MULTIDIMENSIONAL POVERTY AND DEPRIVATION IN RURAL AREA: INSIGHTS FROM TWO VILLAGES OF GURUGRAM DISTRICT IN INDIA

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Abstract: Despite the relatively high growth of the overall world economy in the recent decades, the incidence of poverty and deprivation in various pockets of the globe is still considered a critical matter that needs to be addressed; otherwise balanced international development will remain a far-reaching goal. Poverty is one of the root causes of underdevelopment of a region. It is imperative to look at this problem through a macro as well as a micro glance. Our focus in this study is on micro issues. The main objective of this paper is to measure multidimensional poverty and deprivation in two villages — Alipur and Kasan — of Gurugram district of Haryana state in India. The study collected data from 235 households and the selection of these sample households was done based on the stratified random sampling method, covering the population groups such as 'general category', 'scheduled caste' and 'other backward class'. The study used an updated version of the Rangarajan committee poverty line for measuring income poverty and the Alkire and Foster (2009) methodology for multidimensional poverty analysis. The results show that multidimensional poverty is higher than income poverty; and education and health deprivations are the most significant reasons for multidimensional poverty.

Key words: Income poverty, Deprivation and multidimensional poverty, Rural Haryana, India

1. Introduction

The world economy has witnessed impressive growth on several fronts in the last few decades. However, humans still face many problems in every part of the world. Poverty and deprivations are one of the serious problems among them (UNDP, 2015). Poverty is often defined as the absence of basic goods and services that are necessary to maintain human life (O'Boyle, 1999). According to Spicker (2007), poverty may be defined in several ways. However, it is primarily an absence of material needs (e.g. food, shelter and clothing), and these needs are directly related to income, resources, and wealth. Poverty may also be defined in terms of low standard of living, inequality, poor circumstances (often related to social class and/or socio-economic status), dependency, lack of basic security, lack of entitlement, exclusion (with regard to education, health, housing, etc.), and

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moral judgment (i.e. the conditions that are morally unacceptable).

Poverty is an affair of deprivation (Sen, 1981). Alkire and Foster (2011) measured poverty as a multidimensional approach comprising three dimensions (education, health, and standard of living) and these three dimensions estimate deprivation in terms of ten indicators, i.e. school attainment, school attendance, nutrition, child mortality, safe drinking water, sanitation, cooking fuel, flooring, availability of electricity and access to assets. Multidimensional poverty and deprivation are both similar but not the same. Multidimensional poverty estimates deprivation of only and only poor persons while deprivation takes into consideration the dimensions of inadequacy of various material as well as other needs that are required to maintain life of the people (poor as well as non-poor) (Ray and Sinha, 2015).

Human deprivation is a dynamic concept and the deprivation of the present generation can transfer to the future generation; and children can be affected by the level of education, health, and standard of living of their parents (UNDP, 2016). According to the 2015 report of the UNDP, 204 million people are unemployed in the world in which 74 million are youth of 18-24 years age; and enormous gender disparities present in wages, work, and career progress; and humans face a high level of deprivation in nutrition, child health, drinking water, and sanitation (UNDP, 2015). In the World, 1.3 billion (22 percent) people are living in multidimensional poverty wherein 84.2 percent are living in rural areas. Half of this section of multidimensional poor are children under the age of 18 years, and 67 percent of these poor people are living in middle-income countries (UNDP and OPHI, 2020). Sub-Saharan Africa and South Asia are the most multidimensionally poor regions in the world (UNDP and OPHI, 2019).

In India, 21.9 percent of people were below the poverty line in 2011-12 wherein rural poverty was found much higher (25.7 percent) than urban poverty (13.7 percent) (Government of India, 2014). The level of deprivation in development indicators in India is very high. It has been found that 35.7 percent of children under age 5 years are malnourished (underweight); 32.8 infants per 1000 live births die before their first birthday; about 55 percent of households are using poor quality cooking fuel (i.e. coal, dung, charcoal, etc.); 43.7 percent of households are living in either *kuccha* or semi-*pucca* houses (*kuccha* means makeshift, whereas *pucca* means solid or permanent); 38.9 percent of households do not have proper toilet facilities; 32.4 percent of households do not have separate room or kitchen for cooking; and girls have less access to education than boys in India (Government of India, 2016).

Haryana is one of the wealthiest states in India based on its economic indicators. In 2019-20, the per capita income (PCI) of Haryana at constant price is found double (Rs. 180,026) compared to that of India (Rs. 96,563). The growth rate of Gross State Value Added (GSVA) of the state (7.4 percent) is also nearly double of India (4.9 percent) and all the three sectors (primary, secondary and tertiary) also show high growth rates in GSVA compared to India (Government of Haryana, 2020). According to a report of the Planning Commission, the number of people living below the poverty line has declined from 24.1 percent in 2004-05 to 11.2 percent in 2011-12, and there is a minor difference between rural poor (11.6 percent) and urban poor (10.3 percent) in 2011-12 (Government of India, 2014). Despite high growth and continuously declining income poverty, Haryana shows the poor performance in some quality-of-life indicators such as some social consumption goods/services, child mortality and sex ratio. Moreover, there is a wide gap between male and female child mortality rates (Bhalla, 1995).

