

Poverty and Deprivation: Study of a most impoverished population for better management of resources

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Abstract

Chhattisgarh is having fertile agricultural fields and plenty of natural resources. The state is poor and facing stiff-armed resistance from the tribal population under a Naxalite movement. The paper focus is on poorer and poorest population in the Chhattisgarh state and their struggle under the three focused areas education, health and living standard. The paper adopts Alkire-Foster (A-F) methodology to explore the three-dimension and deprivation that exist under it in the surveyed population. For the purpose of DHS-VII India, 2015-16, surveyed data is obtained, and A-F methodology is applied to reach a meaningful conclusion. The study represents the lowest two quintiles of wealth index category from the population of 26 million spread over 18 districts of the state bifurcated under the urban and rural sector. The modification in methodology to accommodate target population characteristics and to reach meaningful conclusion can be reproduced for any region and helpful in designing policies for the suffering population.

Keywords: Poverty, Development, Alkire-Foster (A-F) methodology, Education, Health and Living Standard

1. Introduction

Natures favours cannot be the guarantee for development; it needs leadership to explore, market and commercialise resources for the benefit of the people. Ironically the Chhattisgarh state of India is paying the price of exploitation of tribal people, inadequate planning for extraction of mineral resources, mismanagement of natural resource earnings where the richness of resources not transferred to displaced population and destruction of the natural environment.

Despite having fertile agricultural fields and plenty of natural resources, Chhattisgarh state is a poor state and facing stiff-armed resistance from the tribal population under a Naxalite movement. The paper focus on poorer and poorest population in the Chhattisgarh state and their struggle under the three focused areas education, health and living standard.

The paper adopts Alkire-Foster (A-F) methodology to explore the three-dimension and deprivation that exist under it in the surveyed population. For the purpose of DHS-VII India, 2015-16, surveyed data is obtained, and A-F methodology is applied to reach a meaningful conclusion. The study represents the lowest two quintiles of wealth index category from the population of 26 million (Chhattisgarh Economic and Human Development Indicators, 2011) spread over 18 districts of the state bifurcated under the urban and rural sector.

Literature Review:

Alkire and Foster (2007, 2011) proposed a methodology for direct measurement of poverty; it forwards poverty thresholds within each indicator and across the indicators where numerous conditions need to be satisfied before fixing the deprivation tag for any observation.

Multidimensional Poverty Index (MPI) is an internationally accepted poverty measure developed by Oxford Poverty and Human Development Initiative (OPHI), the University of Oxford¹, in collaboration with UNDP. (Santos, Acute Multidimensional Poverty: A New Index for Developing Countries, 2010-11) It offers six indicators under the standard of living dimension that the paper applies with little modification. In education, we accept Santos five year of education as the

Oxford Poverty and Human Development Initiative (OPHI), the University of Oxford¹

criteria for household members and fully support that a literate person can forward his wisdom by making the future generation educated.

Multidimensional Poverty Index constructed by Alkire and Santos (2011, 2013) based on AF methodology include three dimensions of poverty: Education, Health and Living Standards; it uses household surveys to provide reliable information that enhances the quality of traditional poverty tools. (WHO/UNICEF, 2006) classified improved and unimproved drinking water and sanitation facilities, the research accept the classification and use the same for analysis.

Augustin Kwasi (2017), in his study, argues that inequality among the population limit the effectiveness of growth and directly affects the poverty-reducing efforts. Even though India per capita GDP growth rate remains high, but average annual poverty reduction remains low. He argues that income should grow at the same rate as GDP, then it will contribute to a substantial drop in poverty; also, low-income countries are required to make more effort to increase income and reduce the poverty gap.

In her work (Roche, 2011), children are identified as poor, and their deprivations measured under child poverty. (Lustig, 2011) in his work on the aggregation of various dimension under one index and conclude that proper identification of weights is a must under welfare economics.

Similarly, papers are available on the subject from different nations, Gambia, Bangladesh, Afghanistan, Jordan, Iran, Spain, Madagascar, India, etc. (Murgai, 2016), forward the case on India and raise the issue of poor population concentration in low-income states. The research considers available studies and evaluates the question of inequality among the population, deprivation among households and welfare economics with the available information before the final argument.

Methodology:

Alkire Foster (AF) methodology is an approach where it addresses the multi-dimension nature of poverty, and it directs timely interventions through a well-defined method. It focuses on minimum achievement (Ahmed, 2018) for each observation (individual, household, etc.) below the perimeter; it will be treated as a deprived observation.

