent during 2015-16: around 1 per cent of the people are poor and live in households that are using unsafe sources of water, around 2.5 per cent are poor living in *kachha* houses, and about 2 per cent are poor and deprived in assets.

Although educational deprivation, in aggregate, becomes lowest among three dimensions of UP-MPI in general, the level of deprivation in its indicators is quite high: around 13 per cent of poor people in U.P live in a household where no one has completed six years of education during 2005-06. The contribution of this deprivation further increased to 17 in 2015-16. Moreover, around 11 per cent of the poor lives in a household where at least a child of school-aged is not attending school during 2005-06. However, the proportion of such deprivations declined to 10 per cent in 2015-16. For the entire study period, deprivation in years of schooling exceeds child school attendance.

In recent years, the share of health deprivation among poor has increased (from 36% in 2005-06 to 38% in 2015-16). At the indicator level, the most prominent proportion of deprivation among the poor is accounted for by undernutrition. During 2015-16, around 32 per cent of the poor live in a household where at least a child is stunted or a woman is undernourished. The percentage was 31% in 2005-06. What makes these facts more striking is that the prevalence of undernourishment in India, on average, is much higher compared to Sub-Saharan Africa (Sen 1999, Svedberg 2000, Gopalan 1995, Banerjee and Duflo 2011).

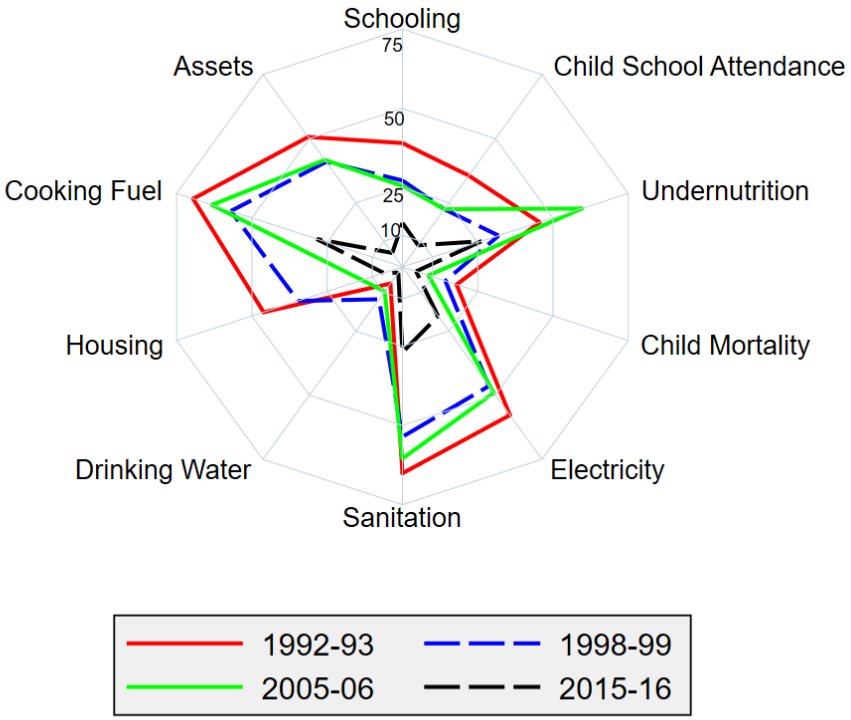
FIG.7-14 CONTRIBUTION TO UP-MPI BY INDICATORS, 1992-93 TO 2015-16



The preceding figure illustrates the composition of UP-MPI in terms of relative contributions of dimensions and indicators (out of 100% share) at one time in one figure. However, to know the absolute changes in the level of deprivation in terms of headcount across indicators, independent of dimensions, a radar type figure considering the censored headcount for all the indicators can be more effective, as shown in Fig. 7-15. Among all the ten indicators used in the construction of UP-MPI, Fig. 7-15 clearly shows that the incidence of poor households that are using unsafe cooking fuels remains at the highest levels over the entire period, followed by poor households using unimproved sources of sanitation, and those

deprived in electricity. It can be observed that during 2005-06 to 2015-16, the incidence of poor households with an undernourished woman or stunted child has decreased through; it still ranks as the third major source of poverty in the state. Moreover, the least incidence of poverty is in those households, which are using an unsafe source of water, followed by poor households that experienced a child's death in the last five years. Moreover, in recent years (2005-06 to 2015-16), the proportion of poor households that are living in *kachha* types houses has also declined, along with a decline in deprivation in Assets.

FIG. 7-15 UP-MPI (CENSORED HEADCOUNT) BY INDICATORS, 1992-93 TO 2015-16



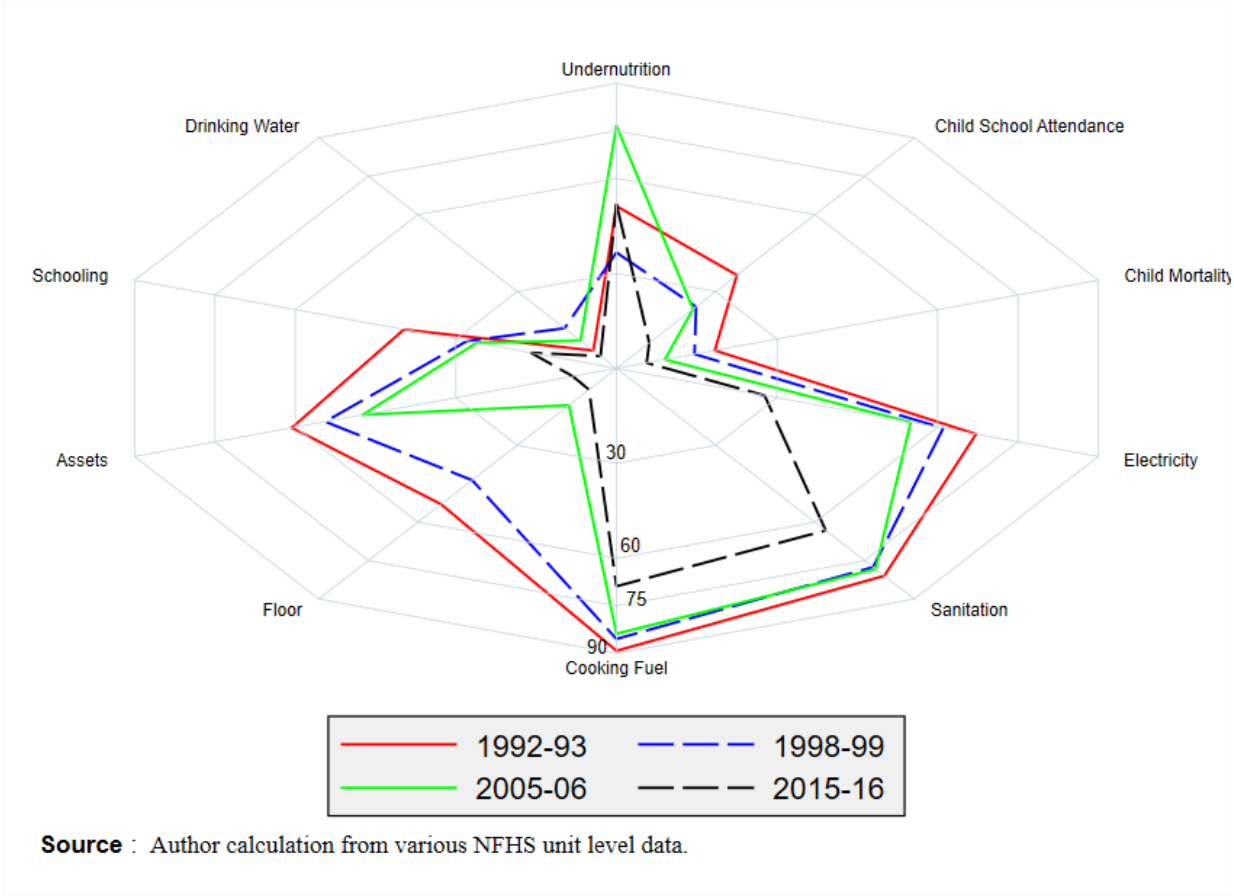
Source : Calculation from various NFHS unit level data.

Note: These estimates represent the censored headcount, which means the incidence of the population that is poor and deprived in the indicator concern.

The proportion of deprived in individual indicator (called, uncensored headcount) also provides useful information (see Section 1.5). Note that, if poor are undefined, and overall population is divided into deprived and not deprived in a particular indicator, then uncensored *H* can be estimated for all the indicators (Fig. 7-16). This measure is importance in the sense that composite index like UP-MPI always considered a trade-off between indicators. As an example, let us take two indicators (1) at least one child has died in the household within the last five years, and (2) no child in the school age is attending school. In UP-MPI, each of

these two indicators gets a weight of 1/6. This implies that there is a trade-off between children attending school and mortality rate. A household will be indifferent if one additional child dies in the household provided one additional school-age child could attend school. It would be informative if uncensored headcount were analysed so see the difference. As censored, uncensored *H* also shows that incidence of deprivation is exceptionally high in SOL dimension particularly three indicators, electricity, sanitation, cooking fuel.

FIG. 7-16 UNCENSORED HEADCOUNT BY INDICATORS, UTTAR PRADESH



Source : Author calculation from various NFHS unit level data.

The present study documents ways to promote clean cooking fuel in terms of transitions of the cooking fuel ladder (turn to Fig.7-17), alternative way outs and factors that determine it (refer Text Box 7-1). Moreover, these results highlight the extreme level of deprivation in sanitation. Therefore, a specific review of literature is presented on Open Defecation-Statistics, Consequences, Obstacles, and Ways out in Text Box 7-2.

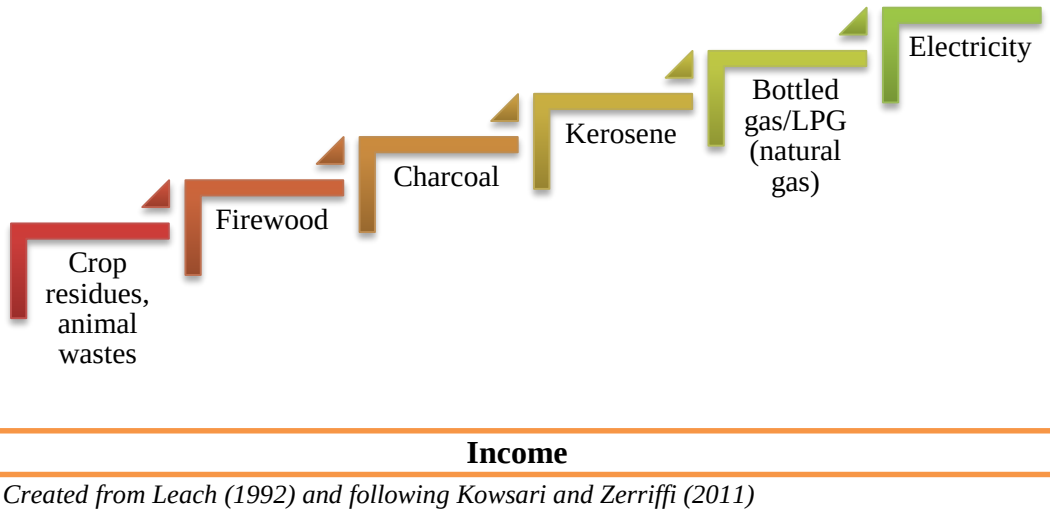
TEXT BOX 7-1: PROMOTING CLEAN COOKING FUEL – TRANSITIONS, ALTERNATIVES AND FACTORS

Studies attempt to provide solutions in promoting clean cooking fuel, as follows:

1. Electricity: World Bank (2001) and Ekholm et al. (2010) stress on the use of electricity for a sustainable and clean source of cooking, which is very rarely used in India. In fact, electricity has manifold benefits in terms of enhancing education and employment prospects (Kanagawa and Nakata, 2008).
2. Transient of Modern Fuel: Viswanathan and Kavi Kumar (2005) offer triple A's combination strategy of affordability, accessibility and awareness of clean fuel for the transient of modern fuel, particularly in rural areas. However, the availability of clean fuel in rural areas is also a matter of concern, particularly Kerosene, though not limited to. Urban households often use kerosene as a transition fuel and may be due to the pro-urban bias followed in the kerosene subsidy. On the other hand, abundant and free availability of biofuels in rural areas makes a preference for biofuels over clean fuel irrespective of income and availability of clean fuels.

The Energy Transition Theory (ETT) of Leach (1992, 1987) explains the energy transition mechanism according to which there exists an ideal fuel preference 'ladder' from the low-quality biomass fuel to relatively efficient, convenient, less polluting, and versatile advanced/modern fuel such as kerosene, LPG, natural gas and electricity (explained in Fig.7-17), choice of which depends on the greater convenience, cleanliness, time saving and modernity (Leach 1987), as well as on availability (Leach 1992). In South Asia, the existence of ETT is supported by rising income, availability, and favourable price regimes, more particularly across urban areas (Leach 1987). Many studies show that the pace of ETT is much higher in urban and semi-urban areas as compared to rural areas (Viswanathan and Kavi Kumar 2005, Van De Laar 1991), as a consequence of changing lifestyles, economic development, and reduced availability of inexpensive biomass in urban areas (Barnes and Toman 2006). However, in India, there is some transition towards (charcoal and coal briquettes (soft coke)), and not fully towards modern fuels may be because one cannot easily grill or bake on them (e.g., nan, chapatis, etc.).

FIG.7-17 FUEL PREFERRED LADDER OF ENERGY TRANSITION THEORY



Source: Created from Leach (1992) and following Kowsari and Zerriffi (2011)

Contrary to ETT, Masera, Saatkamp, and Kammen (2000) while testing data for rural Mexico, get an alternative view in terms of 'multiple fuel model' whereby households do not switch cooking fuel in a linear manner (as ETT explains) but use multiple cooking and lighting fuels. Opposite to 'ladder' pattern, they find a

'fuel stacking' strategy, in the sense that traditional fuels are not completely discarded with rising income, but rather used in conjunction with modern fuels due to cultural preferences (Ekholm et al. 2010). The multiple fuel theory is claimed to be comparatively more accurate in explaining the transition in cooking fuel patterns particularly amongst rural households (Masera, Saatkamp, and Kammen 2000).

Using NSS estimates for the years 1987 and 2010, Cheng and Urpelainen (2014) witnessed an increasing trend in fuel stacking for cooking, as LPG does not replace traditional biomass. They consider constraints on the availability of LPG and easy availability of biomass even in urban areas as probable reasons for the existence of fuel stacking theory (LPG plus traditional biomass) in India. In fact, a significant increase in household income was not able to reduce fuel stacking.

Factor affecting Transition on Cooking Fuel

Income is the primary and most agreed factor (Ekholm et al. 2010), though there are other factors such as power relations within the household, seasonal variation in income, and uncertainty about fuel availability (Soussan, O'Keefe, and Munslow 1990, Viswanathan and Kavi Kumar 2005), location (rural/urban) (Pachauri 2004), affordability along with expenditure on clean fuel and economic status (Viswanathan and Kavi Kumar 2005) specifically for India, energy prices, energy access and local fuel availability for both China and India (Pachauri and Jiang 2008) that influence transition on cooking fuel. High availability or rather economies associated with biomass fuel also reduce the chances for the adoption of cleaner fuels, particularly expensive ones like LPG. Jain et al. (2015) explain how U.P has a higher adoption of LPG compared to West Bengal, even when it faces more constraint (lower infrastructure availability and lower awareness). The fact of the matter is that in U.P 'only nine per cent households that have a connection get LPG cylinders delivered at their doorstep, whereas the number is as high as 60 per cent in West Bengal', those who travel to get their LPG cylinder, the median one-way distance is seven kilometres in U.P, as compared to only three kilometres in West Bengal. It is primarily because, in U.P, there is only 31 per cent of rural households who use free-of-cost biomass for all their cooking energy needs, whereas the corresponding percentage in West Bengal was 66 per cent. In U.P, preferences for Improved Cook Stoves (ICS) are positively related to the perceptions of health and time savings (Bhojvaid et al. 2014). The study evaluated some household factors (such as gender, education, prior experience with clean stoves) and community factors (institutions promoting ICS technologies, and social norms as perceived through the actions of neighbours) that determine the adoption of ICS in U.P.

TEXT BOX 7-2: LITERATURE REVIEW ON OPEN DEFECATION - STATISTICS, CONSEQUENCES, OBSTACLES AND WAYS OUT

Besides inadequate sanitation in general, particular attention is needed in case of open defecation. Gandhi, the Father of the Nation, stressed on the importance of sanitation over Independence during pre-independence India. The issue is critical now as then. India is still the global capital of open defecation where more than half of the population practice open defecation every day (Inclusive Media for Change 2013). WHO and UNICEF (2014) report that around one billion people practising open defecation globally, and India continues to be the single largest country that includes the highest number of people (around 597 million) practising it. A NSSO survey on Swachhta Status that was conducted during May-June 2015, reports that around 52.1 per cent of the rural population and 7.5 per cent of the urban population in India is practising open defecation (Government of India 2016d). For U.P, the proportion is even more in rural (65.9 %) but less in urban (6.4%). Nevertheless, Spears (2013a) highlights two concerning facts regarding open defecation. First, open defecation is much more common in India than it is in many countries in Africa where, on average, poorer people live. Second, despite accelerated GDP growth in India, open defecation has not rapidly declined in India over the past two decades, not even during the rapid growth period since the early 1990s.

The monitoring of open defecation is essential in the sense that defecation without a toilet is among the leading threats to health, globally and particularly in India (Spears 2012). It produces negative externalities to households beyond that practice it in terms of disease transmission. The Government of India (2012a) and others explain how open defecation is harmful for every section of society. In rural areas, it is causing serious social, economic and environmental problems. Also, the congested living arrangements of urban areas necessitated more urgently access to latrines because these types of living arrangements considerably raise the health risks associated with lack of sanitation infrastructure' (Government of Uttar Pradesh 2014a). Poor sanitation is increasing the health cost and untreated sewage from cities is one of the major sources of water pollution in India (Government of India 2017b).

The consequences of open defecation among children, in particular, are critically highlighted in terms of infant deaths and reduction of physical and cognitive growth (Lamba and Spears 2013, Spears 2013a), and may be responsible for stunting in India (Coffey, Spears, and Vyas 2017, Spears 2013a, World Bank 2010, Kozel and Parker 2003), and for diarrhea, and other diseases in India (Nandi et al. 2017). Coffey (2013) finds a significant cross-country link between open defecation and externality in the sense of disease environment that causes children's haemoglobin deficiency. Furthermore, the author suggests that policies targeting anaemia should focus more on sanitation, particularly in regions with high open defecation rates. Earlier economic literature primarily considers inadequate nutrition as the primary cause of anaemia, a disease that reduces productivity among adults and can harm the physical and cognitive development of children directly. However, Coffey, Geruso, and Spears (2017) show that improved sanitation over open defecation contributes significantly to preventing anaemia. Also, Hammer and Spears (2016) find a statistically significant impact of open defecation on children's height that provides an answer to puzzles that "children in India are shorter, on average, than children in Africa who are poorer, on average", known as the Asian enigma. On the positive side, Spears (2012) shows that improved sanitation practices have a significant contribution in improving children's health even in rural areas of India. Similarly, Kumar and Vollmer (2013), using District Level Household Survey 3 estimates, find that access to improved sanitation reduces the risk of contracting diarrhoea among children less

than 5 years of age in rural India, particularly children in high socioeconomic status households. Black, Morris, and Bryce (2003) estimate that around ten million children under the age of five die every year, and out of which, about 2.4 million die within India, with a major cause of diarrhoea. World Health Organization (2004) finds that improved sanitation reduces diarrhoea morbidity by 32%, reduces Schistosomiasis by up to 77%, and can reduce morbidity from ascariasis by 29% and hookworm by 4%.

Women practising open defecation are often forced to restrict themselves by reducing and controlling their diet, which leads to nutritional and health impacts and face higher risks of sexual assault due to lack of household toilets (Government of India 2012a). Chambers (2007) points out that open defecation is one of the common practices in various South and Southeast Asian countries, which leads to a major contributor in sickness, mortality and ill-being particularly for women lacking in accessibility of private toilets. In fact, without latrines, this means only before dawn or after nightfall.

The obstacles in improving sanitation or removing open defecation in India are also widely highlighted in studies. The Government of India (2012a), in particular, points out two challenges that are essential in reducing open defecation at least in rural areas. The first one is lack of awareness about the consequences of open defecation. In fact, the report mentioned that "*even with advent of technology in rural India. Substantive proportion of the rural poor still prefers to purchase a 'mobile phone', rather than on investing for sanitary toilets, since sanitation is neither a felt need nor open defecation is a socio-cultural taboo*'" The Bollywood film '*Toilet- Ek Prem Katha*' also stresses on these issues of sanitation, particularly for women. Secondly, in India, there is still no concept of community health and hygiene in rural areas. Furthermore, a sufficient number of studies pinpoints cultural, ritual, and pollution factors that discourage the abolition of open defecation in rural India (Coffey, Geruso, and Spears 2017, Coffey and Spears 2017, O'Reilly, Dhanju, and Louis 2017, Vyas and Spears 2018).

The caste factor, or rather, the association between 'untouchability', 'Dalit' and 'sweepers' is well known in India (Prashad 2000, Rāmasvāmi 2005), particularly in U.P (UNICEF 2011). Various studies stress that caste in the sense of, 'untouchability' should be considered for understanding the sanitation behaviour of people, particularly in rural India (Spears and Thorat 2016, Coffey, Geruso, and Spears 2017, Routray et al. 2015). The role of caste in influencing improved sanitation practices even under TSC can be visualised, as "Dalit students are forced to clean the toilet" (Bathran 2011, 36). Under TSC, a cash prize programme named 'Nirmal Gram Puraskar' (Clean Village Award) was initiated in 2003, to reward villages that are open defecation free (ODF), also recognises caste-based recognition with government policy. Villages with SC sarpanch are less likely (one-third chance) to win the prize under Nirmal Gram Puraskar despite being achieving comparable levels of latrine use as others, and at least one latrine per household (Spears 2012). Although this scheme has shown a noticeable motivation, as the number of application increases from just 40 in 2003 to 12382 in 2007-08 (Government of India 2011a), monitoring and verification are essentially required to maintain credibility (Brocklehurst 2012). Coffey, Geruso, and Spears (2017) discuss a case for low adoption of pit toilets due to caste effect in rural India based on other studies. Pit toilets are fill within a few years and there is a feeling in rural India that people belonging to 'untouchable' caste must empty it. Now, due to the untouchability factor, people are refusing to work under such circumstances that make the pit toilet less attractive in rural India compared to other countries.

