Poverty Dynamics in Nepal between 2004 and 2011: An Analysis of Hybrid Dataset

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Abstract

Poverty trends describe changes in poverty incidence over time; however, this can mask poverty dynamics. Poverty dynamics discusses the length of time experiencing poverty and explains about movements into and out of poverty. Evidence on poverty dynamics is important for policy makers to design appropriate anti-poverty policies. Panel data is central to obtaining a better understanding of poverty dynamics. Due to the absence of panel data, the paper constructs hybrid dataset using two rounds of cross sectional surveys in 2003/04 and 2010/11 in Nepal to assess the poverty dynamics. Incidence of poverty estimated from hybrid dataset may not be directly comparable with the estimation of poverty through conventional approach. The results indicate that chronic poverty is almost 21 percent for 2003/04 and 2010/11. Movements into and out of poverty, non- poor to poor and poor to non-poor, are 6 percent and 14 percent respectively. Almost 60 percent people are in non-poor category in both periods. Chronic poverty exists in all regions, marginalized ethnic and Dalit (occupational caste) groups. Different anti-poverty policies are required to address chronic or transitory poverty. The policies or opportunities such as increasing credit facilities, increasing access to services, remittances, or social safety net programmes that can stabilize short-term income fluctuations may be more appropriate to address transitory poverty. In contrast, the policies that are related to structural or long-term interventions such as development of basic infrastructure, increasing of social and political inclusion, redistribution of assets, increasing rates of capital accumulation among others are required to address chronic poverty.

Key Words: Poverty dynamics, transitory poverty, chronic poverty, Nepal

JEL Classification: C51, D31, D63, I32

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I.   INTRODUCTION

Recent years, poverty in Nepal has famously declined. This is warranted by a sharply decreasing trend in poverty incidence - from 41.8% in 1996 to 30.9% in 2004 and to 25.16% in 2011 (CBS, 2005; 2011). Many economists question this dramatic change in poverty levels. However, the intention of this paper is not to join the debate on the level of poverty reduction but to recognize the reduction of poverty in the country. Researches and debates on poverty should be continued to keeping poor people on the national agenda. Poverty estimates are vital input to design, monitor and implement appropriate anti-poverty policies (Haughton and Khandker, 2009).

Monetary poverty refers to quantitative measures of poverty by utilizing poverty line threshold and per capita consumption. Consumption may better reflect a household's actual standard of living and ability to meet basic needs. Actual consumption is more closely related to a person's well-being. Therefore, consumption based national poverty line is used to measure the poverty. Incidence poverty depends on the poverty lines. The poverty line plays the role as the threshold of the given level of consumption. Higher levels of threshold determine the higher level of incidence at the given per capita consumption. Therefore, low-income countries use lower level of poverty line than middle-income countries.   The choice of a poverty line is ultimately arbitrary. Consequently, measuring poverty becomes political issue.   In order to ensure wide acceptance of a poverty line, it is important that the poverty line chosen resonate with social norms, with the common understanding of what represents a minimum.

The three measures of poverty: incidence of poverty, intensity of poverty and severity of poverty are popular to estimate the levels of poverty for the country. Foster, Greer and Thorbecke (FGT) poverty index by making use of official national absolute poverty lines for per capita consumption is popular to measure the poverty level for the country. The FGT poverty index can be written as (Chaubey, 1995):

$$\text{Poverty index} = \frac{1}{N}\sum_{i=1}^{n}\left[\frac{P_L - Y_{Pi}}{P_L}\right]^{\lambda} \qquad \qquad \text{.......... (1)}$$

Where, N= size of the population of the study setting, n= number of people below poverty line, P_L = the poverty line consumption (or income); Y_{pi} = below poverty line consumption (or income). Values for λ = 0, 1, and 2, gives headcount index, poverty gap ratio and severity of poverty respectively. The index is sensitive to changes in consumption (or income) when $\lambda > 0$ and to the transfer to consumption (or income) when $\lambda > 1$. A large value of λ gives greater emphasis to the poorest poor. If λ is very large, it considers the last poorest. Hence, as λ increases the value of severity poverty decreases for a given distribution of consumption.