(Santos, 60954_Alkire_Santos_MD_Approach) In his paper explain in detail how AF methodology applied and can be useful in different parts of the world, with a focus on disadvantaged population, over a time frame and for the targeting and even comparing purpose. His paper consists of a detailed explanation of how the methodology applied over a population and how it measures deprivation.

The methodology treats a person or a household as the core, and it moves on to identify indicators in which they are deprived by setting deprivation cutoff limits and form a matrix with an individual score in each dimension (Education, health, Living Standard).

If the score exceeds the cutoff limit, the observation termed as multidimensional deficient. At the end of the identification step, the non-poor Observation or Observation, which are data deficient, censored. The aim is to devise policies that help in increasing human welfare that keep the observation above the deprivation cutoff level. It helps in the identification of the poor and the set of parameters where they fall behind.

The method is useful in establishing indicators to measure deprivation in surveyed observations. It provides incidence (H) or headcount ratio as a percentage of the population that is missing under the program objectives, and it also includes intensity (A) as a percentage of weighted deprivation among the surveyed population. The Adjusted Headcount Ratio denotes all deprivations in the sampled observation, which termed as destitute. It is also known as the product of incidence and intensity.

The outcome can judge the utility of the AF method it provides in the form of comparability between two groups (control and treated (Vaz)), impact evaluation on raw and censored headcounts, and even difference in conditions can be compared if data is available for different periods. (DHS survey are beneficial in comparing different period for many characteristics). It provides further updates where it informs the researcher about the population division along the line of deprivation in different dimensions.

The basis of MPI is three equally weighted dimensions spread over ten indicators. The deprivation cutoffs for the ten indicators elaborate on prevailing deprivation in education, availability of drinking water, sanitation, access to health centres, conditions of their house, and basic amenities in the form of assets available in a household. In our paper, the set cutoff criteria are to exclude a minimum number of households, as we take a household as deprived if more than one indicator from the ten indicators in three dimensions indicate deprivation.

The AF methodology helps to establish empirical evidence for schemes like Cash Transfer Programs, Multi-Sector Focussed Programmes, and Control groups. It creates a baseline to compare the future results and progress and, in the process, provide valuable information on the success ratio (Ahmed, 2018).

The AF method argues against the DHS as it has no information on prices or quality of assets, even than DHS is used by (Roche, 2011) and it provides plenty of choices in terms of a unit of analysis, dimensions, variables, poverty threshold level, and weights for the dimensions.

(Roche, 2011) use the DHS survey from Bangladesh for the period of 1997-2007 to derive the intensity of each child's poverty by utilising AF adjusted headcount ratio and prove that how to interpret the figure and broke down final measures in groups and dimensions for analysis purpose over a timeline.

In the AF methodology, identification of deprivation is crucial as it will provide a poverty gap that any program should aim to reduce or eliminate to reduce the poverty ratio. It happens many times a respondent is deprived in a few dimensions, whereas another respondent is deprived in many aspects AF method clarify such conditions and give proper weight. OPHI, in its presentation forward, that the AF method satisfies multidimensional poverty characteristics like symmetry, poverty & deprivation focus, scale, and replication invariance (Alkire, 2011), etc. It applies weights according to the importance given to a particular indicator in terms of deepness it carries in its poverty status.

The AF methodology is used to design policies and programs to benefit maximum by keeping the rate of reduction (headcount ratio) more than the population growth rate. The decline is possible by successfully reducing the incidence of poverty or by decreasing the intensity of poverty among poor people, or it is possible to reduce both.

An observation must overcome average intensity prevailing among the impoverished population, and in the process, actual deprivation must reduce. Merely reducing the headcount and rearranging concentration among the remaining deprived population should not be the policy objective.

Reducing the deprivation will undoubtedly reduce poverty, either in the form of decreasing intensity or observation escapes the multidimensional poverty due to change in status from poor to non-poor in the measured indicator leading to lower headcount. It may be the case of reduction in only censured headcount if the escape from deprivation is limited to some indicators. The MPI trait to measure subgroups of the population from national to international level and comparability between groups and in different time frame make it more beneficial among the available methodological options.

Demographic and Health Survey:

Demographic and Health Survey VII, India (2015-16) – DHS surveys are the most reliable and comparable source of information available on education, health, living standards, gender and domestic violence, household, nutrition and various respondent features in the form of country survey. Standard DHS Surveys do have a large sample of households and are conducted over a long period, usually five years, to evaluate progress over the years. Traditional mix survey tools used were four models of the questionnaire –Household questionnaire, a Woman's Questionnaire, A Man's Questionnaire, and Biomarker-questionnaire.