In at least two studies, Vyas and Spears (2018) and Geruso and Spears (2018), significant differences

in Hindus and Muslim behaviour in relation to open defecation practices are highlighted. Vyas and Spears (2018), using DHS surveys including India, estimate that rural regions where Hindus population is more, the practice of open defecation is much more common compared with regions where non-Hindus are in the majority. Similarly, Geruso and Spears (2018), using NFHS-3 (2005-05), estimate that Indian Muslims are 25 percentage points less likely to practice open defecation compared to Hindus, despite being poorer.

Studies show that education is among the leading factors that can help in improving sanitation facilities. Coffey, Spears, and Vyas (2017) using the Indian Human Development Survey (IHDS) estimate for the year 2005 and 2012, find that richer or better-educated households, in general, were more likely to switch to using a latrine or toilet. However, the likelihood of switching declines tremendously when it was from open defecation. Barnard et al. (2013) find that households in Orissa in which the female head had been to secondary school were more likely to use latrines provided by the government. Moreover, the presence of newly married women is likely to influence the decision of adoption of toilets in the house (Coffey, Spears, and Vyas 2017). Stopnitzky (2017) studies the Haryana government's 'No toilet, no bride' campaign and finds that households are more receptive to messages about latrine construction at times when a young man is getting married – that is when a new daughter-in-law is entering the household. Spears (2012) shows an awareness message pasted along the villages of U.P; the English translation is "don't let your daughters and daughters in law go outside – make a toilet in your house!".

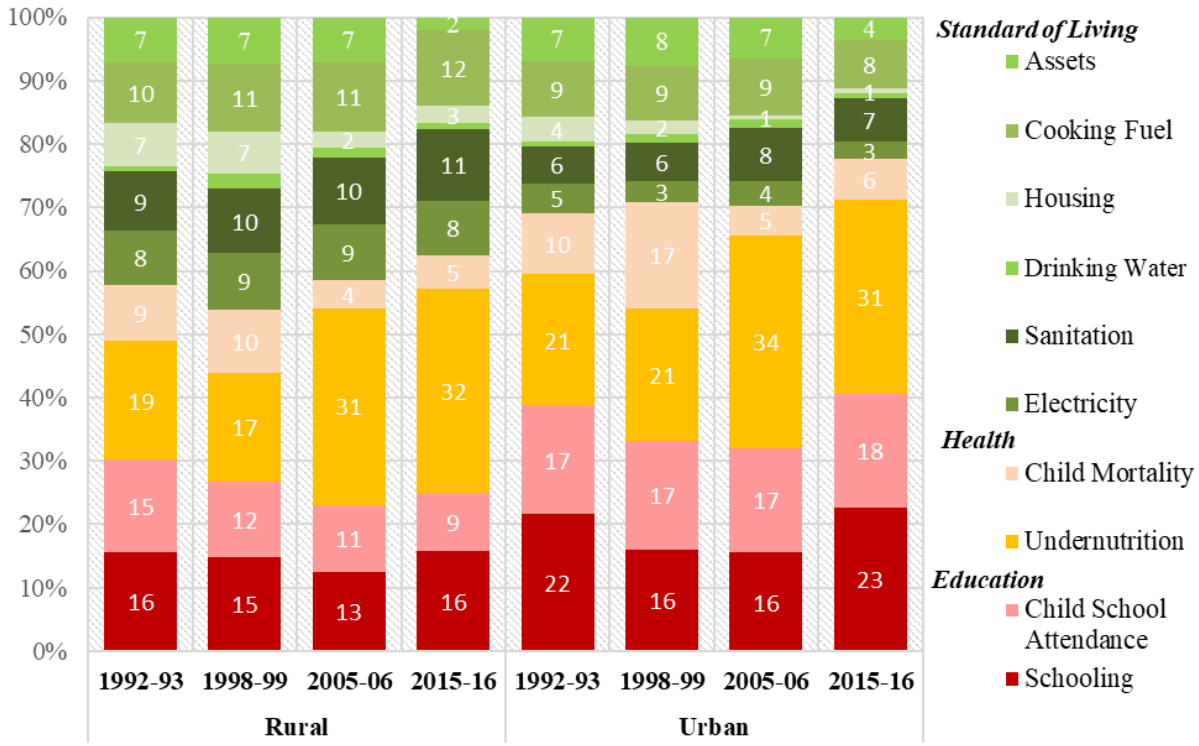
Referring to Kar and Pasteur (2005) participatory approach to controlling open defecation[132], Chambers (2007) highlight that this private interventions approach is significant in controlling open defecation particularly in South Asia, and results in noticeable improvement in health, reduction in mortality, and well-being of women, children and men as well.

[132] It is an intervention where facilitators initiate the process, that is., members of communities using open defecation are asked to 'make maps, usually on the ground, to show their communities and the areas where they defecate. They then walk and stand in those areas, face and smell reality, draw flow diagrams to show pathways from faeces to food and mouths, calculate the cartloads of shit (the crude local word is used) produced and the amounts ingested, and are then encouraged to take action on their own' (Chambers 2007).

7.6.2 (b) Rural-Urban Comparison

The area-wise dimensional contributions to UP-MPI reveal that in rural areas, SOL is the highest contributor of poverty, nearly followed by health (particularly during 2015-16), and health and education being a major contributor to urban poverty (see Fig. 7-13). The composition of UP-MPI by indicators specific to rural and urban areas (Fig. 7-18) reveals that aggregated figures at the dimensional level may hide various policy concerns. First, it is the most significant contribution of deprivation in cooking fuel, sanitation, and electricity and just a minor share of deprivation in drinking water, housing (particularly in the last decade), and assets (in 2015-16) that rank the SOL as a major contributor to rural MD poverty in particular. Second, in the last decade, the contribution of health deprivation has also reached its high level in rural areas, despite being the fact that deprivation in one out of two indicators (child mortality) witnessed a noticeable decline. It is due to the rapid increase in undernutrition, which solely contributes around one third to overall rural poverty in U.P. Third, the contribution of education to rural poverty is comparatively lower and shows a decline over time (1992-93 to 2005-06), but that decline is attributed to those deprived in child school attendance. Actually, schooling until six years as an indicator requires more intense intervention to change by the nature of stock variables, compared to others. Fourth, the major role of education deprivation in urban poverty, particularly during 1992-93 and 2015-16 goes also to deprivation in years of schooling. Nevertheless, the deprivation in child schooling remains stable (at 17%) (-18%) over the last two decades. Fifth, in urban areas, the contribution of health deprivation is also reached at a significant level (during 1998-99 to 2015-16), due to a rapid increase in undernutrition amongst children and women, contributing around one third to overall urban poverty. Sixth, although SOL has the least contribution to poverty in urban areas; two of its components, namely sanitation and cooking fuel that hold the major share, may demand a strong intervention for their alleviation.

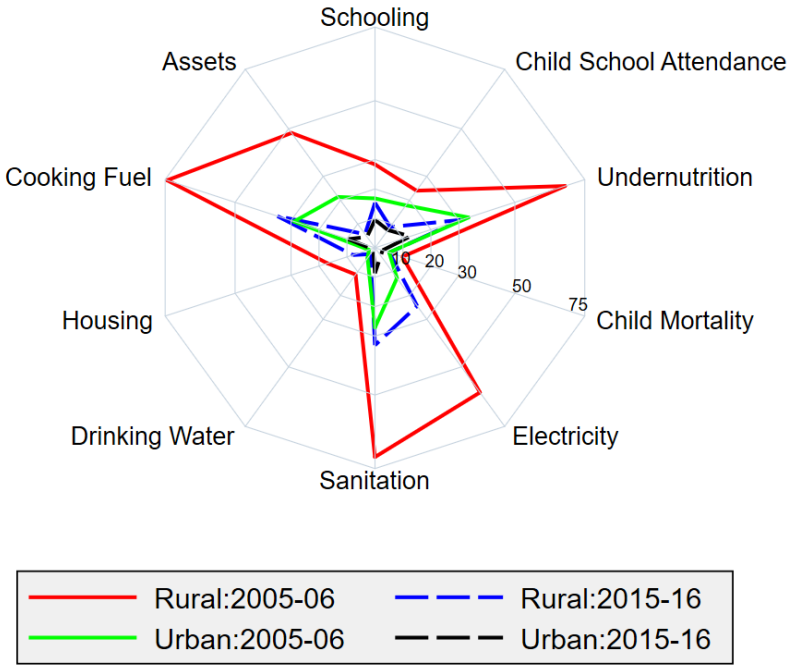
FIG. 7-18 CONTRIBUTION TO UP-MPI BY INDICATORS AND ACROSS AREAS, 1992-93 TO 2015-16



The contemporary scenario of deprivation, connecting the dots in terms of the ten chosen set of indicators along with a comparison at a rural-urban level that expresses in terms of headcount (censored[133]) and presented in the form of a radar graph (Fig. 7-19) may bring another critical concern. The Figure clearly portrays sharp sectoral differences in the level of deprivation among poor households in rural and urban areas. In each 5 out of 10 indicators, more than 15 per cent of the poor households in rural areas are deprived (namely, cooking fuel, sanitation, undernutrition, electricity and years of schooling), whereas, in urban areas, just undernutrition is showing an incidence of more than 10 per cent deprivation. Specifically, it shows that the high proportion of poor in U.P is undernourished in rural (31 %) and urban (13 %) areas. Rural concerns of poverty in the state are explicitly linked to the three SOL indicators. More than 30 per cent of the poor live in households that do not have access to improved or shared sanitation, or cook using unsafe fuel (such as dung, wood or charcoal), and around one-fourth of the poor live in households that lack electricity. In urban areas too, around 10 per cent of the poor are deprived in two of the three primary concerning SOL indicators, namely cooking fuel and sanitation.

[133] Uncensored *H* across rural and urban areas of U.P is presented in Appendix Fig. A-0-1.

FIG. 7-19 UP-MPI HEADCOUNT COMPARISON BY INDICATORS AND AREAS, 2005-06 & 2015-16



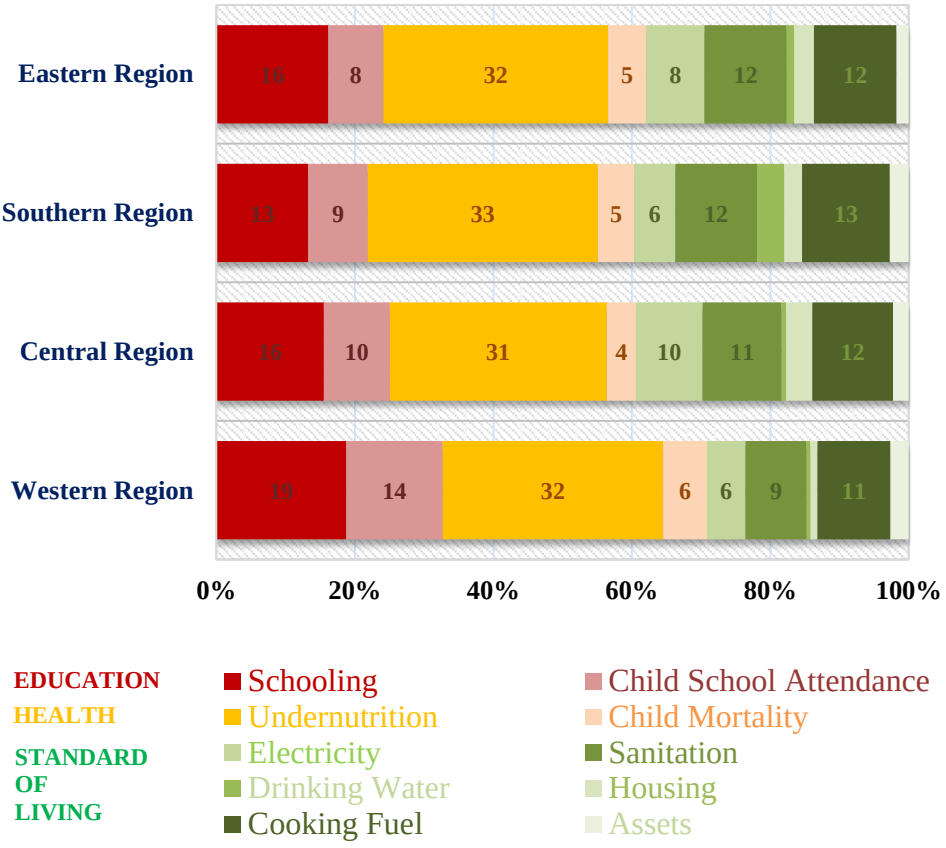
Source : Authors calculation from NFHS-3 and NFHS-4 unit level data.

Note: Same as in Fig. 7-15

7.6.2 (c) Comparison by Regions

It is worth noting that SOL turns out to be the dominant contributor to UP-MPI in CR (39%), SR (40%) and ER (38%), closely followed by health deprivation (36-38%), whereas the WR is highly deprived in health indicator (38%), followed by education (33%). These facts clearly reflect the interregional differences in the pattern of deprivation in the state. Besides, at indicators level, undernutrition remains an unwieldy contributor (more than 30 per cent), and deprivation in years of schooling as the second major contributor (more than 13 per cent) in UP-MPI across all regions. A difference exists for the third major contributor, as in WR, it is deprivation in child school attendance (14%) whereas, in other three regions, it is deprivation in cooking fuel (12-13%). WR is comparatively less deprived in sanitation (9%) compared to the other three regions (around 11-12%). Notably, poor households deprived in electricity are relatively higher in CR (10%), followed by ER (8%), compared to the other two regions (6% in both).

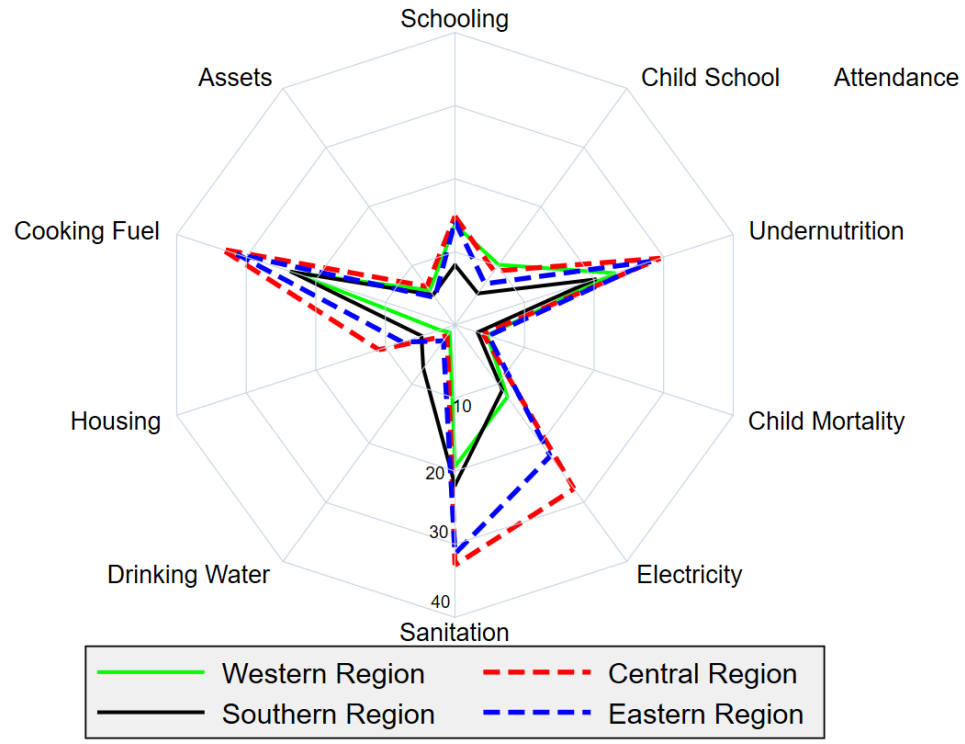
FIG. 7-20 CONTRIBUTION TO UP-MPI BY INDICATORS AND REGIONS (VERSION -1), 2015-16



The regional comparison of deprivation across indicators at the level of headcount (censored[134]) as shown in Fig. 7-21 shows that CR is the most deprived and SR is the least deprived region in the state. Poor in CR suffer the highest level of deprivation in seven out of ten considered indicators, namely years of schooling (15%), undernutrition (30%), electricity (28%), sanitation (33%), housing (11%), cooking fuel (34%), and assets (7%). SR has the lowest level of deprivation in five out of 10 indicators, namely, years of schooling (8%), child school attendance (5%), undernutrition (20%), child mortality (3%), and electricity (11%), and WR in rest of the three indicators: sanitation (19%), drinking water (1%), and housing (2%). Furthermore, in terms of proportion of poor it has more than one-fourth of deprivation; in CR, it is in four out of the 10 indicators (undernutrition, electricity, sanitation, and cooking fuel); in ER, it is among the three indicators (undernutrition, sanitation, and cooking fuel); whereas it is nil in SR and WR.

[134] Region wise uuncensored *H* is presented in Appendix Fig. A-0-2.

FIG. 7-21 UP-MPI CENSORED *H* BY INDICATORS AND REGION (VERSION -2), 2015-16



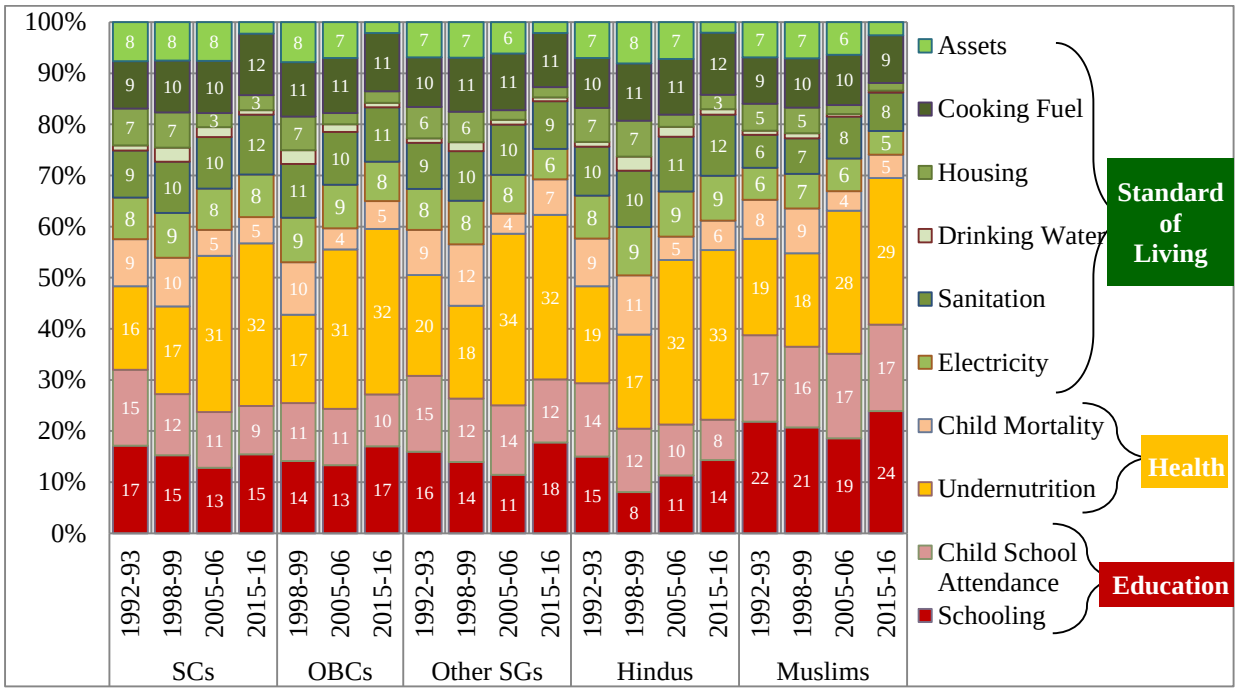
Source : Authors calculation from NFHS-IV 2015-16 unit level data.

Note: Same as in Fig. 7-15

7.6.2 (d) Comparison across Social and Religious Groups.

The composition of UP-MPI by SRGs of U.P (Fig. 7-22) also confirms that undernutrition remains the major contributor, contributing more than 30 per cent during the last decade (with slightly less (28-29%) among Muslims). Although years of schooling remains the second longest contributor, its contribution varies widely across SRGs. It is lowest among Hindus (14%) and highest in Muslims (24%), and surprisingly SCs with 15 per cent and 'others' with 18 per cent during 2015-16. Child school attendance is ranked as the third major contributor across SRGs until 2005-06, but the range of contributions varies significantly: lowest to Hindus (10%) and highest to Muslims (17%), SCs and OBCs (11%), and 'others' (14%). Notably, in the last decade, deprivation in sanitation has increased, particularly amongst SCs, OBCs, and Hindus. Besides this hodgepodge analysis, a few clearly apparent facts are worth noting for the policy concerns. Education deprivation (both years of schooling and child school attendance) has the highest contribution among Muslims poverty; undernutrition in 'others'; electricity and housing in SCs and Hindus; drinking water and assets in SCs; and sanitation among Hindus. (See Text Box 7-2 for a discussion on Hindus and Muslims behaviour in relation to open defecation practices in India).