At this backdrop, the major focus of this study is to measure deprivation and multidimensional poverty based on the dimensions of education, health, and standard of living (see Table 2 for the

dimensions and their indicators) in Alipur and Kasan villages of Gurugram district. Further, the extent of income poverty and the difference between income poverty and the multidimensional headcount ratio is analysed.

2. Research Methodology: Survey Design and Poverty Estimation Methods

The data was collected through multistage random sampling method. Gurugram district comprises four community development blocks — Pataudi, Gurugram, Farrukh Nagar, and Sohna. Two blocks — Gurugram and Sohna — were randomly selected from them. Gurugram block consists of 35 villages whereas Sohna block consists of 50 villages. Two villages — i.e. one village from each block (more specifically, Kasan village from Gurugram block and Alipur village from Sohna block) — were randomly selected for the study.

The data was collected from 10 percent households of the total population of each village. Kasan village is situated in Manesar *tehsil* which is 18 km away from the Gurugram district headquarter and 2 km from the Manesar sub-district headquarter. The total population of the village is 8628, of which the male population is 4575 (53 percent) and the female population is 4053 (47 percent), and the total number of households in the village is 1723 (Census of India, 2011). Alipur village is located in Sohna *tehsil* which is 8 km away from the Sohna sub-district headquarter and 17 km from the district headquarter of Gurugram. The total population of the village is 3398 which includes 1789 male (52.6 percent) and 1609 female (47.4 percent) and there are 591 households in the village (Census of India, 2011). The selection of sample households was based on the stratified random sampling method that covers the population/households of the general category, the scheduled caste (SC) category, and the other backword class (OBC) category. The data was collected from a total of 235 households (998 people) that incorporated 115 general category households, 66 SC category households, and 54 OBC category households. Further details of sample households are given in Table 1. Detailed information on poverty and deprivation was obtained through field survey using a structured questionnaire in 2019.

Table 1: Details of Households in Kasan and Alipur Villages

Village	Sample households				Total number of households (as per 2011 Census)
	General	OBC	SC	Total	
Kasan	80	60	35	175	1723
Alipur	35	6	19	60	591
Total	115	66	54	235	2314

Source: District Census Handbook, Gurugram, 2011

Poverty Head Court Ratio

Income based poverty head-count ratio is the percentage of the population whose income/consumption falls below the income/consumption threshold. Formally:

$$H_Y = \frac{q}{n}$$

where H_Y = income based poverty head-count ratio, q = number of poor whose income fell below the income/consumption threshold, and n = total population.

According to the Rangarajan committee, the poverty line for rural Haryana (based on monthly per capita expenditure) was Rs. 1127.82 at 2011-12 prices (Government of India (2014). To revise this poverty line at 2018-19 prices, the study uses general consumer price index for rural Haryana.

Note that the price level has increased by 42.8 percent from 2011-12 to 2018-19 (Government of Haryana, 2016; Government of Haryana, 2020). So, the revised poverty line is given by:

$$PLR_U = \frac{MPCE \times CPI_R}{100}$$

where PLR_U = updated poverty line at 2018-19 prices for rural Haryana, MPCE (monthly per capita expenditure) = poverty line at 2011-12 prices, and CPI_R = general consumer price index for rural Haryana.

Now,
$$PLR_U = \frac{1127.82 \times 142.8}{100} = \text{Rs. } 1610.52$$

Hence, the updated poverty line at 2018-19 prices for sample households in rural Haryana is Rs.1610.52.

Multidimensional Poverty Measurement Techniques

The study uses the Alkire and Foster (2009) methodology to measure the multidimensional poverty in rural Haryana. Multidimensional poverty method measures the poverty of n number of households with d dimensions. Let $x = [xij]$ and is expressed as $n \times d$ matrix of achievement for n households across d dimensions where xij represents achievement of household i (= 1, 2, 3,......, n) with dimension j (= 1, 2, 3,........., d).

$$x = \begin{bmatrix} x11 & x12 & \dots & x1d \\ x21 & x22 & \dots & x2d \\ \vdots & \vdots & \dots & \vdots \\ xn1 & xn2 & \cdots & xnd \end{bmatrix} n \times d$$

The representative entry in the achievement matrix $xij \geq 0$ represents household i's achievement with dimension d.

Identification

To identify the poor in the population, the multidimensional poverty method uses the dual cut-off criteria. First, it is deprivation dimension cut-off (Z_j). To identify all the households who are deprived in any dimension j, let $Z_j > 0$ be the deprivation cut-off for i's household in dimension j and Z be the vector of deprivation cut-off for each of the dimensions of multidimensional poverty measure.

A deprivation matrix is defined as $g^0 = [gij^0]$ which is derived from the achievement matrix x and may be written as follows:

$$gij^0 = \begin{cases} wj \text{ if } xij < Zj \\ 0 \text{ if } xij \geq Zj \end{cases}$$

If $xij < Zj$ then household i is deprived in terms of dimension j and then $gij^0 = wj$; and if $xij \geq Zj$ then household i is not deprived in terms of dimension j and then $gij^0 = 0$. Here the value of the ij^{th} element of the matrix g^0 has been equal to dimension weight wj if household i is deprived in terms of dimension j, otherwise 0 if household i is not deprived in terms of dimension j. By taking weighted sum of each row of g^0, a column vector C was obtained where Ci element represents the number of deprivation suffered by household i (= 1, 2, 3,......, n). Formally:

$$Ci = \sum_{j=1}^{d} gij^0$$

Second, to identify who is to be considered multidimensionally poor and to measure the multidimensional poverty, a poverty cut-off K > 0 has been selected and applied over the column vector C. If $Ci \geq K$, then households i's are considered multidimensionally poor, otherwise non-poor. If $Ci \geq K$, then C(K) = Ci; but if $Ci < K$, then C(K) = 0. So, C(K) presents deprivation score of only poor.