Incidence of poverty is the share of the population whose consumption is below the poverty line. It means that this is the portion of population that cannot afford to buy a basic basket of goods and services. It estimates the percentage of population that lives below the poverty line. Intensity of poverty is estimated by the poverty gap ratio. It

provides the information regarding how far off households are from the poverty line. Poverty gap indicates the average distance below the poverty line. In this case, non-poor have zero poverty gaps. Therefore, the measures of intensity and severity of poverty (squared of poverty gap) are important complements of the incidence of poverty. The sum of poverty gaps reflects the minimum amount of consumption that needs to be transferred to bring all the poor up to the poverty line. Poverty severity indicates not only the distance separating the poor from the poverty line (the poverty gap), but also the inequality among the poor. It is sensitive to the distribution of consumption among the poor. The squared of poverty gap considerers incidence, intensity and inequality dimensions of poverty.

The Nepal Living Standards Surveys (NLSS) I (1995/96), II (2003/2004) and III (2010/2011) that are the most systematic surveys aimed at measuring poverty levels of the country, demonstrate remarkable progress in poverty reduction. Levels of poverty (incidence, intensity and severity) have declined very sharply over the period of 15 years (Appendices). Survey methods, coverage and some definitions of consumption are frequently improved in the different rounds of surveys. Therefore, levels of poverty may not be directly comparable. Indeed, the poverty trends provide indicative results.

The figures given in appendix demonstrate the associations between incidence of poverty and socio-economic characteristics. The results suggest that the percentage of poor increases with the increase in the number of children. There is a positive association between incidence of poverty and household size. However, a negative association between incidence of poverty and education level of household head is found. The evidence confirms that poverty is a demographic phenomenon. Analysis of a single cross-sectional household data provides static nature of poverty analysis. Static analysis has a limited explanatory power about the persistence of poverty. The fluctuations of poverty trends don't explain the dynamics of poverty. In fact, comparative static methods are applied to analyze the trends of poverty.

Breadth, depth and duration are key dimensions of poverty (Clark and Hulme, 2005). As mentioned above, poverty depth expresses the distance below a poverty line. Poverty breadth refers to the multidimensionality or coverage of poverty. Poverty duration refers to the length of time experiencing poverty and explains about movements into and out of poverty (Jean-Yves et al., 2010). This is also known as poverty dynamics. Indeed, poverty dynamics captures the economic mobility of households and focuses on inter-temporal changes in poverty of the households (Ward, 2016). Nepal's economic structure has changed dramatically over last 3 decades; among the most dynamic economies recently. Consumption capabilities of the households may change over the time. Much research effort has gone into analyses of trends poverty in Nepal, but the estimation of poverty dynamics has received much less attention. The Government of Nepal has targeted to reduce poverty from current level of poverty to 6 per cent by 2030 (NPC, 2015). However, without knowing the dynamics of poverty (what is the percentage of remaining in poverty, what is the percentage of moving up from poverty, and what is the percentage of falling down into the poverty during the given period of time), it may not be realistic to target poverty reduction. Poverty that continues a long time is called chronic poverty. People who move into and out of poverty are said to experience

transitory poverty (also known as transient poverty). We need to deepen our understanding of poverty dynamics. The paper aims at making a complementary contribution on measuring poverty dynamics in Nepal inspired by the recent literature on poverty. To estimate the poverty dynamics, hybrid dataset have been constructed from the cross-sectional data: NLSS II and III.

II. METHODOLOGY

2.1   Conceptual Framework of Poverty Dynamics

Vulnerability to poverty varies across the time as well as different group of the people. While some group of the people might continuously be below the given level of a threshold or poverty line, others might only experience poverty in short but repeated episodes (Hasegawa and Ueda, 2007). Some groups never experience the poverty. There might be at least three main patterns of poverty (as shown in Figure 1): the chronically poor or always poor, the fluctuating poor or transitory poor, and the never poor. Poverty dynamics capture all these patterns and examine aggregate changes in prevalence as well as changes for particular groups and regions. The conceptual framework shows the dynamics of poverty for a long period of time (figure 1); however, the analysis of poverty dynamics captures only two periods: 2003/04 and 2010/11 because NLSS II and III are better comparable than NLSS I.

