

Multidimensional poverty and longevity in India

Introduction

In last two decades, most of the countries had shown substantial increase in longevity; measured in terms of life expectancy at birth. The life expectancy at birth has increased from 74 years in 1990 to 77 years in 2010 for developed countries while it has increased from 63 years to 67 years for developing countries (UN 2010). The increased life expectancy at birth is associated with rising income level, reduction in child and adult mortality, health care utilisation, better nutrition etc (Singh and Siahpush, 2006). Owing to its advantages, the life expectancy at birth is used as the summary measure of health. It is used to measure the health dimension of human development index (HDI). Though the utility of life expectancy at birth as a measure of health status is established, the indicator is often provided at national /regional level without segregating by various social and economic groups. This is possibly due to lack of reliable data on mortality across population sub-groups and by age group.

Along with improvement in longevity, many of the developing countries have also experienced increase in overall level of development. In developing countries, the average value of HDI has increased from 0.320 to 0.435 during 1990 to 2010 (UNDP 2011). However, such increase in HDI value masks wide inequality in income, health and other development indicators across and within the countries. Studies documented rising in poverty and inequality along with increase income level (HDI, 2011). The UN Millennium declaration in 2000 aimed at reducing the multidimensional poverty (health, education, economic status) in its all form.

The concept of poverty is multidimensional and has undergone conceptual and methodological changes over the years. Traditionally, poverty is measured in monetary terms, either income or consumption expenditure. The money-metric poverty has received sharp criticism from all corners. The capability approach of Sen (1981, 1990) brought the concept of multidimensional poverty to centre stage.

India is one of the emerging economies with rapid economic growth, leading to reduction in money metric poverty and sustained progress in social development. capability of an individual, to achieve its basic human needs or freedom to choose an appropriate non-poor functioning, is the endowment of bundles of functioning (Sen, 1992, 1996, 1999). However, such poverty estimates are often revised owing to the recall lapse and revision of price list over the period of time (Sundram, and Tendulkar, 2003). For example, the GOI appointed the Tendulkar Committee to revise the poverty estimate (Planning Commission, 2012). According to the Planning commission 2009-10, 29.8% of the population were living below poverty line.

By definition multidimensional poverty is an aggregate measure of the dimensions of human welfare, which allows for the poverty comparisons based either on a series of indicators aggregate across individuals or on individual data aggregated to welfare indicators at the

individual level first, and then across individuals. Empirically, multidimensional poverty is a composite index of the available information about the human population (Bibi, 2003).

Literature review

Comparing the income level and human development in the oil exporting countries of the Middle East and North Africa, it is found that there is no relationship between reduction in monetary poverty and improvement in human development indicators (Adams and Page, 2001). Income based poverty only provides a part of the picture of the many factors that effects the level of welfare in terms of longevity, good health, good nutrition, education, being well integrated into society, etc (UNDP, 1997). With the acceptance of Millennium Development Goals (MDGs) in the year 2000 it became imperative to measure the improvements in human development in terms of eight interconnected human sufferings that reflects the multidimensional nature of poverty. This also provides the measure for the government interventions to improve the human welfare. Recent economic crisis of 2009 has shifted the national and international focus on the dimension of well-being that can grow even during economic crisis (Stiglitz et al 2009).

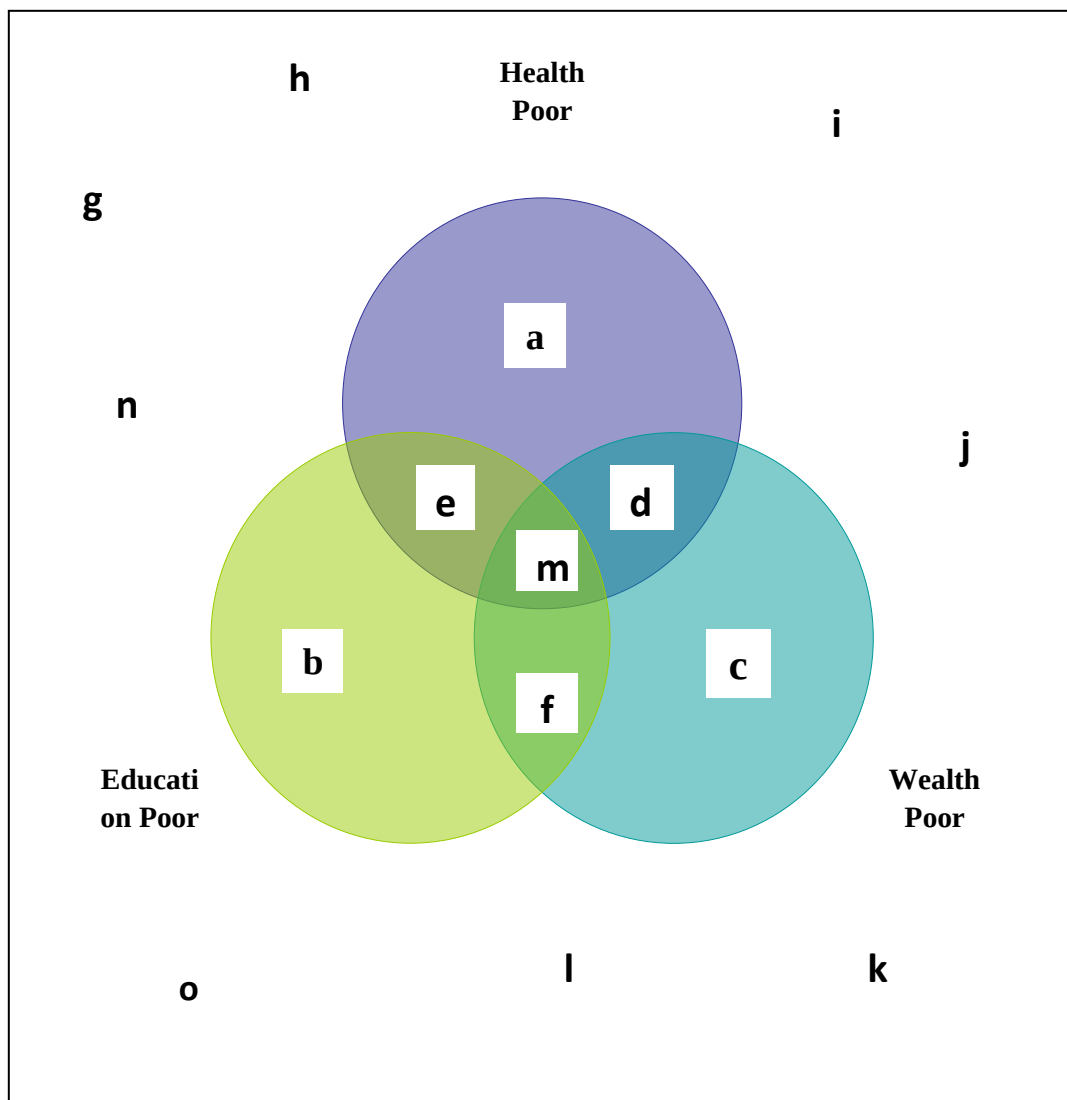
Differences in acquired and inherent attributes like social and wealth status, economic opportunity, education and health itself results in unequal ends, health and long life. Life expectancy is one of the summary health measures which give overall health status after adjustment of the current health, measured in terms of infant and child mortality. By nature of summary health measure any small change in infant and child mortality by time and groups of individuals gets reflected in life expectancy at birth (Murray et, al 2000).

