

Comparison between Multidimensional Poverty Index and Monetary Poverty for Nepal

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Motivation

- The incidence of poverty in Nepal differs substantially 25.4% (monetary) vs 64.7% (MPI) for 2009-10
- Use of Nepal Living Standards Survey (NLSS) data to accommodate both types of measure departing from DHS
- Explore the association between two measures: using appropriate threshold among poor/non-poor
- Identify those people who are deprived in one or both measures or mismatch: who they are
- To see what can be recommended to implement these two estimates (justify)

Presentation outline

- Poverty measurements in Nepal
- Application of multidimensional poverty measure with NLSS data
- Indicators and poverty cutoffs
- Comparison of MPI poor and CBN poor by
 - different MPI cut-offs and poverty lines
 - geographic/administrative level
 - consumption quintiles
 - ethnicity, household size, access, etc.
- Preliminary findings

Data used

- Nepal Living Standards Survey (NLSS) 2010-11
 - Nationally/regionally representative two-stage stratified sampling
- Sample size: 5,988 households (28,474 individuals)
 - 6 strata, 500 Primary Sampling Units (PSUs)
 - 73 out of 75 districts selected
- Multi-topic survey covering
 - demography, housing, consumption, education, health, employment, and other socio-economic areas

Poverty measurement in Nepal

- Poverty has been measured based on Living Standards survey
 - 1995-96 (41.8%)
 - 2003-04 (30.8%)
 - 2010-11 (25.2%)
- Follow Cost of Basic Needs (CBN) approach “consumption bundle deemed to be adequate for satisfying basic consumption needs”
- Setting poverty line with
 - Identifying the minimum caloric requirement :2220 kcal/p/d (2011)
 - Estimating the food poverty line : based on caloric requirement
 - Estimating the non-food poverty line: equivalent non-food allowance
- Comparing per capita consumption against poverty lines to infer the situation of poverty

CBN poverty lines

Analytical Domain	Per-capita annual value (NRs.)		
	Nominal Poverty Line	Nominal Consumption	Real Consumption
Mountains	19,859	27,128	26,239
Urban – Kathmandu	40,933	85,999	40,461
Urban – Hill	19,577	56,623	55,684
Urban – Terai	21,133	44,981	41,026
Rural Hills - Eastern	16,551	28,889	33,597
Rural Hills -Central	18,689	36,266	37,418
Rural Hills - Western	18,428	29,790	31,119
Rural Hills - Mid/Far west	16,355	21,226	24,958
Rural Terai - Eastern	16,856	28,923	33,087
Rural Terai - Central	17,540	30,261	33,290
Rural Terai - Western	15,998	28,492	34,283
Rural Terai - Mid/Far west	17,319	27,959	31,163
National	19,261	34,829	34,196