For our study purpose Household questionnaire with the information of 6,01,509 households consisting of 2,869,043 observation from 36 Indian states and union territories with 640 districts and 430 variables are taken and then dissected it to choose Chhattisgarh state, and under it, only two categories poorer and the poorest from the five categories of the wealth index selected for the research purpose. Later 430 variables also reduced to 67 primary variables categorised into meta-data, education, health, and living standard. The dropped variables belong to categories that are beyond the purview of this

research, like detailed related with meta-data, bio matric questions, malaria prevention, domestic violence module, questions related under living standards but beyond the reach of the two categories poorer and poorest taken from the wealth index.

Education: Information related to educational attainment by the household members are gathered, under which in a household women's, men's and mother's highest education was taken to form the household education index where if all of the household adult members do not complete primary school the house is deprived in education. The reasons for not getting an education also probed in the surveyed population along with its status under the education index. Attaining only primary school or less than five years of schooling is termed as educationally deprived.

Health: Health module probe household on their ability to access health benefits. It collects data on the health schemes and health insurance coverage, where they visit for their treatments and whether they suffer from TB or anaemia. The health module also gathers information on basic health requirements like availability of safe drinking water, sanitation facility, and presence of water at the proper place, separate kitchen, and adequate ventilation, smoking in the house, presence of toilets, shared toilets or no toilet facility at all.

Living Standard: Under the living standard condition of the house, the chosen categories are (Roof, floors, and Walls), presence of electricity, cooking fuel and assets ownership (Sabina Alkire et al.2017), while safe drinking and sanitation facilities are in the Health module due to a direct relationship with diseases in case of non-availability of them. A household with car/truck and refrigerator treated as not deprived under an exclusion criterion in the Saxena Committee and Socio-Economic Caste Census 2011(SECC 2011) along with the inclusion criteria if the household is put under the destitute category or headed by either a single woman or a minor. The paper agrees with the Saxena Committee and treats the subject in the same manner.

Sample Design:

The freedom to decompose sample population into subgroups and measure the poverty is one of the properties used when it comes to comparing the rural-urban divide, progress in various religious groups and castes, differences in States and district-wise growth and dimensional reduction of poverty in all subgroups.

The study uses the data collected under the DHS VII- India, 2015-16 by International Institute for Population Studies (IIPS) Mumbai, India, and provided by DHS program funded by USAID. The sample designed in a way that it is representative at the national level, segregated into rural-urban areas, and swiftly provide information under state division. It applies a two-stage cluster design where stage one includes taking the enumeration data from the national census, and in stage two, selected enumeration areas households sample is taken.

Our study is representative of the Chhattisgarh state and its 18 districts. From the wealth index, it chooses poorer and poorest types for discussion consisting of 11024 households, and it gathers information under 67 variables relating to education, health and living standard and in the later part applying Alkire-Foster methodology to calculate Multidimensional Poverty Index (MPI).

Education:

From the DHS survey data, the education deprivation index formed for the household. The data on how many families deprive of their educational right is collected, the household is considered educationally deprived if adults of the household members don't have any formal education or are having primary school education alone, and it is a general belief that an educated family promotes their wards in education.

Surprisingly 44% of the respondents are not interested in studies (Table A1); respondent's answers divided into two categories one, based on lack of efforts from the respondent side and secondly, lack of facilities from the government. In respondent fault reasons like not interested in studies, repeated failures (8%), further education not considered necessary (2%), got married (3%), and others (2%) are taken whereas the second factor shows government inability to provide educational opportunity, like required to do household work (16%), required to work for money (5%), costs too much (9%), school too far (9%) and not safe for girls, no female teacher and no proper facility for girls.

Table A1: Main Reason for not attending school		
Reasons	Frequency	Percentage
School too far away	84	3.860294118
Transport not available	37	1.700367647
Further education not considered necessary	41	1.884191176
Required for housework	354	16.26838235
Required for work on farm/family business	63	2.895220588
Required for outside work for payment	59	2.711397059
Cost too much	192	8.823529412
No proper school facilities for girls	6	0.275735294
Not safe to send girls	8	0.367647059
No female Teacher	1	0.045955882
Required for the care of siblings	14	0.643382353
Not interested in studies	953	43.79595588
Repeated failures	174	7.996323529
Got married	69	3.170955882
Did not get admission	70	3.216911765
Other	43	1.976102941
Don't Know	8	0.367647059
	2176	100

The respondent's apathy towards education is maybe because of their daily struggle for livelihood, and as we are evaluating only the poor population, their primary aim is to earn bread for their family, education, and expenditure related to education comes much later.

