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ORIGINAL ARTICLE

BRIDGING THE POVERTY GAP IN KBK$^+$ REGION OF RURAL ODISHA: A STATISTICAL ESTIMATION

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Abstract:

The KBK$^+$ region of Odisha comprising undivided Koraput (i.e., Koraput, Nawarangpur, and Malkanagiri & Rayagada), undivided Bolangir (i.e. Subarnapur and Bolangir) and undivided Kalahandi (i.e. Kalahandi & Nuapada) along with other three backward districts Gajapati, Boudh and Kandhamal is one of the poorest and most backward regions of the country. The region is popularly known in India for severe poverty with incidents like starvation deaths and baby sale for food etc. In this paper a special poverty line has been derived for this poorest region from the unit level data of National Sample Survey of India. Bridging the poverty gap is essential before thinking about any development for any backward region of the country. This study has estimated the poor population as well as a budget of money requirement scientifically to bridge the poverty gap of the rural sector of this region. This has suggested a lot to the policy makers and Government regarding the approximate amount of money required for the per capita poors of the poverty stricken region.

KEYWORDS:

Statistical , Region , Poverty , Estimation , Development.

INTRODUCTION :

Development of any region can be sustainable, continuous and accelerated if there is no gap as it is a cause of discontinuity. Before planning for development of a backward region, planning to bridge the gap is essential. The KBK region of Odisha comprising undivided Koraput (i.e., Koraput, Nawarangpur, and Malkanagiri & Rayagada), undivided Bolangir (i.e. Subarnapur and Bolangir) and undivided Kalahandi (i.e. Kalahandi & Nuapada) districts is one of the poorest and most backward region of India. The KBK districts account for 19.8% population over 30.6% geographical area of the State. 90 % people of this region still live in villages. About 38.4 % people of these districts belong to the Scheduled Tribes (ST) communities including the primitive tribal groups like Bonda, Dadai, Langia Saura and Dangaria Kandha etc. The SC and ST population in this region together constituted 54.6 % of the total population1. Also three more districts Kandhamal, Gajapati and Boudh have been officially declared as backward districts and added to KBK region. In this present study the region KBK$^+$ (consists of all official KBK districts along with three more backward districts Gajapati, Kandhamal and Boudh), one of the poorest and most backward region of India has been taken for analysis. This region is very common for severe poverty and starvation deaths.This study is an attempt to derive some measures of poverty based on a special regional poverty line and to suggest a monetary estimation to bridge the poverty gap of rural KBK$^+$.

DATA DESCRIPTION AND SOURCE:

This paper is based on state and center pooled data of Household Consumer Expenditure Survey conducted by NSSO (National Sample survey Office) during its last recent quiniqunial round2 66th (2009-10). These two data sets contain the MPCE (monthly percapita consumer expenditure) of each member of sample households to be used for the study. For further analysis these two data sets are pooled using certain statistical methodology. The sampling frame for NSS 66th round was the list of 2001 census villages and 372 number of sample villages had been surveyed out of 51349 census villages. Again the sample proportion for 66th round was 0.7% i.e. also less than 1%.Two different equal and independent samples i.e. Central and state samples had been surveyed by two different agencies i.e. NSSO, Govt of India and Directorate of Economics & Statistics, Govt of Odisha respectively. By pooling these two raw data of two independent samples of equal size, the sample size of pooled data has become doubled. To obtain the result for KBK[+] region of Odisha, pooling of these two samples has been done, as the sample size of NSS is not adequate for sub_state (regional) level analysis. For this paper, it has been decided to obtain estimate for two specific regions KBK[+] which consists of eleven backward districts and Non_ KBK[+] consisting of rest 19 districts of Odisha. For data pooling and analysis for this study STATA 9.0 (software for statistical analysis) has been used.

METHODOLOGY:

A) Poolability Test of two independent samples: As per the guideline of NSSO (National Sample Survey Office), for the state Odisha central sample and state sample are drawn independently following identical sampling design with same concepts, definitions and instructions to collect the data. There is also expected agency bias in the two sets of data generated by two different agencies of central and state government respectively. Therefore this study has needed to test that the samples are coming from identical distribution function before pooling these two sets of data. Since the parametric distribution of the sample mean is unknown, this study has adopted non-parametric tests such as Median test. In statistics, the median test is a special case of Pearson's Chi-square test. It tests the null hypothesis that the medians of the population from which two samples are drawn, are identical. Observations in each sample are assigned to two groups, one consisting of data whose values are higher than the median value in the two groups combined, and the other consisting of data whose values are at the median or below. A Pearson's Chi-square test is then used to determine whether the observed frequencies in each group differ from expected frequencies derived from a distribution combining the two groups. Taking m^* as the median of the pooled sample data , a 2 X 2 contingency table as below has been constructed and chi-square test used .