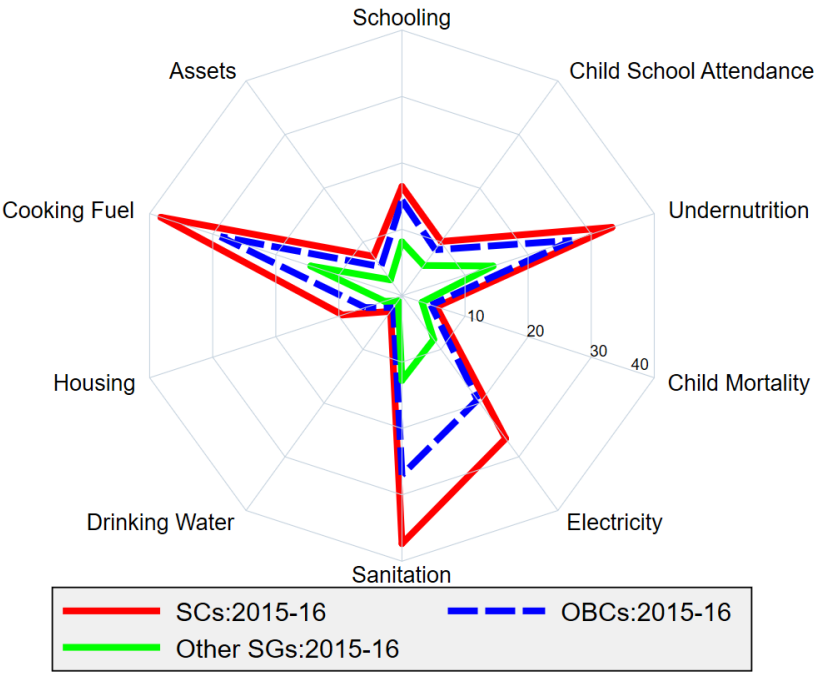
FIG. 7-22 CONTRIBUTION TO UP-MPI BY INDICATORS AND SOCIAL AND RELIGIOUS GROUPS



Looking at the recent levels of deprivation in terms of headcount (censored[135]) across ten considered indicators, Fig. 7-23 unambiguously ranks poor amongst SCs, OBCs and 'others' as the most deprived, second most deprived, and the least deprived social group among all the ten indicators, respectively. Moreover, comparisons across major religious groups (Fig. 7-24) reveals that the poor among Muslims are comparatively more deprived in both the indicators of education and health along with cooking fuel and sanitation, despite the fact that Muslims (3.9 crore) account for even less than one fourth of the Hindus population (16 crore) in the state. These rankings are also confirmed by the fact that a number of indicators in which poor population is deprived by 30 or more per cent range from three indicators among SCs (undernutrition, sanitation, and cooking fuel) to two among Muslims (undernutrition and cooking fuel). The uncensored headcount for Hindus and Muslims of U.P is presented in Appendix Fig. A-0-4. Irrespective of MD poor, it shows that Muslims in U.P are relatively highly deprived in both the indicators of education, whereas Hindus are highly deprived in cooking fuel and sanitation indicators.

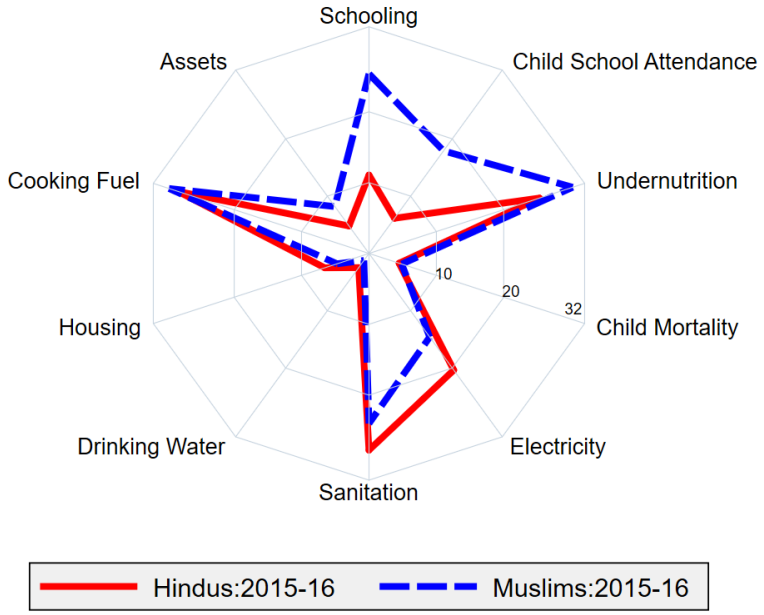
[135] Uncensored *H* across social groups of U.P is presented in Appendix Fig. A-0-3.

FIG. 7-23 UP-MPI CENSORED *H* BY INDICATORS AND SOCIAL GROUPS, 2015-16



Source : Authors calculation from NFHS-4 unit level data.

FIG. 7-24 UP-MPI CENSORED H BY INDICATORS AND RELIGION, 2015-16



Source : Authors calculation from NFHS-4 unit level data.

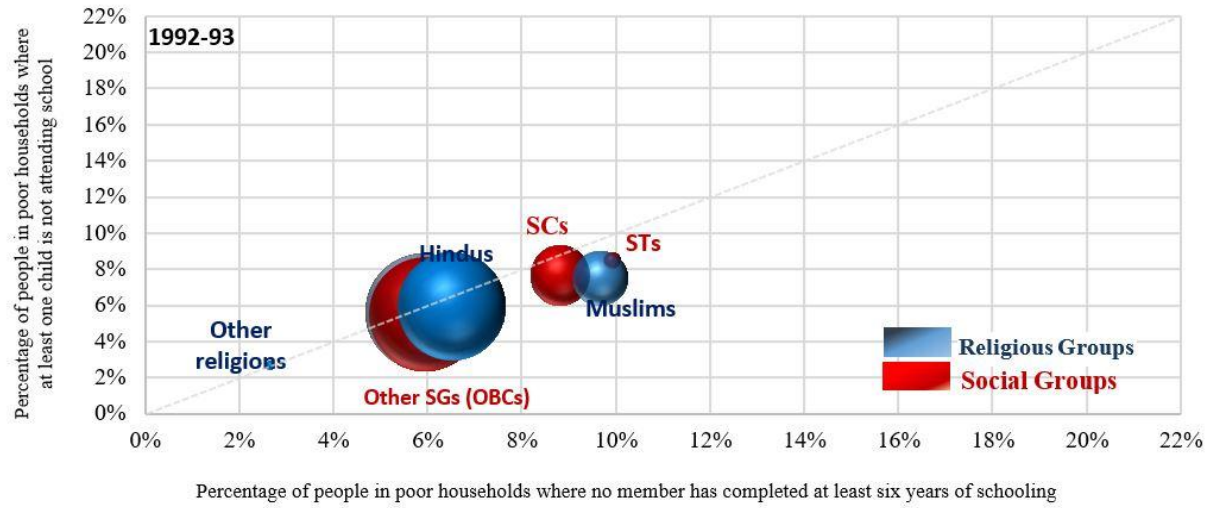
7.7 Comparison of Indicators by Dimension

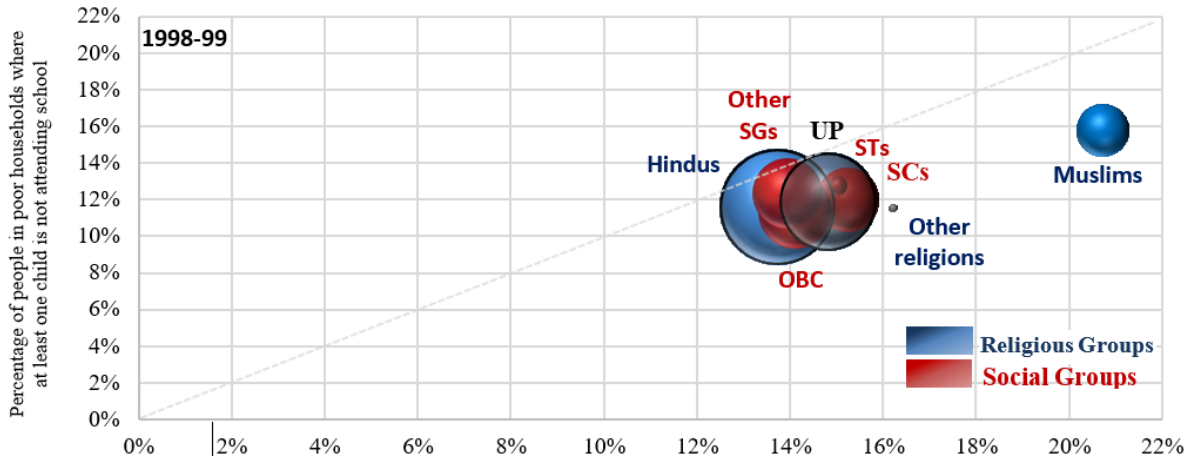
7.7.1 Education Dimension

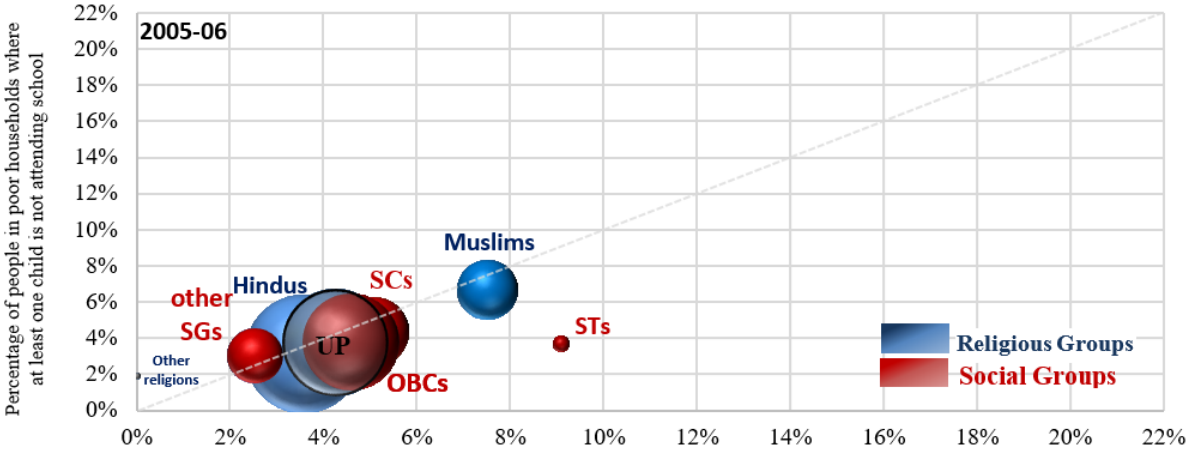
Fig. 7-25 depicts the percentage of people in poor households in which no member has completed at least six years of schooling (years of schooling) against the percentage of people that live in poor households where at least one child in its school going age is not attending the school (child school attendance). It shows that bubbles corresponding to Muslims, in particular, are intensely faraway compared to other SRGs for all the years under consideration. Moreover, in the initial year (1992-93), bubbles corresponding to SCs and Muslims, in particular, are below the diagonal line, reflecting that these groups are relatively more deprived in years of schooling compared to child school attendance. However, since 1998-99, almost all the major subgroups (SCs, OBCs, 'others', Hindus and Muslims) have moved below the diagonal line, which indicates that deprivation level in child school attendance declines faster compared to years of schooling. The bifurcation between OBCs and 'others' since the NFHS-2 (1998-99) reveals that OBCs poor are far more deprived in education compared to 'others' (refer last part of Fig. 7-25). Furthermore, poor among SCs, OBCs, and Muslims, in particular, are highly deprived in education compared to average UPian[136].

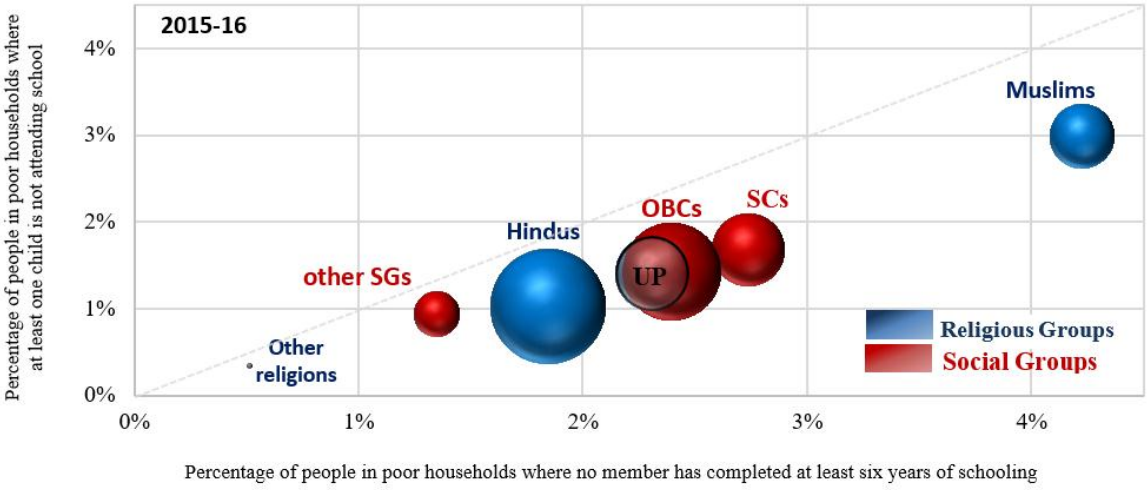
136 U.P is one of the biggest and poorest states in India. Perspectives of people and economic conditions in the Eastern region are very much different from those in the west. There is an essential need to develop the united sense of belonging for the development of the state, irrespective of the region as a whole. With this intention, I want to propose a common name for people belonging to the state as UPian.

FIG. 7-25 YEARS OF SCHOOLING AND CHILD SCHOOL ENROLMENT IN UTTAR PRADESH, 1992-93 TO 2015-16









A similar plot for two health indicators (undernutrition and child mortality) was also drawn, which shows that poor households in U.P among all subgroups possess a much higher level of deprivation in nutrition compared to child mortality. That is even known from the previous discussion; therefore a separate discussion on the health deprivation is not carried forward.

7.8 Summing up

The estimation of UP-MPI, in terms of headcount, intensity and overall poverty across regions, districts and major SRGs, along with decomposition of dimensions, indicators and subgroups, draws many inferences. UP-MPI complements the consumption poverty for all SRGs and regions (particularly in rural areas). SCs are consistently most impoverished and all dimensions (education, health, and SOL), followed by OBCs. Muslims account for consistent and overall higher poverty.

SOL, in general, is a major contributor to MD poverty in the state, particularly deprivation in sanitation, cooking fuel, and electricity. Recently, undernutrition is prominently increasing among all SRGs. Exceptionally; Muslims are more deprived in education dimension.

MD poverty in the state is largely concentrated in rural areas, mostly in ER and CR. Districts with the most substantial poverty level are located in the ER, namely Shrawasti, Bahraich, and Balrampur. Fortunately, poverty in the state has reduced comparably among historically less impoverished subgroups (‘others’) and marginalised groups (SCs). Poverty among Muslims is much closer to SCs. Some of the inferences drawn from these findings develop a new understanding regarding MD poverty and that requires precise testing of these estimates.

CHAPTER 8

Testing Precision of Multidimensional Poverty:

Issues of Mismatches and Robustness

8.1 Introduction

This chapter assesses the precision of MD poverty estimates (UP-MPI) by changing some of its methodological considerations and assessing how comprehensively it equates with the other notions of poverty (consumption and wealth). It includes a comparison between three notions of poverty (consumption, wealth and UP-MPI) in terms of correlations analysis, mismatches (exclusion and inclusion errors), and conditional probabilities associated with them. Last, a robustness analysis has been done to determine the sensitivity of UP-MPI estimates by changing deprivation weights and poverty cut-off (*k*).

8.2 Consumption, Wealth and Multidimensional Poverty

8.2.1 Consumption Poverty and Dimensions of UP-MPI

With the present state of availability of data, particularly for consumption poverty, the correlation between consumption poverty and UP-MPI along SRGs and four regions of the state can be analysed roughly for the period 1992-93 to 2005-06 (refer to Table 8-1)[137]. As the recent available consumption estimates are for 2011-12 whereas UP-MPI is for the year 2015-16. Table 8-1 shows that UP-MPI is capturing a slightly overlapping but mostly distinct aspect of consumption poverty (*cor.*: .42 to .56). Specific to dimensions, consumption poverty is highly correlated with educational deprivation (*cor.*: .49 to .68), followed by SOL (*cor.*: .26 to .38) and least to health (*cor.*: .10 to .23).

Nevertheless, correlation analysis at the household level can deliver better results, provided consumption and UP-MPI estimates are from the same survey. In the NFHS, wealth estimates can determine the wealth-poor as the percentage of people lying in the

[137] The correlation (*cor*) is examining in terms of three methods (Pearson's, Spearman's rank, and Kendall's rank—tau-b and tau-c). For detailed explanation on the calculation and rationale of these methods, refer Alkire et al. (2015).

lowest/poorest quintile in the wealth index[138]. The correlation analysis reveals that wealth poverty is highly correlated with consumption poverty (Table 8-2), particularly in rural areas of U.P (for rural; *cor*.: .59 to .84; for urban, *cor*.: .34 to .56). To estimate the correlation between wealth poor and MD poor,

Table 8-3 reveals that wealth poverty is moderately associated with UP-MPI and specific to deprived dimensions, it is comparatively close to SOL, followed by education; the correlation with health is weak.

The correlation estimates permit to use wealth poverty as a proxy for consumption poverty purposely to depict how well it identifies MD poverty (overlaps between two measures) and to what extent these measures identify the different set of households as poor (mismatches between two measures). These mismatches, in particular, are important in the sense that consumption poverty is used most often as a targeting tool for various poverty alleviation programmes. The degree of overlaps between MD and wealth poverty is expressed in terms of either coinciding headcount between the poor in both or coinciding headcount between non-poor in both, which will depict to what extent they yield similar information regarding deprivation status of households. On the other hand, the mismatches between the two are estimated in terms of two types of error: one wherein household is not MD poor but wealth poor, calling it a Type-I error or inclusion error, and the second where the household is MD poor but not wealth poor, called as Type-II error or exclusion error. Since UP-MPI is more comprehensive as it includes three distinct components of deprivation (education, health, and SOL) whereas wealth poverty is more or less considering economic deprivation only; so the particular concern is about the Type-II error that may be occurred as some of the MD poor may be ignored by wealth poverty. A little caution is about Type-I error that might occur due to considerations of some non-MD poor (Fig. 8-1). Furthermore, Table 8.4 shows the estimates of conditional probability associated with exclusion errors (given that a household is not wealth poor, what is the probability that it is identified as MD poor) and

138 The wealth index is constructed by combining information on 33 household assets and housing characteristics such as ownership of consumer items, type of dwelling, source of water, and availability of electricity, into a single wealth index. The household population is divided into five equal groups of 20 per cent each (quintiles) at the national level from 1 (lowest, poorest) to 5 (highest, wealthiest). For more details about the wealth index, refer Rutstein and Johnson (2004). Note that in NFHS-3, wealth data is included in household file by default, whereas in NFHS-1 and NFHS-2, there is a separate file for wealth data. This separate file is merged with household data using household id variables in NFHS-1 and NFHS-2 to compare the wealth estimates across these rounds.

with inclusion errors (given that a household is wealth poor, what is the probability that it is not identified as MD poor)[139].

TABLE 8-1 CORRELATION BETWEEN CONSUMPTION POVERTY AND DIMENSIONAL HEADCOUNTS OF UP-MPI

Dimensions/UP-MPI*	Pearson	Spearman	Kendall Tau-b	Kendall Tau-c
Education	0.67	0.68	0.49	0.51
Health	0.16	0.23	0.16	0.17
SOL	0.35	0.38	0.26	0.27
UP-MPI	0.56	0.59	0.42	0.44

*Note: *Correlation analysis for the period 1992-93 to 2005-06.*
Source: For consumption poverty, 50th, 55th and 61st rounds of CES, NSSO and for UP-MPI, NFHS (I, II, III).

TABLE 8-2 CORRELATION BETWEEN CONSUMPTION AND WEALTH POVERTY

U.P*	Pearson	Spearman	Kendall Tau-b	Kendall Tau-c
Rural	0.84	0.74	0.59	0.62
Urban	0.56	0.56	0.34	0.35

*Note: *Correlation analysis for the period 1992-93 to 2005-06.*
Source: For consumption poverty, 50th,55th and 61st rounds of CES, NSSO and Wealth poverty, NFHS (I, II, III).

TABLE 8-3 CORRELATION BETWEEN WEALTH POVERTY AND UP-MPI HEADCOUNT, 2015-16

Dimensions[140]	Pearson	Spearman
Education	0.28	0.26
Health	0.13	0.12
SOL	0.31	0.31
UP-MPI	0.48	0.47

Source: NFHS-4 (2015-16).

The estimates presented in Table 8-4 suggest that the potential exclusion error of using the wealth-poverty measure (that is here serving as a proxy for consumption poverty) in place of UP-MPI is quite high. Notably, over the period, particularly 2005-06 to 2015-16,

139 Conditional probability for inclusion (Type-I) error is the proportion of households that are wealth poor but not MD poor with respect to overall wealth poor. Similarly, the conditional probability for exclusion (Type-II) error is the proportion of households that are MD poor but not wealth poor with respect to overall wealth non-poor. For more details, refer to Alkire and Santos (2010).

140 For large scale unit level data available in NFHS-4 data, Kendall Tau-b and Kendall Tau-c statistics are beyond the scope of calculations even by the workstation.

there seems to be a convergence between MD and wealth poverty due to a sharp decline in UP-MPI while wealth poverty remains stable over time. Finally, the gap between the two has narrowed down very significantly and even approaching to comparable level during 2015-16. That is why the conditional probability in terms of exclusion error falls from 57% in 2005-06 to just 17% in 2015-16 at the overall state level. Even across SRGs, the exclusion error (probability) that stands as high as 81% among SCs during 1992-93 came down to 18% in 2015-16. The notable exception is Muslims whose wealth deprivation is still very widely differs from UP-MPI particularly in recent years because MD poor is far exceeding the wealth poor.