There are 9159 educationally deprived female observations in the rural-urban category spread over 18 districts (Table A1); highest in Narayanpur (821, 8.96%) followed by Dakshin Dantewada (761, 8.31%), Koriya (760, 8.3%), Bastar (680, 7.42%), Korba (650, 7.1%) and Chhattisgarh state capital Raipur (491, 5.36%)

In Chhattisgarh state female population who ever attended school above the age of 6 years are 67.6% (80.5% Urban, 63.7% Rural), which is an increase from 53.4% from the last survey data in 2005-06. (National Family Health Survey 2015-16, State Fact Sheet-Chhattisgarh, 2015-16) Rajnandgaon (52%) and Jashpur (51%) are the districts where more than 50% of the females are under the deprived category, followed by Dhamtari (49%) and Janjgor-Champa (48%). The least deprived districts are Dakshin Bastar Dantewada (20%), followed by Bastar (29%) and Narayanpur (30%), overall, 40% females; Households are in the deprived condition in education.

In the male category, Durg and Dhamtari both districts have 69% of male HH in deprivation state, followed by Rajanandgaon (65%), Raigarh (64%) again Dakshin Bastar Dantewada district is the one where male population least deprived in education (26%) followed by Bastar (45%), Narayanpur (48%) and overall 55% male HH are in educationally deprived conditions.

The literacy ratio improves from the previous percentage of 44.9, and now it is 66.3%, whereas 81.6% of urban women and 61.3% are literate in rural. In man, the ratio is 85.7% (Urban 93%, Rural 83.1%), and it is an improvement of 11% from the last figure of 74.1%. (National Family Health Survey 2015-16, State Fact Sheet-Chhattisgarh, 2015-16) The numbers are still below the national average as the literacy ratio of India is 74.04. (Chhattisgarh Economic and Human Development Indicators, 2011)

Health:

(Hazarika, Manisha, 2015) In her work describe 80% of the infectious diseases in India due to poor quality of water, sanitation and hygiene. The situation is worst in slum areas as (Sau, 2017) in her research describe shared toilets and poor water management in the tightly constructed poor quality of shanties are sources of infectious diseases.

(F.Ram) In his studies conclude that after 60 years of independence, a significant proportion of women and children do not have access to essential services like improved drinking water and sanitation. He uses 2007-08 DLHS-3 and National Family Health Survey as evidence. (Nandita Saikia, 2013) In her research, she investigates the known fact that the infant mortality rate is higher in the rural sector, but she finds its determinants in inequality in household wealth and lower maternal education. (Choudhury, 2015) In his findings that parental education results in lower the infant mortality rate and give better results in underdeveloped socio-economic regions using NFHS (2005-06) survey is significant. It stresses on mother's education and exposure to mass media for better health.

(Prashant Kumar Singh, 2012) Also concluded that education does have a significant impact on maternal health care, and promoting higher education for girl child is required. (S K Singh, 2018) In his research article effectively found the relationship between older adults with low education belong to the poorest wealthy quintiles and are exposed to second-hand smoke inside the house are more prone to tuberculosis.

The multiple factors that show a strong association with the disease are smoking in the house, type of cooking fuel, non-availability of a separate kitchen, poor house condition (wall, floor, and roof), and shared toilets, along with the quality of drinkable water. In another study by (Sabrina Naz, 2016) describe unhealthy cooking fuel along with poor household structural design and ventilation as a significant health hazard and the leading cause of respiratory illness.

Similarly, in Bangladesh (Md Nuruzzaman Khan, 2017) state, household air pollution from cooking with solid fuels is a leading source of death and disability in developing countries. (Oyewale Mayowa Morakinyo, 2015) In his research examine the relationship between wealth status, sex of household head and source of potable water and concluded that women-headed household is better in using safe and improved drinking water sources and wealth index play an essential part as lower section have less option to utilise.

Safe drinking water and proper sanitation are must to avoid spreadable diseases. It is vital that every citizen must have access to safe drinking water, but unfortunately, this is far from reality. The study analyses the data regarding how many households are having access to safe drinking water (piped into dwelling, public tap, standpipe, piped to the yard, tube well protected well, protected spring, bottled and community ro plant). Data states (Table A2) majority of the households are having access to drinking water, but the quality of water is questionable; 73% of households are using bore well water (76% rural, 43% Urban), whereas 13% depends on government supplies and 10% of them uses water from the unprotected wells. Only 5% of the population under the studied category is fortunate enough to have access to drinking water in their dwelling. 15% need 15 minutes, 30% need 10 minutes, and 10% are lucky enough to live in the vicinity of the water source, while 34% of the surveyed population need more than 15 minutes to reach the water source.