Multidimensional Poverty Measures

Incidence of multidimensional poverty or multidimensional head-count ratio (H) is the proportion of those people whose deprivation score is below the multidimensional poverty cut-off (K). Formally:

$$H = \frac{q}{n}$$

where H = head-count ratio, q = number of multidimensionally poor people, and n = total population. But the head-count ratio is insensitive to the number of dimensions in which a poor person is deprived and violates 'dimensional monotonicity' principle, which says that if a poor person becomes newly deprived in an additional dimension, then H value should increase. Therefore, one needs to measure the level of depth of deprivation of poor households by **'intensity of poverty' (A)** which represents the ratio of the weighted component dimensions in which, on average, poor people are deprived. For measuring the level of depth, deprivation scores of poor households are summed and divided by the total number of people belonging to these poor houses. Formally:

$$A = \frac{1}{q(d)}\sum_{i=1}^{n}C(K)$$

where $q(d)$ = number of multidimensionally poor people (i.e. q) who face deprivation in possible d dimensions and C(K) = deprivation score of the poor.

Multidimensional poverty index (MPI) or adjusted head-count ratio (M_0) is defined as the product of H and A.

$$M_0 = H \times A$$

Decomposing M_0 by Dimensions and Indicators can tell us the contributions of different deprivation dimensions/indicators in M_0. Formally:

$$Contribution_j = \frac{\frac{1}{n}\sum_{i=1}^{n}C_j(K)}{M_0}$$

where, $Contribution_j$ = contribution of dimension j in M_0, and $C_j(K)$ = poor's deprivation score in dimension j.

Dimensions and Indicators of Multidimensional Poverty Measures

For multidimensional poverty analysis, we have considered three dimensions such as education, health and standard of living in which two indicators (school attainment and school attendance) are taken for the education dimension, two indicators (nutrition and child mortality) are taken for the health dimension and six indicators (access to safe drinking-water, electricity availability, access to sanitation, quality of cooking fuel, quality of floor, and assets) are taken for the standard of living dimension (Alkire and Santos, 2010; Alkire, 2011; Levine et al., 2012; Pasha, 2015; Alkire and Foster, 2016).

Table 2: Dimensions and Indicators of Multidimensional Poverty Measurement

Dimensions	Indicators	Deprived if
Education	Years of Schooling	At least one household member has not completed at least six years of schooling.
	School Attendance	At least one child of 6-14 years age is not going to school.
Health	Nutrition	At least a household member is malnourished as per the nutrition level calculated by Z-score (for up to 5 years old child) and body mass index (for more than 5 years old).
	Child Mortality	At least child (up to 5 years old) died during five years span prior to the survey.
Standard of Living	Electricity	Electricity is not available in the house.
	Drinking Water	Safe drinking water from improved water sources (the sources which are protected from outside contamination) is not available in the household or safe drinking water is available more than 30 minutes away by walking.
	Sanitation	Toilet is not available in the household or toilet is shared with other households.
	Flooring	The house has dung or sand floor, or generally dirty floor.
	Cooking Fuel	The household is using poor quality cooking fuel (e.g. dung cake, charcoal, fuel-wood, etc.).
	Assets	A minimum of one asset related to information gathering source (television set, radio, mobile, and telephone) is not available with the household; a minimum of one asset related to mobility (truck, tractor, car, bike, motorbike, animal cart, and motorboat) is not available with the household; and a minimum of one asset related to livelihood (refrigerator, arable land, and livestock) is not available with the household.

Source: Alkire and Santos (2010)

Weightage to dimensions and indicators

Alkire and Foster methodology is flexible to giving weights to various dimensions which depend on their relative importance (Siani, 2013). In this study, equal weight is assigned to each dimension because it is assumed that all the chosen dimensions (education, health, and standard of living) are equally important for measuring poverty in selected areas and no single dimension is more important than the others. All indicators within each dimension also receive equal weight. So, each of the dimensions gets $\frac{1}{3}$ or 33.3 percent weight in which each indicator inside health and education dimensions obtains $\frac{1}{6}$ or 16.7 percent weight and each indicator inside the standard of living dimension obtains $\frac{1}{18}$ or 5.6 percent weight. Finally, if a household is deprived in terms of $\frac{1}{3}$ dimensions or deprived in terms of at least one out of three dimensions then the household is considered to be multidimensionally poor.