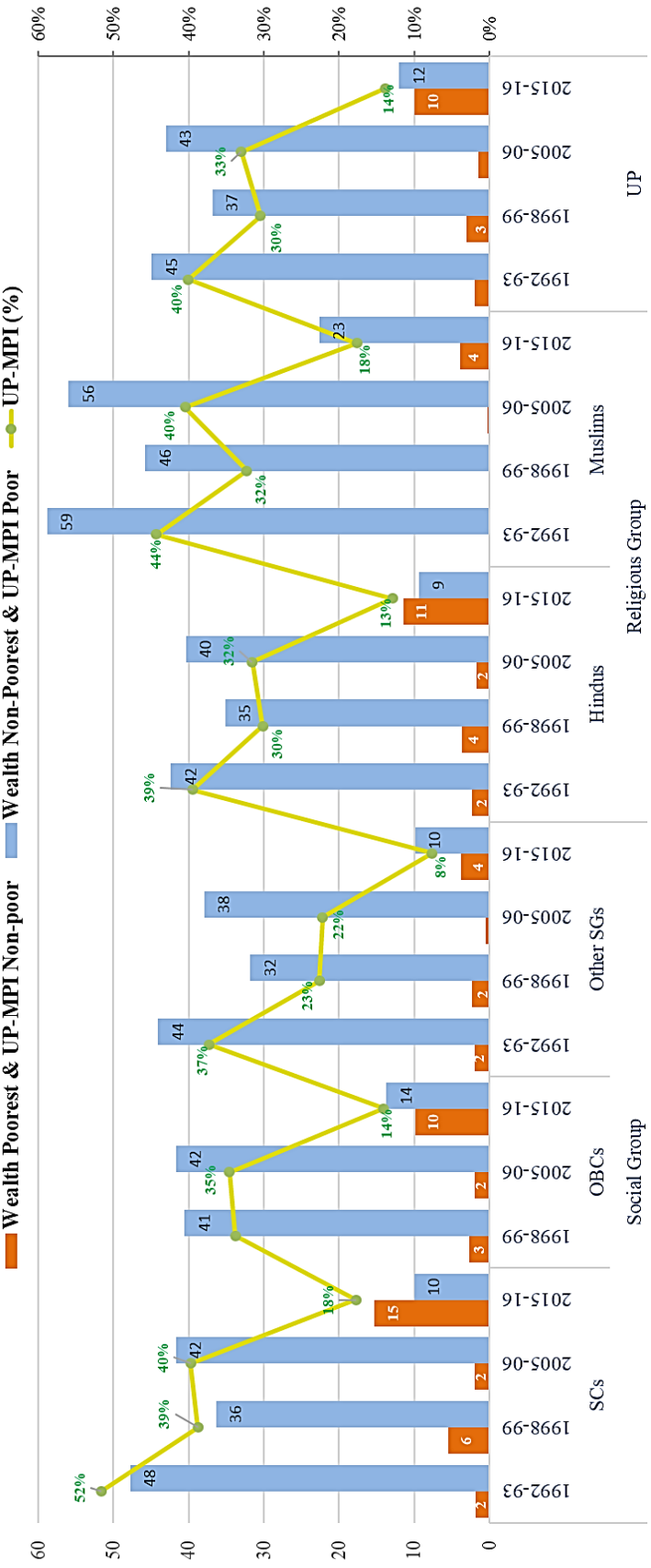
TABLE 8-4 CONDITIONAL PROBABILITY IN TERMS OF EXCLUSION ERRORS, UP-MPI AND WEALTH POOR

SRGs /U.P	Exclusion Error (Conditional Probability)				Inclusion Error (Conditional Probability)				MD poor as per UP-MPI				Wealth-Poor			
	1992-93	1998-99	2005-06	2015-16	1992-93	1998-99	2005-06	2015-16	1992-93	1998-99	2005-06	2015-16	1992-93	1998-99	2005-06	2015-16
SC	81%	62%	65%	18%	5%	13%	5%	34%	87%	72%	76%	40%	41%	41%	36%	45%
OBCs	NA	56%	61%	19%	NA	9%	7%	34%	NA	66%	69%	32%	NA	28%	24%	28%
Others	59%	38%	42%	11%	8%	15%	5%	35%	67%	45%	47%	17%	25%	16%	9%	11%
Hindus	61%	48%	54%	14%	8%	13%	7%	34%	70%	58%	64%	30%	30%	27%	25%	32%
Muslims	72%	54%	69%	28%	1%	1%	1%	36%	77%	61%	75%	37%	19%	16%	19%	19%
U.P	62%	49%	57%	17%	7%	12%	6%	21%	71%	59%	66%	31%	28%	25%	24%	29%

Fig. 8-1, presents the inclusion and exclusion errors in orange and light blue colours respectively, for major subgroups of U.P. It can be observed that Muslim households in general and OBCs, in particular, possess the highest exclusion error over the entire study period. Nevertheless, inclusion errors, though, at a shallow level, are highest among SCs who are also the poorest group in terms of UP-MPI over the entire study period. Moreover, Fig. 8-1 very clearly illustrates that as the UP-MPI goes down first during 1992-93 to 1998-99, and then during 2005-06 to 2015-16, exclusion errors decline and inclusion errors increase, more significantly during the latter period and more particularly among SCs, OBCs, and Hindus. In other words, the probability of a wealth-poor household identified as UP-MPI non-poor (inclusion error) has been widening particularly in recent periods for all the subgroups but more drastically among SCs, OBCs, and Hindus. Regarding conditional probabilities (Table 8-2), it can be said that UP-MPI would consider 7 per cent non-poor as wealth-poor households during 1992-93 but chances of such an error increase to 21 per cent in 2015-16. The inclusion error has witnessed a significant increase in all subgroups under consideration, but it has been more noticeable for Muslims.

Alkire and Santos (2010) explain that it is not the case that income/consumption/ wealth poverty is not a serious issue, but the point of concern is that these three unidimensional notions of poverty have no intrinsic value as such, and of course, they do have marvellous instrumental value. Therefore, it is believed that MD poverty measures that constitute an elementary but core instrument to estimate poverty would be sufficient when they are complemented by consumption/income poverty. However, the practical difficulty in this aspect, as far as Indian surveys are concerned, is that neither NSSO's CES nor NFHS could make it possible. The former provides comprehensive data on consumption levels of the household, while the latter includes economic aspects in terms of either wealth or assets.

FIG. 8-1 COMPARISON OF WEALTH AND MULTIDIMENSIONAL POVERTY BY SRGS (1992-93 TO 2015-16)



8.3 Robustness Analysis

8.3.1 Change in the Poverty Cut-off

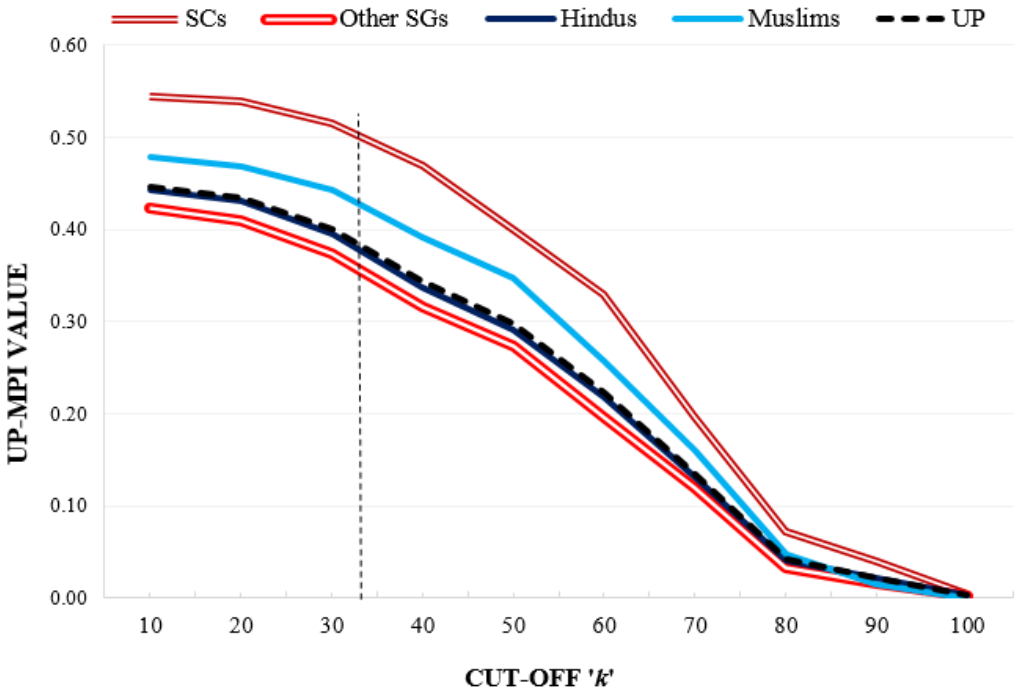
Chapter 4 includes a subsection on the selection of poverty cut-offs (*k*). The value of *k* can range from 0.056 to a maximum of 1. The value of $k = 0.056$ means that deprivation in 5.6 per cent of the weighted indicators is at least required to be considered MD poor. This is applicable to merely a single indicator amongst the six SOL indicators. The discussion there also includes the normative and empirical reasoning that explains the deliberate consideration of $k \geq 33.3\%$. The sensitivity analysis of UP-MPI estimates in response to a change in *k* is conducted as follows:

Social and Religious Groups

Removing all the limits of *k*, and allow it to change from its minimum value (*k*=5.56) to maximum value (*k*=100%), Fig. 8-2 reveals that poverty ranking across SRGs remains relatively robust. It is clearly visible that 'others' (blood red in Fig. 8-2) representing upper or forward castes, dominate all other subgroups for the entire 23 years (1992-93 to 2015-16) as other subgroups possess higher or equivalent UP-MPI for all *k* values, and is strictly greater for at least one *k* value. This implies that 'others' is unambiguously the least poor subgroup in U.P, regardless of the *k* cut-offs. Within social groups, it is perceptible that OBCs (in green) dominate SCs (in dark red), which implies that OBCs are unambiguously less poor than SCs for all *k* values and the entire period. Between the two major religious groups of the state (Hindus and Muslims), it is also noticeable that Hindus (in black) are the least poor religious group in U.P irrespective of any choice regarding *k* value. Within SRGs, it is also observable that Muslims (in light blue) dominate SCs, unambiguously during 1992-93 and 1998-99. However, in the last two periods, Muslims stand high in poverty compared to SCs when k values lie between 0.40 to 0.60 in 2005-06, and from 0.30 to 0.70 in 2015-16. These figures also acknowledge the changes in the level of poverty through gaps across the curves. As in the initial years, the gap between the least poor 'others' and the poorest SCs is very far which remains so even after two decades. More concerning is the gap in poverty levels within religious groups, as the difference between Hindu and Muslim poverty was much narrower in the initial years than it is in the contemporary times.

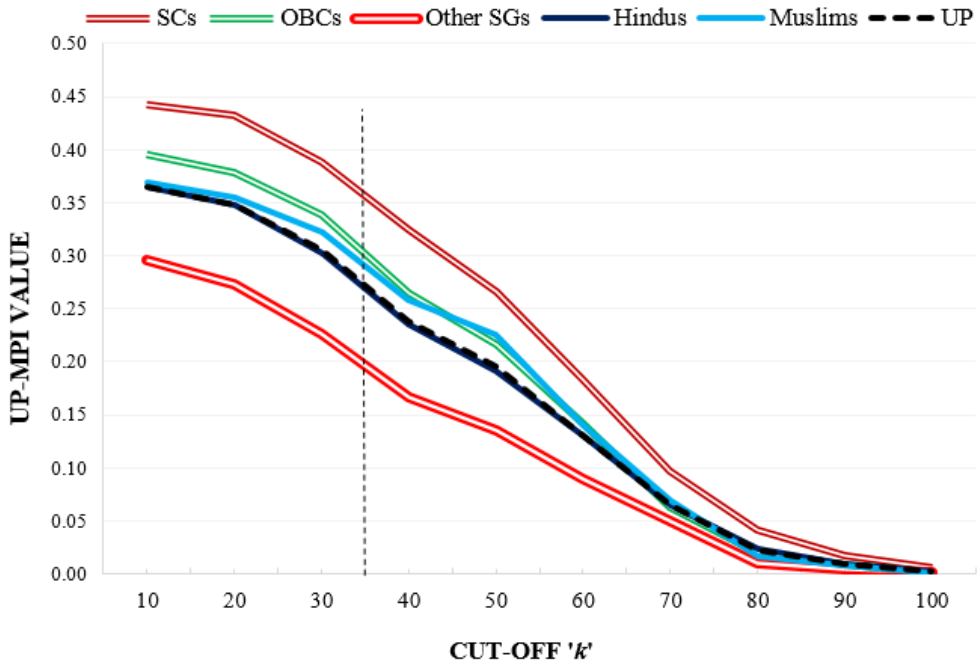
FIG. 8-2 COMPARISON OF UP-MPI AS PER *K*–SRGS AND OVERALL U.P (1992-93 TO 2015-16)

1992-93



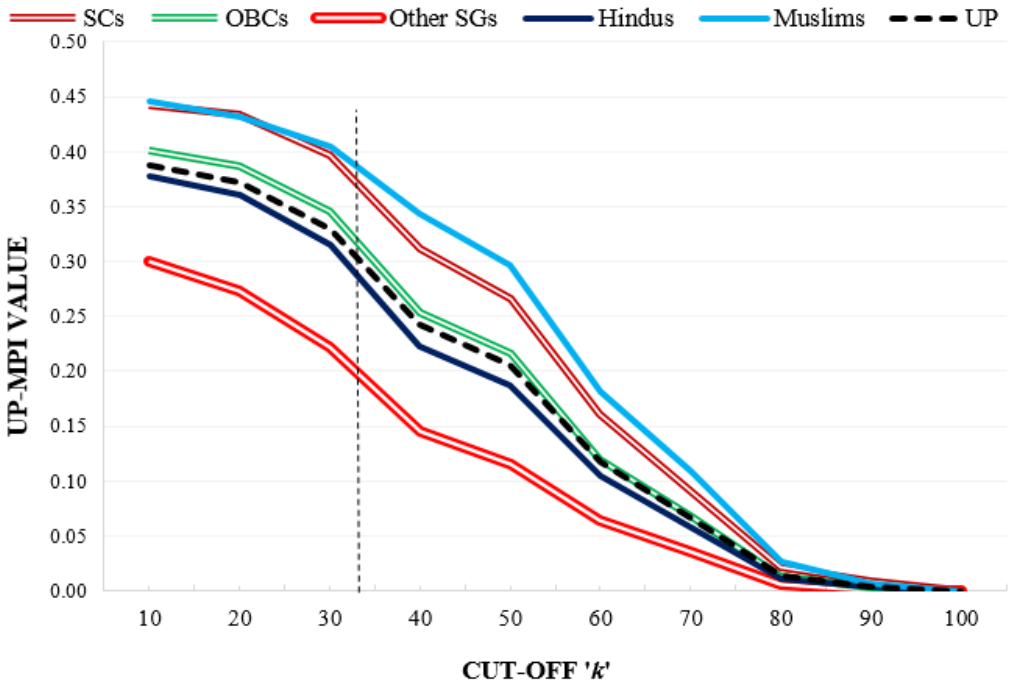
Note: k values are in percentages

1998-99



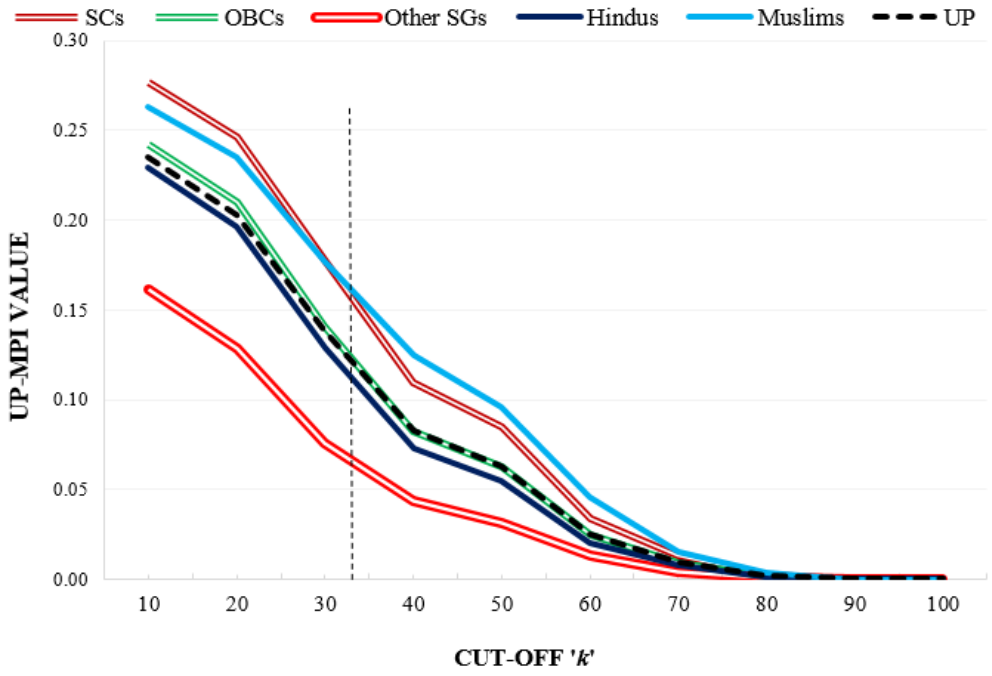
Note: k values are in percentages

2005-06



Note: k values are in percentages

2015-16

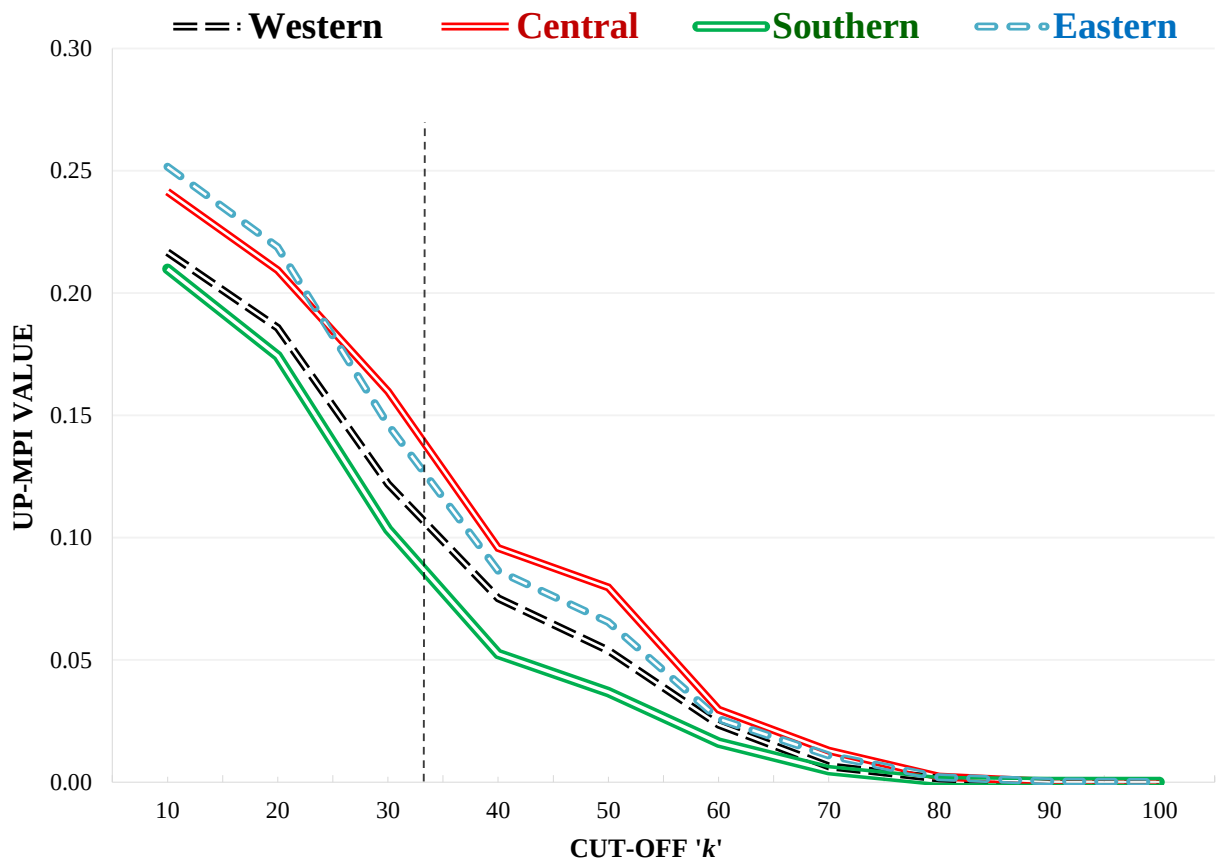


Note: k values are in percentages

Regional Comparison

Fig. 8-3 reveals three very relevant observations. First, poverty ranking is robust across regions, particularly for k >0.20. Nevertheless, the conflicts in poverty ranking exist only between CR (in blood red) and ER (in dotted blue) for $k < 20\%$. However, respecting normative and empirical considerations for values $k \geq 33.3\%$ also remove that conflict. Second, the SR dominates the other three regions of the state for all k values (green in Fig. 8-3). It implies that SR is unambiguously the least poor region in U.P, regardless of the *k* cut-offs. Third, comparing two larger regions of the state, WR is unambiguously less poor than ER, regardless of the *k* cut-offs. In addition, between two smaller regions, SR poverty dominates CR for k >0.20. These points summarise that CR is the most impoverished region in U.P during 2015-16 unrelated to any value of k , followed by ER (if k >0.20). Moreover, these estimates also admit that smaller regions possess wider difference in the level of poverty (as per the gap corresponding to SR and CR) than the larger regions.

FIG. 8-3 COMPARISON OF UP-MPI AS PER *K*—ACROSS REGIONS (2015-16)



Note: k values are in percentages

8.3.2 Change in the Indicators' Weights

UP-MPI follows a nesting style where weights are relatively equally distributed across three dimensions (1/3 or 33.33% each), and that is further subdivided equally among indicators of the concerned dimensions (turn to Chapter 4, Section 4.5.2.1,). However, this normative choice of equal weight is required to be tested on a robustness basis to see how accurate the UP-MPI estimates are for a plausible range of weights. This exercise re-estimates the UP-MPI based on three alternative cases of weighting, by allocating higher relative weight (50%) to each dimension in each case, as follows:

Case one: Education dimension gets 50% weight (and its indicator 25% each), and health and SOL hold 25% each. In this case, each of the two health indicators gets 12.5%, and each of the SOL indicators gets 4.16%.

Case two: Health dimension gets 50% weight (and its indicator 25% each), and education and SOL hold 25% each. In this case, each of the two education indicators gets 12.5%, and each of the SOL indicators gets 4.16%.

Case three: Now, the SOL dimension gets 50% weight (and its indicator 8.33% each), and education and health hold 25% each. In this case, each of the two indicators—education and health, gets 12.5% each.

It is not a big surprise that a change in the weighting structure makes changes in the UP-MPI estimates. However, it is interesting to note that even in such a case, UP-MPI estimates across regions show a high level of correlation (0.67-0.95) between equally-weighted UP-MPI values and three different weighting structure (Table 8-5). Moreover, generated poverty ranking across nine pairs of subgroups (SCs, OBCs, 'others', Hindus, Muslims, WR, CR, SR, ER) to estimate the correlation between equal-weight and three mentioned cases of weighting also reveals at least a moderate level of correlation (0.44-0.77). Thus, it can be concluded that though changing the weighting structure affects the extent of UP-MPI estimates (even that is not in the case of regions), but the above case supports the argument that the poverty ranking of subgroups remains intact while changing the indicators weight.