Sample type	No of sample observations		
	$\leq m^*$	$> m^*$	Total
State Sample	N11	N12	N1.
Central Sample	N21	N22	N2.
Total	N.1	N.2	N..

B) Pooling Methodology: For pooling of two different samples the study follows a scientific method3. According to this method pooled estimate at stratum level is calculated as the weighted average of two sample estimates with number of primary units4(villages) as weights at stratum level. Two different data sets of state and central sample has been taken into a common format with required information like mpce etc of each sample household surveyed.Multiplier5 has been computed for each data set separately using the estimation procedure of NSS 66th round. The two data sets of state & central sample with multipliers has been merged to make a single data set with double size and then the pooled multiplier is calculated using primary units3(villages) as weights at stratum level.

C) Derivation of Regional Poverty Line: A special poverty line has been derived for KBK[+] using the price index scientifically calculated from the unit level pooled data of NSS. At the first part of this study the declared planning commission's poverty line6 (Tendulkar) of rural Odisha has been used for indexing. For

KBK[+] region a regional poverty line has been derived using the derived Price Index of KBK[+] region with relative to Odisha. But for KBK[+] region a regional poverty line has been derived using the derived Price Index of KBK[+] region with relative to Odisha. The price index has been derived from the NSS pooled data by making decile classes of mpce in rural sector of Odisha as well as KBK[+] and Non_ KBK[+] regions. Keeping base year as 2004-05 the price index has been calculated for each decile classes of both KBK[+] and all Odisha for 2009-10 .Then the Fisher's Ideal index has been calculated for each decile class and then the Jevons index has been calculated for final index of 2009-10.The formula for Fisher's ideal index and Jevons index is given below.

$$Pj = \prod_{i=1}^{n} (Pt/P0)^{1/n}$$

Where Pj is the Jevons price index, Pt=Current year, P0=Base year

$$Pf = \sqrt{Pc * Po}$$

Where Po= price index of base year, Pc= price index of current year, Pf= Fisher's Ideal price Index

D) Estimation of an outlay to bridge the poverty gap of KBK[+]
:
For this study the important measure of the poverty gap is known as the Per Capita Poverty Gap (PCPG). This provides an indication towards planning to fill up the depth gap of poverty. This provides information regarding the exact monetary requirements for the poor households of rural Odisha as well as its backward region. The measure of PCPG is:

$$PCPG = \sum_{i=1}^{m}(z - y_i)/m$$

Where y_i is the expenditure of the i th individual, 'z' is the poverty line and m represents the number of poor. Using the percentage of BPL (Below Poverty Line) in the census2011 population the regional BPL population of KBK[+] and Non_KBK[+] region of rural Odisha has been estimated. Then an outlay in terms of rupees for KBK[+] and Non_KBK[+] region as well as the whole rural Odisha has been planned and estimated using the percapita poverty gap(PCPG) and projected BPL population.

RESULT AND ANALYSIS:

A: Poolability Test of two samples
A-1: Median test:
Median test has been applied to test that the samples are coming from identical distribution function or not. For KBK[+] region observations in each sample are assigned to two groups, one consisting of data whose values are higher than the median value in the two groups combined, and the other consisting of data whose values are at the median or below. The table for median test is as follows:

For KBK+ Region of rural Odisha

Sample type	No of sample observations		
	<= m*	> m*	Total
State Sample	416	448	864
Central Sample	448	416	864
Total	864	864	1728

(Where m* be the median of the pooled sample data.)
Pearson chi-square (1) =2.3704 (Calculated)
Tabulated value of chi-square at 1 df=3.84 at 5% level of significance.

   Hence calculated value of chi-square < tabulated chi-square indicates that the null hypothesis is accepted i.e. the median of two samples are identical. Here it is concluded that test of poolability is accepted. As a result the acceptance of poolabilty shows a positive indication towards further analysis.

B) Regional poverty line for rural KBK$^+$

   Using household consumer expenditure data of NSS 66th round the Planning Commission of India has derived the poverty line for rural Odisha as Rs 567.10 for 2009-10. But in this study, using pooled data of central and state sample, price index has been computed as per the methodology described above. Then using this regional price index in the rural poverty line of Odisha, a special poverty line for KBK$^+$ has been computed as in the table B1. The HCR (Head Count Ratio) i.e. the percentage of BPL population for KBK$^+$ has been computed using the regional poverty line Rs 562.55, but the same has been computed for non_ KBK$^+$ as well as Odisha using the poverty line Rs 567.10.The result of HCR is given in table B2.
TableB1: Special poverty line for rural KBK$^+$

