



A Review of Different Measures of Poverty in India

KEYWORDS

Poverty, Accelerated growth, Poverty measurement, Consumer expenditure, Capacity building with equality.

Mr Pankaj Kumar

Desert Medicine Research Centre New Pali Road
Jodhpur- 342005

Dr P K Dam

Desert Medicine Research Centre New Pali Road
Jodhpur- 342005

ABSTRACT

Poverty has been in existence for many centuries in India. Scientific analysis of poverty is a sine qua non to understand the problems at hand & tackling the same for accelerated growth in poverty ridden area concerned. For this, clear ideas regarding socio-economic condition prevailing in poverty ridden area need to be generated to enable the planners & policy makers to know where the shoe really pinches. The present paper reviews various definitions of poverty, different standardized measurements to estimate poverty & quantum of development based on consumer expenditure so that relevance of all these can be assessed in current context of development in India. Poverty has gone down by 7.3% during 2004-05 to 2011-12. Rural / Urban differences in poverty revealed reduction of poverty by 8% in rural areas during the said period. Poverty ratio dropped to 21.9% in 2011-12 from 37.2% in 2004-05 indicates that focalized action towards capacity building with equality is the need of the hour.

INTRODUCTION

Poverty has been in existence for many centuries and continues to exist in India wherein huge socio-economic, cultural & population diversities, and poverty has always been a cause of great concern. Measures of poverty remained as focal point of the planning process in every developing country. World Bank reported that 11.8% of all people in India fall below the international poverty line of US\$ 1.25 per day PPP) over the last decade. The number of poor is now estimated at 148 million in 2014 as compared to 396 million in 2004-05.. UNDP, reported that 29.8% of Indians live below the country's national poverty line. Poverty is defined as a 'pronounced deprivation in wellbeing' (Haughton & Khandker, 2009). and being poor as 'to be hungry, to lack shelter and clothing, to be sick and not cared for, to be illiterate and not schooled... so the poor are those who do not have enough income to meet their needs'. It is a complex human phenomenon associated with unacceptably low standard of living. Poverty characterizes to have multiple dimensions, manifestations and causes (World Bank, 2000) & categorised as absolute and relative.

An absolute poverty line remains fixed over time, adjusted only for inflation (Haughton & Khandker, 2009; World Bank, 2009c). Relative poverty is defined in relation to the economic status of other members of society. Iceland (2005), it compares whether people comparatively lack a certain level of income, consumption, material possessions, good quality housing, clothing, etc.

DATA SOURCES

This Paper is based on the secondary data sources. e.g the values for various estimates has taken from the National Accounts Statistics prepared by the Central Statistical Organization (CSO), Ministry of Statistics and Program Implementation, Government of India. the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. Analysis of per capita consumption patterns of food items come from the various round of National Sample Survey Organization (NSSO) and planning commission.

POVERTY MEASUREMENT

Different types of poverty estimates are used to quantify poverty, commonly used are Head Count Ratio (HCR), the Poverty Gap Ratio (PGR) and the Squared Poverty Gap Ratio (SPGR). The Head Count Ratio (HCR) is the most elementary and commonly used poverty measure. The HCR is defined as the proportion of the national population whose expenditure is below the official threshold (or thresholds) set by the National Government. HCR, therefore is a useful yardstick which allows for the monitoring of the proportion of the national population that is considered to be poor based on a national standard. In India, given the official poverty lines at the state level, at the national level, and by rural and urban areas, the corresponding HCRs are computed from the NSS data.

The Poverty Headcount Ratio (PHR) is the proportion of population whose per capita income/consumption & expenditure is below an official threshold(s) set by the National Government..