Economic development during last two decades has resulted in improved life expectancy of the developed countries through innovation in public health measures and advancement in medical technology (Bloom et al. 2009, Grimm 2011). Such advancement in the determinants of health made easy and cost effective health intervention in the developing countries. Hence long run effort of the developed countries, to improve population health during 19th century, is reaping the low cost health benefit to the developing countries. In newly developed countries mortality as a measure of public health does not show any association with the economic development because of diffusion of medical and health technologies, facilities and personals that occurred independently of economic development (Frederiksen, 1961, 1966; Heer, 1968; Preston, 1975). Hence income alone could not explain the variation in the life expectancy across states in India. Multi dimensional nature of human needs requires establishing it relation with the poverty measure capturing all aspects of human development.

After independence the average health measured in terms of life expectancy in India has improved from 50 years in 1972 to 64 years in 2004 this average picture shows a wide gap in level and growth of life expectancy between states during the period. Life expectancy at birth in 1972 was 62 years and 47 years in Kerala and Madhya Pradesh respectively, which increased to 74 years and 58 years in 2004 in the respective states (RGI). Improvement in life

expectancy does not show any consistency with the economic development. Current status of health and economic status also does not show any relation in the states of India. According to the Planning Commission of India 63% population in Madhya Pradesh and 59% population in Kerala were living below poverty line in 1973, and proportion of the population below poverty line has reduced to 37% and 12% respectively in the states in 2004. The difference in level and growth of life expectancy and its usual covariate, income level, do not show concurrence.

Conceptual framework of multidimensional poverty:-



$$\text{Total households} = a+b+c+d+e+f+g+h+i+j+k+l+m+n+o$$

$$\text{Total households poor in one of the dimensions} = a+b+c$$

$$\text{Households poor in health dimension} = a+e+d+m$$

$$\text{Households poor in education dimension} = b+e+f+m$$

$$\text{Households poor in wealth dimension} = c+f+d+m$$

Total households poor in two dimensions= $d+e+f$

Total households poor in all dimensions= m

Total non-poor households = $g+h+i+j+k+l+n+o$

Need of the study

In last two decade, a number of development programme are set to improve the health and well being of the poor and marginalised. But little is known whether the benefit is reaching to the poor and needy though there has been increasing investment on health. Besides, studies also documented increase in inequality in the country. In the context of changing economy and society, understanding the linkages of multidimensional poverty with summary measure of health would be helpful in formulating effective policies. Accordingly, this study has been conceptualised with the following rationale. First, though the concept of multidimensional poverty has been acknowledged among economist, public health professionals, development thinker, the national govt (Planning Commission) at the centre stage of development agenda, the measurement and application of multidimensional approach in India is limited. In Indian context though there are few studies that explored the measurement and application of multidimensional poverty but limited to a point of time and health care utilisation (Mohanty 2011; Mohanty 2012). Second, the official measure of poverty is derived by the Planning Commission, Govt of India based on the calories intake, from the consumption expenditure data collected by the NSSO in its quinquennial round. However, such estimate is long contested and debated among academia, researchers and often criticised (Sundram, and Tendulkar, 2003). Though there has been reduction in consumption poverty, the health situation of the population has not improved. For example, 42.5% children were underweight (less than -2SD) and 55.3% women were anaemic (<12.0 g/dl) (IIPS and Macro International, 2007). This reflects the problem in conceptualization and measurement of poverty. Third, though India has experienced high GDP growth rate (more than 6%) and improvement in longevity has increased from 58 years to 64 years in last two decades, little is known on the overall health situation across poverty groups. The SRS that provides the reliable estimates of life expectancy at birth is limited to major states by sex and place of residence. We do not have segregated estimates of life expectancy at birth by economic or social group. In this context, it is useful to provide the estimates of life expectancy at birth by multidimensional poverty.

Research questions

1. Whether the multidimensional poverty has reduced over the time and space?
2. What is the extent of inequality in longevity by multidimensional poverty ?

Objectives

The broad objective of the study is to understand the inequalities in longevity e.g. life expectancy at birth by multidimensional poverty in India and states.

The specific objectives are:

1. To estimate the multidimensional poverty over time in India and States.
2. To examine the life expectancy at birth by multidimensional poverty over time in India and states.
3. To examine the relationship of multidimensional poverty and life expectancy in India and states.

Data

The data for the present study has been drawn from two rounds on National Family Health Survey (NFHS) and Sample Registration System (SRS), India. The NFHS are the nationally representative population based survey that provides comprehensive information on fertility, mortality, nutritional status, health care utilization, birth history of women etc. The first round of NFHS was held in 1992-93 that covered 89,777 women of age 15-49 from 88,562 households and third round of NFHS was carried out in 2005-06 that covered 1,24,385 women of age 15-49 from 109,041 households. The household, women and kids file are used in the analysis. Data from the NFHS 1 and NFHS 3 in India have been used in the analysis and data from Sample Registration System (SRS based abridged life table, 1991-95 and 2002-06) is used to compare and validate the estimated life expectancy at birth from Brass method.

Methodology

The methodology consists of the followings steps:-

- A. Estimating the multidimensional poverty using unit data for 1992-93 and 2005-06.
- B. Estimating the life expectancy at birth among multidimensional poverty using the Brass method.
- C. Linkages of multidimensional poverty and longevity.

A: Estimating the multidimensional poverty:

To estimate the multidimensional poverty we have used the uniform methodology for 1992-93 and 2005-06. The detail of the methodology is given in table 1. The measurement of multidimensional poverty is confined to three dimensions, namely, education, wealth and health and depending on the availability of data.. Households are classified as education poor on the basis of two indicators: adult literacy and child enrolment. If there is no adult literate member in the household e.g. household member aged 14 and above having less than five years of schooling or any child aged 7-14 years in the household is not going to school currently than the household is considered as educationally poor. A household is labelled as

health poor if there is at least one severely underweight child (children whose weight for age is below minus two standard deviation from the median of the reference population) in the house. One of the preferred anthropometric measurements is used for this purpose- weight for age which reflects both acute and chronic under-nutrition of child.

