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Abstract

For the purpose of this study, sample was selected through stratified random sampling from Baitadi district, which falls in rural Far-western Hills of Nepal. Both income and consumption measures of poverty revealed that problem of poverty is more severe in Melauli, which is relatively remote village devoid of transportation, communication, market, and other developmental services. Education, occupation, gender of household head, and family size are found to be the most important factors that affect income-poverty as well as consumption-poverty (food insecurity). Caste and landholding size has a significant effect on food insecurity. Households with illiterate head, head engaged in laboring, female-head, larger family size, Occupational Caste household, and small holding are suffering from both income-poverty and consumption-poverty in greater extent. Income-poverty measure shows the higher incidence, gap, and severity of poverty compared to food insecurity for all the variables considered for the study. This could be due to inclusion of non-food expenses while constructing poverty line, and is also due nature of consumption itself, which is relatively continuous compared to income. However, in Melauli, incidence, depth, and severity of both poverty measures are closer. This is due to shortcoming of income-poverty measure to take spatial factor into account. Therefore, adoption of poverty line for whole region i.e., Rural Western Hills could mislead in understanding the issues of poverty. Thus, consumption-poverty is very relevant in the case where construction of location specific income-poverty line demands extra cost and efforts. This can further be justified by significantly higher chance of non-poor, in terms of income-poverty, being food insecure, and lower chance of income-poor being food-secure in Melauli compared to Patan.

Keywords**:** Income-poverty, consumption-poverty, Baitadi district

1. Introduction

Nepal remains one of the poorest countries in the world in terms of monetary as well as non-monetary dimension of poverty. She remains the poorest country in the South Asia and ranks as the twelfth poorest country in the world in terms of Gross National Income with per capita income of US$320 in the year 2006 (WB, 2008a). The per capita income though reached US$388 per annum in the year 2008, the country still remains one of the poorest countries in the world with the wide income disparities, and poor access to basic social services by a large section of the population (ADB, 2008).

Poverty in the country exists in a wide variation depending on the rural-urban, geographical, gender, and caste/ethnic division. This makes poverty and food insecurity complex and diverse. Therefore, poverty should be understood thoroughly to achieve the goal of poverty reduction. Moreover, incidence, gap, and severity analysis suggest that poverty is more rampant, deeper, and severe in rural areas, and much worse in the Mid-western and Far-western Hills/Mountains (UNDP, 2005). Thus, the rural poverty especially in the Mid-western and Far-western Hills/Mountains remains a core issue of poverty in Nepal. This necessitates the detail study of poverty at household level and factors affecting it in the region. Understanding the problem from micro perspective could be a crucial input for designing effective poverty reduction program. Therefore, this study will analyze the household poverty situation through incidence, depth, and severity analysis together with its relationship with household's various socio-economic variables. Besides, this study will be the first of its type that shows the relationship between income and consumption measures of poverty in Nepal.

2. Methodology

Considering the intensity of the problem, Baitadi district from Far-western hills of Nepal was selected for this study. Household survey was conducted among 116 households selected through stratified random sampling in two village development committees of the district, using pre-tested semi-structured interview schedule. The questionnaire incorporated information on demography of households including education and occupation of each members, resource holding, occupation, income, and consumption.

Application of monetary dimension of poverty dominates the literature on poverty (Gradin, et al., 2008). Here, the crucial question, which measure to use, income or consumption, arises while making monetary poverty analysis. Both of these measures have their own pros and cons. Therefore, there is growing evidences in supplementing the income measure with consumption measure in the studies of poverty (Bavier, 2008; Bryan, 2002; Gradin, et al., 2008). But, supplementation of income measure with consumption measure in poverty analysis does not exist in Nepalese case.