Mathematically, **Poverty Headcount Ratio** (P_0) is given as

$$P_0 = \frac{1}{N} \sum_{i=1}^N I(y_i < Z) = \frac{1}{N} \sum_{i=1}^q 1 = \frac{N_p}{N} \dots \dots \dots (1)$$

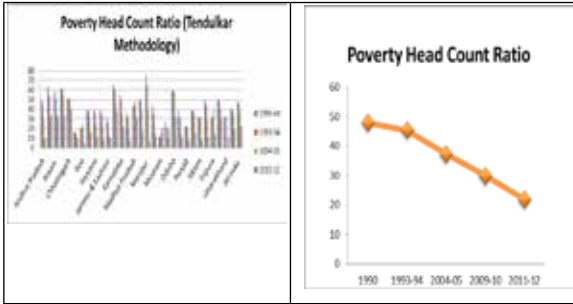
Where: N=total population

1(.) = an indicator function taking a value of

1 (poor) if the bracketed expression is true, and 0 (non-poor) otherwise.

y_i = welfare indicator, e.g., consumption per capita z = poverty line

N_p = number of poor in the population



Note : Poverty Ratio as per Tendulkar Committee Methodology

Source: Planning Commission July 2013 Press Note on Poverty Estimates, 2011-12

The all-India HCR has declined by 7.3 percentage points from 37.2% in 2004-05 to 29.8% in 2009-10, with rural poverty declining by 8.0 percentage points from 41.8% to 33.8% and urban poverty declining by 4.8 percentage points from 25.7% to 20.9%.

Poverty Gap Ratio: Poverty Gap Ratio (PGR) measures that capture the depth and severity of poverty. It is defined as the mean distance below the poverty line as a proportion of the poverty line where the mean is taken over the whole population after counting the non-poor as those having zero poverty gap.

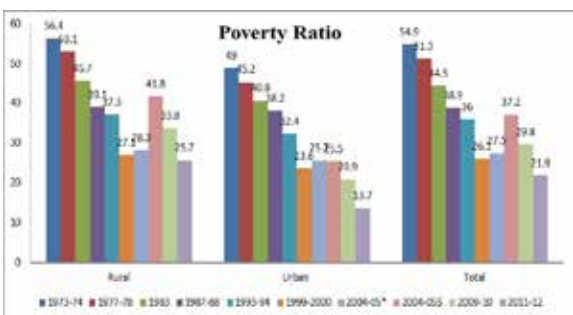
$$P_1 = \frac{1}{N} \sum_{i=1}^N \left(\frac{z - y_i}{z} \right) I(z - y_i) = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right) \dots (2)$$

Mathematically the Poverty Gap Ratio is defined as:

where the variables are defined as in equation 1.

More Specifically, Poverty Gap Ratio P_1 , as the poverty line (z) less welfare indicator for poor individuals, the gap is considered to be zero for everyone else.

Comparable poverty ratios for 1993-94, 2004-05, 2009-10 and 2011-12



Note : Poverty Ratio as per Tendulkar Committee Methodology

Source: NSSO Report No. KI.(68/1.0) on Key Indicators of Household Consumer Expenditure in India 2011-12, NSS 68th round, National Sample Survey Office

Squared Poverty Gap Ratio (SPGR)

Squared Poverty Gap Ratio, P_2 is the average of the square relative poverty gaps. It is defined similar to the Poverty Gap Ratio except that the poverty gaps are squared, thus giving the highest weighting to the largest poverty gaps. The squared poverty gap Ratio captures differences in in-

come levels among the poor. This measure is also called the Severity of Poverty Ratio. SPGR is defined as a weighted sum of poverty gaps as a proportion of the poverty line, where the weights are the proportionate poverty gaps themselves. By squaring the poverty gap, more weight is assigned to the section of population that has a higher poverty gap

$$P_2 = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^2 \dots (3)$$

Taking our previous notations, P_2 can be defined as:

The Foster-Greer-Thorbecke Poverty Ratio

The Headcount Index, the Poverty Gap Index, and the Squared poverty Gap Index belong to a family of poverty measures known as the Foster-Greer-Thorbecke (FGT) Index. These are referred to as decomposable poverty measures. A poverty measure is said to be decomposable if the poverty measure of a group is a weighted average of the poverty measures of the individuals in a group (Aguirregabiria 2003).