To derive economic poor, we assume that the relative position of consumption expenditure and wealth of household is similar. Under this assumption we equate the percentage of households as wealth poor with the planning commission estimates of poverty, which is based on consumption expenditure. However for deriving these estimates we have constructed a composite wealth index based on a set of consumer durables, household amenities, land size etc (table 1). The principal component analyses (PCA) has been used to construct the wealth indices separately for rural and urban areas as wealth estimates differ when indices are computed separately (Mohanty, 2009). PCA is one of valid and reliable technique to use for the construction of composite wealth indices. The factor score is like a weight. PCA assigns weights to the original variable on the basis of their covariance. Variables with a positive factor score are generally associated with a better economic status, and those with negative factor score with relatively lower economic status. The details of the variables used along with the factor score, mean and 95% confidence interval are given in Appendix 1. All the variables used in the PCA are in expected direction. The cut off point of poor is 31.8% in urban area and 50.1% in rural area, in 1992-93 and the cut off point of poor is 25.5% in urban area and 42% in rural area, in 2004-05 (Planning commission, Govt of India). Rural and urban indices are combined to obtain overall national wealth indices.

We consider a household as non-poor if it is not poor in any of the three dimensions: education, health or wealth. And a household is considered as poor in one dimension if it is classified as poor in any one of the stated dimensions. Similarly, multidimensional poor households are those which are poor in any two dimensions or in all the above mentioned dimensions of poverty.

B. Estimating the life expectancy at birth among multidimensional poverty using the Brass method

The Brass method that uses the average children ever born and children surviving by five year age group of women estimate the infant mortality, under five mortality and life expectancy at birth. The mean children ever born and children surviving by poverty level has been tabulated for five year age group (15-49). The UN MORTPAK is used to estimate the life expectancy at birth.

Brass equation is given as:

$$q(x) = k(i) * D(i) ;$$

where,

$q(x)$ is the probability of dying before reaching age x , usually $x=5$,

$D(i)$ is the proportion dead among children ever born to women in successive five year age group,

$k(i)$ is meant to adjust the non-mortality factors. Relation between $D(i)$ and $q(i)$ is primarily influenced by age pattern of fertility in addition to mortality. Age pattern of fertility determines the distribution of children by exposure of dying.

From the mean CEB data we have computed the mean age at child bearing using indirect estimates of fertility- MORTPAK which is used in Palloni-Heligman version of Brass method of indirect estimation of infant, under 5 mortality and equation to estimate life expectancy at birth for different age groups. I have used South Asian Pattern of United Nations Model Life table and average of estimated life expectancy at birth of 20-25 and 25-30 age groups.

C. Linkages of multidimensional poverty and longevity

Ordinary least square regression equation (OLS) establishes the relationship between multidimensional poverty and longevity.

Results:

Results are presented in two sections. Section I describes the estimates of multidimensional poverty and Section II provides the estimates of life expectancy by multidimensional poverty and dimensional poor.

Section I: Estimation of multidimensional poverty.

Table 2 provides the mean value of dimensional indicators for two point of time. It is found that 19% of the households did not had an adult literate member in 2005-06 which has declined from 33% from 1992-93. Similarly, 18% and 9% households have at least one child between ages 7-14 currently not going to school in 1992-93 and 2005-06 respectively. There were 14% households which are poor in health domain in 1992-93, which is reduced to 10% from 2005-06. On an average 47% households were below poverty line in 1993, now it has reduced to 38% in 2006.

The mean, 95% confidence interval and factor score of the variables are given in Appendix 1. The mean value of consumer durables has shown a substantial increase over time. For example, the mean value of television has increased from 0.089 in 1992-93 to 0.301 in 2005-06 for rural area. Similarly, the housing condition measured by the availability of electricity, drinking water, type of house and toilet facility has improved over time. This indicates that the economic condition of the household has increased over time. The distribution of composite wealth index for rural and urban India is shown below.

The estimation of multidimensional poverty for 1992-93 and 2005-06 is shown in table 3. During 2005-06, the distribution of households by multidimensional poverty showed that 39% households were non-poor, 29% poor in one dimension 27% poor in two dimensions and 5% were poor in all three dimensions. During 1992-2006, while the share of non-poor has increase by 8%, the percentage of multidimensional poor has declined 10%. In terms of percentage change health dimension of the poverty has recorded the maximum improvement

(10%) followed by wealth and education dimension during the period 1992-06. Overall, the poverty has reduced by 8%.

Table 4 depicts the state differentials in estimated poverty over time. The proportion of multidimensional poor households remained highest in the state of Bihar followed by Orissa in both the time period. On the other hand, multidimensional poor households were lowest in Delhi followed by Kerala in 2004-05. On the other hand the proportion of non-poor household was maximum in Delhi (81%) followed by Kerala (80%) in 2005-06. In 1992-93, Kerala had 61% of non-poor households preceded by Delhi and Goa. During 1992-06, the proportion of multidimensional poor households had monotonically declined over time with maximum reduction of 16% in Andhra Pradesh followed by Tamil Nadu (14%) and Assam (14%) and least reduction of 0.4% in Haryana and 1% in Meghalaya. Percentage of non-poor households has increased during 1992 -2006 with varying magnitude. This increase is highest in Kerala (19%) followed by Tamil Nadu and Maharashtra (13%). In eight major states, percentage of multidimensional poor household exceeds the national percentage.

Section II: Estimates of life expectancy by multidimensional poverty and dimensional poor

Table 5 depicts the overall life expectancy at birth in the major states of India from two different sources; the SRS estimates and the estimates derived using Brass method. The estimated expectancy at birth derived from Brass method are close to the SRS estimates indicating that the estimates are reliable. For example, the estimated expectancy at birth for India during 2004-05 was estimated at 65 years by Brass method compared to 60 years by SRS. The states differentials vary in a narrow range from 61 years to 80 years in 2005-06 and from 52 years to 70 years in 1992-93. In general it is observed that all the states have recorded increase in life expectancy at birth over time. Average annual change in life expectancy at birth is highest in Kerala followed by Rajasthan and lowest in Andhra Pradesh followed by Punjab, Madhya Pradesh and Maharashtra.