3. Levels of Deprivation in Gurugram District and Haryana State: Secondary Data

This section presents the levels of deprivation in Gurugram and Haryana in terms of some important quality of life indicators such as literacy, adult and child nutrition, electricity, improved drinking water, toilet facilities, and quality of cooking fuels based on the secondary data collected from the Government of India (2016). Table 3 shows the level of deprivation in literacy, adult nutrition, and child nutrition in Gurugram and Haryana. The data reveals that the percentage of male illiteracy in Gurugram is a little less than that of male illiteracy in Haryana, whereas illiteracy rate among female population in the district is higher than that in entire Haryana. More importantly, there is a huge difference between male and female illiteracy rates in both Gurugram and Haryana. This shows that female deprivation in education is much higher than that of male, and the important point to note is that both male and female illiteracy rates in urban areas are higher than that in rural areas in Gurugram district, whereas the scenario is quite different in overall Haryana.

In Gurugram, 12.5 percent of adults are malnourished (underweight) and in overall Haryana 15.8 percent of adults are underweight. The incidence of urban malnourishment in Gurugram district is 11 percent and rural malnourishment is 17.1 percent. In both Gurugram district and overall Haryana, rural adult malnutrition rate is higher than urban adult malnutrition rate. In Gurugram, 41.2 percent of children are stunted (whose height falls short of their age), 17.9 percent of children are wasted (who are underweight compared to their height), and 30.6 percent of children are underweight or malnourished compared to their age. In overall Haryana, 34 percent of children are stunted, whereas 21.2 percent and 29.4 percent of children are wasted and underweight, respectively.

Table 3: Illiteracy and Malnutrition in Gurugram and Overall Haryana (in Percent)

	Indicator	Gurugram District			Haryana State		
		Urban	Rural	Total	Urban	Rural	Total
1.	Male illiteracy	11.2	2.9	9.1	7.0	11.1	9.4
2.	Female illiteracy	26.9	20.8	25.4	19.7	27.9	24.6
3.	Adult malnutrition	11.0	17.1	12.5	12.2	18.2	15.8
4.	Stunted children	44.3	28.5	41.2	33.4	34.3	34.0
5.	Wasted children	16.3	24.0	17.9	21.0	21.3	21.2
6.	Underweight children	31.5	27.1	30.6	28.5	29.9	29.4

Source: National Family Health Survey (NFHS-4), 2015-16

Table 4 presents the level of household deprivation in electricity, drinking water, sanitation facilities, and clean cooking fuel. In Gurugram, sanitation (rural + urban) is found to be the main deprivation indicator (which indicates that 33.7 percent of households do not have toilet facilities), followed by clean cooking fuel (18 percent), drinking water facilities (2.1 percent), and electricity (only 0.2 percent), respectively. In overall Haryana, poor quality cooking fuel is the biggest problem (47.8 percent of households are deprived of clean cooking fuel), followed by sanitation problem (20.8 percent of households are deprived of toilet facilities), non-accessibility to safe drinking water (8.3 percent households), and non-availability of electricity (1.2 percent households), respectively. In most of these indicators, rural households are more affected than urban households in both Gurugram district and overall Haryana state.

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Table 4: Non-availability of Basic Amenities in Gurugram and Overall Haryana
(Households in Percent)

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	Deprivation Indicator	Gurugram District			Haryana State		
		Urban	Rural	Total	Urban	Rural	Total
1.	Electricity	0	0.9	0.2	0.4	1.7	1.2
2.	drinking water	1.4	4.9	2.1	12.0	5.7	8.3
3.	Sanitation facilities	36.1	24.6	33.7	18.3	22.6	20.8
4.	Clean cooking fuel	7.7	58.4	18.0	15.1	71.1	47.8

Source: National Family Health Survey (NFHS-4), 2015-16

4. Poverty and Deprivation in Alipur and Kasan Villages: Primary Data

This section presents primary data related to poverty and level of deprivation in Alipur and Kasan villages of Gurugram district in Haryana state in India. At the outset, we describe the general profile of the respondent households of two villages and the patterns of their incomes and occupations.

General Profile, Income and Occupation of Villagers

Table 5 depicts that there are 84.7 percent households which have Above-Poverty-Line (APL) ration card and the remaining 15.3 percent have Below-Poverty-Line (BPL) ration card. Of the total 235 households, 60 households (that comprise 270 people) were surveyed in Alipur village, and 175 households (that comprise 728 people) were surveyed in Kasan village. Some 15 percent of households in Alipur village and 15.4 percent of households in Kasan village were found to be belonging to BPL category.

Table 6 shows the details of households' annual income in the study areas. The highest number of households (70 households) — i.e. 29.8 percent of total households — belong to the annual income category of Rs.100,000–299,999 in the combined study area (i.e. Alipur + Kasan). Some 21.3 percent of households have Rs. 400,000-and-above annual income, followed by the income categories of Rs. 50,000–99,000 (20.4 percent), Rs. 200,000–299,999 (14.9 percent), Rs. 300,000–399,999 (8.1 percent), and less than Rs. 50,000 (5.5 percent), respectively.

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Table 5: General Profile of Respondent Households in Two Villages

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Gender	Alipur		Kasan		Total	
	Number of people	Percent	Number of people	Percent	Number of people	Percent
a) Male	144	53.3	402	55.2	546	54.7
b) Female	126	46.7	326	44.8	452	45.3
c) Total	270	100	728	100	998	100
Type of Ration Card	**Alipur**		**Kasan**		**Total**	
	Number of household	Percent	Number of household	Percent	Number of household	Percent
a) APL	51	85.0	148	84.6	199	84.7
b) BPL	9	15.0	27	15.4	36	15.3
c) Total	60	100	175	100	235	100

Source: Field survey, 2019

Table 6 also gives similar types of illustrations about the annual incomes of the households belonging to Alipur and Kasan villages. For further details in this regard — i.e. for the individual village-wise details — see Table 6.