$$P_\alpha = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^\alpha \dots (4)$$

where $\alpha \geq 0$

The general formula for the FGT class of poverty measures is:

All three measures of poverty discussed so far can be derived from the Foster-Greer-Thorbecke (FGT) class of poverty measures

$\alpha = 0$ = PHR when

$\alpha = 1$ =PGR when

$\alpha = 2$ =SPGR when

Sen Index.

$$P_s = P_0(1 - (1 - G^p) \frac{\mu^p}{z}) \dots (5)$$

Sen (1976) has proposed an index that sought to combine the effects of the number of poor, the depth of their poverty, and the distribution of poverty within the group. It incorporates the headcount index, the income gap, and the Gini coefficient. The index is given by

$$P_s = P_0 G^p + P_1(1 - G^p) \dots (5a)$$

where P_0 is the headcount index, μ^p is the mean income (or expenditure) of the poor, and G^p is the Gini coefficient of inequality among the poor. The Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality), and is discussed in chapter 5 in the context of measuring inequality. The Sen Index can also be written as the average of the headcount and poverty gap measures, weighted by the Gini coefficient of the poor, giving:

$$P_s = P_0 P_1^p (1 + G^p) \dots (5b)$$

It can be shown (Osberg and Xu 2002) that the Sen Index may also be written as

where G^p is the Gini coefficient of the poverty gap ratios of only the poor and P_1^p is the poverty gap index calculated over poor individuals only.

The Sen-Shorrocks-Thon index.

$$P_{SST} = P_0 P_1^p (1 + \hat{G}^p) \dots (6)$$

The Sen index has been modified by others, and perhaps the most compelling version is the Sen-Shorrocks-Thon (SST) index, defined as which is the product of the head-count index, the poverty gap index (applied to the poor

only), and a term with the Gini coefficient of the poverty gap ratios (i.e. of the G_n 's) for the whole population. This Gini coefficient typically is close to 1, indicating great inequality in the incidence of poverty gaps.

ESTIMATES OF POVERTY HEAD-COUNT RATIO, POVERTY GAP RATIO, AND SQUARED POVERTY GAP RATIO FOR 2009–10

State	Head-count ratio			Poverty gap			Squared poverty gap		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Andhra Pradesh	22.8	17.7	21.1	4.7	3.8	4.5	1.5	1.2	1.4
Assam	39.9	26.1	37.9	7.3	5.9	7.2	1.9	2	1.9
Bihar	55.3	39.4	53.5	13.4	10.3	13.1	1 4.5	3.7	4.5
Chhattisgarh	56.1	23.8	48.7	12.4	6.2	11.3	3.8	2.3	3.6
Gujarat	26.7	17.9	23	4.6	3.6	4.2	1.2	1.1	1.1
Haryana	18.6	23	20.1	3.7	4.6	4	1.1	1.2	1.1
Himachal Pradesh	9.1	12.6	9.5	1.4	2.4	1.5	0.4	0.7	0.4
Jammu & Kashmir	8.1	12.8	9.4	1.2	1.9	1.4	0.3	0.4	0.4
Jharkhand	41.6	31.1	39.1	9.1	7.9	8.8	2.8	2.8	2.8
Karnataka	26.1	19.6	23.6	4.8	4.4	4.6	1.3	1.4	1.3
Kerala	12	12.1	12	2.3	2.1	2.2	0.7	0.6	0.7
Madhya Pradesh	42	22.9	36.7	10.6	5.6	9.4	3.7	1.9	3.3
Maharashtra	29.5	18.3	24.5	5.7	4	5	1.6	1.3	1.4
Orissa	39.2	25.9	37	9	5.3	8.5	3	1.7	2.8
Punjab	14.6	18.1	15.9	1.9	3.8	2.6	0.4	1.1	0.6
Rajasthan	26.4	19.9	24.8	4.3	3.8	4.2	1.1	1.1	1.1
Tamil Nadu	21.2	12.8	17.1	3.7	2.1	3	1	0.6	0.8
Uttar Pradesh	39.4	31.7	37.7	7.6	7.3	7.5	2.1	2.4	2.2
Uttaranchal	14.9	25.2	18	2	5.1	2.8	0.6	1.5	0.8
West Bengal	28.8	22	26.7	5.3	4.5	5.1	1.4	1.4	1.4
Total	33.8	20.9	29.8	6.8	4.5	6.2	2.1	1.4	1.9