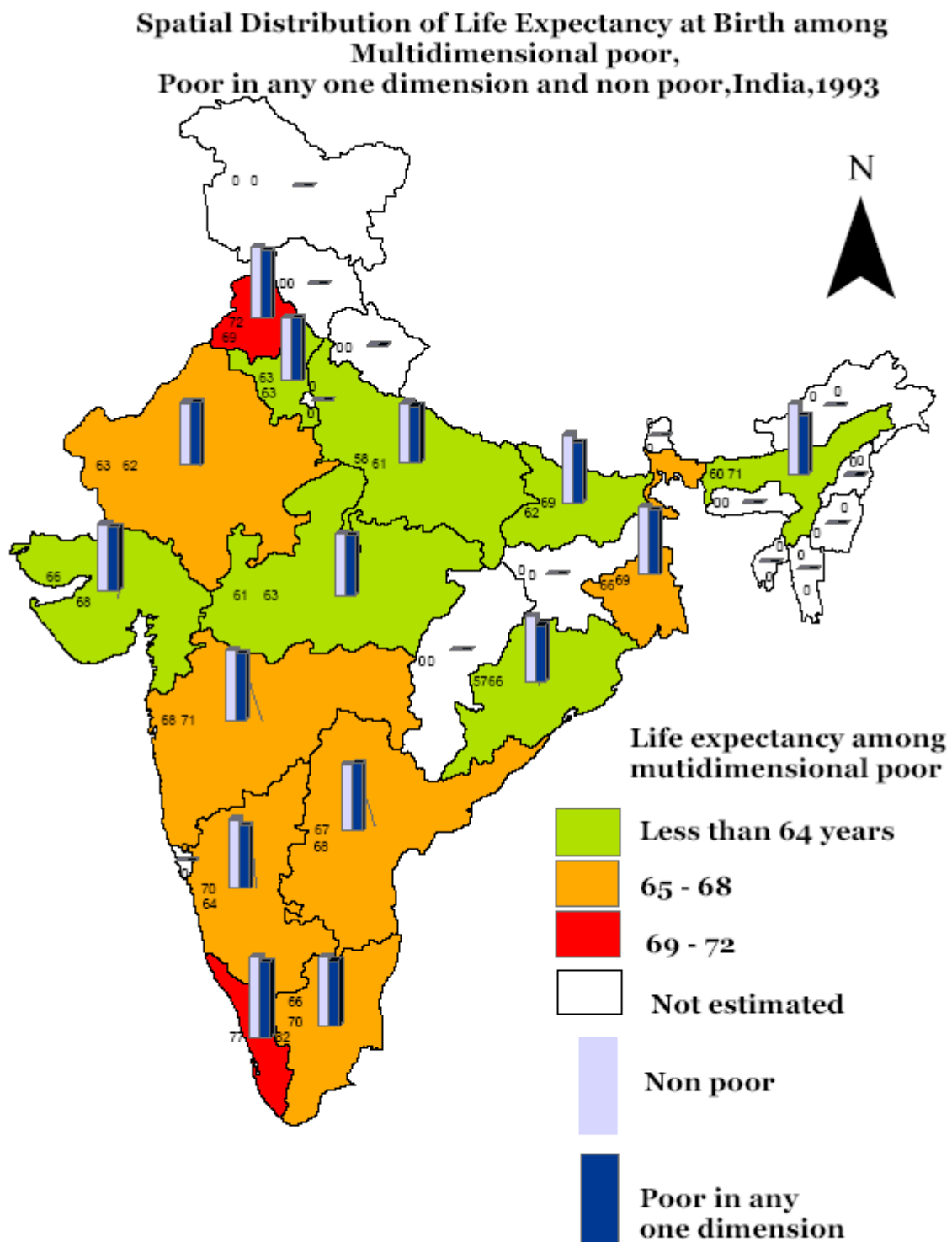
To understand whether the increased longevity has been shared across poverty groups, we have provided the estimated value of life expectancy at birth by multidimensional poverty and by dimensional poor for India during 1992-06 in Table 6. It also provides the average annual change in life expectancy at birth and the ratio of life expectancy at birth among non-poor and poor. Results indicate overall life expectancy at birth is consistent with the SRS estimates of the respective years. During 1992-2005, the estimated life expectancy at birth among non-poor in India has increased from 68 years to 71 years while that of multidimensional poor has increased from 59 to 63 years. The average change in life expectancy at birth was similar across poverty groups; 0.27 years among non-poor, 0.26 among those poor in one dimension and 0.28 among multidimensional poor. However, the differences in longevity among non-poor and multidimensional poor remained large (about 10 years) over time. The estimated life expectancy at birth by dimensional poor indicated that the life expectancy at birth among education and wealth poor are similar (57 year each) and lower than the health poor. Life expectancy of poor in health dimension is higher than that of non-poor; this might be due to single indicator of health. Ratio of non-poor to poor indicates

the extent of inequality in life expectancy at birth in poor and non-poor. The closer the ratio to 1, lesser is the inequality and vice versa. As we move from non-poor to poor in one dimension and multidimensional poor, life expectancy at birth decreases in both years. Value of this ratio is greater than one in each category signifies the excess of life expectancy at birth among non-poor.