MPI methodology

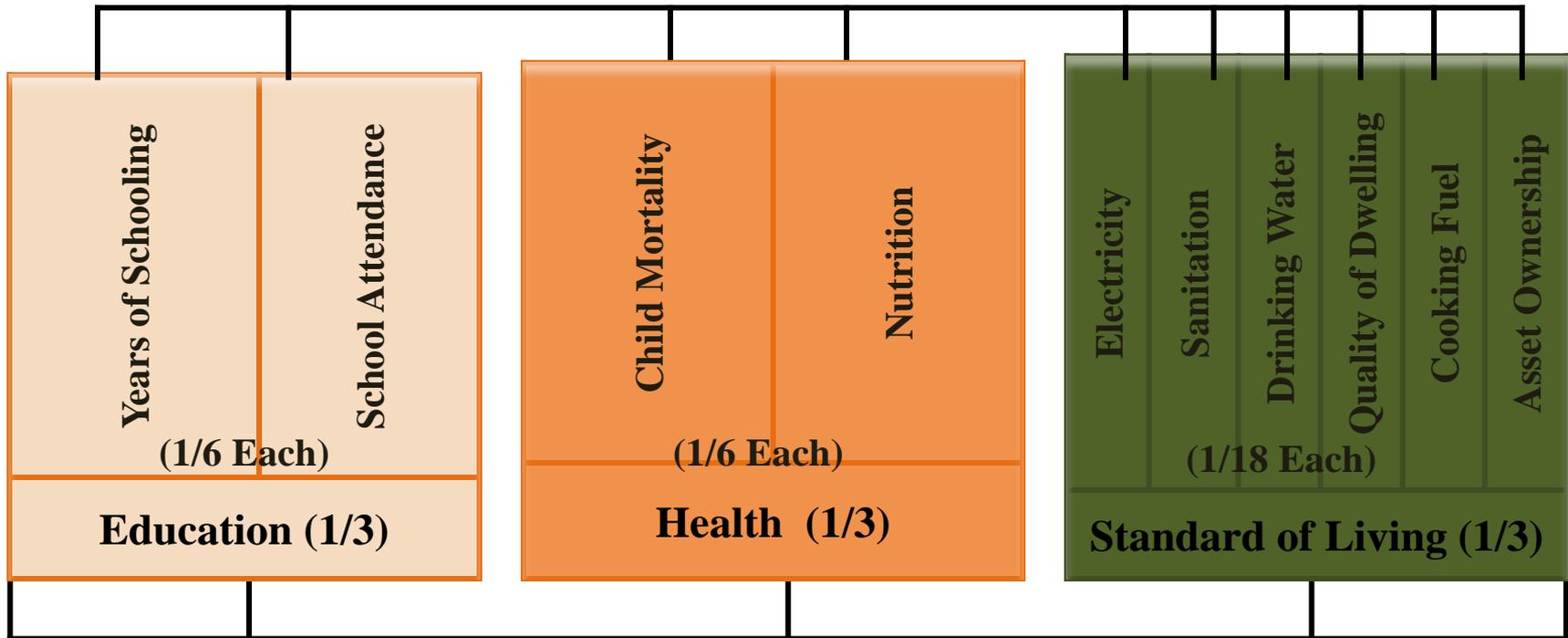
- Alkire Foster Adjusted Headcount Ratio to build a Multidimensional Poverty Index (MPI):

$$\text{MPI} = M_0 = H \times A$$

- H is the percent of people who are identified as poor, it shows the *incidence* of multidimensional poverty.
- A is the average proportion of weighted deprivations people suffer at the same time. It shows the *intensity* of people's poverty – the *joint distribution* of their deprivations.

MD poverty: dimensions, indicators and weights

10 Indicators



3 Dimensions

Indicators and cutoffs

Indicator	Deprived if
Years of Schooling	no member of the household has completed five years of schooling
School Attendance	any children of school age for grades 1 to 8 are not attending school
Child Mortality	any child has died in the family
Child Nutrition	any child less than 5 years old is underweight: weight-for-age < -2SD
Electricity	the household has no electricity
Sanitation	the household does not have any type of flush toilet, non-flush composting toilet, and they are not shared
Drinking Water	the water source is other than piped water, public tap, borehole or pump, protected well, spring or rainwater, and the access to clean drinking water is more than a roundtrip distance of 30 minutes' walk
Dwelling Quality	the construction materials of outside wall is other than cement-bonded bricks or stones and foundation is not pillar or cement-bonded
Cooking Fuel	the household cooks with dung, wood or charcoal
Asset Ownership	a household does not own more than one radio, TV, telephone, bike, motorbike or refrigerator, and does not own a car or tractor

Poverty cutoffs

Poverty cutoff:

A person is identified as poor if the household is deprived in **33%** of all weighted indicators.

Justification:

This is the deprivation on one-third of the dimensions, **education, health or living standards**; one indicator each from education and health or three indicators deprived in living standards coupled with one from others

Alternative cutoff: 40% (different combinations of indicators):
One indicator each from education and health and one more indicator from living standards (nearly)