Table 6: Annual Income of the Households in Two Villages

	Annual Income (in Rupees)	Alipur		Kasan		Total	
		Number of household	Percent	Number of household	Percent	Number of household	Percent
1.	Less than 50,000	7	11.7	6	3.4	13	5.5
2.	50,000–99,999	5	8.3	43	24.6	48	20.4
3.	100,000–199,999	26	43.3	44	25.1	70	29.8
4.	200,000–299,999	7	11.7	28	16.0	35	14.9
5.	300,000–399,999	4	6.7	15	8.6	19	8.1
6.	400,000 and above	11	18.3	39	22.3	50	21.3

Source: Field survey, 2019

Table 7 presents the sources of livelihood of the people in sample households. In the study area (two villages), 303 people were found employed at the time of the survey in which the majority of people (50.1 percent) were working in the formal private sector and 11.2 percent were working as government employee. And the remaining 39.7 percent were dependent on the unorganized sector (labourers, farmers, private drivers, auto-rickshaw drivers, small shopkeepers, etc.) for employment. Both the villages present almost the same picture in terms of number of private sector employees. Around half of the total employed people are working in companies or factories as private employees in each of the two villages.

Table 7: Occupations of Working People in Two Villages

	Occupation	Alipur		Kasan		Total	
		Number of people	Percent	Number of people	Percent	Number of people	Percent
1.	Daily wage labourer	4	5	15	6.7	19	6.3
2.	Agriculture labourer	0	0	0	0	0	0
3.	Farmer	20	25	30	13.5	50	16.5
4.	Government Job	12	15	22	9.9	34	11.2
5.	Private employee	38	47.5	114	51.1	152	50.1
6.	Small shopkeeper	2	2.5	13	5.8	15	5.0
7.	Businessman	4	5	20	9.0	24	7.9
8.	Other	0	0	9	4.0	9	3.0
9.	Total	80	100	223	100	303	100

Note: 'Other' category includes truck driver, auto-rickshaw driver, private bus driver and conductor.
Source: Field survey, 2019

Education Dimension

Table 8 shows the education profile of the adult people (above 14 years old). The data depicts that 7.4 percent of adult people are illiterate in two villages (combined); 11.3 percent of female and 3.9 percent of male are illiterate. People who have completed secondary education (10th standard) account for the largest proportion (31.9 percent of people), followed by senior secondary (23.5 percent). People who completed graduation and 8th standard have equal share (12.5 percent), and

only 1.1 percent of people completed their post-graduation. In Kasan village, 33.5 percent of people completed their secondary education (highest proportion), followed by senior secondary (21.2 percent), graduation (13.4 percent), 8th standard (12.7 percent), primary education (11.8 percent), and post-graduation (only 1.3 percent), respectively. In Alipur village, 30 percent of people completed their senior secondary education (highest proportion), followed by secondary (27.4 percent), 8th standard (12.1 percent), graduation (10 percent), and post-graduation (only 0.5 percent), respectively. In both the villages, the level of higher education (graduation and post-graduation) demonstrates a poor illustration; less than 15 percent of adults completed higher education. Further, special attention needs to be paid to female education. Proportions of illiterate women are higher than that of men in two villages. Educational status of women in post-secondary level also needs improvement.

Table 9 reveals the school enrolment rates of children (6-14 years age group) and the types of schools the children are studying. The result depicts that all the school-going-age children are going to school for their studies. But more than 64 percent of the children are studying in private schools and the remaining about 36 percent are studying in government schools. Both the villages show almost the same picture, i.e. the majority of the children are going to private schools to study. The policymakers need to pay attention to the question as to why the public schools are losing importance.

Table 8: Education Profile of Respondents in Two Villages (in Percent)

	Level of Education of Adults	Alipur			Kasan			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	Illiterate	6.3	15.8	11.1	3.1	9.5	6.1	3.9	11.3	7.4
2.	Literate	0	5.3	2.6	0	0	0	0	1.5	0.7
3.	Primary (up to 5th standard)	3.2	9.5	6.3	8.4	15.8	11.8	7.1	14.0	10.3
4.	Middle (up to 8th)	10.5	13.7	12.1	10.8	14.9	12.7	10.7	14.6	12.5
5.	Secondary (up to 10th)	31.6	23.2	27.4	33.1	34.0	33.5	32.7	31.0	31.9
6.	Senior secondary (up to 12th)	34.7	25.3	30.0	26.5	14.9	21.2	28.5	17.9	23.5
7.	Graduation	13.7	6.3	10.0	16.4	10.0	13.4	15.7	8.9	12.5
8.	Above graduation	0	1.1	0.5	1.7	0.8	1.3	1.3	0.9	1.1

Note: Household members of more than 14 years old are considered adult. Only general/technical education is considered; vocational training is not taken into consideration.
Source: Field survey, 2019