Region	Poverty line (in Rs 0.00) for 2009-10
ODISHA	567.1
KBK+	562.55

Graph B1
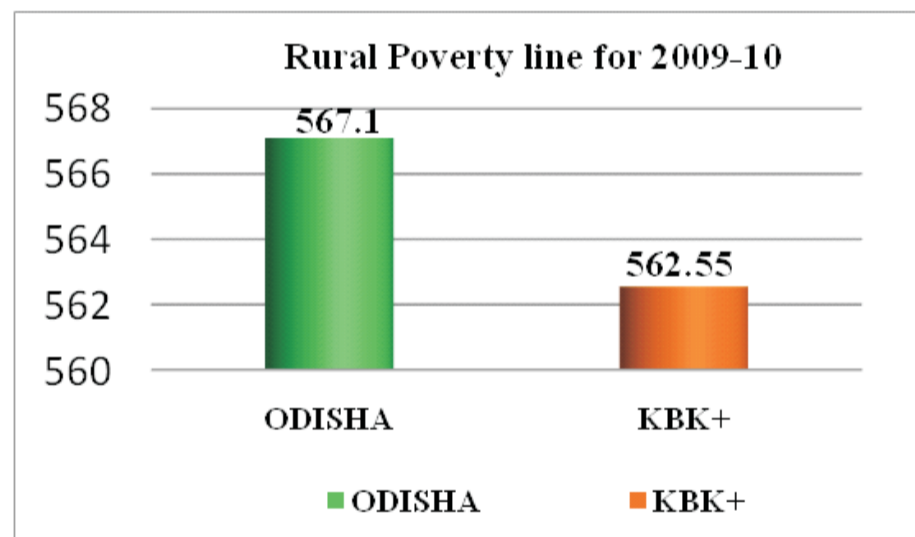
Table2: Regional Poverty (% of BPL persons or HCR) for 2009-10 comparing to Odisha.

Region	KBK$^+$	NON_ KBK$^+$	ODISHA
HCR	66.28	31.41	41.31

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Graph B2

% of persons below poverty line(HCR)

66.28   31.41   41.31

66th(2009-10)

■ KBK+ ■ NON_KBK+ ■ ODISHA
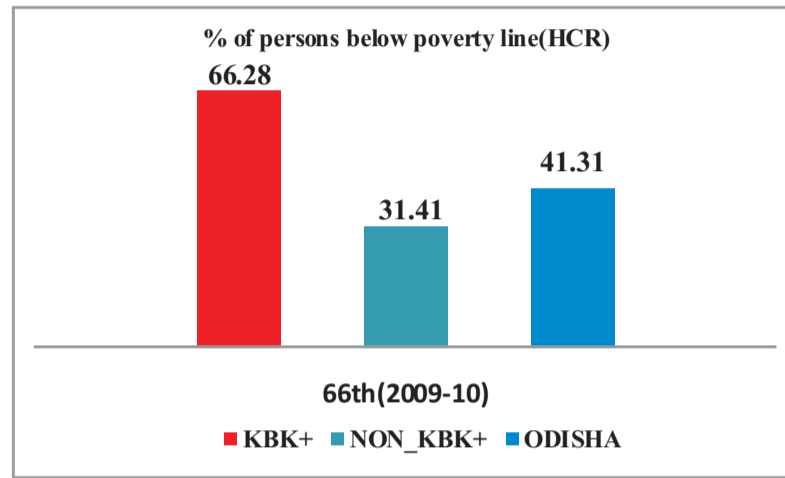
C) Estimation of an outlay to bridge the poverty gap

To bridge the poverty gap and to remove the regional disparities is essential before thinking about proper development of any backward region. Any plan and project adopted in the past to develop this poverty stricken region did not yield desired results. In consultation with the Government of India, State Government has initiated many special plans for the backward districts.i.e Biju KBK Plan, Biju Kandhamal 'O' Gajapati Yojana and Backward Regions Grant Fund etc for accelerated development.

But this estimation of outlay is based on the gap of the poor households from the minimum requirement of living in term of household consumer expenditure. A projected BPL population of rural KBK$^+$, rural Non_ KBK$^+$ as well as whole rural Odisha is given in table C1.Estimated outlay in terms of rupees to bridge the regional poverty gap in rural Odisha is given in table C2.