Analysis of correlation within indicators

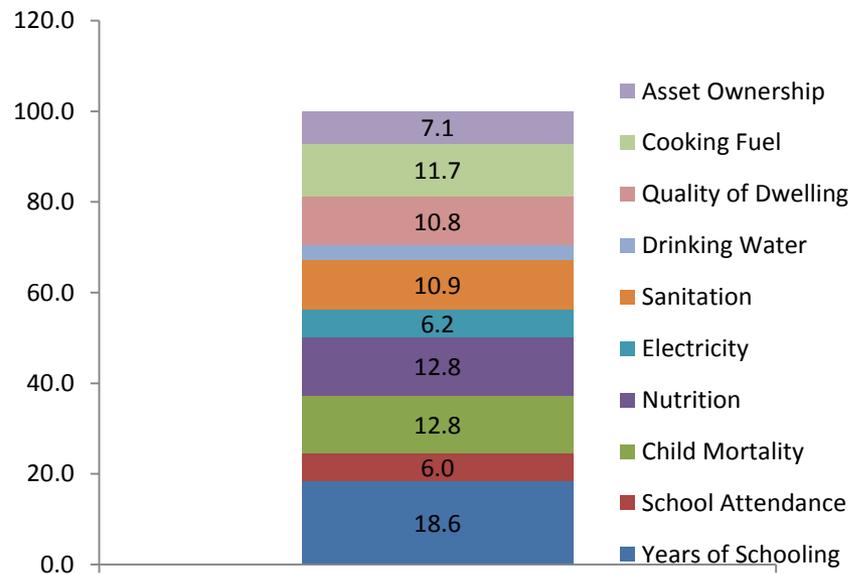
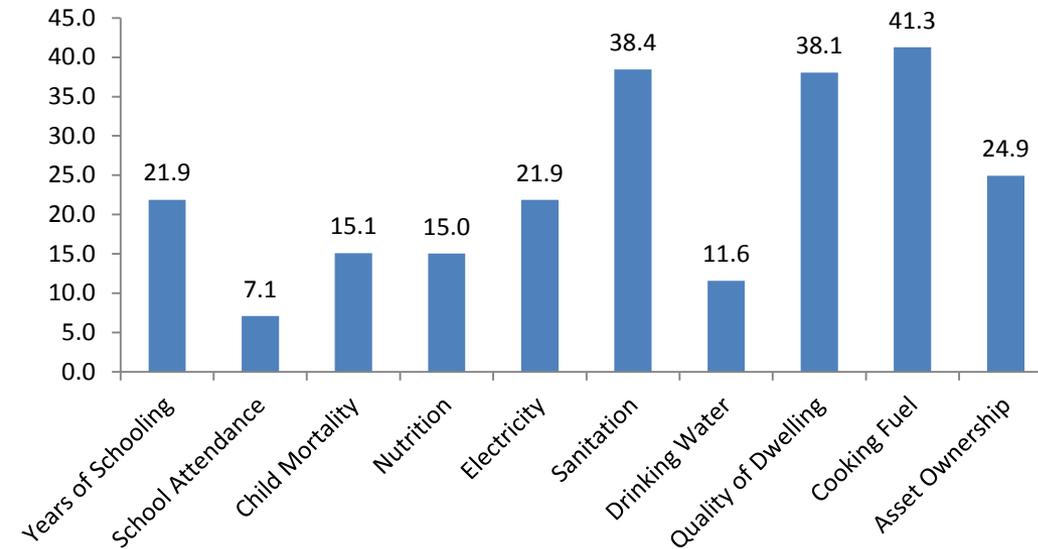
Indicators	schyrs~5	childn~h	child_~1	underwt	no_elec	no_san~n	no_dwa~r	poor_d~l	sol_ck~l	no_asset
schyrs_lt5	1									
childnosch	0.1686	1								
child_mort1	0.0348	0.093	1							
underwt	0.1075	0.0818	0.0521	1						
no_elec	0.2568	0.1143	0.0928	0.1175	1					
no_sanitn	0.2784	0.1486	0.1368	0.1678	0.3921	1				
no_dwater	0.0793	-0.0027	0.036	0.0257	0.2099	0.1324	1			
poor_dwell	0.2418	0.0779	0.1131	0.1026	0.3885	0.472	0.1645	1		
sol_ckfuel	0.2496	0.1256	0.1406	0.1768	0.393	0.5568	0.121	0.6044	1	
no_asset	0.3881	0.1112	0.0728	0.111	0.4884	0.3834	0.2094	0.3724	0.3927	1

Raw and censored headcounts, MPI composition

Indicators	Raw headcount	Censored headcount (k=33%)	Censored headcount (k=40%)	Contribution to MPI (k=33%)	Contribution to MPI (k=40%)
Years of Schooling	23.5	21.9	16.4	18.6	20.1
School Attendance	7.8	7.1	6.0	6.0	7.4
Child Mortality	18.5	15.1	10.5	12.8	12.9
Child Nutrition	17.6	15.0	11.0	12.8	13.5
Electricity	31.3	21.9	16.3	6.2	6.7
Sanitation	66.4	38.4	23.5	10.9	9.6
Drinking Water	17.4	11.6	8.1	3.3	3.3
Dwelling Quality	71.4	38.1	22.4	10.8	9.2
Cooking Fuel	81.0	41.3	24.6	11.7	10.1
Asset Ownership	34.9	24.9	17.9	7.1	7.3
Total		41.7	24.7	100.0	100.0