Table A2: Source of Drinking Water				
Source of drinking water	Total	Percentage	anything is done to make it safe	
			No	Yes
Piped into dwelling	45	0.41	31	14
Piped to yard/plot	559	5.07	322	237
Public tap/standpipe	892	8.09	558	334
Tube well or borehole	8080	73.29	5413	2667
Protected well	91	0.83	30	61
Unprotected well	1138	10.32	334	804

Protected spring	7	0.06	3	4
Unprotected spring	37	0.34	16	21
River/dam/lake/ponds/stream/canal/irrigation	148	1.34	81	67
Rainwater	4	0.04	4	0
Tanker truck	8	0.07	5	3
Cart with small tank	1	0.01	1	0
Community ro plant	13	0.12	8	5
Other	1	0.01	0	1
	11024	100.00	6806	4218

It is crucial to note sources that considered unsafe are not considered in the same way by the households using them. The quality of the water supply is unreliable, including water provided from government sources. At a different place, the quality of water changes due to available natural resources or industrial pollution, the treatment of water is a necessity, but many households do not consider it, either due to their ignorance or are too poor to consider it as an essential. Unfortunately, 62% of the household doesn't do anything to make it safe. Survey data shows that 6806 households don't treat water to make it safe.

85% of the households (Table A3) don't have toilet facilities (9360), and 8447 of them hold BPL card. 86% of households in the rural and 70% in the urban category is facing a dilemma.

Table A3: Type of Toilet facility in Urban and Rural areas and Household with BPL card

Type of toilet facility	Urban	Rural	Total	Per cent	Households with BPL card		
					No	Yes	Total
Flush to piped sewer	3	1	4	0.04%	2	2	4
Flush to septic tank	172	636	808	7.33%	115	693	808
Flush to pit latrine	68	450	518	4.70%	71	447	518
Flush to somewhere else	7	6	13	0.12%	3	10	13
Flush, don't know where	2	3	5	0.05%	1	4	5
Ventilated improved pit latrine	9	69	78	0.71%	11	67	78
Pit latrine with slab	12	148	160	1.45%	10	150	160
Pit latrine without slab	3	30	33	0.30%	4	29	33
No facility/bush/field	689	8671	9360	84.91%	910	8447	9357
Composting toilet	7	25	32	0.29%	3	29	32
Dry toilet	1	5	6	0.05%	1	5	6
Other	7	0	7	0.06%	2	5	7
			11024*	100.00%			11021*

*Three responses under don't know category - No Facility/Bush/field

The most common type of toilet facility prevailing both in rural and urban areas is flush to the septic tank (48.55%) in comparison to other techniques available in the market. Also, a considerable number of individuals sharing toilets is a cause of concern as 394 households are forced to share with others.

The interviewer observed that the majority of households (10967) have a place where family members wash their hands, and it is a positive development, but in 4566 households, they are not able to see the presence of water, and 4280 households are from rural areas, and in it, 3866 households are from BPL category.

The health schemes (Table A4) cover 72.6% of households. Among them, 7416 belong to the BPL category, and more importantly, 2407 households who belong to the BPL category not covered by any health scheme. In a rural area, 7377 households and urban 628 are given the protection, while 6847 households in rural areas hold BPL card and covered under the health scheme. In urban areas, the figure is 569 households.

Member of household covered by a health scheme or health insurance	Has BPL card			Type of Residence		
	Total	No	Yes	Don't Know	Urban	Rural
No	2945	538	2407		342	2603
Yes	8005	588	7416	1	628	7377
Don't Know	74	7	65	2	10	64

The majority of the population, 66%, depending on a public sector (Table A5) that includes government hospitals, dispensary, or Public health centers-PHC (1227), Rural hospitals/Blocks PHC (2735), followed by Private Clinics (2206), Additional PHC (2105) and sub-centres (1001). More than 22% of the households depend on private hospitals and clinics for their treatment, but less than one per cent population still visit traditional healers, and many a time takes self-medication without any consultation to any doctor.