Table C1:

Rural Population	KBK+	Non_KBK+	Odisha
Total population (Census 2011)	9322511	25628723	34951234
BPL POPULATION	**6178960**	**8049982**	**14438355**

Table C2:

Per Capita Poverty Gap(PCPG) (in Rs)	32	22	27
Monthly amount required(in Rs)	**197726729**	**217349511**	**415076240**
Yearly amount required(in Rs)	**2372720752**	**2608194134**	**4980914885**
Yearly Approximate amount required(in Rs) in crores	**238**	**261**	**499**

From the table C2 it is observed that in KBK$^+$ region of rural Odisha, each poverty affected person needs Rs 32 to cross the poverty line while the same is Rs 22 for Non_ KBK$^+$ region. Finally the study has estimated that, all the poverty stricken persons of rural KBK$^+$ require Rs 238 crores annually to cross the poverty line. The same required amount is Rs 261 crores for rural Non_ KBK$^+$ and Rs 499 crores for the entire rural Odisha.

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CONCLUSION:

Using Tendulkar methodology the Planning Commission of India has derived the state specific poverty line for rural Odisha is Rs 567.10 for the year 2009-10.This paper has derived the regional poverty line for the backward region KBK+ as Rs 562.55.According to these poverty lines 66.28% persons of rural KBK+ are suffering from poverty where as the proportion is 31.41% for rural Non_ KBK+ region of Odisha. But while coming to the number of persons, there are about 80 lakhs persons of rural Non_ KBK+ are suffering from poverty where the same is about 61 lakhs for rural KBK+. PCPG (Per Capita Poverty Gap) is an indicator to measure gap between a person's actual living standard and the minimum living standard. This study has concluded that a poor of rural KBK+ requires Rs 32 monthly to cross the border of the poverty line while the same requirement is Rs 22 for rural Non_ KBK+. KBK+ is one such region where incidence of poverty is the highest in the State. For the development of this backward region Government of India and State Government has initiated many special plans. BIJU KBK plan was implemented on pilot basis in the year 2006-07 and continuing in a full-fledged manner from the year 2007-08 with an outlay of Rs.120 crore per annum. The plan will continue in the Twelfth Five Year Plan. Recently in the month of October 2012 the Cabinet Committee on Economic Affairs (CCEA) has approved the proposal for continuing the special plan for KBK districts in 2012-13 with an allocation of Rs 250 crore. Biju Kandhamal 'O' Gajapati Yojana (BKGY) has been launched by the State Government in 2009-10 under State Plan with an annual allocation of Rs.28.50 crore with a view to accelerating the development process and expediting poverty reduction in Kandhamal and Gajapati districts. The State Government in consultation with Planning Commission have submitted a new Eight Year Perspective Plan for KBK Districts for Rs.4, 550.00 crores for the period from 2009-10 to 2016-17. But this study suggested an estimated outlay of Rs 499 crore annually for poverty stricken people of rural Odisha to make them cross the poverty line. The same is Rs 238 crore for rural KBK+ and Rs 261 crore for rural Non_ KBK+. Hence this paper suggests to the government and policy makers of India to plan and take step to identify the poverty stricken households properly and to bridge the poverty gap.The state and its backward regions can be advanced towards a significant development after bridging the poverty gap.

NOTE

1----As per the result of population Census 2001

2----NSSO conducts its survey of quinquinial round in the gap of each five years and planning commission prepares poverty estimate for national and state level based on this result.

3----Minha and Sardana method published in Sarvekshana July –Sept 1990

4--- (A two-stage stratified sampling design has been adopted for both 55th & 61st round survey. The first stage units (FSU) or primary units were census villages in the rural sector. All rural areas of each district constitute a separate rural stratum.)

5- The value which is multiplied to sample characteristics (statistic) to obtain population characteristics (parameter) is called as multiplier.

6- Planning Commission set up an expert group under the chairmanship of Professor Suresh Tendulkar to examine the issue and suggest a new poverty line and estimates. The expert group has considered this issue in detail and has suggested new methodology to arrive at state wise and all India rural and urban poverty lines for 2004-05 and 2009-10.

REFERENCES

1- *Notes on Sample Design and Estimation procedure for 66th round*. SDRD, NSSO, Govt of India.

2- B.S. Minha & M.G. Sardana—*"A notes on pooling of state and central sample data of NSS" – Sarvekshana July –Sept 1990, NSSO, Department of Statistics, MOSPI, Govt of India.*

3. Press note on poverty estimates, 2009-10, *Government of India, Planning Commission (2012).*

4. *Report of export group to review the methodology for estimation of poverty under the chairman ship of prof S. Tendulkar, Planning commission, Government of India. (2011)*

5. Forthcoming Arthavijnana, 2006-- *Prices, Price Indexes and Poverty Counts in India during 1980s and 1990s: from CPIs to Poverty Lines? Amaresh Dubey NCAER, New Delhi) and Richard Palmer-Jones. (University of East Anglia)*

6. Annual action plan, 2012-13, *Planning and Co-ordination Department, Govt of Odisha.*

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