TABLE 8-5 CORRELATION BETWEEN EQUAL AND CASE-BASED WEIGHTING STRUCTURE

U.P	Pearson	Spearman	Kendall Tau-b
All cases, using ranking estimates			
0.67	0.63	0.44	0.67
0.62	0.61	0.50	0.62
0.77	0.77	0.56	0.77
For regions only, using UP-MPI estimates			
Case 1	0.86	0.95	0.83
Case 2	0.87	0.80	0.67
Case 3	0.95	0.80	0.67

8.4 Summing up

U.P-MPI captures a slightly overlapping but mostly distinct aspect of consumption poverty. On the other hand, exclusion errors in using the wealth-poverty measure in place of UP-MPI are quite high. Robustness of UP-MPI estimates also shows an unambiguous ranking. Therefore, assessment of MD poverty is the form of UP-MPI is exceptionally desirable.

CHAPTER 9

Summary, Conclusions and Policy Implications

9.1 Introduction

This chapter summarises the overall findings of the study, and conclusions drawn from the analyses carried out in the preceding chapters. Section 9.2 presents a brief summary of the study with main findings in the form of unidimensional and MD poverty in U.P, across regions and districts, and among SRGs, followed by conclusions in the subsequent section. Further, section 9.4 brings out the policy implications for the effective alleviation of poverty from the state. This exercise intends to help the policymakers to identify critically poor regions and to understand the dynamics of poverty across socially excluded and marginalized sections of the society. Section 9.5 outlines the scope for future research on the theme.

9.2 Summary

Present study undertakes unidimensional and MD notions of poverty to portray a comprehensive scenario of poverty prevailing in U.P, one of the most impoverished and populated states in India. The comprehensive profiling of poverty starts with an aggregated estimation, proceeding by segregating the population across four economic regions (WR. CR, SR, and ER), and among major social (SCs, OBCs and 'others') and religious (Hindus and Muslims) groups of the state.

The first phenomenon, i.e., unidimensional poverty, is measured in terms of consumption expenditure (MPCE) and identified poor as per the Government of India provided poverty line, using the unit level records of four quinquennial CES of NSSO (38th, 50th, 61st, and 68th) with classifying the study period into three phases; first decade (1983 to 1993-94); second decade (1993-94 to 2004-05) and the contemporary period (2004-05 to 2011-12). The disaggregated (district-wise) analysis of unidimensional poverty can only be carried out for the contemporary period with the availability of unbiased district-wise estimates. Consumption poverty is aggregated in terms of the total number of poor, levels of poverty, and differences in poverty. The total number of the poor is estimated based on population projections over the last three Indian censuses (1991, 2001, and 2011). The levels

of consumption poverty are assessed in terms of *HCR*, *PGR* and *SPGR*, which target nearly poor, moderately poor or poorer, and severely poor or ultra-poor populations respectively. The differences in consumption poverty have been analysed by absolute and relative poverty risks. The analyses of consumption poverty have been completed with the examination of proximate factors underlying its differences at the inter-regional level as well as among SRGs in rural and urban areas of the state during 2004-05 and 20011-12, based on survey logistic regression.

The second phenomenon, MD poverty, comprises a construction of MD poverty index (called, UP-MPI) that includes three dimensions—education, health, and SOL, which are represented by ten indicators such as years of schooling, child school attendance, undernutrition, child mortality, electricity, safe drinking water sources, improved sanitation, safe cooking fuel, housing structure and assets. A household is considered deprived when no member of the household has completed at least six years of schooling, or if there exists a child aged (7-14) who is not attending school; or an underweight woman (15–49 of age) or a stunted child; or if household experienced a child death within the last five years of the survey, or if household has no access to electricity; safe drinking water sources (or if a source of safe drinking water is located at 30 minutes or more walk from home, roundtrip); improved sanitation (or if improved but shared); safe sources of cooking, or if the structure of the house is *kachha* type, or if they do not own at least one asset related to access to information (radio, TV, telephone) and one asset related to mobility (bike, motorbike, car, truck, animal cart, tractor) or at least one asset related to livelihood (refrigerator, arable land, livestock).

These three dimensions are equally weighted (equals to 33.33% each), and that is distributed equally across indicators. Finally, any household whose total deprivation counts is higher than or equal to poverty cut (*k*, 33.3%) is considered as MD poor. After identification, aggregation of MD poverty is estimated by way of *H* and *A* component of UP-MPI. The former component defines the incidence (or proportion) of people that are MD poor and the latter component is called the intensity of poverty which is the average deprivation of the MD poor people. The UP-MPI as an index is computed as a product of *H* and *A*. The value of UP-MPI represents the share of the population that is MD poor adjusted by the intensity of the deprivation suffered. Next is the decomposition of UP-MPI in the sense of contribution to overall poverty, first by dimensions and indicators, and then by population subgroups (including social groups, religious groups, and four regions of rural and urban U.P). This

entire estimation exercise is done after refining non-eligible and missing information for each indicator. In other words, the estimation of UP-MPI is carried out after considering only the available information in all the ten indicators.

The estimation of UP-MPI spans a period of more than two decades (1992-93 to 2015-16) based on four rounds of NFHS, conducted respectively, in 1992-93 (NFHS-1), 1998-99 (NFHS-2), 2005-06 (NFHS-3), and the latest in 2015-16 (NFHS-4). The MD poverty is also estimated for the same classification of subgroups that was done for consumption poverty so that both types of poverty can be compared meaningfully. However, the disaggregated and regional profile of MD poverty can be analysed for the latest NFHS-4 only. After refining the sample, it is estimated that in all four NFHS (NFHS-1 for 1992-93, NFHS-2 for 1998-99, NFHS-3 for 2005-06, and the recent NFHS-4 for 2015-16), not less than 85 per cent of the original sample is being utilised in any case, except for WR (NFHS-4). Moreover, to balance the non-eligible and missing observations, the present study follows an adjustment procedure for the re-sampling of weights suggested by Alkire and Santos (2015) and Kovacevic and Calderon (2014). The precision of UP-MPI estimates is tested on grounds of mismatches (or inclusion and exclusion error) in the identification of MD poor when equated with other notions of poverty (wealth and consumption), followed by correlation analysis and conditional probabilities associated with them. The robustness of UP-MPI estimates is determined by sensitive analysis of the changes in deprivation weights and poverty cut-offs (*k*, 33.3%).

The main findings of the study are presented as per the analyses undertaken in preceding chapters:

9.2.1 Unidimensional Poverty in Uttar Pradesh

- The total number of consumption poor in the state is around 5.92 crore out of 19.99 crore overall (extrapolated) population during 2011-12. Out of 5.92 crore, around 80 per cent (4.76 crore) of total poor people live in the rural areas. Between 2004-5 and 2011-12, around 1.46 crore population got rid out of poverty.
- Consumption poverty has been analysed for the last three decades (1983 to 2011-12) using both LEG and TEG poverty lines and aggregated in terms of *HCR*, *PGR*, and *SPGR*. The results show that whatever poverty line is used and at whatever level, poverty in terms of all the three measures (*HCR, PGR, and SPGR*) has declined in both rural and urban areas of the state during the study period.

- Between rural-urban areas, the incidence of poverty shows that only in the initial year 1983, poverty is higher in urban areas (52.44%) compared to its rural counterpart (48.11%). In subsequent years, this trend has completely reversed as rural areas witnessed the high level of poverty. In the year 2011-12, *HCR* in rural areas was higher in the rural areas (30.4%) than the urban areas (26.2%). Over the period, the rate of decline in consumption poverty (in % points per annum) shows that urban areas have experienced a faster decline in the first decade (in rural, *HCR*: -0.48%, *PGR*: -0.22%, and *SPGR*: -0.12%, in urban, *HCR*: -1.56%, *PGR*: -0.53%, and *SPGR*: -0.23%). However, during the second decade and the contemporary period, rural areas have registered a faster decline in poverty compared to urban areas.
- There has been a drastic reduction in rural-urban differences in the levels of poverty, particularly in recent years. Percentage point differences (in *HCR*) declined from 7.03% points in 1993-94 to 3.18% points in 2004-05 as per LEG poverty line; from 11.45% points in 1993-94 to 8.65% points in 2004-05, and to 4.22% points in 2011-12 as per TEG poverty line. Also, in terms of rural/urban *HCR or PGR or SPGR* ratios, in earlier years, the gap between rural and urban poverty is relatively high particularly in the year 1993-94 (*HCR*:1.26, *PGR*: 1.33, *SPGR*: 1.32 as per TEG), but in recent years, there is a significant reduction (*HCR*:1.16, *PGR*: 1.07, *SPGR*: 1.07 in 2011-12).

9.2.2 Unidimensional Poverty across Regions of Uttar Pradesh

- Regional estimates of poverty have been evaluated by dividing the state into four economically classified regions (WR, CR, SR, and ER).
- The WR is named as 'consistently better-off' region as poverty in this region remained at the lowest level in both rural and urban areas during most study periods. A worrisome fact specific to the contemporary period is a sudden increase in the levels of poverty in the CR (in rural, 2004-05 *HCR*: 37.5%, 2011-12 *HCR*: 42.2%; in urban, 2004-05 *HCR*: 23.9%, 2011-12 *HCR*: 30.2%) that marked the region as the most and the second most (after ER) impoverished region in rural and urban areas, respectively.
- The ER is named as 'recently better-off' region due to the highest rate of decline in rural poverty (*HCR*) particularly during the contemporary period (1.73 % points per annum). Nevertheless, the decline must continue, as the levels of poverty are not low (rural *HCR*: 34.6%, urban *HCR*: 33.2% in 2011-12). That is why looking at the inter-regional

difference in terms of relative poverty risk; it does not signify a noticeable reduction in the disparity in poverty across these larger regions of the state (WR and ER).

- The SR is named as the 'finest performer', as it is contributing positively in reducing the inter-regional differences in poverty due to its exceptionally high poverty reduction (in terms of *HCR*) during the second decade (rural: -2.59% points per annum, urban: -2.85% points per annum) as well as in the contemporary period (rural: -1.45% points per annum and urban: -2.13% points per annum); given that, historically, it has been the most impoverished region.
- The logistic regression analysis also confirms the recent increase in the impoverishment levels of CR (over 2005-12), which can be attributed possibly due to relatively larger household size on average, and significant increases in poverty likelihoods amongst SCs of rural areas: 'Sec. to Higher Sec.' educated household heads' and 'Graduated and above' (in urban), and urban casual labourers in particular. Besides the high increase in the incidence of poverty in the region among OBCs (rural), SCs (urban), even semi-medium landholders (in rural), and the stagnant or increasing poverty trends among the majority of its occupation classification in rural areas and educational categories in both rural and urban areas will remain an issue of concern for the region.
- Two facts highlight the exceptional levels of poverty in the ER. First, the share of SCs and OBCs in the total population of the region is the highest, and these subgroups have a high incidence of poverty in the region (SC's rural *HCR*: 47.5%; urban *HCR*: 60.8%; OBC's rural *HCR*: 34.1%; urban *HCR*: 37.3%). Second, nearly half of the total rural poor of the state are concentrated in this region only.
- Contributions from the service sector (urban areas) and the percentage of electrified villages (rural areas) are found statistically significant in influencing the likelihoods of being poor in the state, particularly in SR, WR and ER.

9.2.3 Unidimensional Poverty across Districts of Uttar Pradesh

- District-level poverty has been illustrated by mapping separately for rural and urban areas during 2004-05 and 2011-12. Unlike the regional profile of poverty that reveals that rural poverty is highly perpetuating, district-wise poverty depicts that urban areas of the state occupy a larger number of critically high *HCR* districts (*HCR* greater than 60%) as compared to their rural counterparts in both 2004-05 and 2011-12.

- Besides, on average, a significant number of critically high *HCR* districts are concentrated only in two regions (ER, followed by CR) during 2011-12. A total number of 12 such districts are identified: five are located in CR (Unnao and Fatehpur in rural, and Kheri, Hardoi and Barabanki in urban areas), five in ER (Basti in rural, and Kaushambi, Ambedkar Nagar, S R Nagar and Mirzapur in urban areas), one in WR (Rampur in urban areas), and in SR (Chitrakoot in urban areas). Considering also the high *HCR* districts (*HCR* 40%-60%), around 65% of them are situated in the CR and ER. This foregrounds the grim poverty scenario prevailing across the CR and ER of the state.

9.2.4 Poverty across Social and Religious Groups of Uttar Pradesh

- The poverty trends across the major social groups (SCs, OBCs and 'others' representing upper caste) reveal that SC households have the highest levels of poverty (*HCR*, *PGR*, and *SPGR*) in both rural and urban areas during the last three decades, which also signals the historical roots of poverty among them.
- The bifurcation of OBCs from 'others' in the 61st round (2004-05) clarifies that households belonging to OBCs have the second highest levels of poverty whereas 'others' (formally, upper castes) are the least poor amongst all in both rural and urban areas (OBC's 2004-05 rural *HCR*: 42.2%; urban *HCR*: 42.7%, 'others' 2004-05 rural *HCR*: 26%; urban *HCR*: 20.9%).
- Considering the rate of decline in poverty (percentage points per annum in *HCR*), SCs in rural areas have witnessed notable progress, particularly in the contemporary period (SCs: -2.21, OBCs: -1.64, 'others': -1.93). The absolute poverty risk in terms of *SPGR* shows that even the poorest SC households have witnessed declining likelihoods of being poor during the second decade (from 64% in 1993-94 to 51% in 2004-05 as per LEG) and also in the contemporary period (from 45% in 2004-05 to 37% in 2011-12 as per TEG). However, relative poverty risk reveals that in comparison to 'others', SC households are most likely to be poor in both rural and urban areas, followed by OBCs in 2004-05 and such likelihood increases further among both the subgroups in 2011-12, which reflects the rising disparity in poverty across social groups particularly during 2004-05 and 2011-12.
- Poverty trends across the two major religious groups reveal that Muslim households are relatively poor at all poverty levels (*HCR*, *PGR*, *SPGR*) in both rural and urban areas during the entire period. As far as the decline in poverty is concerned (percentage points per annum in *HCR*), Muslim households have witnessed high poverty reduction during

the first decade (Rural Muslims: -0.90, Hindus: -0.40; Urban Muslims: -1.90, Hindus: -1.31) and in the contemporary period (Rural Muslims: -1.84, Hindus: -1.74; Urban Muslims: -1.71, Hindus: -0.89). Nevertheless, the absolute (along with relative) poverty risk reveals that Muslim households in urban areas, in particular, are more likely to be poor since 1983 (by 26% in 1983, 29% in 1993-94, 34% in 2004-05 and 39% in 2011-12 (TEG)).

- Regression estimates show that most impoverished SRGs (SCs and Muslims) are poor largely on similar grounds such as illiteracy, casualization of workforce and sudden increase in poverty in overall CR in general and low engagement in self-employment agricultural occupation, large household size, marginal land holdings and backwardness of rural ER in particular to rural households. The two most unfortunate facts observed among SCs are that even the Semi-Medium landholders are poor, and for any given category of occupation, they experienced the highest poverty in both rural and urban areas during 2011-12.

9.2.5 Multidimensional Poverty in Uttar Pradesh

- The total number of MD poor in U.P during 2015-16 as per UP-MPI is around 6.33 crore out of an overall population of 20.03 crore. Rural areas contain around 3.5 times more population (15.6 crore in 2015-16) and eight times more MD poor (5.63 crore in 2015-16) compared to the urban counterpart (population: 4.5 crore; MD poor 0.70 crore in 2015-16).
- Positioning UP-MPI for the year 2015-16 with Global MPI estimates on the HDR 2016, it reveals that U.P lies between Ghana and Vanuatu, which rank 46 and 47 respectively among the poorest 102 countries worldwide.
- From 1992-93 to 2015-16, the incidence of MD poverty in terms of *H* declined by approximately 1.73 percentage points per annum (71% in 1992-93 to 31% in 2015-16:31%). Across sub-periods, this decline was not consistent; it was around 2.03 percentage points per annum during 1993-1999 (71% to 59% in 1998-99) and increased by about 0.98 percentage points per annum in the next seven years (from 59% to 66% in 2005-06). The last decade shows a much more significant decline of about 3.45 percentage points per annum (from 66% to 31%).
- Decomposition of MD headcount (*H*) into absolute and relative dimensional contribution (education, health, and SOL) shows that traditionally, it was the deprivations in SOL that

contributed the most, but the recent NFHS-4 based UP-MPI estimates reveal a departure. As of now, health deprivation contributes a significant role in MD poverty. In 1992-93, the relative share of SOL was around 41%, which increased to 45% in 1998-99, and in 2015-16, it declined to 36%, whereas the share of health deprivation, which was around 28% in 1992-93 increased to around 37.5% during 2015-16.

- At the indicator level, the most prominent contribution is held by undernutrition (31% in 2005-06 and 32% in 2015-16). In addition, out of six SOL indicators, it is mainly the three (sanitation: 11%, cooking fuel: 11% and electricity: 8%) that largely makes the dimension a major contributor (around 35.5% in 2015-16). For the rest of the three indicators, (water: 1%, housing: 2%, and assets: 2%), the aggregated sum of deprivation is merely six per cent. Although educational deprivation, in aggregation, becomes lowest among three dimensions in general, at indicator levels, its share is quite high. For years of schooling, the contribution was around 13 per cent in 2005-06 and 17 per cent in 2015-16. For the child school attendance indicator, deprivation share is 10 per cent in 2015-16 (11% in 2005-06). For the entire study period, deprivation in years of schooling exceeds the deprivation in the child school attendance.
- The censored *H* reveals that the poor in U.P are highly deprived in sanitation (65.7% in 1992-92 and 26.93% in 2015-16), cooking fuel (69.5% in 1992-93 and 28.5% in 2015-16), nutrition (46% in 1992-93 and 26.18% in 2015-16), and electricity (57.8% in 1992-93 and 19% in 2015-16). Across rural areas, the poor are highly deprived in these four indicators. However, besides undernutrition, sanitation and cooking fuel, the urban poor are also deprived in two education indicators (child school attendance and years of schooling).
- Comparing the consumption poverty headcount (*HCR*) with the UP-MPI headcount (*H*), the study finds that MD poverty in the form of UP-MPI complements the consumption poverty. For the first three years (1992-93, 1998-99, and 2005-06), *H* has been much higher compared to *HCR* for all the subgroups as well as for overall U.P. Considering the latest *HCR* (for the year 2011-12) unadjusted as a proxy for the latest *H* available for 2015-16, regional comparison supports that *H* complements *HCR* particularly for WR, CR and ER in rural areas. Also, adjusting the *HCR* for the year 2015-16 as per its change in 2005-2012 supports that *H* complements *HCR* in rural areas. The percentage points gap between the two types of poverty increases, particularly during the last two survey years for all subgroups.

9.2.6 Multidimensional Poverty across Regions and Districts of Uttar Pradesh

- The recent NFHS-4 data allows for precise district level estimates for all 70 districts in the state. These district estimates are clubbed as per four economically classified regions (WR, CR, SR, and ER).
- Poorer regions in U.P are more intensely deprived, particularly in rural areas. In terms of two components of UP-MPI (Headcount *H* and Intensity *A*), CR is the poorest (*H*:45%, *A*: 45%) and SR is the least poor (*H*:30%, *A*: 42%) both in terms of *H* and *A*. Rural CR, in particular, has a relatively very high *H* and *A* and is the most deprived region of the state.
- In rural areas, the highest number of MD poor is in ER (45%, 2.53 crore out of 5.63 crore), followed by WR (30%, 1.68 crore), and CR (21%, 1.20 crore), whereas in urban areas, WR holds the highest number of poor (60%, 0.42 crore out of 0.70 crore), followed by the ER (22%, 0.15 crore), and CR (15%, 0.10 crore). SR in both rural and urban areas has a minimum share. The distribution of poor and overall population across regions brings out that CR in rural areas and WR in urban areas possess the higher poverty burden compared to other regions of the state.
- There are interregional differences in the pattern of deprivation in the state. As per dimensional contributions, SOL is the dominant contributor in CR (39%), SR (40%) and ER (38%), closely followed by health deprivation (36-38%), whereas the WR is highly deprived in health indicator (38%), distantly followed by education (33%). At indicators level, undernutrition remains an unwieldy contributor (more than 30 per cent) and deprivation in years of schooling is the second major contributor (more than 13 per cent) across all regions. WR is comparatively less deprived in sanitation (9%) compared to the other three regions (around 11-12%).
- Poor people in CR are highly deprived in seven out of ten indicators (as per censored *H*): years of schooling (15%); undernutrition (30%); electricity (28%); sanitation (33%); housing (11%); cooking fuel (34%); and assets (7%); whereas SR relatively holds the lowest level of deprivation in five indicators: years of schooling (8%), child school attendance (5%), undernutrition (20%), child mortality (3%), and electricity (11%),
- Geographical clustering of poverty is stark in U.P. Poverty is lowest among districts located in the upper WR (surrounding the National Capital Region of India) and among SR. High clustering of poverty is visible in upper central-eastern regions, particularly adjacent to the Nepal border. Districts with the most substantial poverty level are located in the ER, namely Shrawasti (70%), Bahraich (66%), and Balrampur (63%). In around 64

per cent of districts (45/70), every fourth person is counted as MD poor (13 in WR, 8 in CR, 4 in SR, and 20 in ER). Districts estimates also confirm that poverty in the state is sharply concentrated in rural areas.

9.2.7 Multidimensional Poverty across Social and Religious Groups of Uttar Pradesh

- SCs are consistently the most impoverished social group over the entire period of study and across all dimensions (education, health, and SOL), followed by OBCs compared to 'others'. During 1998-99, the proportion of poor (*H*) ranges from 72% among SCs, 66% among OBCs to 45% for 'others', decreasing significantly to 40% among SCs, 32% among OBCs and 17% among others. Across periods, the proportion of the poor has reduced among all social groups in both the initial (1993-99) and recent periods (2006-16), though it increased in the middle period.
- Across two major religious groups, Muslims are consistently the poorest. The differences in the proportion of the poor among Hindus and Muslims, which ranges from 70% and 77% respectively during 1992-93 and 1998-99, reduced to 30% and 37% respectively in 2005-06 and 2015-16.
- The 2015-16 estimates on the levels of deprivation in terms of *H* (censored) across ten considered indicators show that proportion of the poor among Hindus and Muslims poor amongst SCs, OBCs and 'others' are the most deprived, second most deprived, and the least deprived social group respectively in all the ten indicators. Moreover, across major religious groups, the poor among Muslims are comparatively more deprived in both indicators of education and health along with cooking fuel and sanitation.
- Until 2005-06, deprivation in SOL indicators contributed the highest among SRGs in general. Recently, poor people in the state have witnessed higher deprivation in terms of health dimension in almost all the major SRGs under consideration. In urban areas, the poor among Hindus are factually deprived in the health dimension, whereas among other SRGs, there has been a recent increase in it. Exceptions are the poor Muslims who are relatively more deprived in education in both rural and urban areas over the last two decades. It is primarily due to undernutrition whose contribution to UP-MPI has increased to such an extreme level, after 2005-06, and now around one-third of the poor live in a household where at least a stunted child or a woman is undernourished. The second major contributor over the last two decades across SRGs cannot be fixed in line, but among poor

Muslims, health deprivations remain the second most important factor in their poverty in both rural and urban areas.