Income-poverty is the most widely used measure of poverty. Here, poverty line is established based on the estimated amount of money necessary to meet the basic necessities for a given period in a given location. Households, which are not able to meet the poverty line with its incomes are then categorized as poor. Income-poverty study in this paper is based on the poverty line established by Nepal Living Standards Survey (NLSS[1]) I and II. These surveys consider the temporal and spatial dimensions as well as sum up food and non-food poverty line while establishing poverty line. Thus, a poverty line of Rs 7,857 per person per year at the current price

[1] NLSS I and NLSS II were conducted in the year 1995-96 and 2003-03, respectively. These are the highly authenticated government documents on poverty that applied the Living Standards Measurement Survey developed by the World Bank.

of 2001 for the sample district is calculated considering the poverty line of the Rural Western Hills in order to make income-poverty analysis in this study.

However, in case of consumption-poverty, there lacks consensus on the correct measure of consumption to use (Bavier, 2008; Bryan, 2002; Johnson, et al., 2005). Food insecurity is the most important subset of consumption-poverty in the case of developing countries where food is the first and the most important priority for any household (Rhoe, et al., 2008)

Food insecurity is calculated through a measurement of food consumption and requirement in calorie unit of the sampled households (Maxwell & Frankenberger, 1992). Calorie consumption of a household was calculated through the calorie conversion of major food items consumed by the sample households (Prennushi, 1999). Whereas, for a calculation of calorie requirement, standard calorie requirement of 2,344 kcal per person per day for Mountain/Hills of Nepal set by NPC based on WHO guidelines was considered (Subedi, 2003). Then, based on the adjusted family size, i.e., adult equivalent[2] (AE) that takes into account of age and gender of household members, total calorie requirement of the household was calculated. Thus, the household whose consumption fell below standard requirement was categorized as food insecure household.

Magnitude of poverty was assessed through head-count ratio, poverty gap index, and severity index in order to assess and analyze incidence, depth, and severity of poverty, respectively (WB, 2008b). The assessment was done separately for both income and consumption-poverty analyses. Following formulas were used to measure the incidence, depth, and severity of poverty.

$$PI = \frac{n}{N} X\,100 \qquad \text{---------- (1)}$$

$$SI = \frac{1}{N}\sum_{i=1}^{n}\left[\frac{z_i - y_i}{z_i}\right]^2 X100 \qquad \text{---------- (2)}$$

[2] Adult equivalent (AE)-average measures of family size that standardize consumption unit within the household taking age, and sex of household members into account (Annex 1).

$$SI = \frac{1}{N}\sum_{i=1}^{n}\left[\frac{z_i - y_i}{z_i}\right]^2 X\ 100 \quad \text{---------- (3)}$$

Where,

PI = Poverty incidence

n = Number of poor households

N = Total number of sample households

PGI = Poverty gap index

SI = Severity index

z_i = Poverty line/calorie requirement of i^{th} household

y_i = Income/calorie consumption of i_{th} household

3. Results and Discussion

3.1 Socio-economic characteristics and resource distribution

Proportion of the female-headed household in the study area is 15.5%. The proportion is higher in Melauli with 19.6% households headed by female compared to 11.7% in Patan but the difference is statistically non-significant (Table 1). Caste-wise distribution of the sample households shows that Chhetri[3] is the most dominating caste group in both the VDCs in terms of population. Education attainment also differs significantly in two VDCs. Illiteracy of household heads (HHHs) is quite prevalent in Melauli. More than 41% of the HHHs are illiterate compared to 13.3% in Patan. The figure is just reverse for attainment of college education and school education by the HHHs.