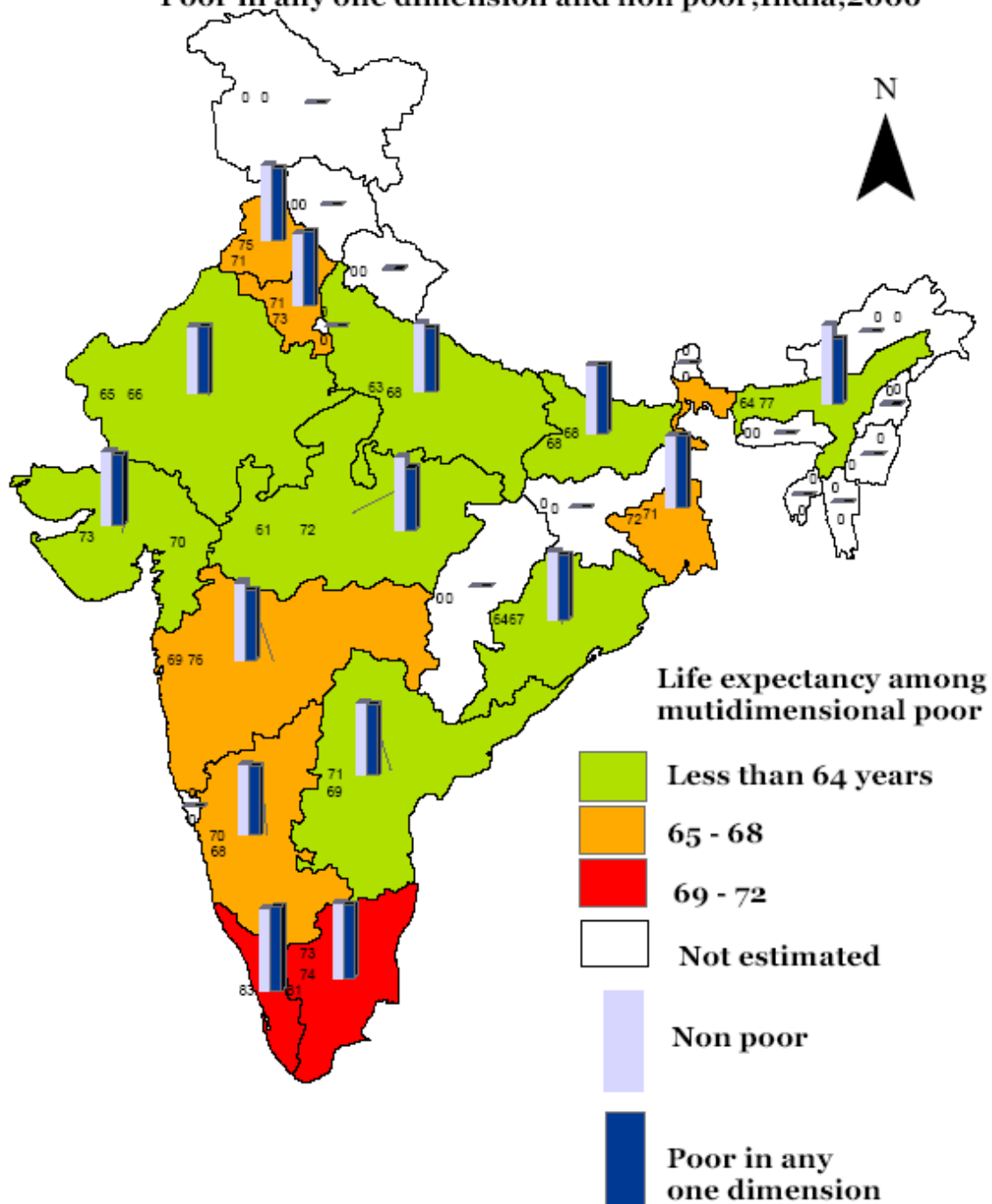
To understand the differentials in life expectancy at birth across economic groups, the life expectancy at birth has been estimated against wealth deciles over time which is shown in Table 7. Life expectancy at birth has increased in all the strata of the population over time with highest annual change in sixth decile and lowest in ninth decile. As the poorest strata require more efforts to increase their life expectancy at birth whereas richer strata has already reached and saturated at a high level. So, there is more scope of increase in life expectancy at birth in lower deciles. The differences between the highest and lowest decile was 10 years over time indicating that inequality in longevity has not declined over time. Ratios of richest decile to the poorest and subsequent deciles remain same.

Table 8 provides the estimated life expectancy at birth by multidimensional poverty for the states of India at two point of time. The estimated life expectancy at birth by multidimensional poverty levels, in year 1992-93 among the non poor in Uttar Pradesh was the lowest (61 years) followed by Rajasthan (62 years) and Madhya Pradesh (63 years); whereas Kerala had the highest life expectancy (82 years) preceded by Punjab (72) and Assam (71 years). During the period 13 years (1992-06) among non-poor Uttar Pradesh witness the average annual growth of life expectancy at birth (0.56 years) and achieved the 69 year life expectancy at birth, whereas being at highest in the list of life expectancy Kerala recorded the negative average annual growth of life expectancy at birth (-0.09). Having experienced the highest average annual growth (0.66 years) of life expectancy at birth among the non-poor Madhya Pradesh achieved the 71 year of life expectancy in 2005-06. In 1992-93 Orissa had the lowest life expectancy at birth (57 years) among the poor in one dimension followed by Uttar Pradesh (58 years) and Assam (60 years), on the other side as usual Kerala had the highest life expectancy at birth (77 years) proceeded by Punjab (69 years) and Maharashtra (68 years) in terms life expectancy at birth. During the period of 13 years (1992-2005) life expectancy at birth among the poor in one dimension in Orissa was 64 years with an average annual growth of life expectancy at birth of 0.47 years; during the same period poor in one dimension in Kerala recorded average annual growth of 0.5 years and achieved to the life expectancy at birth of 83 years. In the front of average annual growth of life expectancy at birth Haryana recorded the highest average annual growth (0.74 years) of life expectancy at birth (63 to 73 years). Among the multidimensional poor in 1992-93 Uttar Pradesh, had the lowest life expectancy at birth (54 years) and Kerala had the highest (72 years). Interestingly in the year 1992-93 life expectancy at birth among the multi dimensional poor shows the clustering at 55 years (Assam, Madhya Pradesh and Orissa) and at age 62 (Rajasthan, Karnataka, West Bengal and Andhra Pradesh), where I did not find any such clustering of life expectancy at birth after 13 years in 2005-06. Improvement during the period 1992-06 in life expectancy among the multidimensional poor Tamil recorded the

highest (0.65 years) and Punjab the negative (-0.12) average annual improvement in life expectancy at birth.



**Spatial Distribution of Life Expectancy at Birth among
Multidimensional poor,
Poor in any one dimension and non poor, India, 2006**



To understand the linkage of multidimensional poverty with life expectancy at birth, the Ordinary least square regression equation (OLS) has been attempted and the results are given

in table 9(a) and 9(b). The life expectancy at birth is regressed against multidimensional poverty at state level. The results indicate that the multidimensional poverty is a significant predictor of life expectancy at birth. The coefficient of multidimensional poor is -0.22 indicate that decline in multidimensional poverty by 10% would lead to increase in life expectancy at birth by 2 years. To understand the significant effect of dimensional poverty, the life expectancy at birth is regressed over economic, health and wealth dimension. Results indicate that effect of economic dimension is statistically significant whereas it is not so other dimensions.

Summary and Conclusion

In last decade, there has been increased emphasis to measure poverty in multidimensional space and linking with key indicators of health and well being. However, the measurement and application is limited. For the first time, the UNDP in 2010-11 brought out the Multidimensional index, MPI using the unit data of 104 countries including India. This research is a step forward that attempts to measure the multidimensional poverty over time and link it with the summary indicator of health; the life expectancy at birth. The multidimensional poverty affects the overall health of the population measured in terms of life expectancy. In this paper multidimensional poverty and corresponding life expectancy has been estimated using NFHS1 (1992-93) and NFHS3 (2005-06) data for India and major states. The following are main findings of the study. First, the multidimensional poverty has declined from 42% in 1992-93 to 33% in 2004-05. The decline has been noticed for all the states of India, maximum in the state of Andhra Pradesh and minimum in the state of Haryana. Second, the multidimensional poverty varies largely among the states of India, ranging from 50% in 1992-93 to 55% in 2005-06. Third, the life expectancy at birth is significantly lower among multidimensional poor compared to non-poor. The differences in longevity among non-poor and multidimensional poor remained 10 years over last 14 years. Fourth, the average annual increase in life expectancy at birth is similar across the poverty group. However, differences are observed between the states. Fifth, the life expectancy at birth is significantly related to multidimensional poverty. Among the three dimensions, economic dimension exerts greater influence than education and health. Relative improvement in life expectancy during 1992-2006 is lowest among those belonging to the multidimensional poor household.