- Besides undernutrition being a major contributor in general, years of schooling remains as the second-most contributor; its contribution varies widely: least among Hindus (14%) and highest among Muslims (24%), and moderately among SCs (15%) during 2015-16. Child school attendance is ranked as the third major contributor across SRGs until 2005-06, but the range of contributions varies significantly: lowest to Hindus (10%) and highest to Muslims (17%), SCs and OBCs (11%), and 'others' (14%).
- Considering incidence and intensity of poverty estimates and valued in terms of index (UP-MPI), the recent changes (2005-06 to 2015-16) among social groups reveal significant reduction among historically less impoverished subgroups ('others') compared to marginalised groups (SCs), but looking at the percentage changes, it seems that the rate of decline is comparable to some extent- 'others' by 66 per cent (from .22 to .08), OBCs by 58 per cent (from .35 to .15), and SCs by 55 per cent (from .40 to .18). Among religious groups also, while the value of UP-MPI has shown high reduction amongst Hindus (59 %, from 0.32 to 0.13), it is closely followed by Muslims (56 %, from 0.40 to 0.18). Comparing the recent values of UP-MPI for SCs and Muslims (more or less heterogeneous subgroups) indicates that MD poverty among Muslims is much closer to that among SCs.
- Decomposing changes in UP-MPI over time and as per variation in its components (*H* and *A*) shows that recent impressive decline and a slower decline in the initial period is primarily attributed to changes in *H* for all SRGs. The decline in *H* is significant in the recent period (4.8% in SCs, 5-5.3% in Muslims, OBCs and Hindus, and 6.3% in 'others'), whereas in the initial period, it is relatively less (2.8-2.9% in Hindus and SCs, 3.5% in Muslims, and 5.5% in 'others'). Also, during 1998-99 to 2005-06, intensities of UP-MPI are on a marginally declining trend whereas headcount is increasing intensively which results in an increase in overall poverty across all the SRGs, particularly Muslims and 'others' is an exception. Like regions, poorer SRGs are more intensely poor in the chosen deprivations. There is a direct and robust relationship between the *H* and *A*, more particularly among poorer subgroups (SCs and Muslims).
- While checking the robustness of UP-MPI estimates in terms of poverty rankings across SRGs, which remains relatively robust, but also acknowledge that the gap between the least poor 'others' and the poorest SCs is quite high, which persists even after two

decades. More concerned is the gap in poverty levels within religious groups, as the difference between Hindu and Muslim poverty was much narrower in the initial years than it was in contemporary times.

9.3 Conclusions

- The inter-group and inter-regional poverty trends concluded following observations:
    - The study foregrounds the grim poverty scenario prevailing across the rural CR and urban ER of U.P. These two regions have emerged as critically poor, where more than 60 per cent of Muslims and SC households were BPL during 2011-12. A significant number of critically high *HCR* districts (*HCR* greater than 60%) are concentrated only in two regions (ER, followed by CR) during 2011-12. Also, for high *HCR* districts (*HCR* 40%-60%), around 65% of them are situated in the CR and ER. The overall increase in the level of poverty in CR is primarily attributed to SC households in general and rural OBCs in particular, along with the majority of its occupation classes (rural) and educational categories in both rural and urban areas, even semi-medium landholders in rural areas. In ER, the population share of SCs and OBCs across the region is highest, and these subgroups witnessed a high incidence of poverty in the region. Both consumption and MD poverty district-wise estimates show a substantial incidence of poverty (greater than 60%) particularly in the ER. Consumption poverty highlights five critically poorer districts (Basti in rural areas, and Kaushambi, Ambedkar Nagar, S R Nagar and Mirzapur in urban areas), whereas MD poverty displays three critically poor districts in the region (Shrawasti, Bahraich, and Balrampur).
    - Socially advantaged groups (’others’ social groups) are performing well in backward regions (SR), while socially disadvantaged groups (SCs and Muslims) are doing well in developed regions (WR).
- Overtime poverty trends across SRGs bring out three conclusive observations:
    - For both consumption and MD poverty, contemporary changes in the levels of poverty, particularly among SRGs, bring out shrinking inter-group differences in poverty due to high (or, at least equal) poverty reduction amongst the most excluded SRGs, particularly SCs (rural), OBCs (urban) and Muslims (rural and urban).

- Despite the declining rate of poverty among the most excluded SRGs, the levels of poverty are still high among them. This may be because the majority of Muslims and SCs in the state have remained impoverished over a long period. Besides, the MD poverty estimates highlight that poor SCs are more intensely deprived (particularly in rural areas) in all the three dimensions (education, health, and SOL) and all the ten indicators, particularly in rural areas. Moreover, the poor among Muslims are comparatively more deprived in both indicators of education and health along with cooking fuel and sanitation. These facts signal the historical roots of poverty that, in turn, perpetuate the chronic state of poverty among them.
- Regression estimates find that most impoverished SRGs (SCs and Muslims) are poor largely on the similar grounds such as illiteracy, casualization of workforce and sudden increase in poverty in overall CR in general and low engagement in self-employment agricultural occupation, large household size, marginal land holdings and backwardness of rural ER in particular to rural households. The two most unfortunate facts observed among SCs are that even the Semi-Medium landholders are poor, and for any given category of occupation, they experienced the highest poverty in both rural and urban areas during 2011-12.

➢ The sensitivity analysis of UP-MPI reveals that estimates are robust on two grounds:

- In response to a change in poverty cut-offs (*k*), poverty rankings across SRGs and regions remain relatively robust. The 'others' representing upper castes is unambiguously the least poor subgroup in U.P, regardless of the *k* cut-offs. Within social groups, OBCs are unambiguously less poor than SCs for all *k* values and entire periods. Hindus are the least poor religious group in the state. irrespective of any choice regarding *k* values. In addition, SR is unambiguously the least poor region in U.P, regardless of the *k* cut-offs. WR is unambiguously less poor than ER, regardless of the *k* cut-offs. CR is the most impoverished region in the state during 2015-16, unrelated to any k , followed by ER (if k >20).
- Changing the weighting structure also supports the argument that the poverty ranking of subgroups remains intact while changing the indicators weight.

➢ Traditionally, the poor in the state were mostly deprived among SOL indicators. Recently in 2015-16, health deprivation played a significant role in MD poverty for almost all the population subgroups under consideration, due to the presence of least stunted -children

or undernourished women. In urban areas, poor among Hindus are factually deprived in health whereas among others SRGs, there is a recent increase in it. Exceptions are the poor Muslims who are relatively more deprived in education in both rural and urban areas over the last two decades.

- Besides undernutrition, poor people across regions of the state are the second most deprived in years of schooling on average. Child school attendance is ranked as the third major contributor across SRGs until 2005-06. Still the poor are most often deprived in sanitation, cooking fuel and electricity. Education deprivation (both years of schooling and child school attendance) has the highest contribution among Muslims poverty; undernutrition in 'others'; electricity and housing in SCs and Hindus; drinking water and assets in SCs; and sanitation among Hindus. In general, deprivation in water, child mortality, housing (recently), and assets is relatively lesser. On the contrary, the poor are deprived in cooking fuels, sanitation, electricity, and undernourishment are exceptionally high. Deprivation in sanitation has increased in the last decade, particularly amongst SCs, OBCs and Hindus. Poor among SCs, OBCs and Muslims, are highly deprived in education compared to the average UPian.
- MD poverty in the form of UP-MPI complements consumption poverty, particularly in rural areas. For the first three years (1992-93, 1998-99, and 2005-06), *H* has been much higher compared to *HCR* for all subgroups as well as for overall U.P. The percentage points gap between the two types of poverty increases, particularly during the last two survey years for all subgroups.

9.4 Limitation of the Study

- Present study measured consumption poverty using different rounds of NSSO's CES household surveys while the MD poverty is measured using various NFHS. Since these two different surveys are used to measure poverty based on alternative approaches (consumption and MD), the linkage between the two approaches cannot be established directly. From the policy perspectives, it is important to know how the two approaches are related.

9.5 Policy Implications

There are basically two objectives to estimate poverty–descriptive and policy formation. Following Sen (1979, 1981) suggestion that descriptive analysis of poverty in terms of deprivation diagnosis precedes policy choices. Present study identifies poverty in the sense of acknowledging multiple deprivations in the descriptive form so that policy recommendations derived from such analysis may be fruitful. In fact, the estimates drawn from UP-MPI can serve as an ingredient to evaluate the impact of government programmes. It identifies the historical roots or chronic state of poverty among population sub-groups. Moreover, the decomposition of consumption and MD poverty by subgroups and regions provides useful statistics for policy guidance. The results and discussions encompassing the study are indicative of various factors underlying poverty status among SRGs in general and inter-regional differences of poverty in particular in the state. Given the constraints of time, availability of data, and scope of the study, the present work does not suggest specific policies and instruments to operationalize the same. However, it certainly provides an insight into the direction the policies could be oriented towards. The major suggestions are listed below.

- SC and Muslim households are the most impoverished subgroups across all the regions in general, but particularly in CR and ER of the state, and this kind of heterogeneity across the regions and amongst SRGs demands region-specific and group-specific policies and development programmes. To increase the pace of poverty alleviation in the state, high poverty regions along with their impoverished subgroups should be targeted first with strategic planning and development. To promote harmony, social and religious equality, overall progress in the state in general and poverty alleviation in particular, the study suggests for target specific policy interventions, with special emphasis on the upliftment of socially excluded sections of society (SCs and Muslims).
- In general, human development aspects (education, health, water and SOL) are considered critical dimensions of poverty. Effective public spending on these basic services can support poverty alleviation. For these services, direct assessment in terms of outcome measures can better reflect progress. Moreover, it is useful to see the leading components of deprivation across and within population subgroups because such type of analysis can be used to design the effective sequence of poverty interventions. A new emerging deprivation in the form of nutritional deficiency among children and women

demands some serious political commitments in favour of food security and other related affirmative actions.

- Reducing deprivation in terms of cooking fuel and sanitation, coverage of programmes like Ujjawala and Swachch Bharat must be enhanced. The present study extensively discusses transitions, alternatives and factors promoting clean cooking fuel (see Text Box 7-1). Also, to eliminate open defecation, awareness is necessary. The present study also extensively discusses statistics, consequences, obstacles and ways out to eradicate open defecation (Text Box 7-2).
- As per regression analysis, increasing the levels of education particularly 'secondary to higher secondary' and 'graduation and above' significantly reduces the likelihoods of being poor across both rural and urban areas of the state. Consideration needs to be paid towards the development of sound and comprehensive education policies to increase the education level at least to the post-elementary levels, particularly among Muslims and SCs, along with enhancement in the quality of education and employable skills. The poverty alleviating policies should precisely focus on the education of women as they may help in generating awareness regarding family planning to reduce unwanted births.
- Estimates drawn from the regression analysis suggest that impoverished groups (SCs and Muslims) are poor largely due to illiteracy, casualisation of workforce, low self-employment in agricultural occupations and marginal landholdings. To reduce the level of poverty, occupation opportunities must be expand. The casual workforce, particularly in agriculture, should be supported to be self-employed.
- Besides micro-level factors, many social, cultural, regional and economic determinants can have the potential to influence the deep-rooted poverty in U.P. Increase in the contribution of agriculture and allied sector in the state's income is prominent in rural poverty reduction, particularly in WR. Also, the contribution of the services sector is found significant in urban poverty reduction across all the regions. Promotion of small-scale industries may also support poverty reduction, particularly in SR and WR. The increase in road connectivity and electrification in the villages may also help for rural poverty reduction.

9.6 Suggestions for the Future NFHS and NSSO

- NFHS collects information from households on access to electricity in dichotomous form (yes or no). It is suggested that if NFHS could introduce variables in future surveys

regarding hours of electricity supply, then deprivation in electricity can be determined in a more relevant sense.

- NFHS, being a household survey, collects records from households owning/possessing a house. To capture the appropriate proportion of housing deprivation, the homeless population should also be counted. They are eligible contenders for counting on any poverty identification exercise as far as housing as an indicator is concerned. Future NFHS should find a way to capture the homeless population.
- It is usually suggested that income/consumption poverty should be blended with other relevant dimensions of poverty. Though these unidimensional measures have no intrinsic importance as such, of course, they do have marvellous instrumental value. Therefore, it is believed that MD poverty measures that constitute elementary but core instruments to estimate poverty should be sufficient when they are complemented by consumption/income poverty. However, the practical difficulty in this aspect, as far as Indian surveys are concerned, is that neither NSSO's CES nor NFHS can make it possible. The former provides comprehensive information about consumption levels of the household; the latter includes economic aspects in terms of either wealth or assets. Therefore, it is recommended that the future surveys may blend the consumption estimation with health and education along with SOL parameters.
- The poverty analysis carried out by the present study across SRGs is revealing. It would be useful if NSSO and NFHS could collect information related to affirmative actions and anti-poverty government interventions, particularly among low caste and Muslims.

9.7 Scope for the Future Research

There are three points where future studies can focus.

- The present study suggests improvements in some of the indicator's definition and their deprivation cut-offs, which can be utilised by future studies as per the availability of data. Regarding housing deprivation, the present study considers the presence of the *kachha* house as a proxy for deprivation in housing. However, household surveys do not consider the homeless population. The population with no house will be eligible contenders for housing deprivation. Future studies may find a way to capture the homeless population based on population projections using census data or some other approximation. In addition, the deprivation in access to safe drinking water in terms of unimproved sources may now be of less concern as the majority of households in U.P are using safe sources of

drinking water, as revealed by the recent NFHS report. Future studies can focus on monitoring of 'piped water at home' to determine its's quality.

- Future studies can identify rural and urban-specific indicators of MD poverty for better comparison across two areas.
- NSSO's CES may be merged with NFHS so that consumption expenditure be included as one of the indicator/dimensions of MD poverty.

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APPENDIX

TABLE A-0-1 REGION-WISE SAMPLE SIZE, *HCR* AND STANDARD ERROR ACROSS DISTRICTS OF U.P.

Regions	S. No.	Districts	Rural						Urban					
			2004-05			2011-12			2004-05			2011-12		
			N	*HCR*	SE	N	*HCR*	SE	N	*HCR*	SE	N	*HCR*	SE
Western Region	1	Saharanpur	120	23.07	0.05	96	11.48	0.06	40	36.18	0.09	64	24.71	0.09
	2	Muzaffarnagar	160	37.75	0.06	128	8.03	0.05	40	51.78	0.10	64	21.18	0.07
	3	Bijnor	150	24.64	0.04	96	18.75	0.06	40	12.49	0.08	64	26.74	0.08
	4	Moradabad	160	23.88	0.04	128	14.92	0.04	40	25.89	0.10	64	27.15	0.07
	5	Rampur	80	44.68	0.07	64	27.07	0.09	40	36.28	0.10	32	65.55	0.11
	6	J P Nagar	80	16.05	0.06	64	29.70	0.09	40	45.37	0.10	32	19.52	0.09
	7	Meerut	80	16.12	0.05	64	0.23	0.00	119	15.37	0.05	96	4.95	0.03
	8	Baghpat	80	29.05	0.07	32	19.45	0.12	40	24.22	0.09	32	3.12	0.02
	9	Ghaziabad	70	21.85	0.06	64	8.18	0.07	40	44.88	0.13	96	0.96	0.01
	10	G B Nagar	40	12.21	0.07	32	1.91	0.02	40	4.86	0.02	32	1.82	0.01
	11	Bulandshahr	119	18.78	0.05	96	11.58	0.04	39	24.02	0.08	64	11.58	0.06
	12	Aligarh	118	25.90	0.06	95	20.26	0.10	39	29.70	0.10	64	17.68	0.06
	13	Hathras	79	52.06	0.07	64	1.29	0.01	39	44.07	0.11	32	26.34	0.11
	14	Mathura	80	41.86	0.07	64	24.13	0.09	39	60.67	0.10	64	26.27	0.07
	15	Agra	120	30.70	0.06	96	23.12	0.07	120	27.56	0.06	96	28.37	0.07
	16	Firozabad	79	31.83	0.07	64	32.63	0.10	38	44.57	0.11	64	39.40	0.08
	17	Etah	159	40.65	0.05	96	18.05	0.06	40	41.05	0.12	64	30.89	0.07
	18	Mainpuri	80	33.82	0.08	64	54.86	0.12	40	24.91	0.09	32	43.29	0.11
	19	Budaun	160	45.88	0.06	96	31.28	0.10	40	58.85	0.10	32	26.47	0.09
	20	Bareilly	160	42.95	0.05	95	6.90	0.04	80	21.62	0.05	64	15.49	0.07
	21	Pilibhit	80	43.98	0.08	64	19.17	0.09	40	50.90	0.10	32	30.35	0.14
	22	Shahjahanpur	120	45.55	0.06	96	32.67	0.10	40	27.93	0.13	32	33.02	0.12
	23	Farrukhabad	80	45.57	0.08	64	25.56	0.11	40	43.70	0.10	32	43.31	0.12
	24	Kannauj	80	33.13	0.08	64	42.87	0.13	40	73.33	0.08	32	53.06	0.11
	25	Etawah	79	49.09	0.07	64	12.21	0.08	40	29.51	0.09	32	56.48	0.10
	26	Auraiya	80	38.03	0.08	64	22.21	0.09	40	62.80	0.12	32	22.74	0.10
		Western	*2693*	*33.56*	*0.01*	*2014*	*19.18*	*0.02*	*1233*	*33.86*	*0.03*	*1344*	*21.22*	*0.02*
Central Region	27	Kheri	160	29.80	0.05	128	40.01	0.09	39	26.00	0.08	32	73.13	0.09
	28	Sitapur	199	30.85	0.05	128	41.25	0.07	38	53.73	0.11	32	56.80	0.14
	29	Hardoi	160	41.25	0.06	128	33.60	0.07	40	43.91	0.09	32	62.77	0.10
	30	Unnao	160	32.13	0.05	96	63.25	0.07	40	50.25	0.11	32	33.17	0.10
	31	Lucknow	80	43.19	0.08	64	36.43	0.10	160	11.40	0.03	128	21.70	0.06
	32	Rae Bareli	160	67.65	0.05	128	45.43	0.06	39	43.05	0.12	32	42.31	0.18
	33	Kanpur Dehat	80	41.69	0.08	64	18.08	0.13	40	74.42	0.08	32	17.73	0.09
	34	Kanpur Nagar	80	28.90	0.07	64	11.39	0.05	160	15.80	0.04	128	11.97	0.05
	35	Fatehpur	120	47.79	0.06	96	63.44	0.07	39	43.13	0.11	32	50.41	0.12
	36	Barabanki	160	18.47	0.04	96	47.41	0.09	40	34.91	0.11	32	80.65	0.07
		Central	*1359*	*37.53*	*0.02*	*992*	*42.17*	*0.03*	*635*	*23.92*	*0.02*	*512*	*30.23*	*0.03*
Southern Region	37	Jalaun	80	26.07	0.06	64	27.71	0.10	40	76.10	0.08	32	12.09	0.10
	38	Jhansi	80	35.50	0.07	64	15.59	0.08	40	33.15	0.11	64	17.75	0.06
	39	Lalitpur	40	22.49	0.11	32	15.55	0.09	40	33.04	0.11	32	2.99	0.02
	40	Hamirpur	40	46.65	0.09	32	18.16	0.09	40	58.03	0.10	32	35.99	0.11
	41	Mahoba	40	39.59	0.10	32	40.95	0.18	40	52.70	0.10	32	33.49	0.12
	42	Banda	79	61.92	0.07	64	51.77	0.12	40	68.70	0.10	32	48.18	0.12
	43	Chitrakoot	40	87.97	0.05	32	40.41	0.21	40	53.70	0.14	32	75.05	0.09
		Southern	*399*	*44.66*	*0.04*	*320*	*30.22*	*0.05*	*280*	*48.22*	*0.06*	*256*	*26.88*	*0.04*