Agriculture is the most dominating occupation in the district. Difference in distribution of households by occupation of HHHs in two VDCs is statistically significant. The higher concentration of small landholding households (37.5%) with insufficient food production in Melauli results into higher proportion (19.7%) of HHHs involved in daily wage laboring. This is

[3] Nepalese society is classified based on the Hindu caste hierarchy in which there are broadly four caste groups. The priestly *Brahmins* (Bahun) are at the top of the caste hierarchy with the *Kshetriya* (Chettri-kings and warriors) just beneath them followed by the *Vaishya* (merchants) and the *Sudra* (peasants and laborers), respectively. Beneath every one are Occupational caste and untouchable. They are often involved in metal-work (blacksmithing-*Kami* and goldsmithing-*Sunar*), and tailoring (Damai). These castes are socially discriminated as polluters, though illegal by law.

also a reason for relatively lower proportion of HHHs engaged in agriculture in Melauli. Involvement of individuals in salaried jobs is related with the attainment of secondary and college education. Therefore, higher proportion of HHHs in Patan (30%) is involved in salaried jobs compared to Melauli (14.3%).

Table 1. Social characteristics of sample households

Variables	Patan	Melauli	Total
Gender of HHH *P-value = 0.23*			
Male	53 (88.3)	45 (80.4)	98 (84.5)
Female	7 (11.7)	11 (19.6)	18 (15.5)
Caste *P-value = 0.00****			
Bahun	25 (41.7)	8 (14.3)	33 (28.4)
Chhetri	30 (50.0)	40 (71.4)	70 (60.4)
Occupational Caste (OC)	5 (8.3)	8 (14.3)	13 (11.2)
Education of HHH[4] *P-value = 0.00****			
Illiterate	8 (13.3)	23 (41.1)	31 (26.7)
Literate	13 (21.7)	17 (30.4)	30 (25.9)
School education	28 (46.7)	11 (19.6)	39 (33.6)
College education	11 (18.3)	5 (8.9)	16 (13.8)
Average year of schooling (P-value = 0.00****)*	*7.0*	*3.8*	*5.5*
Occupation of HHH *P-value = 0.02***			
Agriculture	37 (61.7)	32 (57.1)	69 (59.5)
Salaried jobs	18 (30.0)	8 (14.3)	26 (22.4)
Business	2 (3.3)	5 (8.9)	7 (6.0)
Laboring	3 (5.0)	11 (19.7)	14 (12.1)
Family size category – AE *P-value =0.62*			
Small (1-5 Members)	20 (33.3)	23 (41.1)	43 (37.1)
Medium (>5-10 Members)	31 (51.7)	27 (48.2)	58 (50.0)
Large (>10 Members)	9 (15.0)	6 (10.7)	15 (12.9)
Average family size(AE)(P-value =0.33)	*6.3*	*5.7*	*6.0*
Landholding category *P-value =0.11*			
Small (Less than 0.5ha)	12 (20.0)	21 (37.5)	33 (28.5)
Medium (0.5-2ha)	47 (78.3)	34 (60.7)	81 (69.8)
Large (>2ha)	1 (1.7)	1 (1.8)	2 (1.7)
Average land holding (ha.)(P-value =0.05***)*	*0.87*	*0.73*	*0.8*
Overall	**60 (100)**	**56 (100)**	**116 (100)**

Source: Field Survey, 2001.
Note: Figures in parentheses indicate percentage, *** significant at 1 percent, and ** significant at 5 percent.

Fifty percent of households come under the medium family sized households having more than 5 to 10 members followed by small (less than 5 members) and large (more than 10 members) family sized households. The distribution of households by family size does not differ significantly in two VDCs (Table 1). In case of landholding, households with medium holding

[4] Categorized into 4 categories on following basis: Illiterate-cannot read and write, literate-attained informal education or formal education up to 5th grade and can read and write, school education-attained formal education from 6th grade to 10th grade, and College education-attained formal education above 10th grade

(0.5-2.0ha.) constitute the highest proportion of the households i.e., 70%. A proportion of small holding (less than 0.5ha.) households in Melauli are significantly higher compared to that of Patan. Landholding size is also significantly higher in Patan, i.e., 0.87ha and 0.73ha in Patan and Melauli, respectively.