Where household members generally go for treatment	Frequency	Households with BPL card					Urban		Rural		
		Urban	Rural	No	Yes	Don't Know	Don't have BPL card	have BPL card	Don't have BPL card	have BPL card	Don't Know
Public: government/municipal hospital	1227	273	954	131	1095	1	39	234	92	861	1
Public: government dispensary	16	8	8	2	14	0	2	6	0	8	0
Public: UHC/UHP/UFWC	28	5	23	2	26	0	1	4	1	22	0
Public: CHC/Rural hospital/block PHC	2735	203	2532	289	2445	1	37	166	252	2279	1
Public: PHC/Additional PHC	2105	65	2040	193	1911	1	10	55	183	1856	1
Public: sub-centre	1001	9	992	95	906	0	1	8	94	898	0
Public: vaidya/hakim/homeopath (ayush)	38	0	38	3	35	0	0	0	3	35	0
Public: anganwadi/ICDS centre	35	0	35	4	31	0	0	0	4	31	0
Public: Asha	66	1	65	3	63	0	0	1	3	62	0
Public: Government mobile clinic	5	0	5	0	5	0	0	0	0	5	0
Other public sector	6	3	3	2	4	0	1	2	1	2	0
NGO or Trust hospital/Clinic	53	0	53	4	49	0	0	0	4	49	0
Private hospital	277	45	232	42	235	0	11	34	31	201	0
Private doctor/clinic	2206	330	1876	262	1944	0	74	256	188	1688	0
Private paramedic	19	1	18	2	17	0	1	0	1	17	0
Private: vaidya/hakim/homeopath (ayush)	14	0	14	2	12	0	0	0	2	12	0
Private: traditional healer	69	1	68	3	66	0	0	1	3	65	0
Private: pharmacy/drugstore	36	8	28	2	34	0	1	7	1	27	0
Other private sector	64	3	61	8	56	0	1	2	7	54	0
Shop	11	0	11	1	10	0	0	0	1	10	0
Home treatment	26	0	26	1	25	0	0	0	1	25	0
Other	987	25	962	82	905	0	5	20	77	885	0
	11024	980	10044	1133	9888	3	184	796	949	9092	3

Rural households are more dependent on PHC and other means (67%) in comparison to urban households, who prefer private clinics (38%) and private hospitals (4.7%). Only 18.67% of rural households prefer private clinics and private hospitals. The main reason may be private clinics and hospitals are not getting enough business and are not motivated to open their business in rural areas, and the rural population has to depend on the public sector for health services.

Availability of nearby private clinics does affect the decision whether to visit or not as 19% of BPL category rural households in comparison to urban 20% visit them in sickness. In the surveyed population, only 0.27% of observation was suffering from tuberculosis, and most of them belong to rural areas and are from the BPL category. Most of the suffering population prefer government hospitals (68%), while 15% visit the private sector, while 9% has taken consultation from both sectors. In women, 1556 cases of moderate level and 135 cases of severe anaemia was noted. The majority of them belong to the rural region. Another observation that 48% of BPL category mothers suffer from anaemia is a cause of concern.

(Pushpanjali Swain, 2016) studies impact of government program on sanitation but finds that significant surveyed population are unaware of it and communication at the village level and in the most impoverished household is necessary for any success. (Luis A. Andres, 2014) quoted that 47 per cent reduction observed in diarrhoea prevalence between children living in a household without access to improved sanitation and children residing in improved sanitation in rural areas. (Anurag Banerjee, 2016) study government initiative to reduce open defecation by constructing 8 million toilets in 2014-15, in his conclusion, he identified that merely providing facility is not enough; it needs social marketing, increases in female education, the financial capability of rural and poor households, changes in religion and caste-based beliefs.

(Madhusudan N. Pandya, 2018) Describe that there is gender-based sanitation insecurity as they face a threat when they go in open fields for defecation, and there is a need to improve the economic, social and political position of women, and with government initiative, it is slowly gaining ground. (Parimita Routray, 2017) Studies point out decision to construct a sanitation facility in 80 per cent cases are taken by the male head, while 11 per cent cases involve women and only in 9 per cent cases the women make the decision. (Isabel Gunther, 2010) 172 DHS survey was used from 70 countries to establish that significant reduction is possible by using improved sanitation and water amenities.

The findings highlight the need for sanitation and availability of safe drinking water for the deprived population fighting with diseases and depending too much on the public sector for their treatment. The low income and education also hinder their ability to consult private health clinics and adopt safe practices inside their vicinity and in their houses.

Living standard:

(Seth, 2013) In her article examine the Indian Socio-Economic Caste Census methodology and compare it with the different alternatives to identify the Below Poverty Line (BPL) household to help the government to design the schemes and provide benefits that the BPL category population is entitled to. The 2002 census survey is severely criticised based on the poor quality of data, limited coverage, and poor survey design. Later 2011 census survey aims to rectify the mistakes. Indian government appoints the N C Saxena committee to develop a new method for proper identification of the BPL population. The paper accepts Saxena committee inclusion, exclusion, and scoring method criteria and incorporates them in its methodology.