Note:

All estimates have been calculated from unit-level data based on Tendulkar Committee poverty lines. The MPCE measure used is Mixed Recall period. All estimates are in percentages. These estimates have been produced by use of an adjusted MPCE measure which excludes MDM expenditure. They are comparable to poverty estimates of 1993–94 and 2004–05 reported by the Tendulkar Committee.

Conclusion:

The observations and their interpretation do not claim to be exhaustive and these may be subject to further enlightenment with more information data etc. that would become available in the years to come. Interchange of concepts related to poverty measurement through different models like PHR, PGR and SPGR as well as their computations for finer resolution to define their respective weightage and the legacy of selected indexes (e.g The Foster-Green-Thorbecke Index) between planner and policy maker, administrators, academicians, research scholars, etc

connected with poverty elimination measures and uplifting human development index along with quantifiable quality of life in health in our country is the need of the hour, in which possibly there can hardly be any dispute. But what is required is to utilise such interchange of ideas or concepts to improve the existing plans and programmes of extinguishing poverty so that the same can be effective for the poorest of the poor in our country

Acknowledgements:

The author is extremely thankful to Dr. G.S. Toteja, Director DMRC Jodhpur, & Prof G C Tikkiwal, Former Dean & Head Department of Mathematics & Statistics, JNVU Jodhpur for their valuable suggestions and encouragement.