Figure 1: Conceptual framework for poverty dynamics
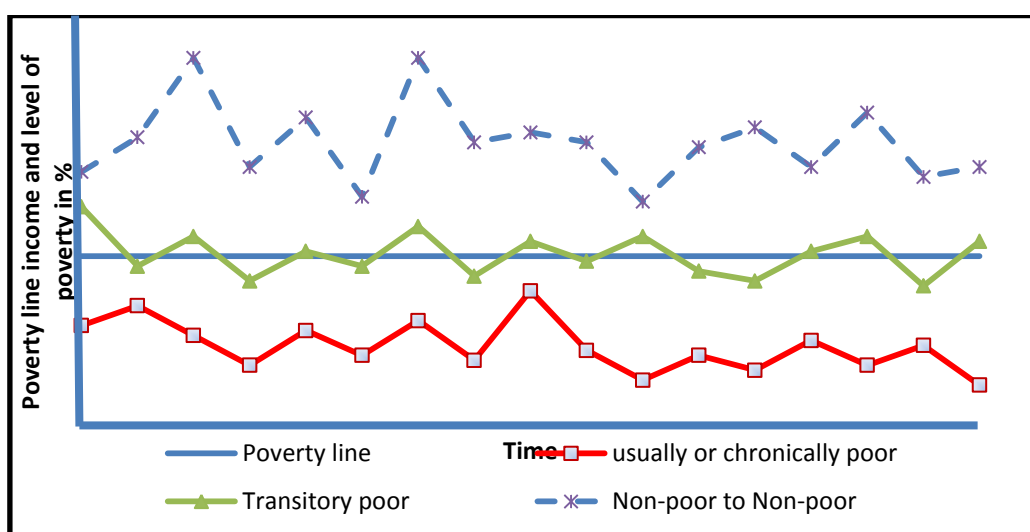
Source: Author

2.2   Methodology for Constructing Synthetic Panels

The analysis of poverty dynamics entails the identification of the same economic unit through time. It requires longitudinal data that tracks individuals or households over time. Hybrid data (synthetic panel) are used in the absence of longitudinal data to analyze the

poverty dynamics. Recently, pseudo-panel approaches are popular to create hybrid or synthetic panel data using repeated cross-sectional surveys (Cruces et al. 2014). Synthetic panels based on cohorts have been widely used to track income and consumption outcomes over time (Deaton and Paxson, 1994; Banks et al., 2001; Pencavel, 2007; Dang et al., 2014; Dang and Lanjouw, 2013). The methodology of this paper largely relies on recently developed procedures and methods of constructing hybrid dataset from cross-sectional surveys (Dang et al., 2014; Dang and Lanjouw, 2013) and a number of studies which validate the method have generally yielded encouraging findings (Dang et al., 2014; Dang and Lanjouw, 2013; Cruces et al., 2014).

It is assumed that y_{it} round t household capita consumption (where t = 1, 2) of household i and z is the poverty line. Let X_{it} be a vector of household characteristics observed in survey round $t(t = 1, 2)$ that are also observed in the other survey round for household $i, i = 1, ..., N$. These household characteristics include time-invariant variables such as household head's ethnicity, education and sex of the household heads which remain same across survey rounds.

The paper seeks to estimate the fraction of poor population in the first round of the survey who escaped poverty $P(y_{i1} \leq z_1 \ and \ y_{i2} \geq z_2)$ or remain poor $P(y_{i1} \leq z_1 \ and \ y_{i2} \leq z_2)$ in the second round of the survey, and the fraction of non-poor population in the first round of the survey who became poor $P(y_{i1} \geq z_1 \ and \ y_{i2} \leq z_2)$ or remained non-poor $P(y_{i1} \geq z_1 \ and \ y_{i2} \geq z_2)$ in the second round of the survey. $z_1 \ and \ z_2$ are poverty lines for NLSS II and III respectively. Both surveys, NLSS II and NLSS III, adopted random sampling procedures to select the households.

We can estimate the relationship between consumption and time invariant characteristics in each round:

$$y_{it} = \beta'_1 x_{it} + \varepsilon_{it} \qquad\qquad t = 1, 2. \qquad\qquad .... (2)$$

ε_{it} is an error term.

Using observations from the NLSS III round, we can predict consumption in the NLSS II round by means of the same observed vector of time-invariant or retrospective characteristics and the NLSS II round OLS estimates of parameters. Lower and upper bound estimates of poverty transitions are derived from two different sets of assumptions about the correlation (ρ) between the error term in the NLSS II round and in the NLSS III round. As suggested by Dang and Lanjouw (2013) the mobility of into and out of poverty in context of synthetic panels can be defined as follows.

a)   Probability of being poor in 2003/04 remaining poor in 2010/11.