Indicator deprived & composition of MPI (k=33%)

Population Deprived %



Different measures of MD poverty

(k=33%)

Level of Aggregation	Incidence of Poverty (H)			Average Intensity Across Poor (A)			MPI = H×A		
	Mean	L. B.	U.B	Mean	L. B.	U.B	Mean	L. B.	U.B
Urban/Rural									
Urban	13.7	10.2	17.2	43.4	27.4	59.4	0.059	0.044	0.075
Rural	48.3	45.4	51.1	47.3	44.2	50.5	0.229	0.213	0.244
Ecological Belt									
Mountain	58.8	48.1	69.5	47.1	39.9	54.2	0.277	0.219	0.334
Hill	37.9	34.7	41.1	47.2	41.9	52.5	0.179	0.161	0.197
Terai	42.6	38.9	46.3	47.0	42.2	51.9	0.200	0.181	0.219
Development Region									
Eastern	36.8	31.7	42.0	44.6	36.8	52.3	0.164	0.140	0.189
Central	40.8	36.7	44.9	49.1	42.7	55.4	0.200	0.177	0.224
Western	33.8	29.0	38.6	45.4	36.7	54.0	0.153	0.129	0.178
Mid-western	57.0	50.4	63.6	48.9	43.7	54.2	0.279	0.242	0.315
Far-western	52.2	45.0	59.3	45.2	39.0	51.4	0.236	0.200	0.272
National (2010-11)	41.7	39.3	44.1	47.1	43.7	50.5	0.196	0.183	0.209
DHS 2006	64.7	-35.6	(%↓)	54.0	-12.8	(%↓)	0.350	-43.9	(%↓)

Different levels of MD poverty

Level of Aggregation	Union (k=10%)	Intersection (k=100%)	Incidence of Poverty (k=33%)	Vulnerable Poverty (20% <=k<=33%)	Severe Poverty (k>=50%)
Urban/Rural					
Urban	46.7	0.00	13.7	10.5	3.8
Rural	91.3	0.07	48.3	21.3	20.6
Ecological Belt					
Mountain	96.5	0.00	58.8	22.1	24.6
Hill	78.7	0.13	37.9	21.8	15.3
Terai	84.6	0.00	42.6	16.6	18.3
Development Region					
Eastern	87.8	0.10	36.8	21.4	12.2
Central	74.9	0.10	40.8	15.4	19.7
Western	79.6	0.00	33.8	21.0	12.3
Mid-western	92.4	0.00	57.0	21.1	26.4
Far-western	94.1	0.00	52.2	22.4	20.0
National	82.8	0.06	41.7	19.3	17.4

Poverty threshold and correlation analysis

MPI cut-off	Multidimensional Poverty			Correlation with CBN Headcounts	
	MPI = H×A	Intensity Across Poor (A)	Headcount (H)	At NPL	29.2% Inflated
k=10%	0.276	33.3	82.8	0.2438*	0.3100*
k=20%	0.245	40.1	61.0	0.3190*	0.3840*
k=30%	0.196	47.1	41.7	0.3215*	0.3697*
k=40%	0.136	55.0	24.7	0.3150*	0.3450*
k=50%	0.104	59.4	17.4	0.3004*	0.3067*
k=60%	0.056	67.8	8.2	0.2680*	0.2538*
k=70%	0.019	78.7	2.5	0.1529*	0.1471*
k=80%	0.006	87.4	0.7	0.1115*	0.0886*
k=90%	0.002	96.2	0.2	0.0540*	0.0461*
k=100%	0.001	100.0	0.1	0.0152	0.0266
Total				25.0	41.7