REFERENCE

- AHLUWALIA, M. S. Rural Poverty and Agricultural Performance in India. *Journal of Development Studies*, 1978, 14(13), pp. 298–323. | AMARTYA SEN' Poverty: An ordinal approach to measurement , *Econometrica*, Vol. 44, No. 2, (Mar., 1976), pp. 219-23 | ANDREW SUMNER Meaning versus measurement: why do 'economic' indicators of poverty still predominate? *Development in Practice*, Volume 17, Number 1, February 2007 | BARDHAN, P. K. On the Minimum Level of Living and the Rural Poor. *Indian Economic Review*, New Series, 1970, 5(1), pp. 129–136.. | HIMANSHU AND KUNAL SEN Revisiting the Great Indian Poverty Debate: Measurement, Patterns, and Determinants May 2014 BWPI Working Paper 203 | HIMANSHU , Poverty and Food Security in India, No. 369 | September 2013. | Haughton, Jonathan, & Shahidur R. Khandker (2009) *Handbook on Poverty and Inequality* Washington, world bank | Iceland , *Measuring Poverty: Theoretical and Empirical Considerations*, 2005, 3(4), 207–243 | KAKWANI, N., PERNIA, E. M. What is Pro-Poor Growth? *Asian Development Review*, 2000, 18(1), pp. 1–16. | KAKWANI, N., BRAHM PRAKASH, HYUN SON. Growth, Inequality, and Poverty: An Introduction. *Asian Development Review*, 2000, 18(2), pp. 1–21. | KAKWANI, N. On Measuring Growth and Inequality Components of Poverty with Application to Thailand. *Journal of Quantitative Economics*, 2000, 16(1), pp. 67–79. | KAPILA, U. Indian Economy-Performance and Policies. Academic Foundation, New Delhi, 2011, pp. 180–184. | MCGILLIVRAY, M. The Human Development Index-Yet Another Redundant Composite Development Indicator? *World Development*, Elsevier, 1991, No. 19, pp. 1461–68. | MCGILLIVRAY, M., WHITE, H. Measuring Development? The UNDP's Human Development Index. *Journal of International Development*, John Wiley and Sons, 1994, 5(2), pp. 183–92. | Millennium Development Goals India Country Report 2014 Social Statistics Division | Ministry of Statistics and Programme Implementation Government of India | MEHTA, J., VENKATARAMAN, S. Poverty Statistics. *Economic and Political Weekly*, 2000, 35(27), pp. 2377–85. | NNMB. National Nutrition Monitoring Bureau. Reports Hyderabad: National Institute of Nutrition, 2006. 1979-2006. Available from: <http://www.nfhsindia.org/nfhs2.html>, accessed | on September 20, 2007. | NSSO. Key Indicators of Employment and Unemployment in India, 2011-12.: National Sample Survey Organization office. Ministry of Statistics and Programme Implementation, Government of India; 2013. | NOORBAKHSH, F. Human Development and Regional Disparities in Iran: A Policy Model. *Journal of International Development*, John Wiley and Sons, 2002, 14(2), pp. 927–49. | NOORBAKHSH, F. A Modified Human Development Index. *World Development*, Elsevier, 1998a, 26(3), pp. 517–32. | PLANNING COMMISSION July 2013 Press Note on Poverty Estimates, 2011-12 | PLANNING COMMISSION. *Economy and the Plan: An Overview*. Annual Report, Chapter-2, New Delhi: Government of India, 2011. | PLANNING COMMISSION. *Press Note on Poverty Estimates*, New Delhi: Government of India, 2012. | PLANNING COMMISSION. *Report of the Expert Group to Review the Methodology for Estimation of Poverty* [online]. New Delhi: Government of India, 2009. [cit. 25.7.2012]. <http://planningcommission.nic.in/reports/genrep/rep_pov.pdf | Rowntree, B. S. 1901. *Poverty: A Study of Town Life*. London: Macmillan. Sen, Amartya K. (1992), *Inequality Re-examined*, Oxford: Clarendon Press. | Sarlo, C (2008): "What is Poverty? Providing Clarification for Canada" Fraser Institute Digital Publication, May 2008 | Sarlo, Christopher (2007). *Measuring Poverty—What Happened in Copenhagen?* | *Journal of the Institute of Economic Affairs* 27, 3 (September): 6-14 | Sen, Amartya K. (1993), *Capability and Well-being* in Martha C. Nussbaum and | Amartya K. Sen (eds), *The Quality of Life*, Oxford: Clarendon Press, pp. 30-53. | Sen, A. K. (1994), "Well-Being, Capability and Public Policy", *Giornale Delgi Economist e Annali di Economia*, 53, 333-47. | Sen, A. K. (1997), "Editorial: Human Capital and Human Capability", *World Development*, 25(12), 1959-61. | SUNDARAM, K., TENDULKAR, S. D. *Poverty in India in the 1990s: An Analysis of Changes in 15 Major States*, Economic and Political Weekly, 2003, 38(14), pp. 1385–1393. | SURYANARAYANA, M. H., AGRAWAL, A., PRABHU, S. *Inequality Adjusted Human Development Index for India's States*. New Delhi: UNDP, 2011 | United Nations. *The Millennium Development Goals Report 2011*. New York: United Nations ; 2011 | World Bank (2000) *World Development Report 2000/1*, Washington, DC: World Bank. | World Bank (2001a) 'Strengthening Statistical Systems for Poverty Reduction Strategies', Washington, DC: World Bank. | World Bank (2001b) 'Well-being Measurement and Analysis Technical Notes', Washington, DC: World Bank. | World Bank (2002) *Poverty Reduction Strategy Papers Sourcebook*, Washington, DC: World Bank. | World Bank (2010), *Homepage, Poverty & Inequality Analysis*. | World Bank (2013) *World Data Bank. World Development Indicators*. |