Table 9: School Enrolment of Children (6-14 Years) in Two Villages (in Percent)

1.	Enrolment of Children	Alipur	Kasan	Total
	a. Going to school	100	100	100
	b. Not going to school	0	0	0
2.	Type of School the Children Are Going	Alipur	Kasan	Total
	a. Government school	33.3	36.7	35.9
	b. Private school	66.7	63.3	64.1

Source: Field survey, 2019

Health Dimension

This section presents the level of deprivation in terms of health dimension focussing on nutrition level among male and female sample individuals in two villages of Gurugram district. Table 10 shows that 13 percent of people are underweight. Incidence of female malnourishment is 15.3 percent and male malnourishment is 11 percent. In Kasan village, 11 percent of people are underweight. The percentage of female who are underweight (14.7 percent) is higher than the percentage of underweight male (8 percent). However, in Alipur village, the percentage of male malnourishment (19.4 percent) is higher than female malnourishment (16.7 percent). This is opposite to the finding of Kasan village. Based on the Table 13 results, the district shows the best performance in child mortality indicators where the child mortality rate is 0 percent in Alipur village and only 0.6 percent in Kasan village.

Table 10: Incidence of Malnutrition (Underweight) in Two Villages (in Percent)

	Gender	Alipur	Kasan	Total
1.	Male	19.4	8.0	11.0
2.	Female	16.7	14.7	15.3
3.	Total	18.1	11.0	13.0

Source: Field survey, 2019

Standard of Living Dimension

The dimension discussed in this section reflects the level of living of households in the study area, taking into consideration (non-)availability of some basic domestic facilities and utilities such as kitchen, bathroom/toilet, and durable goods — e.g. television/radio, refrigerator, fan/air-cooler, mobile/phone, washing machine, tractor/car, air conditioner and computer. Table 11 presents household conditions based on types of their houses, ventilation of houses, and availability of kitchen and bathroom facilities in their houses. Table 11 illustrates that 1.2 percent of households live in *kuccha* house and 12.8 percent live in semi-*pucca* house in two villages (combined). And 86 percent of households live in *pucca* house. This means that 14 percent of households still require *pucca* housing. Some 60 percent of households have proper ventilation facilities, but 40 percent of households do not have proper ventilation facilities. However, each house in both the villages has a bathroom. In Kasan village, every household has a separate kitchen for cooking purposes, but 3.3 percent of households in Alipur village do not have separate kitchen.

Table 11: Housing Conditions of Households (in Percent) in Two Villages

	Housing conditions	Alipur	Kasan	Total
1.	*Kuccha* (makeshift) house	5.0	0	1.2
2.	*Pucca* (solid/permanent) house	70.0	91.4	86.0
3.	Semi-*pucca* house	25.0	8.6	12.8
4.	Proper ventilation	83.3	52.0	60.0
5.	Availability of kitchen	96.7	100.0	99.1
6.	Availability of bathroom	100.0	100.0	100.0

Source: Field survey, 2019

Table 12 presents the household level deprivation with regard to durable goods such as television/radio, mobile/phone, refrigerator, etc. The findings reveal that most of the households (i.e. 90.2 percent) in two villages (combined) do not have a computer. This is followed by air conditioner (86.8 percent of households), tractor/car (57.9 percent of households), washing machine (18.7 percent), motorcycle/scooter/scooty (12.3 percent), refrigerator (4.9 percent) and some other items

such as television/radio, mobile/phone, and air-cooler/fan (all less than 1 percent). For further details in this regard — i.e. for the individual village-wise details — see Table 12.

Table 12: Durable Goods in Households (in Percent) in Two Villages

	Durable Goods	Alipur	Kasan	Total
1.	Television/Radio	3.3	0	0.9
2.	Mobile/Phone	0	0.6	0.4
3.	Refrigerator	8.3	3.4	4.9
4.	Air-Cooler/Fan	1.7	0	0.4
5.	Washing Machine	10.0	21.7	18.7
6.	Tractor/Car	70.0	53.7	57.9
7.	Motorcycle/Scooter/Scooty	28.3	6.9	12.3
8.	Computer	93.3	89.1	90.2
9.	Air Conditioner	91.7	85.1	86.8

Source: Field survey, 2019

Table 13 shows household level deprivation in terms of ten indicators of multidimensional poverty index (MPI). Let us take a look at the 'Total' column. The findings indicate that 40 percent of households are deprived of nutrition (at least one person in a household is malnourished); 37.9 percent of households are deprived of school attainment (at least one adult in a household did not complete six years of schooling); 33.2 percent of households are deprived of sanitation (improved toilet) facilities; 27.7 percent of households are using poor quality fuel (wood, dung cakes, coal, etc.) for cooking; 24.3 percent of households are deprived of safe drinking water; 11.9 percent of households have dirty floor (dung or sand floor) at home; and 8.9 percent of households are deprived of assets. However, as regards school attendance and access to electricity, two villages do not demonstrate any flaw. In the case of deprivation in terms of most of these indicators, Alipur village shows high deprivation compared to Kasan village.