Table 2. Resource distribution among different caste groups

	Resource	Caste			Total	P-value
		Bahun	Chettri	OC		
Patan	Landholding (ha)	0.81	1.00	0.43	0.87	0.03**
	Irrigation coverage (percentage)	46	35.1	29.4	44.0	0.09*
	Livestock holding (LSU[5])	4.2	4.4	3.9	4.3	0.92
	Family size (AE)	6.6	5.9	6.9	6.3	0.48
	Schooling year of HHH	7.6	7.6	0.8	7.0	0.01***
	Dependency ratio[6]	1.3	1.2	0.8	1.2	0.5
Melauli	Landholding (ha)	1.1	0.72	0.37	0.73	0.01***
	Irrigation coverage (percentage)	22.2	26.9	19.0	26.7	0.07*
	Livestock holding (LSU)	4.6	4.0	3.7	4.0	0.69
	Family size (AE)	6.6	5.5	5.7	5.7	0.50
	Schooling year of HHH	5.1	4.0	1.3	3.8	0.04***
	Dependency ratio	1.6	1.1	1.0	1.3	0.02**
Overall	Landholding (ha)	0.88	0.84	0.39	0.80	0.00***
	Irrigation coverage (percentage)	40.3	34.6	27.7	35.7	0.07*
	Livestock holding (LSU)	4.3	4.1	3.8	4.1	0.79
	Family size (AE)	6.6	5.7	6.2	6.0	0.18
	Schooling year of HHH	6.9	5.5	1.2	5.5	0.00***
	Dependency ratio	1.4	1.2	0.9	1.2	0.24
P-Value†	Landholding (ha)	0.16	0.01***	0.57	0.09*	
	Irrigation coverage (percentage)	0.02**	0.00***	0.09*	0.00***	
	Livestock holding (LSU)	0.72	0.50	0.77	0.58	
	Family size (AE)	0.97	0.43	0.49	0.18	
	Schooling year of HHH	0.19	0.00***	0.58	0.00***	
	Dependency ratio	0.36	0.26	0.05	0.98	

Source: Field Survey, 2001.
Note: *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent, and † P-value for the distribution between two VDCs.

Resource distribution of the sample households by caste group is presented in Table 2. Resource distribution between caste groups as well two VDCs differs significantly. Landholding, irrigation coverage, and schooling year of HHHs are significantly lower in Melauli. Rugged

[5] LSU (Livestock Standard Unit) is aggregate of different types of livestock kept at household in standard unit calculated using the given equivalent (CBS, 2003).
[6] Dependency ratio is the ratio of economically non-active member to economically active member (members with age between 15-60 years involved in any sort of income generating activity).

terrain with limited infrastructure development such as lack of transportation, communication, market, and other social services including school is the main reason for such discrepancy.

Similarly, there is a significant difference in resource distribution among the caste groups. OC households are having the lowest level of resource holdings. Landholding, irrigation coverage, and schooling year of HHHs are significantly lower for OC households. OC households also have relatively low livestock holding. Dependency ratio, calculated based on the economically active and economically non-active members in the household, is lower for OC in both VDCs. Lower dependency ratio among OC is due to their economic distress. Such distress forced each members of the household, regardless of age, to involve themselves in any sort of income generating opportunities in order to meet their basic needs, especially food, at the least. Therefore, lower dependency ratio here reflects their economic hardship rather than economic strength. Education being foundation for achieving overall welfare, disparity in overall welfare existing between caste groups and location itself can be explained by disparity in education.

3.2 Poverty situation

Situation of income-poverty and consumption-poverty that includes incidence, gap/depth, and severity is presented in tables 3 and 4, respectively. Income-poverty shows higher incidence, depth, and severity of poverty compared to food insecurity. This could be due to the inclusion of non-food expenses while constructing income-poverty line, whereas consumption-poverty considers only the food needs. In addition, nature of consumption itself, which is relatively continuous compared to income, could be another reason for such difference.