The asset index is developed from the selected seven items if it has a score of less than five; it is a deprived household under the asset category. For a household, the minimum requirement of assets, categorised under the need for physical rest (cot, mattress & table/chair), entertainment (radio or TV), cooking (pressure cooker) and transport (bicycle).

The selection of assets has a sole objective to differentiate the surveyed population with permanent address but falls under poorer and poorest category with the people having no permanent address, migrating nature, and are in acute poverty. Still, the survey (Table A6) found that 437 households don't have any of the necessary assets, 1793 households have a single asset, 3606 households having two, 2822 households three and 1578 household having four, only four households have all seven items in their house. The most available asset was bed or cot, followed by bicycle in the studied category.

Table A6 Asset Index	A household has the BPL card			
	No	Yes	Don't Know	Total
No item in a household	58	379	0	437
One Item in a household	181	1612	0	1793
Two items in a household	361	3243	2	3606
Three items in a household	283	2538	1	2822
Four items in a household	168	1410	0	1578
Five items in a household	73	556	0	629
Six items in a household	9	146	0	155
Seven items in a household	0	4	0	4
Total	1133	9888	3	11024

The data collected under the living standard for the poorer and poorest category based on the Saxena Committee 2009 and Social- Economic and Caste Census 2011 and it is used to set criteria for the exclusion from the deprived class like having a car or truck or motorcycle or refrigerator without having BPL card. In the exclusion criteria, two types of error are possible, type-1 including the household that should not be in the BPL category but still holds a BPL card, or type-2 household should be in the BPL category but don't have the card as evidence.

There are 10003 households having electricity (Table A7) and 8973 households among them holds BPL card, while 915 BPL cardholders household doesn't have electricity, but 105 households are more unfortunate as they neither have electricity nor BPL card.

Table A7: Households Assets		Has BPL Card			Total
		No	Yes	Don't Know	
Has Electricity	No	105	915	1	1021
	Yes	1028	8973	2	10003
Member owns this house or any other house	No	242	720	1	963
	Yes	891	9168	2	10061
Has Refrigerator	No	1125	9832	3	10960
	Yes	8	56	0	64
Has Motorcycle/Scooter	No	938	8394	3	9335
	Yes	195	1494	0	1689
Has Car/truck	No	1131	9878	3	11012
	Yes	2	10	0	12
Household has a separate room as a kitchen	No	506	4304	0	4810
	Yes	522	5054	1	5577
Has Bank Account					0
	No	180	798	0	978
	Yes	952	9072	2	10026
	Don't Know	1	18	1	20

There are 9888 households with BPL card, but 1494 household with BPL card have motorcycle/scooter, only 56 BPL cardholder has a refrigerator, and 10 BPL cardholder have car or truck in their possession.

There are only 118 households with means like LPG or Biogas, while in the deprived class, 10328 households use woods, 308 animal dung and 161 uses coal as the prime source of cooking fuel. Although 10387 households cooked food inside their house, still 10754 households cooked food on an open fire, and 10144 households cooked food inside their home on an open fire, and 9175 of them hold BPL card. Even 5577 households have a separate room like the kitchen, and 5054 holds BPL card.

In the surveyed population, 10026 households have bank accounts, and 9072 households belong to the BPL category. From them, 8342 belongs to the rural sector and 730 houses in the urban sector.

The procedure for identification of BPL population is full of loopholes, and the main reason for persisting high figure of poverty in the country. It is undoubtedly a matter of investigation of how a BPL cardholder can hold luxurious assets. A refrigerator is taken as a luxurious asset as it requires affordability of electricity and a limited amount of food security. Further, a household that can afford petrol for a two-wheeler should not be under the BPL category, and it applies to ten households that own four-wheelers.

The condition of houses (Table A8) where the two categories of the population live is pitiable as the majority of them use mud for construction of walls (9167) and floor (4506) while the temporary and low-cost roof options used in the majority of cases. The houses are not suitable for harsh Chhattisgarh state weather conditions where severe rain, cold and hot weather test the survival stamina of the suffering population.