Table 13: Overall Deprivation in Terms of MPI Indicators among Households (in Percent)

	Indicators	Alipur	Kasan	Total
1.	School attainment	48.3	34.3	37.9
2.	School attendance	0	0	0
3.	Nutrition	56.7	34.3	40.0
4.	Child mortality	0	0.6	0.4
5.	Electricity	0	0	0
6.	Water	38.3	19.4	24.3
7.	Sanitation	26.7	35.4	33.2
8.	Floor	26.7	6.9	11.9
9.	Cooking fuel	58.3	17.1	27.7
10.	Assets	21.7	4.6	8.9

Source: Field survey, 2019

5. Poverty Estimates

Table 14 presents the estimates of income poverty (in percent), multidimensional poverty (head-count in percent), intensity of poverty (in percent), and multidimensional poverty index (MPI). In addition, it also presents contributions of different dimensions and indicators in the MPI. Let us first take a look at the 'Total' column in the table. The results reveal that 19.5 percent of people are income poor in two villages, whose monthly per capita income is less than Rs. 1610.52, whereas

the level of the multidimensional poverty (headcount) is 26.9 percent which is higher than the level of income poverty. The intensity of poverty is 39.3 percent which means that an average poor is deprived by 39.3 percent. The value of MPI, which is a product of multidimensional poverty head count and multidimensional poverty intensity, is 0.11 or 11 percent. The details of dimensions and indicators of the MPI are as follows.

- Education dimension has the highest contribution (37.6 percent) in MPI. Note that education dimension is reflected by school attainment indicator only, as school attendance indictor has got a '0'.
- In MPI, education dimension is followed by health dimension which has 35.4 percent contribution. Health dimension is reflected by nutrition indicator only, as child mortality indicator has got a '0'.
- The standard of living dimension has 27 percent contribution in MPI. Thus, it has the lowest contribution in MPI. In standard of living dimension, sanitation indicator has 7.8 percent contribution; water indicator has 6.8 percent contribution; cooking fuel indicator has 5.3 percent contribution; assets indicator has 3.6 percent contribution; and floor indicator has 3.5 percent contribution. Hence, health and education dimensions are largely responsible for multidimensional poverty in rural areas of the district.

Table 14: Income Poverty and Multidimensional Poverty in Two Villages

	Description	Alipur	Kasan	Total
1.	Income Poverty (in %)	20.7	19.1	19.5
2.	Multidimensional Head-count Ratio (H) (in %)	43.3	20.7	26.9
3.	Intensity of Poverty (expressed as A) (in %)	39.8	38.8	39.3
4.	Multidimensional Poverty Index (MPI)	0.17	0.08	0.11
	i) Contribution of Dimensions in MPI			
	a) Education (in %)	33.3	41.0	37.6
	b) Health (in %)	36.5	34.5	35.4
	c) Standard of Living (in %)	30.2	24.5	27
	ii) Contribution of Indicators in the Dimensions			
	a) School attainment (in %)	33.3	41.0	37.6
	b) School attendance (in %)	0	0	0
	c) Nutrition (in %)	36.5	34.5	35.4
	d) Child mortality (in %)	0	0	0
	e) Electricity (in %)	0	0	0
	f) Water (in %)	8.3	5.6	6.8
	g) Sanitation (in %)	5.6	9.6	7.8
	h) Floor (in %)	5.2	2.1	3.5
	i) Cooking fuel (in %)	6.5	4.4	5.3
	j) Assets (in %)	4.6	2.8	3.6

Source: Original data was collected through field survey in 2019

Let us now take a look at the individual village level data in Table 14. In Alipur village, 20.7 percent of people are income poor, whereas 43.3 percent of people live in multidimensional poverty (which is much higher than the income poverty) and an average poor is 39.8 percent deprived. The MPI value is 0.17. The health dimension (36.5 percent) has the highest contribution in MPI, followed by the education dimension (33.3 percent) and the standard of living dimension (30.2 percent), respectively. In Kasan village, income poverty is 19.1 percent but multidimensional poverty is 20.7

percent which is greater than the income poverty. The intensity of poverty is 38.8 percent. The MPI value is 0.08 and education is the most responsible dimension for multidimensional poverty, which has 41 percent contribution in MPI and is followed by health dimension which has 34.5 percent contribution in MPI. In this village too, the standard of living has the lowest contribution (24.5 percent) in MPI. So, the results show that multidimensional poverty is much higher than income poverty; and education and health are mostly responsible dimensions for multidimensional poverty in both the villages.

Table 15 provides the number of multidimensionally poor persons and weighted deprivation score of total poor persons in Alipur and Kasan villages at different deprivation thresholds (K=1, K=2, ..., K=10). We will soon get back to the relevance of these weighted deprivation scores in connection with the derivation of head-count ratio (H) and intensity of poverty (A) presented in Table 16.