Comparison of MPI and CBN poor

k=33% & PL=29.2% inflated					% of population		
		Monetary poor			Monetary poor		
		Non-poor	Poor	Total	Non-poor	Poor	Total
MPI poor	Non-poor	74.8	25.2	100	74.8	35.2	58.3
	Poor	35.2	64.8	100	25.2	64.8	41.7
	Total	58.3	41.7	100	100	100	100

k=40% & PL=NPL							
		Monetary poor			Monetary poor		
		Non-poor	Poor	Total	Non-poor	Poor	Total
MPI poor	Non-poor	83.0	17.0	100	83.3	51.3	75.3
	Poor	50.8	49.2	100	16.7	48.7	24.7
	Total	75.0	25.0	100	100	100	100

MPI poor and CBN poor by geography

k=33% & PL=29.2% inflated

Level of Aggregation	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
Urban/Rural							
Urban	13.7	27.4	4.0	17.6	9.7	68.7	19.0
Rural	48.3	45.1	17.2	14.0	31.1	37.7	81.0
Ecological Belt							
Mountain	58.8	58.0	16.5	15.7	42.3	25.5	7.2
Hill	37.9	39.6	13.4	15.2	24.5	46.9	44.4
Terai	42.6	41.1	15.6	14.1	27.1	43.3	48.5
Development Region							
Eastern	36.8	38.2	13.9	15.3	23.0	47.9	23.4
Central	40.8	35.6	16.6	11.4	24.2	47.8	35.3
Western	33.8	38.5	12.0	16.7	21.8	49.5	19.1
Mid-western	57.0	52.7	17.9	13.6	39.1	29.4	13.2
Far-western	52.2	65.4	10.2	23.4	42.0	24.4	9.0
National	41.7	41.7	14.7	14.7	27.0	43.6	100.0

MPI poor and CBN poor by geography

k=40% & PL=NPL

Level of Aggregation	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
Urban/Rural							
Urban	6.1	15.3	2.8	11.9	3.4	81.9	19.0
Rural	29.0	27.2	14.8	13.0	14.2	57.9	81.0
Ecological Belt							
Mountain	36.3	42.2	13.6	19.5	22.7	44.1	7.2
Hill	23.6	24.3	11.0	11.8	12.6	64.6	44.4
Terai	24.0	23.0	13.8	12.7	10.2	63.3	48.5
Development Region							
Eastern	18.4	21.3	10.1	13.0	8.3	68.5	23.4
Central	25.4	21.1	13.4	9.2	11.9	65.4	35.3
Western	18.8	22.1	10.4	13.7	8.4	67.5	19.1
Mid-western	40.3	31.4	20.7	11.8	19.6	47.9	13.2
Far-western	28.0	46.0	8.0	26.0	20.0	45.9	9.0
National	24.7	25.0	12.5	12.8	12.2	62.5	100.0

MPI poor and CBN poor by consumption quintiles

Real PC Consumption Quintile	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
k=33% & PL=29.2% inflated							
First (Poorest)	73.5	100.0	0.0	26.5	73.5	0.0	19.8
Second	57.6	100.0	0.0	42.4	57.6	0.0	19.7
Third	39.1	11.3	33.3	5.6	5.7	55.4	19.8
Fourth	27.6	0.0	27.6	0.0	0.0	72.4	20.2
Fifth (Richest)	12.2	0.0	12.2	0.0	0.0	87.8	20.5
National	41.7	41.7	14.7	14.7	27.0	43.6	100.0
k=40% & PL=NPL							
First (Poorest)	51.9	100.0	0.0	48.1	51.9	0.0	19.8
Second	35.1	26.3	25.5	16.7	9.6	48.2	19.7
Third	21.1	0.0	21.1	0.0	0.0	78.9	19.8
Fourth	11.8	0.0	11.8	0.0	0.0	88.2	20.2
Fifth (Richest)	4.7	0.0	4.7	0.0	0.0	95.3	20.5
National	24.7	25.0	12.5	12.8	12.2	62.5	100.0