The difference in case of Melauli is not so high compared to that of Patan. Shortcoming of income-poverty measure to take into account of spatial factor (difference in two locations due to various levels of infrastructure development and access to market) may be the main reason behind this. As price of marketed goods in Melauli is quite high compared to Patan, due to extra

cost involved in labor intensive transportation of goods through porter or animal power, poverty line should be higher in Melauli compared to Patan. Therefore, income-poverty line constructed for the Rural Western Hills, which is supposed to cover food and non-food items, could not cover the aspects evenly in the district, especially the different situational nature of consumptions in places such as Melauli. Thus, construction of location specific income-poverty line is very crucial. Therefore, adoption of poverty line for whole region i.e., Rural Western Hills as done by NLSS I and NLSS II could mislead in understanding the issues of poverty and the dynamics therein.

Income-poverty shows that poverty is significantly related with gender of HHH, family size, education and occupation. Whereas, consumption-poverty shows significant relation with all of the variables considered. Characterized by the low level of resource possession and relatively higher family size, female headed and OC households are suffering significantly higher incidence, gap/depth, and severity of poverty. Also given limited employment opportunities and smaller landholdings, large family sized households have significantly higher incidence, gap/depth, and severity of poverty.

Education and occupation are closely related to each other. Most of the illiterate households are also the one who are engaged in laboring, agriculture, and petty business. Therefore, significantly higher proportion of households who's HHH is illiterate and engaged in laboring or agriculture is trapped into poverty with significantly higher gap/depth, and severity. In case of landholdings, incidence, gap, and severity do not vary significantly for income-poverty, i.e., even the larger landholding household is suffering income-poverty. But in terms of consumption-poverty, significant association of poverty with landholding is revealed, i.e., incident, depth, and severity are significantly higher for small landholding households.

Table 3. Income-poverty incidence, gap index, and severity index in the study areas according to different socio-economic variables

Variables	Patan			Melauli			Overall		
	PI	**PGI**	**PSI**	**PI**	**PGI**	**PSI**	**PI**	**PGI**	**PSI**
Gender									
Male	41.5	22.1	15.2	55.5	27.2	16.7	47.9	24.4	15.9
Female	71.4	40.9	28.6	72.7	41.1	27.1	72.2	41.0	27.7
P-value	***0.14***	***0.06****	***0.06****	***0.30***	***0.09****	***0.07****	***0.06*****	***0.05*****	***0.08****
Caste									
Bahun	44.0	22.0	16.0	50.0	33.1	25.0	45.5	24.7	18.2
Chhetri	43.3	22.8	13.9	55.0	27.0	16.9	50.0	26.7	17.4
OC	60.0	26.3	17.9	87.5	41.2	21.7	76.9	34.1	18.7
P-value	***0.78***	***0.9***	***0.9***	***0.20***	***0.5***	***0.6***	***0.14***	***0.67***	***0.98***
Education									
Illiterate	87.5	32.1	17.8	69.6	42.3	28.8	74.2	39.7	26.0
Literate	38.5	25.3	18.8	64.7	33.2	20.6	53.33	29.8	19.8
School	42.9	24.5	17.6	45.5	10.2	3.0	43.6	20.5	13.5
College	27.3	16.6	11.5	20.0	4.9	1.2	25	13.0	8.3
P-value	***0.06****	***0.8***	***0.9***	***0.15***	***0.01*****	***0.01*****	***0.01*****	***0.02*****	***0.09****
Occupation									
Agriculture	59.5	28.5	18.3	68.8	36.3	22.8	63.8	32.1	20.4
Salaried jobs	11.1	8.4	6.5	12.5	11.1	9.8	11.5	9.2	7.5
Business	50.0	48.2	46.1	40.0	2.3	0.2	42.9	15.4	13.3
Laboring	66.7	51.4	39.6	72.7	37.6	22.2	71.4	40.6	25.9
P-value	***0.01*****	***0.05*****	***0.07****	***0.02*****	***0.03*****	***0.06****	***0.01*****	***0.00*****	***0.09****
Family size category									
Small	45.0	21.1	13.6	56.5	20.6	10.6	51.2	20.8	12.0
Medium	32.3	15.6	10.1	59.3	37.1	25.9	44.8	25.6	17.4
Large	88.9	61.0	46.9	66.7	32.9	18.2	80.0	49.8	35.4
P-value	***0.01*****	***0.00*****	***0.00*****	***0.9***	***0.18***	***0.09****	***0.05*****	***0.01*****	***0.01*****
Landholding category									
Small	58.3	21.2	14.8	61.9	71.7	51.5	57.6	35.9	25.7
Medium	42.5	25.5	17.6	55.9	29.6	18.6	49.4	27.3	18.1
Large	-	-	-	100	28.3	17.5	50.0	25.7	16.5
P-value	***0.42***	***0.7***	***0.7***	***0.64***	***0.37***	***0.3***	***0.73***	***0.9***	***0.87***
Total	**45.0**	**24.2**	**16.8**	**58.9**	**29.9**	**18.8**	**51.7**	**27.0**	**17.7**