Table 15: Number of Multidimensionally Poor Persons and Weighted Deprivation Score of Total Poor Persons in Alipur and Kasan Villages at Different Deprivation Thresholds

Deprivation cut-off (K)	Number of multidimensionally poor persons (observed in field data)			Weighted deprivation score of total poor persons $\left(\sum_{i=1}^{n} C(K)\right)$		
	Alipur	Kasan	Total	Alipur	Kasan	Total
K=1	239	446	685	72.999	116.557	189.556
K=2	212	293	505	68.873	91.662	160.535
K=3	117	151	268	46.621	58.596	105.217
K=4	37	45	82	17.298	20.863	38.161
K=5	17	9	26	9.262	4.799	14.06
K=6	5	0	5	3.07	0	3.07
K=7	0	0	0	0	0	0
K=8	0	0	0	0	0	0
K=9	0	0	0	0	0	0
K=10	0	0	0	0	0	0

Note: For the details of $\sum_{i=1}^{n} C(K)$, see methodology section
Source: Original data was collected through field survey in 2019

Table 16: Levels of Multidimensional Poverty at Different Poverty Cut-offs (K) in Alipur and Kasan Villages

	Poverty Cut-off	Alipur			Kasan			Total		
		H (in %)	A (in %)	MPI	H (in %)	A (in %)	MPI	H (in %)	A (in %)	MPI
1.	K=1	88.5	30.5	0.27	61.3	26.1	0.16	68.6	27.7	0.19
2.	K=2	78.5	32.5	0.26	40.2	31.3	0.13	50.6	31.8	0.16
3.	K=3	43.3	39.8	0.17	20.7	38.8	0.08	26.9	39.3	0.11
4.	K=4	13.7	46.8	0.06	6.2	46.4	0.03	8.2	46.5	0.04
5.	K=5	6.3	54.5	0.03	1.2	50.2	0.006	2.6	54.1	0.01
6.	K=6	1.9	61.4	0.01	0	0	0	0.5	61.4	0.003
7.	K=7	0	0	0	0	0	0	0	0	0
8.	K=8	0	0	0	0	0	0	0	0	0
9.	K=9	0	0	0	0	0	0	0	0	0
10.	K=10	0	0	0	0	0	0	0	0	0

Notes: H = Head-count ratio; A = Intensity of poverty; and MPI = Multidimentional poverty index
Source: Original data was collected through field survey in 2019

Let us now directly turn towards Table 16 which presents the results of sensitivity analysis of multidimensional poverty measures. It shows the values/percentages of multidimensional head-count ratio (H), poverty intensity (A) and MPI. How did we derive these percentages? We just give one example of their derivations for the poverty cut-off level at K=1 presented in 'Total' column of Table 16. Note that multidimensional poverty at K=1 (i.e. at 10 percent level) identifies the persons who live in households which are deprived in at least one indicator (out of total 10 indicators). Considering K=1, it is found from our field survey data that there are total 685 persons (q) who are deprived in at least one indicator (mentioned in the row of K=1 in Table 15). Since n = 998, multidimensionally poor head-count ratio (H) is as follows.

- H = $\frac{q}{n}$ = $\frac{685}{998}$ = 0.686 (or 68.6%) (see methodology section for full illustration of the formula).

- The value of $\sum_{i=1}^{n} C(K)$ or weighted deprivation score of all poor persons at K=1 (i.e. deprived in at least one indicator) is 189.556 (mentioned in the row of K=1 in Table 15). Therefore, A = $\frac{1}{q(d)} \sum_{i=1}^{n} C(K)$ = $\frac{189.556}{685}$ = 0.277 (or 27.7%) (see methodology section for full illustration of the formula).

- Adjusted multidimensional poverty head-count ratio or
  MPI = M_0 = H × A = 0.686 × 0.277 = 0.19 (or 19%) (see methodology section for full illustration of the formula).

Note that the values/percentages of H, A and MPI change as we change the cut-off point or threshold (K). Let us take a look at these values in column 'Total' (i.e. two villages combined) in Table 16. Our analysis shows that at K=1 multidimensional head-count ratio is 68.6 percent; multidimensional poverty intensity is 27.7 percent; and multidimensional poverty index (MPI) is 0.19 or 19 percent. At K=2, 50.6 percent of people are living in multidimensional poverty; the intensity of poverty is 31.8 percent; and MPI is 0.16 or 16 percent. In both the villages, head-count ratio and MPI decrease as we increase the threshold, but intensity of poverty increases. It is interesting to observe that the values of head-count ratio, poverty intensity and MPI are '0' for K=7 and above. Thus, this exercise helped us in identifying the poor in the study villages at different deprivation cut-off levels.

6. Summary and Conclusion

Although large percentage of the working population in two selected villages are employed in the formal private sector, almost 40 percent of people are still dependent upon the unorganized sector (labourers, farmers, private drivers, auto riders, small shopkeepers, etc.). Malnutrition and low level of adult education are the two major features observed in the study villages. Female respondents have stated that due to social and family restrictions they were not able to attain the desired level of education, whereas male respondents cited mostly lack of interest in study or education. Nearly 30 percent of the households are still using poor quality cooking fuel. It has been observed that the incidence of multidimensional poverty outweighed the incidence of income poverty. Education and health are mainly responsible for high level of multidimensional poverty. The high incidence of deprivation observed with regard to sanitation, cooking fuel, and drinking water is a matter of concern for villages which are situated in a so called developed district, i.e. Gurugram. Based on its analysis, the paper suggests that poverty reduction policies should go beyond income poverty measures and focus more on basic necessities, productive assets, and social infrastructure (especially, health and education, among others). Specific programmes and interventions related to health and

education should be framed and implemented more effectively, as health and education dimensions are found to contribute major portion of deprivation and multidimensional poverty in the study villages of Gurugram.

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