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Table 1: Indicators used in computing multidimensional poverty by residence in India

Dimensions	Rural	Urban	Defining Poor
Education	Any child in the school going age (7-14) not going to school currently No adult(14 and above) literate member in the household	Any child in the school going age (7-14) not going to school currently No adult literate member in the household	Household do not have an adult literate member or any of the child age 7-14 in the household currently not going to school
Health	Any child below 4 years age is severely underweight	Any child below 4 years age is severely underweight	At least one child below 4 years age is severely underweight in the household
Wealth	Housing Condition Persons per room, Access to improved water, Type of cooking fuel, Electricity, Type of house Consumer Durables Motorcycle, Car , Sewing machine, Watch, Bicycle, Radio, Television, Refrigerator Size of Landholding No land, marginal land, small, large holdings Agricultural accessories Thresher, Tractor, Water pump	Housing Condition Persons per room, Access to improved water, Type of cooking fuel, Separate kitchen, Type of house, Type of toilet facility Consumer Durables Motorcycle, Car , Sewing machine, Watch, Television, Refrigerator	Derived from the composite wealth index using PCA The cut off point of poor is 31.8% in urban area and 50.1% in rural area, in 1993-94 The cut off point of poor is 25.5% in urban area and 42% in rural area, in 2004-05 Source: Planning Commission, Govt. of India.

Table 2: Mean and confidence interval of dimensional indicators in India, 1992-2006

Dimensional Indicators	1992-93		2003-04	
	Mean	95% CI	Mean	95% CI
Education				
Households without a single adult literate	0.328	0.325- 0.331	0.188	0.186-0 .190
Households with any of the child age 7-14 currently not going to school	0.179	0.176-0.182	.0914	0.089- 0.094
Health				
Households with any child below 4 years age is severely underweight in the	0.239	0.236-0.242	0.142	0.140- 0.144
Economic status				
Household below national poverty line	0.467	0.464-0.471	0.375	0.372-0.378

Table 3: Percentage of multidimensional poor households in education, health and wealth and the multidimensional poverty, India, 1992-2006

	1992-93	2005-06	Difference (%)
Poverty level of Households			
Percentage of households poor in education	44.20	34.76	-9.44
Percentage of households poor in health	19.94	13.80	-6.14
Percentage of households poor in wealth	46.39	37.77	-8.62
Overall poverty status			
Percentage of non-poor households	31.19	38.79	7.6
Percentage of households poor in one dimension	26.68	28.82	2.14
Percentage of households poor in two dimension	33.40	27.07	-6.33
Percentage of households poor in all three dimension	8.73	5.32	-3.41
Classification of poverty			
Percentage of non-poor households	31.19	38.79	7.6
Percentage of multidimensional (abject) poor households	42.13	32.39	-9.74
Percentage of households poor	68.81	61.21	-7.6
Total number of cases (Households)	88,562	109,041	

Table 4: Percentage of non-poor, poor in one dimension and multidimensional poor households in India and States, 1992-2006

Major states	1992-93				2005-06				Percentage change during 1993-2006		
	Non Poor	Poor in any 1dimension	Poor in 2 or 3 dimensions	Poor in 1, 2 or 3 dimensions	Non Poor	Poor in any 1dimension	Poor in 2 or 3 dimension	Poor in 1, 2 or 3 dimensions	Non Poor	Poor in any 1dimension	Poor in 2 or 3 dimensions
Andhra Pradesh	28.68	22.84	48.48	71.32	39.54	28.45	32.01	60.46	10.86	5.61	-16.47
Assam	21.79	29.13	49.08	78.21	30.81	34.23	34.95	69.18	9.02	5.1	-14.13
Bihar	16.09	23.36	60.55	83.91	16.07	25.25	58.68	83.93	-0.02	1.89	-1.87
Gujarat	41.94	27.54	30.53	58.07	50.81	27.8	21.39	49.19	8.87	0.26	-9.14
Haryana	52.66	28.47	18.87	47.34	53.27	28.27	18.46	46.73	0.61	-0.2	-0.41
Karnataka	34.57	27.2	38.23	65.43	46.66	28.79	24.54	53.33	12.09	1.59	-13.69
Kerala	61.34	27.76	10.89	38.65	80.07	15.86	4.07	19.93	18.73	-11.9	-6.82
Madhya Pradesh	23.22	25.21	51.57	76.78	25.77	30.99	43.24	74.23	2.55	5.78	-8.33
Maharashtra	40.46	29.12	30.42	59.54	53.2	28.15	18.65	46.8	12.74	-0.97	-11.77
Orissa	18.8	25.6	55.6	81.2	23.06	32.72	44.21	76.93	4.26	7.12	-11.39
Punjab	56.83	27.08	16.09	43.17	66.31	22.58	11.11	33.69	9.48	-4.5	-4.98
Rajasthan	28.08	27.76	44.16	71.92	32.54	27.75	39.72	67.47	4.46	-0.01	-4.44
Tamil Nadu	36.16	28.95	34.9	63.85	49.44	29.88	20.68	50.56	13.28	0.93	-14.22
Uttar Pradesh	22.3	28.54	49.16	77.7	26.14	33.63	40.23	73.86	3.84	5.09	-8.93
West Bengal	31.21	24.28	44.5	68.78	36.37	27.42	36.21	63.63	5.16	3.14	-8.29
India	31.19	26.68	42.13	68.81	38.79	28.82	27.07	55.89	7.6	2.14	-15.06
Smaller states											
Goa	66.51	22.21	11.28	33.49	74.98	18.04	6.97	25.01	8.47	-4.17	-4.31
Himachal Pradesh	43.41	30.99	25.6	56.59	55.94	31.1	12.96	44.06	12.53	0.11	-12.64
Jammu and Kashmir	50.89	27.69	21.42	49.11	52.97	29.86	17.18	47.04	2.08	2.17	-4.24
Manipur	50.74	29.65	19.62	49.27	49.69	32.70	17.61	50.31	-1.05	3.05	-2.01
Meghalaya	30.44	27.52	42.04	69.56	35.71	25.45	38.83	64.28	5.27	-2.07	-3.21
Mizoram	63.94	23.09	12.97	36.06	61.06	25.14	13.8	38.94	-2.88	2.05	0.83
Nagaland	48.49	32.36	19.15	51.51	38.1	31.40	30.51	61.91	-10.39	-0.96	11.36
New Delhi	69.57	24.72	5.71	30.43	81.03	17.01	1.95	18.96	11.46	-7.71	-3.76
Arunachal Pradesh	30.18	33.82	36.00	69.82	32.83	30.15	37.02	67.17	2.65	-3.67	1.02
Tripura	35.73	30.03	34.24	64.27	43.48	30.48	26.05	56.53	7.75	0.45	-8.19