$$P(y_{i1} \leq z_1 \ and \ y_{i2} \leq z_2) = \phi\left(\frac{z_1 - \beta'_1 x_{i1}}{\sigma_{\varepsilon_1}}, \frac{z_2 - \beta'_1 x_{i2}}{\sigma_{\varepsilon_2}}, \rho\right) \qquad .... (3)$$

b)   Probability of being poor in 2003/04 becoming non-poor in 2010/11.

$$P(y_{i1} \leq z_1 \ and \ y_{i2} \geq z_2) = \phi\left(\frac{z_1 - \beta'_1 x_{i1}}{\sigma_{\varepsilon_1}}, -\frac{z_2 - \beta'_1 x_{i2}}{\sigma_{\varepsilon_2}}, -\rho\right) \qquad .... (4)$$

c)   Probability of being non-poor in 2003/04 becoming poor in 2010/11.

$$y_{i1} \geq z_1 \ and \ y_{i2} \leq z_2) = \phi\left(-\frac{z_1 - \beta_1'x_{i1}}{\sigma_{\varepsilon_1}}, \frac{z_2 - \beta_1'x_{i2}}{\sigma_{\varepsilon_2}}, -\rho\right) \quad \text{.......... (5)}$$

d)   Probability of being non-poor in 2003/04 becoming non-poor in 2010/11.

$$P(y_{i1} \geq z_1 \ and \ y_{i2} \geq z_2) = \phi\left(-\frac{z_1 - \beta_1'x_{i1}}{\sigma_{\varepsilon_1}}, -\frac{z_2 - \beta_1'x_{i2}}{\sigma_{\varepsilon_2}}, \rho\right) \quad \text{.......... (6)}$$

We need to repeat the procedure R times and take average of above equations in order to estimate movements in and out of poverty because there is randomly drawn distribution of estimated errors. Sampling errors were calculated using bootstrap method and bootstrap standard errors were calculated with 1000 replications.

2.3   Data Sources and Poverty Lines

The paper used to analyze two cross sectional rounds of the household Surveys: NLSS II in 2003/04 and NLSS III in 2010/11). Both surveys were implemented by the Central Bureau of Statistics (CBS) with support of World Bank. Both surveys were nationally representative with the sampling unit at the household level. NLSS II enumerated 3912 households from 326 Primary Sampling Units (PSU) of the country. NLSS III enumerated 5988 households from 500 PSU. Both surveys followed the Living Standards Measurement Survey methodology developed and promoted by the World Bank. Both surveys provide details of consumption related information. Official poverty lines are used for both surveys. Following official poverty lines are used while estimating the poverty dynamics (tables 1 and 2). Nepalese rupees (Rs.) 7696 and Rs. 19,261 are average poverty lines for NLSS II and NLSS III respectively.

Table 1: Poverty lines for 2003/04

Analytical domain	Food (in Rs)	Non-food (in Rs)	Total (in Rs)
Kathmandu	6722.0	4334.8	11056.8
Other urban	4919.2	2981.9	7901.1
Rural Western Hill	5613.0	3288.5	8901.5
Rural Eastern Hill	5311.2	2758.5	8069.7
Rural Western Terai	4308.4	3110.0	7418.4
Rural Eastern Terai	4323.2	1755.6	6078.8
Nepal	**4966.4**	**2729.4**	**7695.8**

Source: World Bank, 2006

Table 2: Poverty lines for 2010/11

Analytical domain	Food (in Rs)	Non-food (in Rs)	Overall (in Rs)
Mountains	13295	6564	19859
Kathmandu Urban	14610	26323	40933
Urban Hill	11805	7772	19577
Urban Terai	11743	9390	21133
Rural Hills Eastern	12297	4254	16551
Rural Hills Central	12240	6448	18688
Rural Hills Western	12537	5891	18428
Rural Hills Mid and Far Western	11772	4583	16355
Rural Terai Eastern	11333	5524	16857
Rural Terai Central	11257	6283	17540
Rural Terai Western	10600	5398	15998
Rural Terai Mid and Far Western	10998	6321	17319
Nepal	**11929**	**7332**	**19261**

Source: CBS, 2011

III. ESTIMATION OF POVERTY DYNAMICS

3.1 Overall Poverty Mobility

The results of poverty dynamics between the periods of 2003/04 and 2010/011 for Nepal exhibit that almost twenty one per cent populations remain in poor state in both periods. Similarly, 58 per cent populations are in non-poor to non-poor category. Transition from poor state to non-poor state is higher than non-poor to poor between two periods. This means that more people are getting out of poverty in 2010/11. Movements into and out of poverty are almost 20 percent (sum of poor to non-poor and non-poor to poor).