Main floor material	Frequency	Main Wall Materials	Frequency	Main Roof Material	Frequency
mud/clay/earth	4506	No Walls	22	No Roof	3
Sand	40	Cane/Palm/Trunks	59	Thatch/Palm leaf	165
Dung	5174	Mud	9167	mud	76
Raw Wood Planks	2	Grass/reeds/thatch	10	sod/mud and grass mixture	34
Brick	3	bamboo with mud	15	plastic/polythene sheeting	98
Stone	281	Stone with mud	42	rustic mat	13
Parquet, Polished wood	7	Plywood	2	palm/bamboo	11
Ceramic tiles	11	Cardboard	1	raw wood planks/timber	4
Cement	968	Unburnt Brick	79	Unburnt Brick	34
Carpet	1	Raw/Reused wood	2	Loosely packed stone	105
Polished stone/marble/granite	29	Cement /Concrete	1006	metal/gi	171
Other	2	Stone with Lime/cement	25	wood	8
	11024	burnt bricks	558	Calamine/cement fibre	658
		Cement Blocks	31	asbestos sheets	297
		Wood Planks/Shingles	3	rcc/rbc/cement/concrete	526
		Gi/metal/asbestos Sheets	2	roofing shingles	3
			11024	tiles	16
				slate	19
				burnt brick	8781
				other	2
					11024

Conclusion:

The research opens up with a systematic dissection of DHS Indian data comprised of 36 states and 545 districts with 2869043 observations representing an Indian population of over 100 crores. It uses the Alkire-Foster methodology to observe multidimensional poverty in the state of Chhattisgarh, selecting the poorer and the poorest categories under the wealth index for its analysis.

Evidence available point out the fundamental right to access health facilities and safe drinking water and sanitation facility in the lowest two categories of wealth index is far from a satisfactory level. The existing socio-economic inequalities make it difficult to provide universal facilities to all. The issue of regional disparities within the state of Chhattisgarh, especially in the hilly and tribal areas where Naxalism exist, and state government face difficulty in controlling law and order. Government infrastructure and officers are the targets, and the state is recovering from a difficult time; under such circumstances providing health facilities to its citizens is a challenge.

The low education status of the concern categories along with the low standard of living where the majority of the targeted population comes under the BPL category, and a sufficient number of households are even deprived of BPL facilities because they are unregistered under it despite fulfilling the criteria is also a development hurdle.

The results highlight the deprivation that exists in the surveyed population; 89 % of the household have family members deprived of their education rights. The criteria that primary education no longer considered enough for improving the earning potential or it gives enough voice to demand rights is the main reason behind the higher deprivation in the education dimension.

From the 55670 observation from 12289 households surveyed eighty-five per cent of households are facing deprivation in one or more than one dimension, as our MPI value suggest (0.85). Keeping the cutoff low and focus only on the poorer and poorest category is the reasons for a higher percentage of deprivation as the main aim is to study deprivation characteristics of the population which is at the bottom of social hierarchy.

Table A9: Selected Households in Chhattisgarh District-wise (Rural and Urban)

District	Total observation with & without deprivation	Household surveyed	Females deprived of education	Average HH Size	MPI
Korea (koriya)	4745	1109	760	5.18	0.85121822
Surguja	3196	753	520	5.13	0.85994071
Jashpur	3443	778	427	5.33	0.85009289
raigarh	2333	571	360	5.01	0.86977816
Korba	3861	870	650	5.37	0.85749519
janjgir - champa	2267	509	298	5.47	0.85485983
bilaspur	2552	515	391	5.85	0.85290778
kabirdham	2957	636	520	5.90	0.87067789
Rajnandgaon	2596	523	352	5.80	0.80524123
Durg	2768	627	414	5.42	0.83474666
Raipur	3051	699	491	5.36	0.84183306
mahasamund	2711	618	397	5.50	0.86572748
dhamtari	2114	486	308	5.12	0.8133316
uttar bastar kanker	2730	597	418	5.50	0.82192135
Bastar	3590	761	680	5.52	0.86555737
Narayanpur	3902	763	821	5.96	0.86072218
dakshin bastar dantewada	3406	723	761	5.62	0.86012959
Bijapur	3448	751	591	5.29	0.8528809

District-wise deprivation data (Table A9) elaborates that Dantewada, Bastar, Raigarh and Mahasamund are suffering comparatively more than the other districts. The average household size is 5.46, Narayanpur with the largest average size of 5.96 and Raigarh with the smallest 5.01.

The severity of the condition increases when a household, being poor, don't have documentary proof to avail the government relief. A significant percentage of the population having characteristics of the poor but don't have the BPL card, as the finding shows, now require an approach and methodological change to make them count under the government system. Future studies must elaborate asset index to accommodate features that prominently relate to poverty and specify the population accordingly.

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