Eastern Region	44	Pratapgarh	158	75.20	0.05	128	47.68	0.08	40	32.30	0.09	32	43.54	0.13
	45	Kaushambi	80	59.45	0.07	63	55.75	0.09	40	75.36	0.09	32	72.75	0.10
	46	Allahabad	200	46.71	0.05	128	27.77	0.07	79	41.76	0.08	63	25.08	0.07
	47	Faizabad	80	32.48	0.08	64	38.11	0.12	40	38.72	0.10	32	36.41	0.12
	48	Ambedkar Ngr	120	56.40	0.06	96	37.32	0.07	40	77.14	0.07	32	75.31	0.09
	49	Sultanpur	160	36.68	0.06	128	26.40	0.07	40	13.16	0.08	31	32.09	0.11
	50	Bahraich	120	55.48	0.07	96	57.35	0.09	40	37.17	0.11	32	23.35	0.14
	51	Shrawasti	80	69.73	0.07	64	39.10	0.11	40	51.65	0.11	30	45.55	0.11
	52	Balrampur	80	32.49	0.08	63	32.20	0.12	40	31.25	0.10	32	49.29	0.12
	53	Gonda	160	58.09	0.06	128	34.69	0.08	40	51.24	0.11	32	2.99	0.02
	54	Siddharthnagar	120	72.52	0.05	96	31.54	0.08	40	40.18	0.10	32	51.84	0.11
	55	Basti	120	37.12	0.06	96	60.56	0.07	40	42.13	0.11	32	45.68	0.11
	56	S K Nagar	80	65.56	0.07	64	39.68	0.09	40	73.30	0.10	32	52.67	0.12
	57	Maharajganj	120	65.92	0.06	96	39.27	0.07	40	64.30	0.10	32	41.72	0.11
	58	Gorakhpur	160	65.13	0.04	128	26.69	0.06	40	56.66	0.11	64	16.27	0.07
	59	Kushinagar	160	65.63	0.05	128	26.32	0.07	40	61.04	0.10	32	51.11	0.11
	60	Deoria	160	60.44	0.05	96	38.21	0.08	40	60.91	0.11	32	49.73	0.14
	61	Azamgarh	190	38.66	0.05	128	40.32	0.08	40	16.94	0.06	32	32.74	0.10
	62	Mau	80	51.17	0.07	64	14.52	0.06	40	67.25	0.10	32	44.15	0.13
	63	Ballia	160	61.44	0.05	96	30.25	0.08	40	16.30	0.06	32	42.25	0.10
	64	Jaunpur	200	42.79	0.05	128	22.66	0.05	40	12.02	0.05	32	36.48	0.11
	65	Ghazipur	159	58.88	0.05	128	27.00	0.06	40	47.03	0.14	32	40.36	0.13
	66	Chandauli	70	39.27	0.08	64	24.35	0.09	40	71.49	0.08	32	0.12	0.00
	67	Varanasi	120	39.34	0.06	96	21.21	0.06	119	20.61	0.06	96	20.19	0.07
	68	S R Nagar	80	34.20	0.07	64	46.50	0.10	39	45.52	0.11	32	61.76	0.12
	69	Mirzapur	120	39.40	0.06	96	31.63	0.07	40	53.41	0.11	32	61.55	0.11
	70	Sonbhadra	80	32.07	0.08	64	43.46	0.10	40	33.33	0.11	31	2.51	0.03
		Eastern	*3417*	*51.94*	*0.01*	*2590*	*34.57*	*0.02*	*1197*	*41.27*	*0.03*	*987*	*33.18*	*0.02*
		Uttar Pradesh	*7868*	*42.72*	*0.01*	*5916*	*30.40*	*0.01*	*3345*	*34.06*	*0.02*	*3099*	*26.17*	*0.01*

Note: N, HCR and SE represent 'sample size', 'Headcount Ratio' and 'Standard Error' respectively.
Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-2 ABSOLUTE POVERTY RISK AMONG SOCIAL GROUPS IN UTTAR PRADESH (1983 TO 2011-12)

Social Groups	1983*	1993/94*	2004/05*	2004/05**	2011/12**
	Headcount Ratio				
R: SCs	-21%	-40%	-34%	-33%	-35%
R: OBCs	N.A	N.A	1%	1%	-1%
R: Others	6%	13%	41%	39%	59%
U: SCs	-15%	-67%	-44%	-30%	-49%
U: OBCs	N.A	N.A	-19%	-25%	-23%
U: Others	1%	11%	37%	39%	51%
	Poverty Gap Ratio				
R: SCs	-34%	-55%	-44%	-40%	-43%
R: OBCs	N.A	N.A	5%	3%	1%
R: Others	10%	17%	43%	42%	61%
U: SCs	-22%	-73%	-53%	-49%	-57%
U: OBCs	N.A	N.A	-23%	-26%	-23%
U: Others	1%	12%	45%	45%	55%
	Square Poverty Gap Ratio				
R: SCs	-42%	-65%	-49%	-44%	-37%
R: OBCs	N.A	N.A	6%	6%	1%
R: Others	13%	20%	45%	42%	63%
U: SCs	-24%	-78%	-55%	-54%	-66%
U: OBCs	N.A	N.A	-29%	-26%	-19%
U: Others	0%	11%	48%	49%	54%

*Notes: 1. * Based on LEG, **Based on TEG*
2. 'R' and 'U' denotes rural and urban, respectively.
Source: Calculation from various CES rounds of NSSO, Government of India.

TABLE A-0-3 ABSOLUTE POVERTY RISK AMONG RELIGIOUS GROUPS IN UTTAR PRADESH (1983 TO 2011-12)

Religion	1983*	1993/94*	2004/05*	2004/05**	2011/12**
	Headcount Ratio				
R: Hindus	1%	0%	2%	2%	2%
R: Muslims	-10%	0%	-10%	-10%	-12%
U: Hindus	12%	11%	15%	19%	19%
U: Muslims	-27%	-29%	-34%	-42%	-39%
	Poverty Gap Ratio				
R: Hindus	2%	-2%	2%	3%	1%
R: Muslims	-9%	8%	-12%	-14%	-7%
U: Hindus	18%	11%	19%	23%	17%
U: Muslims	-39%	-28%	-43%	-50%	-36%
	Square Poverty Gap Ratio				
R: Hindus	1%	-2%	1%	3%	1%
R: Muslims	-9%	12%	-16%	-19%	-6%
U: Hindus	22%	8%	23%	25%	14%
U: Muslims	-48%	-25%	-55%	-58%	-26%

Notes: Same as in Table A-0-2.
Source: Calculation from various CES rounds of NSSO, Government of India.

TABLE A-0-4 MEAN VALUES OF THE DETERMINANTS USED IN LOGISTIC REGRESSION FOR RURAL U.P AND ITS REGIONS

Variables	**Rural U.P**		*Western*		*Central*		*Southern*		*Eastern*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	5.70	5.47	5.73	5.63	5.43	5.09	5.52	5.17	5.82	5.56
Land	0.66	0.57	0.66	0.60	0.69	0.57	1.51	1.68	0.55	0.40
Age	44.80	45.26	43.00	43.44	44.06	44.60	45.65	45.70	46.49	46.98
Regions*										
WR #	42.46	33.66	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
CR	15.69	19.33	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
SR	1.65	5.12	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
ER	40.21	41.89	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
Religious Group*										
Hindus	86.05	85.58	82.73	81.56	87.91	88.19	95.54	96.66	86.77	86.25
Muslims #	13.76	14.18	17.12	18.00	11.56	11.75	4.46	2.58	13.14	13.65
Social Group*										
SCs	26.77	28.18	23.61	25.25	33.66	34.47	25.76	35.14	26.40	26.78
OBCs	53.70	54.23	55.87	53.78	47.34	49.15	56.76	49.47	54.40	57.50
'others' #	19.02	16.30	20.31	18.61	18.65	15.87	17.48	14.69	18.32	14.84
General Education *										
Not Literate #	50.17	46.67	45.91	43.92	50.20	45.60	47.25	34.93	53.95	50.81
without schooling	1.59	0.38	1.54	0.39	0.56	0.60	1.36	0.03	2.11	0.30
Below primary	6.92	7.12	6.10	6.87	7.89	8.04	8.36	5.50	6.98	7.09
Primary to middle	25.53	26.42	27.77	25.86	28.37	28.86	29.48	31.97	21.99	25.06
Sec. to higher Sec.	12.28	14.45	14.48	17.39	10.49	13.20	10.85	22.20	11.47	11.70
Diploma	0.13	0.17	0.13	0.35	0.05	0.02	0.00	0.03	0.19	0.11
Graduate and above	3.38	4.80	4.07	5.22	2.44	3.68	2.70	5.35	3.31	4.91
Household Type*										
SEA	48.55	44.55	43.49	45.53	51.42	46.01	61.17	49.72	49.84	42.45
SENA	18.36	16.45	20.76	16.11	15.44	12.00	11.38	12.95	18.57	19.21
RWSE		5.18		6.33		3.97		4.05		4.96
AL #	14.24	10.97	15.25	10.54	18.11	13.81	4.76	7.60	12.86	10.41
NAL	9.64	17.25	9.74	16.61	6.86	19.84	16.06	23.62	10.02	15.79
Others	9.20	5.60	10.76	4.88	8.16	4.36	6.63	2.05	8.72	7.19
Sector*										
Agriculture	66.37	58.46	61.34	58.54	73.91	63.13	68.75	57.67	66.84	56.28
Secondary	17.40	26.30	19.32	24.39	13.09	25.90	21.13	30.72	17.30	27.50
Tertiary#	16.19	15.24	19.27	17.07	12.96	10.97	10.12	11.61	15.86	16.22

Note: 1. # Reference category.

*2. * In percentages, and rest are in averages.*

3. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-5 MEAN VALUES OF THE DETERMINANTS USED IN LOGISTIC REGRESSION FOR SRGS IN RURAL U.P

Variables	*SCs*		*OBCs*		*'others'*		*Hindus*		*Muslims*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	5.41	5.16	5.80	5.60	5.81	5.58	5.61	5.40	6.22	5.90
Land	0.34	0.33	0.67	0.56	1.05	1.03	0.70	0.60	0.39	0.37
Age	43.44	43.44	44.93	45.36	46.40	48.30	45.10	45.53	42.93	43.71
Regions*										
WR #	30.08	30.16	35.49	33.38	36.43	38.43	32.80	32.08	42.46	42.73
CR	23.50	23.65	16.48	17.52	18.33	18.82	19.08	19.92	15.69	16.03
SR	4.90	6.39	5.38	4.67	4.68	4.62	5.65	5.79	1.65	0.93
ER	41.52	39.80	42.65	44.42	40.56	38.14	42.47	42.21	40.21	40.31
Religious Group*										
Hindus	99.64	99.06	84.06	81.05	72.67	76.73	(---)	(---)	(---)	(---)
Muslims #	(---)	(---)	15.82	18.62	27.00	23.12	(---)	(---)	(---)	(---)
Social Group*										
SCs	(---)	(---)	(---)	(---)	(---)	(---)	31.00	32.62	(---)	(---)
OBCs	(---)	(---)	(---)	(---)	(---)	(---)	52.46	51.35	61.70	71.23
'others' #	(---)	(---)	(---)	(---)	(---)	(---)	16.06	14.61	37.29	26.57
General Education *										
Not Literate #	60.59	54.87	51.56	47.46	31.38	29.08	48.42	44.82	61.17	57.82
without schooling	1.23	0.17	1.70	0.49	1.68	0.39	1.11	0.17	4.60	1.61
Below primary	6.28	6.81	7.15	7.79	7.13	5.53	6.69	6.83	8.27	9.01
Primary to middle	22.97	27.28	25.49	25.47	29.53	28.62	26.41	27.03	20.01	22.82
Sec. to higher Sec.	7.22	9.09	11.50	14.28	21.58	24.28	13.39	15.67	5.35	6.99
Diploma	0.00	0.15	0.15	0.09	0.27	0.40	0.14	0.19	0.08	0.02
Graduate and above	1.71	1.63	2.45	4.42	8.43	11.71	3.84	5.29	0.51	1.72
Household Type*										
SEA	32.46	28.96	53.10	49.25	58.80	58.34	51.68	47.20	29.03	28.82
SENA	17.64	15.06	19.50	18.00	16.12	13.32	15.57	14.53	35.83	27.65
RWSE		4.51		4.29		8.28		5.35		3.76
AL #	25.59	19.12	11.25	8.81	6.58	3.15	14.00	11.63	15.89	7.12
NAL	17.95	28.82	7.23	13.76	4.25	8.59	9.87	16.19	8.31	23.93
Others	6.37	3.53	8.92	5.89	14.25	8.31	8.88	5.10	10.94	8.72
Sector*										
Agriculture	60.08	49.00	68.19	61.65	70.50	66.68	69.04	61.56	48.80	39.56
Secondary	26.46	38.94	15.08	22.98	10.40	13.44	16.68	24.49	22.26	37.99
Tertiary#	13.44	12.06	16.71	15.37	18.99	19.89	14.25	13.95	28.80	22.44

Note: 1. # Reference category.

*2. * In percentages, and rest are averages.*

3. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-6 MEAN VALUES OF THE DETERMINANTS USED IN LOGISTIC REGRESSION FOR URBAN U.P AND ITS REGIONS

Variables	**Urban U.P**		*Western*		*Central*		*Southern*		*Eastern*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	5.07	4.89	4.90	5.00	5.05	4.69	5.26	4.98	5.49	4.84
Age	42.99	43.91	41.49	43.58	44.28	43.88	47.76	45.27	44.23	44.35
Regions*										
WR #	52.72	49.3367	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
CR	22.11	22.8087	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
SR	5.36	5.13811	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
ER	19.81	22.7165	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
Religious Group*										
Hindus	71.82	69.44	68.35	69.03	76.87	63.43	78.51	93.16	73.58	70.99
Muslims #	26.56	28.92	29.68	28.75	21.21	35.59	20.70	5.67	25.80	27.84
Social Group*										
SCs	13.94	12.83	10.25	15.81	17.34	7.57	37.25	18.49	13.65	10.37
OBCs	42.76	47.03	42.35	41.17	33.35	46.80	43.48	46.81	54.15	60.05
'others' #	42.75	39.09	47.40	41.96	48.58	44.15	17.67	33.48	30.66	29.05
***General Education **										
Not Literate #	24.60	26.99	26.74	29.43	18.71	27.60	27.41	17.32	24.74	23.29
without schooling	2.83	0.56	3.94	0.59	0.99	0.88	0.23	0.00	2.64	0.29
Below primary	5.46	4.80	5.55	4.89	3.72	2.75	7.10	7.10	6.72	6.15
Primary to middle	27.12	21.26	27.98	20.52	27.74	22.37	35.21	21.80	21.99	21.64
Sec. to higher Sec.	21.97	23.48	21.06	21.03	25.01	24.53	23.86	28.01	20.52	26.69
Diploma	0.50	0.57	0.35	0.77	0.71	0.00	0.20	0.05	0.75	0.82
Graduate and above	17.51	22.34	14.39	22.77	23.11	21.87	6.00	25.72	22.65	21.13
Household Type*										
SE	46.77	44.76	48.82	45.31	39.53	44.14	39.83	33.04	51.35	46.84
RWSE	35.51	32.29	34.97	33.43	45.83	31.97	32.79	41.92	26.11	27.96
CL	9.17	13.52	9.26	15.69	8.25	14.32	12.72	13.54	8.99	8.00
Others	8.55	9.43	6.94	5.57	6.39	9.57	14.66	11.50	13.55	17.20
Sector*										
Agriculture	7.31	6.90	7.42	7.44	5.34	3.73	7.91	15.62	9.22	6.89
Secondary	32.94	34.45	38.32	35.97	23.24	35.23	26.46	31.35	30.81	30.60
Tertiary#	59.52	58.65	53.98	56.59	71.07	61.04	65.63	53.03	59.97	62.51

Note: 1. # Reference category.

*2. * In percentages, and rest are averages.*

3. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-7 MEAN VALUES OF THE DETERMINANTS USED IN LOGISTIC REGRESSION FOR SRGS IN URBAN U.P

Variables	*SCs*		*OBCs*		*'others'*		*Hindus*		*Muslims*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	4.97	4.58	5.38	5.21	4.81	4.45	4.65	4.58	6.24	5.71
Age	42.30	43.81	43.34	43.14	42.88	45.38	42.58	43.81	43.71	44.18
Regions*										
WR #	58.46	49.05	58.46	49.05	58.46	52.95	0	49.05	58.92	49.05
CR	25.12	20.84	25.12	20.84	25.12	25.76	0	20.84	17.66	28.07
SR	2.217	6.89	2.217	6.89	2.217	4.40	0	6.89	4.18	1.01
ER	14.21	23.22	14.21	23.22	14.21	16.88	0	23.22	19.24	21.87
Religious Group*										
Hindus	70.29	1.33	65.41	1.33	70.29	73.21	(---)	(---)	(---)	(---)
Muslims #	(---)	(---)	34.47	17.58	26.41	23.62	(---)	(---)	(---)	(---)
Social Group*										
SCs	(---)	(---)	(---)	(---)	(---)	(---)	18.85	17.58	(---)	(---)
OBCs	(---)	(---)	(---)	(---)	(---)	(---)	38.94	39.87	0	66.2776
'others' #	(---)	(---)	(---)	(---)	(---)	(---)	41.84	41.22	0	31.9301
General Education *										
Not Literate #	15.06	21.12	15.06	21.12	15.06	14.94	16.65	17.89	47.56	50.32
without schooling	4.079	27.03	4.079	27.03	4.079	0.43	1.70	0.31	6.04	1.18
Below primary	3.953	0.68	3.953	0.68	3.953	2.81	4.63	4.65	7.91	4.92
Primary to middle	22.25	28.32	22.25	28.32	22.25	16.07	29.13	21.12	20.98	21.48
Sec. to higher Sec.	24.27	41.42	24.27	41.42	24.27	26.78	25.79	27.03	11.39	14.16
Diploma	0.664	37.08	0.664	37.08	0.664	0.89	0.61	0.68	0.23	0.34
Graduate and above	29.73	11.84	29.73	11.84	29.73	38.08	21.48	28.32	5.90	7.60
Household Type*										
SE	44.24	9.66	52.60	9.66	44.24	43.80	41.62	41.42	59.98	52.69
RWSE	42.14	7.23	28.49	7.23	42.14	40.15	41.42	37.08	19.65	20.63
CL	4.228	29.51	11.08	29.51	4.228	5.79	8.26	11.84	12.12	18.33
Others	9.392	63.26	7.83	63.26	9.392	10.26	8.69	9.66	8.24	8.36
Sector*										
Agriculture	5.814	5.39	8.39	8.28	5.814	5.76	7.90	7.23	6.17	6.40
Secondary	27.41	48.29	39.45	37.32	27.41	26.55	30.03	29.51	42.09	46.95
Tertiary#	66.74	46.32	51.80	54.40	66.74	67.69	61.97	63.26	51.16	46.65

Note: 1. # Reference category.
*2. * In percentages, and rest are averages.*
3. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-8 ESTIMATES OF LOGISTIC REGRESSION FOR RURAL U.P AND ACROSS REGIONS, 2004-05 AND 2011-12

Variables	Rural U.P		*Western*		*Central*		*Southern*		*Eastern*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	39.2***	37.6***	49.3***	56.8***	41.9***	59***	43.1***	84.1***	150.2***	28***
Land	-57.9***	-41.7***	-64.1***	-56.7***	-67.9***	-39.3*	-49.4***	-16.9	-53.4***	-54.7***
Age	-2***	-2***	-3***	-3.7***	-1.1	-0.8	-1.2	2.4	-1.8***	-1.9***
Regions: WR (Reference)										
CR	32.8***	278.2***	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
SR	320.7***	248***	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
ER	142.2***	160.7***	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
Religion: Muslims (Reference)										
Hindus	1.7	-13.7	-0.4	31.3	-13.2	-70.1***	-83.6**	-82.4	20.9	23.5
Social Group: 'others' (Reference)										
SCs	128.3***	156.5***	138.4***	105.1*	118.3**	191.3**	326.8**	456.9	136.4***	175.7***
OBCs	63.1***	84***	64.3***	80.5*	128.7***	72.7	13.2	581.8*	55.3***	92.8**
General Education : Not Literate (Reference)										
without schooling	-69***	94	-78.1***	131	-38.3	-76.1	-73.5		-68.9***	673.3*
below primary	-29.4**	2.1	-36*	-37.2	13.5	23.7	65.6	-48.1	-45.6***	26.7
Primary to middle	-37***	-23.7**	-49***	-13.2	-33.1**	-29.5	-47.1*	-15.3	-27.5**	-27.2*
Sec. to Higher Sec.	-59.1***	-67.4***	-57.6***	-60.6**	-61.3***	-70**	-76.6***	-58.6	-55.5***	-74.2***
Diploma	-96.3***	0	-85.6	0		0		0		0
Graduate and above	-62.1***	-63***	-74.8***	-76.2**	15	-29.9	-89.1*	-78.1	-64***	-69.2**
Household Type: AL (Reference)										
SEA	167.9***	-41.5***	-2.5	-39.7	398.4***	-30.5	453.9	-93.3***	199.9***	-26.1
SENA	79.3**	-56.3	-26.8	-42.1	110.7	6.1	142	-96.2	111.3**	-64.2
NAL	85.8***	-6.7	59.4**	69.2	77.2**	193.2	107.9	-80.7	104.4***	-40.6
RW/SE	(---)	-55.2	(---)	-15	(---)	-26.2	(---)	-96	(---)	-64.1
Others	-21.9	76.2	-67.4**	62.8	4.2	67.4	179.4		-20.7	154.2
Sectors: Services (Reference)										
Agriculture	127.7***	6.6	2.7	141.5	194.5**	-14.3	123.7	15.1	166***	-33.3
Secondary	-13.7	12	-19.9	-3.6	-28.9	.	-68.7	285.1	2.8	19.4
Observations	**7423**	**5631**	**2552**	**1911**	**1289**	**961**	**379**	**312**	**3191**	**2444**
Goodness-of-fit test										
F-adjusted test statistic	2.01	0.20	1.02	0.30	1.53	0.95	1.26	9.56	1.30	1.38
Prob>F, *p*	0.04	0.99	0.44	0.98	0.14	0.48	0.26	0.00	0.23	0.19

*Note: 1. Results are expressed in per cent change in odds. *, **, ***Coefficients would be significantly different from zero at 10, 5, and 1 per cent levels of significance, respectively*

2. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-9 ESTIMATES OF LOGISTIC REGRESSION ACROSS SRGS OF RURAL U.P, 2004-05 AND 2011-12

Variables	*SCs*		*OBCs*		*'others'*		*Hindus*		*Muslims*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	45.2***	46.3***	40.8***	37.1***	30.5***	36***	39.9***	36.7***	36.1***	51.8***
Land	-55.5***	-19.8	-63.7***	-47.7***	-40***	-63.6**	-58***	-45***	-57.6**	-23.6
Age	-1.8***	-1.5*	-1.7***	-1.6**	-2.7***	-4.7***	-1.9***	-1.7***	-2.1***	-3.6***
Regions: WR (Reference)										
CR	8.2	257.2***	54.4***	261.2***	29.5	661.1***	32.9**	204***	34.7	1146.3***
SR	500***	206.9***	226.2***	277.4***	495.6***	188.9	297.9***	215.7***	1603.1***	979.6
ER	172.8***	246.8***	124.7***	129.4***	144.9***	31.9	155.5***	146.5***	81.1***	196.5***
Religion: Muslims (Reference)										
Hindus	-15.6	1753.2***	47.4***	0.6	-54.5***	-55.5**	(---)	(---)	(---)	(---)
Social Group: 'others' (Reference)										
SCs	(---)	(---)	(---)	(---)	(---)	(---)	185.7***	256.6***	114.8	-92.8***
OBCs	(---)	(---)	(---)	(---)	(---)	(---)	113.6***	155.5***	-12.5	14.3
General Education : Not Literate (Reference)										
without schooling	-67.8**	180.9	-75.4***	-10.6	-70.4*	4620.6***	-66.1***	222.4	-75.3***	-27.8
below primary	-31.4	-4.2	-24.9	16.1	-39.8	-20.4	-27.5**	14.5	-33.1	-42.3
Primary to middle	-35.6***	3.9	-37.8***	-28.3*	-28.9	-52.9*	-36.9***	-19.6	-28.2	-24.3
Sec. to Higher Sec.	-44.6**	-71.2***	-63.1***	-58.4***	-50.7**	-88.1***	-58.2***	-66.6***	-50.3*	-65.8**
Diploma		0	-95.7**	0		0	-95.5***	0		0
Graduate and above	4	30.7	-86.1***	-77.2***	-38.1	-53.2	-57.3***	-55.8**		-82.8
Household Type: AL (Reference)										
SEA	119.8*	-61.2***	221.1***	-24.7	49.1	55.2	150.2***	-41.1**	222.5	-28.1
SENA	22.3	-48.7	185.1***	-72.3***	-39.1	24.5	69.9**	-47.7	129.2	-86.5***
NAL	68.4**	9.1	97.1***	-38.8	89*	119.6	91.3***	-0.7	74	-50.4
RW/SE	(---)	-69.5	(---)	-68.7**	(---)	203.1	(---)	-53.2	(---)	-57.8
Others	-72.5**	446	21.5	-58.7	-42.9		-27	119.1	-14.7	-31.6
Sectors: Services (Reference)										
Agriculture	38.7	79.4	230.7***	-46.1	15.3	92.7	135.3***	41.7	96.4	-82.8**
Secondary	-32	10.5	-15	7.4	18.7	155.7*	-1.4	27.4	-44.4**	-28.6
Observations	**1765**	**1481**	**4003**	**2988**	**1612**	**1088**	**6377**	**4848**	**1015**	**770**
Goodness-of-fit test										
F-adjusted test statistic	1.23	0.69	2.61	1.39	1.09	9.16	2.08	0.86	0.46	0.67
Prob>F, *p*	0.27	0.72	0.06	0.22	0.37	0.00	0.03	0.56	0.90	0.77

*Note: 1. Results are expressed in per cent change in odds. *, **, ***Coefficients would be significantly different from zero at 10, 5, and 1 per cent levels of significance, respectively*

2. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05 and 2011-12.