Source: Field Survey, 2001.

Note: *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent, PI-Poverty incidence, PGI-Poverty gap index and PSI-Poverty severity index

Table 4. Incidence of food insecurity, depth index, and severity index in the study areas according to different socio-economic variables

Variables	Patan			Melauli			Overall		
	IFI	**DFI**	**SFI**	**IFI**	**DFI**	**SFI**	**IFI**	**DFI**	**SFI**
Gender									
Male	30.2	6.2	2.1	51.1	11.2	3.9	39.8	8.5	2.9
Female	42.9	5.1	0.8	63.6	9.1	2.0	55.6	7.6	1.6
P-value	*0.50*	*0.8*	*0.6*	*0.45*	*0.7*	*0.4*	*0.21*	*0.8*	*0.4*
Caste									
Bahun	24.0	5.1	1.8	75.0	13.6	4.2	36.4	9.5	3.7
Chhetri	30.0	4.1	0.9	45.0	7.8	2.2	38.6	6.2	1.6
OC	83.3	20.1	8.1	75.0	23.3	9.6	76.9	16.4	5.8
P-value	*0.05***	*0.02***	*0.02***	*0.13*	*0.03***	*0.02***	*0.03***	*0.04***	*0.04***
Education									
Illiterate	62.5	11.7	4.2	65.2	13.4	4.9	64.4	12.0	4.1
Literate	46.2	7.9	2.2	58.8	12.2	4.1	53.3	9.1	2.6
School	28.6	6.1	2.0	36.4	10.0	2.9	30.8	6.6	2.2
College	-	-	-	20.0	8.0	2.7	6.3	4.2	1.5
P-value	*0.02***	*0.23*	*0.48*	*0.10**	*0.9*	*0.09**	*0.00****	*0.25*	*0.5*
Occupation									
Agriculture	40.5	6.7	1.8	62.5	11.3	4.5	50.7	8.4	2.3
Salaried jobs	5.6	0.8	0.1	12.50	5.8	1.3	7.7	2.3	0.5
Business	50.0	27.6	15.3	40.0	10.3	3.0	42.9	15.9	6.2
Laboring	66.7	16.6	6.3	63.6	15.7	6.2	64.3	16.0	7.6
P-value	*0.03***	*0.00****	*0.00****	*0.06**	*0.6*	*0.4*	*0.00****	*0.02***	*0.00****
Family size category									
Small	15.0	2.2	0.4	26.1	4.8	1.4	20.9	3.6	0.9
Medium	32.3	5.2	1.6	66.6	12.7	4.0	48.3	8.7	2.7
Large	66.7	18.0	7.0	100	25.2	9.5	80.0	20.9	8.0
P-value	*0.02***	*0.00****	*0.01****	*0.00****	*0.01****	*0.02***	*0.00***	*0.00****	*0.00****
Landholding category									
Small	50.0	8.7	2.9	61.9	13.9	4.5	57.6	12.3	3.9
Medium	27.7	5.6	1.8	50.0	7.9	2.4	37.0	6.5	2.0
Large	-	-	-	-	-	-	-	-	-
P-value	*0.26*	*0.67*	*0.8*	*0.38*	*0.1*	*0.25*	*0.06**	*0.1*	*0.1*
Total	**31.7**	**6.10**	**1.96**	**53.6**	**10.8**	**3.5**	**42.2**	**8.4**	**2.7**