Table 5: A comparison of estimated life expectancy at birth with SRS estimates for selected states, India, 1992-2006

States	1992-93	2005-06	Average annual change	SRS estimate 1991-95	SRS estimate 2002-06
Uttar Pradesh	56.2	61.9	0.44	56.8	60.0
Rajasthan	52.2	63.8	0.90	59.1	62.0
West Bengal	63.9	69.1	0.40	62.1	64.9
Karnataka	64.3	67.7	0.27	62.5	65.3
Maharashtra	67.4	70.4	0.23	64.8	67.2
Assam	57.3	63.7	0.49	55.7	58.9
Andhra Pradesh	64.2	66.1	0.15	61.6	64.4
Bihar	59.5	64.6	0.39	59.3	61.6
Gujarat	62.0	66.5	0.35	61.0	64.1
Haryana	62.1	70.5	0.65	63.4	66.2
Kerala	77.4	79.6	1.71	72.9	74.0
Madhya Pradesh	57.3	60.5	0.24	54.7	58.0
Orissa	57.1	61.6	0.34	56.5	59.6
Punjab	70.0	72.3	0.18	67.2	69.4
Tamil Nadu	65.6	72.9	0.56	63.3	66.2
India	61.7	65.4	0.28	60.3	63.5

Table 6: Estimated life expectancy at birth by multidimensional of poverty in Wealth, Education and/or Health, India, 1992-2006

Dimensions of poverty		1992-93	2005-06	Average annual change	Ratio(non-poor/poor)	
					1992-93	2005-06
Wealth	Non Poor	67.2	70.8	0.28	1.15	1.14
	Poor	58.4	62.2	0.30		
Education	Non Poor	65.5	68.7	0.24	1.13	1.12
	Poor	58.0	61.3	0.25		
Health	Non Poor	59.6	64.2	0.35	0.93	0.96
	Poor	63.9	67.0	0.24		
Multidimensional	Non Poor	67.7	71.2	0.27		
	Poor in one dimension	63.4	66.8	0.26	1.07	1.07
	Poor in two or three dimensions	58.9	62.6	0.28	1.08	1.07
Combined life expectancy		61.7	65.4	0.29		
SRS based life expectancy		60.3	64.2	0.30		

Table 7: Life expectancy by wealth deciles, India, 1992-2006

Deciles	1992-93	2005-06	Average annual change	Ratio(non- poor/poor)	
				1992-93	1992-93
1(Poorest)	57.6	61.2	0.28	1.3	1.2
2	56.3	60.5	0.32	1.3	1.2
3	58.5	63.6	0.39	1.2	1.2
4	60.3	65.9	0.43	1.2	1.1
5	61.7	67.5	0.45	1.2	1.1
6	62.9	70.3	0.57	1.2	1.1
7	66.6	70.7	0.32	1.1	1.1
8	67.0	73.6	0.51	1.1	1.0
9	72.1	72.2	0.01	1.0	1.0
10(Richest)	72.3	74.6	0.18	1.0	1.0

Table 8: Estimated life expectancy by multidimensional poverty in selected states, India, 1992-2006													
States	Non Poor			Poor in one dimension					Multidimensional poor				
	1992-93	2005-06	Average annual change	1992-93	2005-06	Average annual change	Ratio(non-poor/ poor in one dimension)-1992-93	Ratio(non-poor/poor in one dimension)-2005-06	1992-93	2005-06	Average annual change	Ratio (non-poor/ multidimen sional poor)-1992-93	Ratio (non-poor/ multidimen sional poor)-2005-06
Uttar Pradesh	60.70	67.93	0.56	57.91	62.91	0.38	1.05	1.08	54.31	60.19	0.45	1.12	1.13
Rajasthan	62.42	66.42	0.31	63.04	64.75	0.13	0.99	1.03	62.02	62.14	0.01	1.01	1.07
West Bengal	69.32	70.62	0.10	65.49	71.81	0.49	1.06	0.98	62.19	67.45	0.40	1.11	1.05
Karnataka	69.59	70.42	0.06	63.85	67.48	0.28	1.09	1.04	62.12	66.26	0.32	1.12	1.06
Maharashtra	70.66	76.21	0.43	67.76	69.36	0.12	1.04	1.10	65.27	66.19	0.07	1.08	1.15
Assam	71.10	77.35	0.48	59.51	63.80	0.33	1.19	1.21	54.57	61.50	0.53	1.30	1.26
Andhra Pradesh	66.89	70.75	0.30	67.74	68.59	0.07	0.99	1.03	62.48	61.78	-0.05	1.07	1.15
Bihar	69.32	68.12	-0.09	62.33	67.57	0.40	1.11	1.01	57.35	63.91	0.50	1.21	1.07
Gujarat	67.79	72.64	0.37	65.97	69.89	0.30	1.03	1.04	56.95	60.69	0.29	1.19	1.20
Haryana	63.24	71.4	0.63	63.41	73	0.74	1.00	0.98	59.11	67.2	0.62	1.07	1.06
Kerala	82.07	80.9	-0.09	76.53	82.99	0.50	1.07	0.97	71.67	71.53	-0.01	1.15	1.13
Madhya Pradesh	63.03	71.61	0.66	60.93	60.89	0.00	1.03	1.18	54.63	59.18	0.35	1.15	1.21
Orissa	66.2	67.24	0.08	57.41	63.52	0.47	1.15	1.06	55.47	59.8	0.33	1.19	1.12
Punjab	72.2	75.4	0.25	68.6	71.3	0.21	1.05	1.06	69.93	68.4	-0.12	1.03	1.10
Tamil Nadu	70.04	74.18	0.32	65.63	72.95	0.56	1.07	1.02	63.24	71.75	0.65	1.11	1.03

Table 9 a: Ordinary least square

	Model 1 (1992-06) Multidimensional poor		
Variables	Coefficient	t-statistics	CI
Multidimensional poor	-0.217	-4.270	-0.320-0.113
Dummy variable (year)	-4.37607	-2.890	-7.479-1.273
Constant	73.879	40.480	70.134-77.623
R-squared	0.581		
Adj R-squared	0.550		
F statistic	18.75		
Number of cases(N)	30		

Table 9 b: Ordinary least square

	Model 2 (2005-06)		
Variables	Coefficient	t-statistics	CI
Wealth	-0.178	-2.07	-0.367-0.012
Education	-0.077	-0.55	-0.388-0.234
Health	-0.032	-0.19	-0.403-0.338
Dummy variable (year)	***	***	***
Constant	78.676		73.635-83.717
R-squared	0.760		
Adj R-squared	0.694		
F statistic	11.59		
Number of cases(N)	15		