MPI poor and CBN poor by household size

Household Size	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
k=33% & PL=29.2% inflated							
1	59.9	7.5	53.5	1.1	6.4	39.0	0.7
2	42.3	15.1	30.7	3.4	11.7	54.3	4.5
3	31.9	17.4	20.8	6.4	11.0	61.7	9.6
4	31.8	27.3	14.5	10.0	17.3	58.2	16.7
5	39.6	39.8	14.5	14.7	25.1	45.7	18.8
6	44.3	50.1	13.1	18.9	31.3	36.8	17.4
>=7	49.1	57.4	10.9	19.2	38.2	31.7	32.2
National	41.7	41.7	14.7	14.7	27.0	43.6	100.0
k=40% & PL=NPL							
1	35.3	3.3	33.0	0.9	2.4	63.7	0.7
2	19.6	7.3	15.9	3.5	3.7	76.9	4.5
3	15.8	7.4	12.7	4.3	3.1	79.9	9.6
4	19.3	12.8	11.9	5.4	7.3	75.3	16.7
5	23.6	21.0	14.1	11.5	9.5	64.9	18.8
6	26.0	32.7	10.6	17.3	15.4	56.7	17.4
>=7	30.6	37.6	12.0	19.1	18.6	50.3	32.2
National	24.7	25.0	12.5	12.8	12.2	62.5	100.0

MPI poor and CBN poor by ethnic group

Ethnic Group	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
k=33% & PL=29.2% inflated							
Brahman	17.3	20.4	8.4	11.6	8.8	71.1	13.4
Chhetri	38.1	39.2	13.1	14.2	25.0	47.7	17.8
Tarai Middle Class	52.6	48.8	16.5	12.7	36.0	34.7	15.1
Dalit	64.2	61.7	18.5	16.1	45.7	19.8	13.3
Newar	12.0	19.1	5.9	13.0	6.1	75.0	6.3
Janajati	44.3	44.8	16.4	16.9	27.9	38.8	29.1
Muslim and Other	49.9	43.1	22.8	16.0	27.1	34.1	5.1
National	41.7	41.7	14.7	14.7	27.0	43.6	100.0
k=40% & PL=NPL							
Brahman	6.1	10.9	3.0	7.8	3.1	86.2	13.4
Chhetri	23.4	23.8	11.3	11.7	12.1	64.9	17.8
Tarai Middle Class	29.8	27.4	15.4	13.0	14.4	57.2	15.1
Dalit	41.9	41.7	18.3	18.0	23.7	40.0	13.3
Newar	4.5	9.6	2.6	7.7	1.9	87.8	6.3
Janajati	26.2	27.5	13.6	15.0	12.5	58.8	29.1
Muslim and Other	34.4	19.5	24.6	9.7	9.8	55.9	5.1
National	24.7	25.0	12.5	12.8	12.2	62.5	100.0

MPI poor and CBN poor by head's education

Education of HH Head	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
k=33% & PL=29.2% inflated							
<=0 years of schooling	56.6	52.5	18.7	14.7	37.8	28.8	48.3
Literate, or <5 completed [5-7]	48.8	47.0	16.1	14.3	32.7	36.9	14.8
completed [8-10]	27.6	36.0	11.8	20.2	15.8	52.2	13.3
completed 11+	18.9	25.6	9.1	15.7	9.9	65.4	11.0
National	41.7	41.7	14.7	14.7	27.0	43.6	100.0
k=40% & PL=NPL							
<=0 years of schooling	36.4	33.0	17.5	14.1	18.9	49.5	48.3
Literate, or <5 completed [5-7]	28.3	27.4	14.9	14.0	13.4	57.7	14.8
completed [8-10]	11.2	19.7	7.4	15.8	3.9	72.9	13.3
completed 11+	7.9	13.2	5.2	10.5	2.7	81.6	11.0
National	24.7	25.0	12.5	12.8	12.2	62.5	100.0

MPI poor and CBN poor by land ownership

Land ownership Group	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
k=33% & PL=29.2% inflated							
No Land	32.8	36.1	10.8	14.1	22.0	53.1	20.9
<0.2 ha.	51.4	49.8	16.7	15.1	34.7	33.5	17.6
0.2-1 ha.	44.7	44.7	15.4	15.4	29.3	39.9	43.8
1-2 ha.	39.8	36.3	16.9	13.4	22.9	46.8	13.0
2+ Ha	21.7	23.4	11.1	12.7	10.7	65.6	4.7
National	41.7	41.7	14.7	14.7	27.0	43.6	100.0
k=40% & PL=NPL							
No Land	20.6	22.1	10.2	11.6	10.5	67.8	20.9
<0.2 ha.	31.8	29.4	15.3	12.9	16.5	55.3	17.6
0.2-1 ha.	25.4	28.4	12.2	15.2	13.2	59.4	43.8
1-2 ha.	23.5	18.9	15.1	10.6	8.4	66.0	13.0
2+ Ha	12.5	5.6	8.4	1.4	4.2	86.1	4.7
National	24.7	25.0	12.5	12.8	12.2	62.5	100.0