Source: Field Survey, 2001.

Note: *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent, IFI-Incidence of food insecurity, DFI-Depth of food insecurity, and SFI-Severity of food insecurity

3.3 Relationship between poverty and food insecurity

Income-poverty and consumption-poverty are significantly correlated with each other in both the study VDCs (Table 5). Degree of correlation, however, is weaker in Melauli. This is mainly due to mismatch between income-poverty and consumption-poverty in Melauli, especially for income-non-poor households. Here, significantly higher proportion of income-non-poor households is suffering food insecurity. This is mainly due to constraints in income poverty measure i.e., unable to capture the spatial difference. For instance, price of goods are

significantly higher in Melauli due to higher cost involved in labor intensive transportation of goods either by using porters or animals. This suggests that consumption poverty measure is more relevant in making poverty comparison between the two VDCs if the construction of location specific poverty line demands extra cost and efforts. In addition, consumption poverty measure captures the several aspects of poverty, which income-poverty measure cannot capture, such as borrowing and bartering, a common phenomenon in rural Nepal.

Table 5. Relationship between poverty and food insecurity

VDCs		Poverty	Food insecurity		Total	P-value
			Food insecure	Food secure		
Patan	Income-poverty	Poor	14 (51.9)	13 (48.2)	27 (45.0)	0.01***
		Non-poor	5 (15.2)	28 (84.8)	33 (55.0)	
		Total	19 (31.7)	41 (68.3)	60 (100)	
Melauli		Poor	21 (64.6)	12 (36.4)	33 (58.9)	0.07*
		Non-poor	9 (39.1)	14 (60.9)	23 (41.1)	
		Total	30 (53.6)	26 (46.4)	56 (100)	
Overall		**Poor**	**35 (58.3)**	**25 (41.7)**	**60 (51.7)**	**0.00*** **
		Non-poor	**14 (25.0)**	**42 (75.0)**	**56 (48.3)**	
		Total	**49 (42.2)**	**67 (57.8)**	**116 (100)**	

Source: Field Survey, 2001.
Note: Figures in parentheses indicate percentage, *** significant at 1 percent, * significant at 10 percent.

4. Conclusion

This study revealed that distribution of landholding and irrigation coverage, which is also very crucial resources for agriculture based livelihood, is skewed more towards higher caste such as Bahun and Chhetri, and households in Patan. In addition, both Bahun and Chhetri are well-off in terms of educational attainment, which again is closely related to occupation. Therefore, significantly higher proportion of OC households and households in Melauli, characterized by smaller landholding, lower irrigation coverage and lower educational attainment, and engagement in either laboring or agriculture, are suffering from significantly higher incidence, gap/depth, and severity of poverty. Family size and gender of HHH are other important factors that have significant effect on poverty.