Appendix

Table 1: Mean, 95% confidence interval and factor score of variables used for the construction of wealth index by place of residence, India, 1992

Variables	Rural			Urban		
	Factor Score	Mean	95% CI	Factor Score	Mean	95% CI
Type of house						
Kaccha	-0.252	0.112	0.109-0.114	-0.226	0.172	0.167-0.176
Semi-pucca	0.109	0.603	0.599-0.607	-0.120	0.261	0.256-0.266
Pucca	0.235	0.284	0.280-0.287	0.278	0.565	0.559-0.570
Toilet Facility						
No Toilet		0.871	0.868-0.873	-0.262	0.241	0.236-0.246
Pit Toilet		0.060	0.058-0.062	-0.053	0.158	0.153-0.162
Flush Toilet		0.069	0.067-0.071	0.268	0.601	0.595-0.607
Land						
No land	0.048	0.646	0.642-0.650		0.197	0.192-0.201
Marginal Holding	-0.045	0.518	0.514-0.522		0.152	0.148-0.156
Small holding	0.060	0.069	0.067-0.071		0.021	0.019-0.022
Medium irrigated land	0.132	0.057	0.055-0.058		0.022	0.020-0.023
Marginal non irrigated land	0.021	0.480	0.476-0.484		0.137	0.133-0.141
Small non irrigated land	0.004	0.089	0.087-0.091		0.027	0.025-0.029
Medium non irrigated land	0.044	0.075	0.073-0.077		0.030	0.028-0.032
Agricultural accessories						
Tractor	0.138	0.014	0.013-0.015		0.004	0.003-0.005
Thrasher	0.105	0.015	0.014-0.016		0.003	0.002-0.004
Water pump	0.155	0.054	0.052-0.056		0.019	0.017-0.020
Person per room						
Two person	0.125	0.433	0.429-0.437	0.155	0.499	0.493-0.504
2-4 person	-0.053	0.375	0.371-0.379	-0.062	0.327	0.321-0.332
4+ person	-0.092	0.192	0.189-0.195	-0.127	0.174	0.170-0.179
Other amenities						
Electricity	0.255	0.387	0.384-0.391	0.261	0.828	0.824-0.832
Radio	0.239	0.316	0.312-0.320	0.227	0.594	0.589-0.600
Television	0.301	0.089	0.087-0.092	0.308	0.517	0.511-0.523
Refrigerator	0.201	0.017	0.016-0.018	0.244	0.201	0.196-0.206
Bicycle	0.147	0.397	0.393-0.401	0.133	0.475	0.469-0.480
Motorcycle	0.221	0.038	0.037-0.040	0.222	0.192	0.188-0.197
Car	0.096	0.003	0.003-0.004	0.109	0.032	0.030-0.034
Watch	0.266	0.431	0.427-0.435	0.256	0.787	0.783-0.792
Fan	0.326	0.187	0.183-0.190	0.313	0.686	0.680-0.691
Sewing machine	0.225	0.113	0.110-0.115	0.218	0.355	0.350-0.361
Cooking fuel	0.209	0.026	0.025-0.027	0.292	0.351	0.345-0.356
Improved Drinking Water	0.103	0.691	0.688-0.695	0.118	0.933	0.930-0.936
Animal	0.013	0.657	0.653-0.661		0.135	0.131-0.139

Table 2: Mean, 95% confidence interval and factor score of variables used for the construction of wealth index by place of residence, India, 2006

Variables	Rural			Urban		
	Factor Score	Mean	95% CI	Factor Score	Mean	95% CI
Type of house						
Kaccha	-0.154	0.191	0.188-0.194	-0.155	0.025	0.024-0.027
Semi-pucca	-0.147	0.516	0.512-0.520	-0.263	0.158	0.155-0.161
Pucca	0.297	0.288	0.284-0.291	0.313	0.812	0.809-0.816
Toilet Facility						
No Toilet			0.742-0.749	-0.301	0.174	0.171-0.178
Pit Toilet			0.052-0.056	-0.063	0.038	0.037-0.040
Flush Toilet			0.196-0.203	0.308	0.787	0.783-0.790
Land						
No land	0.025	0.585	0.581-0.589		0.190	0.187-0.194
Marginal Holding	-0.056	0.482	0.478-0.486		0.141	0.138-0.144
Small holding	0.067	0.062	0.060-0.064		0.027	0.026-0.028
Medium irrigated land	0.121	0.041	0.040-0.043		0.023	0.021-0.024
Marginal non irrigated land	0.008	0.493	0.489-0.497		0.157	0.154-0.160
Small non irrigated land	0.006	0.055	0.053-0.057		0.019	0.018-0.020
Medium non irrigated land	0.037	0.036	0.035-0.038		0.015	0.014-0.016
Agricultural accessories						
Tractor	0.125	0.023	0.022-0.024		0.005	0.004-0.005
Thrasher	0.084	0.022	0.021-0.023		0.004	0.004-0.005
Water pump	0.153	0.099	0.096-0.101		0.110	0.107-0.113
Person per room						
Two person	0.063	0.324	0.320-0.328	0.089	0.376	0.372-0.380
2-4 person	0.029	0.426	0.422-0.430	0.008	0.430	0.425-0.434
4+ person	-0.100	0.249	0.246-0.253	-0.119	0.193	0.189-0.196
Other amenities						
Electricity	0.270	0.557	0.553-0.561	0.245	0.931	0.928-0.933
Radio	0.165	0.270	0.266-0.274	0.151	0.389	0.384-0.393
Television	0.311	0.301	0.298-0.305	0.278	0.732	0.728-0.735
Refrigerator	0.240	0.066	0.064-0.068	0.270	0.335	0.330-0.339
Bicycle	0.083	0.516	0.512-0.520	0.069	0.501	0.497-0.505
Motorcycle	0.252	0.108	0.105-0.111	0.238	0.305	0.301-0.309
Car	0.122	0.010	0.009-0.011	0.137	0.061	0.059-0.063
Watch	0.207	0.714	0.71-0.717	0.191	0.910	0.908-0.913
Fan	0.321	0.386	0.382-0.390	0.275	0.847	0.844-0.851
Sewing machine	0.217	0.126	0.124-0.129	0.189	0.309	0.305-0.313
Cooking fuel	0.257	0.088	0.086-0.090	0.313	0.601	0.597-0.606
Improved Drinking Water	0.055	0.848	0.845-0.851	0.056	0.960	0.958-0.962
Animal	-0.041	0.651	0.647-0.655		0.151	0.148-0.154