TABLE A-0-10 ESTIMATES OF LOGISTIC REGRESSION FOR URBAN U.P AND ACROSS REGIONS, 2004-05 AND 2011-12

Variables	Urban U.P		*Western*		*Central*		*Southern*		*Eastern*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	42.3***	38.5***	54.2***	36.9***	56.6***	66.9***	63.8***	51.4***	29.1***	35.2***
Age	-2***	-1.5**	-2.6**	-0.5	-1.8	-2.9**	-1.6	-5.5**	-2.1**	-1.6
Regions: WR (Reference)										
CR	-8.8	153.1***	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
SR	104.8**	128.2***	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
ER	33.7	152.7***	(---)	(---)	(---)	(---)	(---)	(---)	(---)	(---)
Religion: Muslims (Reference)										
Hindus	11.9	-16.4	29.1	-5.9	16.5	-39.8	10.1	-56.4	-23.5	14.8
Social Group: 'others' (Reference)										
SCs	107.2***	190.5***	69.5	158.9***	80.1	198.1*	72	209.7	344.7***	400.3***
OBCs	45.1**	60.4**	60.5*	60.8*	12	43.2	103.9	74.4	73.5*	162.3***
General Education : Not Literate (Reference)										
without schooling	-71.7***	-11.1	-70.4**	73.9	-80.1	-92.3			-74.4*	138.9
below primary	-25.1	-17.1	-25.5	-27.3	-58.5	-89**	-8.6	-26.5	-9.1	70.3
Primary to middle	-56.6***	-49.5***	-54.4***	-61.7***	-61.5**	1.4	-87***	-78.6**	-42.6*	-57.9***
Sec. to Higher Sec.	-79.1***	-79.1***	-78.6***	-79.4***	-78.2***	-81.6***	-95.4***	-71.2	-74.9***	-82***
Diploma	-76	-69.7	61.8		-80.4		-95.3**		-97.8**	12.6
Graduate and above	-91.9***	-93.5***	-88.2***	-92.3***	-94.6***	-98.5***	-99.1***	-93.6**	-92.5***	-91.1***
Household Type: RW/SE (Reference)										
SE	89.2***	12.8	66.9*	-3.7	131**	-0.1	598.9**	151.4	28.2	45.1
CL	295.8***	170.3***	353.8***	54.5	473.8***	490.1***	1203.2**	678**	76.7	303.5***
others	65.5	301.8**	21.9	680.2***	-70.7				35	1049.3*
Sectors: Services (Reference)										
Agriculture	35.7	31.3	-44.2	-17.8	224.5*	295.1	-23.7	-17.2	435.1***	125.6*
Secondary	26.4	-9.4	19.5	-8	25.2	-20.7	64.5	-75.4**	26.4	9.4
Observations	**3056**	**2835**	**1142**	**1240**	**592**	**460**	**243**	**227**	**1076**	**893**
Goodness-of-fit test										
F-adjusted test statistic	4.32	97.44	3.15	118.43	2.26	13.21	349.48	31.33	57.60	58.25
Prob>F, *p*	0.00	0.00	0.01	0.00	0.08	0.00	0.00	0.00	0.00	0.00

Note: 1. *** Significance at 1% level, ** significance at 5% level,* significance at 10% level.

2. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05and 2011-12.

TABLE A-0-11 ESTIMATES OF LOGISTIC REGRESSION ACROSS SRGS OF URBAN U.P, 2004-05 AND 2011-12

Variables	*SCs*		*OBCs*		*'others'*		*Hindus*		*Muslims*	
	61st	68th	61st	68th	61st	68th	61st	68th	61st	68th
Household Size	68.2***	67***	40***	36***	***39.3	36.2***	42.7***	54.9***	47.2***	27.6***
Age	-2	-2.1	-1.6*	-1.6*	*-1.9	-0.3	-1.5*	-2.8***	-2.7**	-0.6
Regions: WR (Reference)										
CR	-10.9	291.3***	-23.6	133.5***	6.7	160.7**	-10.6	120.3**	-6.1	162***
SR	73.1	189.2*	141.9*	137.5**	***288	44.4	78.3*	121.4**	231.9**	211.2*
ER	158*	326.1***	12.9	138.8***	13.2	58.2	36.4	207.3***	17.8	109.6**
Religion: Muslims (Reference)										
Hindus	643.2***	-57.9	24.3	-12.1	1.2	-30.5	(---)	(---)	(---)	(---)
Social Group: 'others' (Reference)										
SCs	(---)	(---)	(---)	(---)	(---)	(---)	143.3***	187.6***	-70.5*	622.9**
OBCs	(---)	(---)	(---)	(---)	(---)	(---)	46.7	71.6*	33.7	26.1
General Education : Not Literate (Reference)										
without schooling	1437.4***		-71.4**	120.6	**-82.9	-92.1*	-84.6***	162.3	-65.4**	-53.8
below primary	-3.7	-57.9	-37.9	5.3	-42.3	-60.7	-14.7	-54.9**	-23.2	88.4
Primary to middle	-30.6	-73***	-59.9***	-33.2	***-70.5	-62.8**	-45.1**	-59***	-69***	-38.6
Sec. to Higher Sec.	-48.2	-87***	-83.8***	-76.2***	***-84.1	-79.6***	-71.3***	-82.2***	-88.4***	-80.9***
Diploma	(---)	(---)	-43.6	(---)	**-92.2	-49.6	-59.8	(---)	-97.3	46.5
Graduate and above	-81.1**	-98.3***	-93.7***	-82.1***	***-93.3	-98***	-90.5***	-94.5***	-89.1***	-93.3***
Household Type: RW/SE (Reference)										
SE	268.4***	92.1	141.4***	18.4	20.5	-29.3	124.7***	54.3	39.6	-36.6
CL	500.7***	227**	353.6**	168.9***	***356.5	221.6**	387.1***	275.3***	179.8**	52.3
others	-94.9***	154.6	360.7***	584.1**	1.5		11	151.9	510.3*	3934.8***
Sectors: Services (Reference)										
Agriculture	457***	17.2	-22	5.5	41.9	89.2	128.1***	87.7*	-72.7**	-34.3
Secondary	31.9	-14.7	25.4	-12.2	38.4	-4.2	92.9***	1	-36.4*	-25.4
Observations	524	399	1406	1394	1106	994	2141	1950	876	833
Goodness-of-fit test										
F-adjusted test statistic	4.09	3.45	3.17	0.62	0.85	542.27	2.91	68.75	1.16	0.97
Prob>F, *p*	0.00	0.00	0.01	0.78	0.57	0.00	0.02	0.00	0.32	0.46

Note: 1. *** Significance at 1% level, ** significance at 5% level,* significance at 10% level.

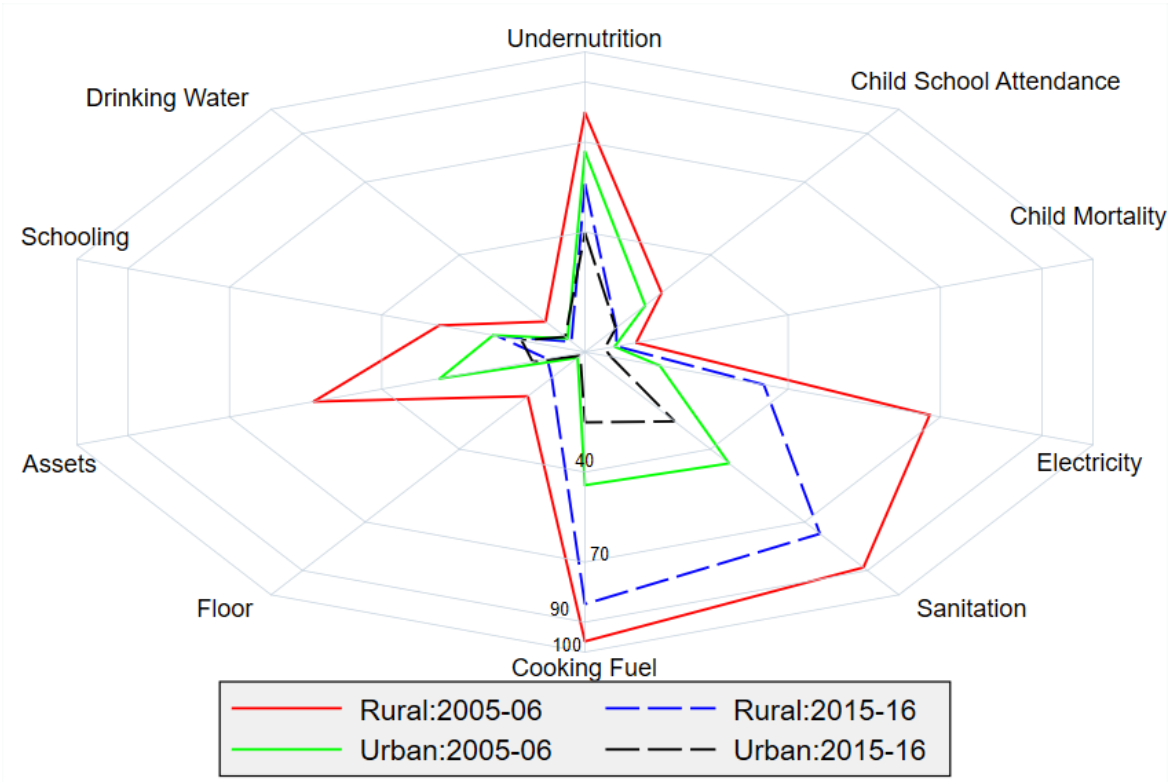
2. 61st represent for the year 2004-05 and 68th for the year 2011-12.

Source: Calculation from NSSO, 61st and 68th round data of CES, Government of India, 2004-05and 2011-12.

TABLE A-0-12 UP-MPI AND ITS COMPONENTS (*H* AND *A*), 1992-93 TO 2015-16

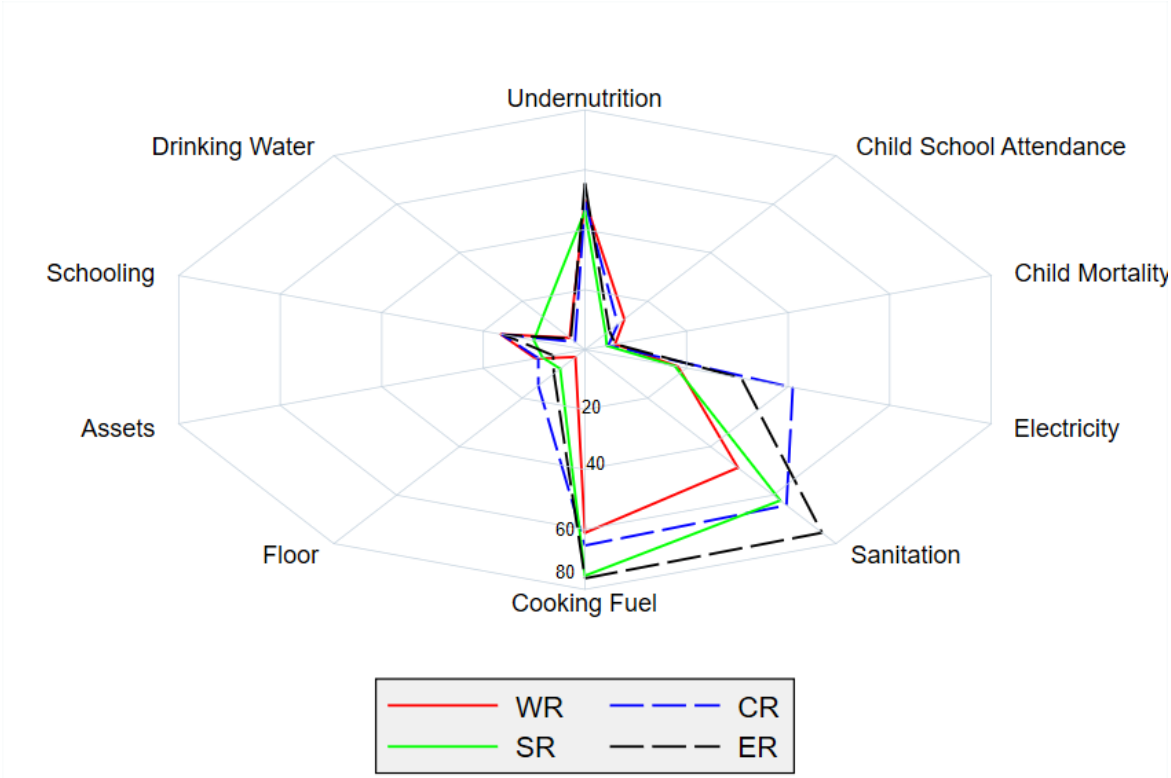
SRGs/U.P	Headcount (H)			
	2015-16	**2005-06**	**1998-99**	**1992-93**
SCs	0.40	0.76	0.72	0.87
OBCs	0.33	0.69	0.66	N.U
Other SGs	0.17	0.47	0.45	0.67
Hindus	0.30	0.64	0.58	0.70
Muslims	0.37	0.75	0.61	0.77
Uttar Pradesh	0.31	0.66	0.59	0.71
SRGs/U.P	**Intensity (*A*)**			
	2015-16	**2005-06**	**1998-99**	**1992-93**
SCs	0.45	0.52	0.54	0.59
OBCs	0.44	0.50	0.51	N.A
Other SGs	0.44	0.47	0.50	0.56
Hindus	0.43	0.49	0.52	0.56
Muslims	0.47	0.54	0.53	0.57
Uttar Pradesh	0.44	0.50	0.52	0.56
SRGs/U.P	**UP-MPI**			
	2015-16	**2005-06**	**1998-99**	**1992-93**
SCs	0.18	0.40	0.39	0.52
OBCs	0.15	0.35	0.34	N.A
Other SGs	0.08	0.22	0.23	0.37
Hindus	0.13	0.32	0.30	0.39
Muslims	0.18	0.40	0.32	0.44
Uttar Pradesh	0.14	0.33	0.30	0.40

FIG. A-0-1 UNCENSORED HEADCOUNT BY INDICATORS AND AREAS, 2005-06 AND 2015-16



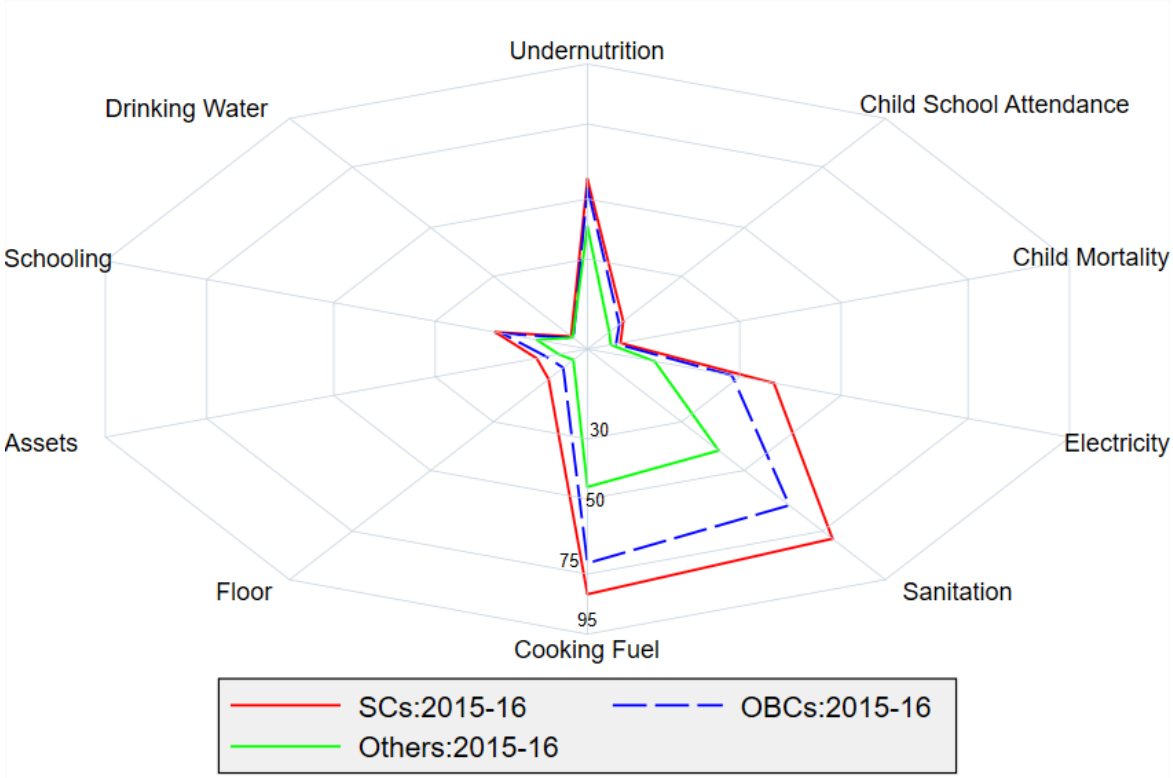
Source : Author calculation from various NFHS unit level data.

FIG. A-0-2 UNCENSORED HEADCOUNT BY INDICATORS AND REGION, 2015-16



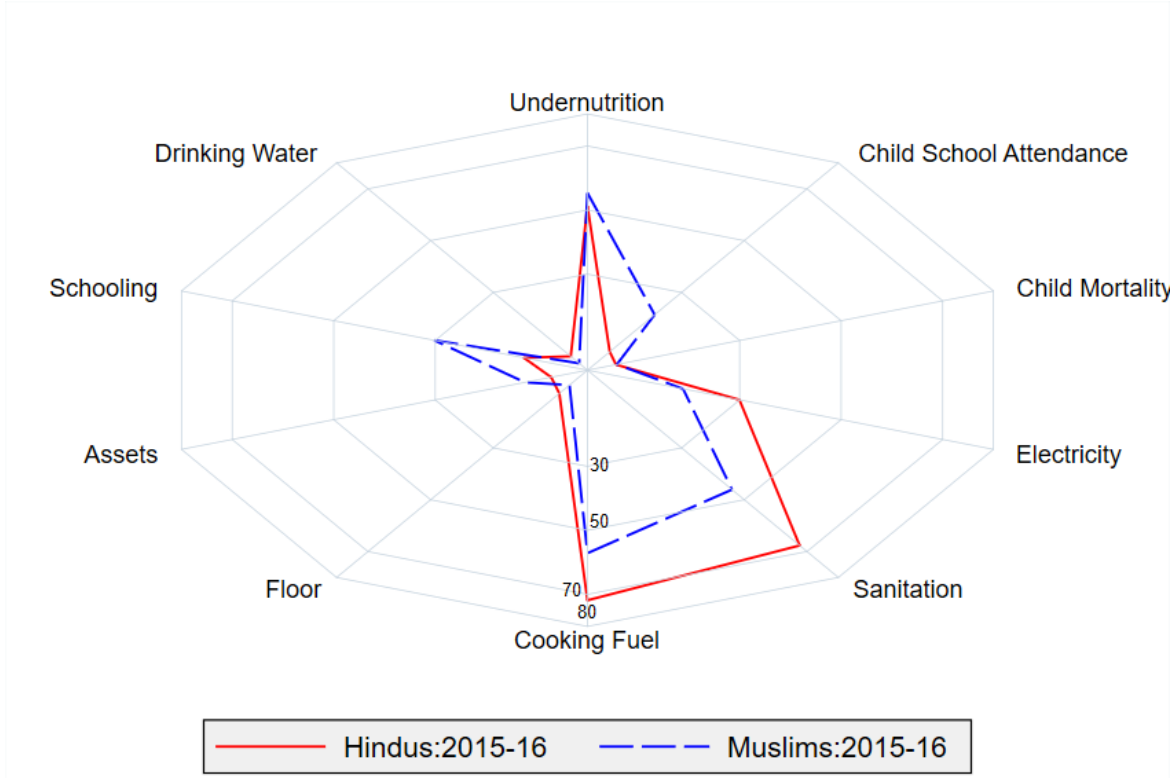
Source : Author calculation from various NFHS unit level data.

FIG. A-0-3 UNCENSORED HEADCOUNT BY INDICATORS AND SOCIAL GROUPS, 2015-16



Source : Author calculation from various NFHS unit level data.

FIG. A-0-4 UNCENSORED HEADCOUNT BY INDICATORS AND RELIGION, 2015-16



Source : Author calculation from various NFHS unit level data.