Both the income and consumption measures of poverty reflect the higher existence of poverty in the study area. But the higher incidence, gap, and severity shown by the income poverty measure supports the nature of income-poverty discussed in the literatures. Relative closeness of income-poverty and consumption-poverty in Melauli suggests that, income-poverty which is supposed to cover both the food and non-food aspects of poverty is not an appropriate measure. This holds true especially when common income-poverty line is considered for two locations overlooking their situational differences. Therefore, considering the wider aspects covered by consumption-poverty such as consumption trough borrowing, bartering and using saving, it can be concluded that use of consumption poverty measure is suitable for making both spatial and temporal comparisons of the poverty. The conclusion should be further verified through the application of both poverty measures in longitudinal data to capture temporal dimension of poverty, advantages of which over cross-sectional data is widely acknowledged. Therefore, it is recommended to make poverty analysis using longitudinal data, in order to capture wider aspects of both measures as well as the poverty itself.

Reference

Asian Development Bank (2008). *Asian Development Bank and Nepal: 2008* (A fact sheet). Kathmandu, Nepal: Asian Development Bank.

Bavier, R. (2008). Reconciliation of income and consumption data in poverty measurement. *Journal of Policy Analysis and Management, 27*(1), 40-62.

Bryan, P. (2002). The mismatch between income measures and direct outcome measures of poverty. *Social Policy Journal of New Zealand*(19), 101-127.

Central Bureau of Statistics (2005). *Poverty trends in Nepal (1995-96 and 2003-04)*. Kathmandu, Nepal: Central Bureau of Statistics.

Gamba, P. (2005). Urban domestic consumption pattern for meat: trends and policy implications, Tegemeo working paper 17/2005, Nairobi, Tegemeo Institute of Agricultural Policy and Development, Egerton University, p 5.

Gradin, C., Canto, O., & DelRio, C. (2008). Inequality, poverty, and mobility: Choosing income or consumption as welfare indicators. *Investigaciones Economicas, 32*(2), 169-200.

Johnson, D. S., Smeeding, T. M., & Torrey, B. B. (2005). Economic inequality through the prisms of income and consumption. *Monthly Labor Review, 128*(11-24).

Maxwell, S., & Frankenberger, T. R. (1992). *Household food security: Concepts, indicators, measurement (A technical review)*. New York, USA, and Rome, Italy: United Nations Children's Fund, and International Fund for Agricultural Development.

Prennushi, G. (1999). *Nepal: Poverty at the turn of the twenty-first century (Main report and background studies)* (Report No. IDC 174). Washington DC, USA: The World Bank.

Rhoe, V., Babu, S., & Reidhead, W. (2008). An analysis of food security and poverty in Central Asia-Case study of Kazakhstan. *Journal International Development, 20*, 452-465.

Subedi, B. P. (2003). Population and environment: A situation analysis of population, cultivated land, and basic crops production in Nepal in 2001. *Population monograph of Nepal (Vol II)*. Kathmandu, Nepal: Central Bureau of Statistics.

United Nations Development Programme (2005). *Millennium Development Goals (MDGs) progress report, 2005*. Kathmandu, Nepal: United Nations Development Programme.

World Bank (2008a). Nepal Country Overview 2008. Retrieved September 16, 2008, from http://www.worldbank.org.np/WBSITE/EXTERNAL/COUNTRIES/SOUTHASIAEXT/NEPALEXTN/0,,contentMDK:20094195~menuPK:148707~pagePK:1497618~piPK:217854~theSitePK:223555,00.html

World Bank (2008b). Measuring poverty; defining welfare measures. Retrieved June 10, 2008, from http://go.worldbank.org/2QL8LOO410

Appendix 1. Conversion factor to compute adult equivalents

Age group	Adult equivalence		Age group	Adult equivalence	
	Male	Female		Male	Female
Under 1 Year	0.33	0.33			
1-1.99	0.46	0.46	12-13.99	0.96	0.84
2-2.99	0.54	0.54	14-15.99	1.06	0.86
3-4.99	0.62	0.62	16-17.99	1.14	0.86
4-6.99	0.74	0.70	18-29.99	1.04	0.80
7-9.99	0.84	0.82	30-59.99	1.00	0.82
10-11.99	0.88	0.78	60 and over	0.84	0.74

Source: Gamba, 2005