Poverty comparison by access (k=33% & PL=29.2% inflated)

Facility within 30 minutes' travel	Status	MPI Poor	CBN Poor	MPI Poor CBN Nonpoor	CBN Poor MPI Nonpoor	Both Poor	Both Nonpoor	Population Share
Primary School	Away	67.8	60.6	18.2	10.9	49.7	21.2	5.5
	Within	40.2	40.6	14.5	14.9	25.7	44.9	94.5
Secondary School	Away	59.9	56.4	19.1	15.6	40.8	24.5	29.9
	Within	33.9	35.4	12.8	14.3	21.1	51.8	70.1
Higher S. School	Away	55.8	54.1	17.6	15.9	38.2	28.3	45.4
	Within	29.9	31.3	12.2	13.7	17.7	56.4	54.6
Health Post	Away	43.1	44.4	13.8	15.1	29.3	41.8	51.1
	Within	40.3	38.9	15.7	14.3	24.6	45.5	48.9
Hospital	Away	50.5	48.2	17.0	14.8	33.4	34.7	67.8
	Within	23.3	27.9	9.7	14.4	13.5	62.3	32.2
Paved Road	Away	54.7	52.2	18.2	15.6	36.6	29.6	50.9
	Within	28.2	30.8	11.1	13.7	17.1	58.1	49.1
Dirt Road	Away	39.2	41.5	12.4	14.8	26.7	46.1	35.7
	Within	43.1	41.8	15.9	14.6	27.1	42.3	64.3
Haat Bazaar	Away	42.9	44.5	13.7	15.3	29.2	41.7	60.6
	Within	39.8	37.3	16.2	13.7	23.6	46.5	39.4
Market	Away	53.7	50.9	17.9	15.1	35.8	31.1	56.6
	Within	26.0	29.6	10.5	14.1	15.5	59.9	43.4
Agriculture Centre	Away	54.2	50.7	18.5	15.1	35.6	30.8	58.6
	Within	24.0	28.9	9.2	14.1	14.8	61.8	41.4
Cooperative	Away	58.2	53.6	19.0	14.4	39.2	27.4	48.9
	Within	25.8	30.3	10.5	15.0	15.3	59.2	51.1
Bank	Away	53.9	50.7	18.3	15.1	35.6	31.0	61.7
	Within	22.1	27.2	8.9	14.0	13.2	63.9	38.3
Total		41.7	41.7	14.7	14.7	27.0	43.6	100.0

Alternative measure (+adult's undernourishment)

Level of Aggregation	Incidence of Poverty (H)	Average Intensity Across the Poor (A)	MPI = H×A	Population Share
Urban/Rural				
Urban	19.6	43.2	0.085	19.0
Rural	55.0	48.3	0.265	81.0
Ecological Belt				
Mountain	68.5	47.8	0.327	7.0
Hill	46.4	48.3	0.224	44.2
Terai	47.0	47.6	0.224	48.7
Development Region				
Eastern	42.3	45.1	0.191	23.3
Central	46.3	49.6	0.230	35.7
Western	41.2	46.1	0.190	19.2
Mid-western	66.0	50.3	0.332	13.0
Far-western	60.8	46.5	0.283	8.8
National	48.2	47.9	0.231	100.0

Conclusion

- The estimates of multidimensional poverty measure is closely associated with monetary measure in terms of
 - Ethnicity, education, land ownership, access to facility; but
 - Different in consumption quintiles, hhld size (related to CBN poverty)
- At 33% cut-off (25% poverty), 65% of MPI poor are CBN poor. For 40% cut-off (42% poverty), 50% of MPI poor are CBN poor.
- The Far-West Nepal's MPI headcount appears comparatively better in different cut-offs though this is the remote poorest area.
- Some estimates in the geographically disaggregated levels are ambiguous due to large standard errors, difficult to rank (region, domains)
- The alternative measure of MPI with addition of adult nutrition information follows similar ranking though estimates differ.
- The household size is important determinant of monetary poverty but not of MPI poverty.