Table 3: Overall Poverty Dynamics for 2003/04 and 2010/11

SN	Categories	Poor / Non-poor in %	Standard Error
1.	Poor to Poor	20.9	0.009
2.	Poor to Non-Poor	14.4	0.014
3.	Non-poor to Poor	06.4	0.009
4.	Non-poor to Non-poor	58.2	0.014

Source: Author

3. 2 Poverty Mobility for Population Sub-groups

The result exhibits in table 4 that the percentage of non-poor to non-poor is lowest for mountain (53 %). Almost one fifth populations fall into chronic poverty for all ecological belts. The percentage of non-poor to poor (13%) for mountain belt is higher than the percentage of poor to non-poor (10.7%). It indicates that there is a higher probability of increasing poverty. The chronic (or permanent) poverty for Terai and Eastern region are found higher than other belts or development regions. The results indicate that almost 60 percent people are in non-poor to non-poor category. In average, almost 20 percent people are in poor to poor category or chronically poor and remaining 20 percent are in

transitory poor. It suggests that almost 40 percent people are vulnerable for poverty. However, this average percentage can hide regional disparity. In the far western region, more than 27 percent are chronic poor (table 4). Fourteen percent people move from non-poor to poor category between 2003/04 to 2010/11. The chronic poverty is concentrated on Dalit, Disadvantaged non-Dalit Terai caste and Disadvantaged Janajatis. Almost 11 percent Dalit move to non-poor to poor category whereas only nine percent move from poor to non-poor category.

Table 4: Overall Poverty Dynamics for Population Sub-groups

| SN	Population Sub-groups	Poor to poor		Poor to Non-poor		Non-poor to Poor		Non-poor to Non-poor	
Ecological Belts in % (Standard Error)									
1	**Mountain**	23.3	(0.014)	10.7	(0.016)	13.0	(0.015)	53.0	(0.018)
2	**Hill**	18.8	(0.008)	16.1	(0.015)	04.8	(0.008)	60.4	(0.015)
3	**Terai**	23.4	(0.011)	12.9	(0.014)	07.6	(0.010)	56.1	(0.015)
Development regions (Standard Error)									
1	**Eastern**	24.9	(0.011)	12.5	(0.015)	07.1	(0.011)	55.5	(0.016)
2	**Central**	16.2	(0.008)	19.0	(0.015)	03.1	(0.008)	61.7	(0.015)
3	**Western**	19.6	(0.011)	14.4	(0.016)	05.5	(0.010)	60.5	(0.016)
4	**Mid-western**	26.0	(0.012)	09.9	(0.015)	11.7	(0.013)	52.4	(0.016)
5	**Far-western**	27.4	(0.014)	06.1	(0.015)	14.0	(0.014)	52.5	(0.016)
Place of Residence in % (Standard Error)									
1	**Urban**	12.9	(0.007)	22.3	(0.015)	01.6	(0.006)	63.2	(0.014)
2	**Rural**	26.5	(0.014)	09.5	(1.014)	09.7	(0.012)	54.3	(0.015)
Caste (Standard Error)									
1	**Dalit**	27.6	(0.012)	09.1	(0.015)	10.9	(0.013)	52.5	(0.015)
2	**Disadvantaged Janajatis**	26.8	(0.012)	09.6	(0.014)	09.9	(0.012)	53.7	(0.015)
3	**Disadvantaged Non dalit Terai caste**	27.0	(0.013)	11.5	(0.015)	07.6	(0.012)	53.9	(0.016)
4	**Religious Minorities**	22.8	(0.014)	10.9	(0.018)	10.4	(0.015)	55.9	(0.018)
5	**Relatively advantaged Janajatis**	12.7	(0.007)	21.2	(0.016)	01.8	(0.006)	64.2	(0.016)
6	**Upper caste groups**	17.5	(0.009)	17.3	(0.015)	04.4	(0.008)	60.7	(0.015)

Source: Author

3. 3 Sensitivity Analysis

Levels of poverty are estimated using the official poverty lines as mentioned in tables 1 and 2. Poverty lines may be arbitrary for the place of residence or geographical regions. Poverty line is obviously a matter of judgment. Researchers should not impose their own judgment but rather should present results for a range of values of poverty line. On the other hand, to measure global poverty, various poverty lines for example, US$ 1/ day (at 1985 PPPs); US$ 1.08/ day (at 1993 PPPs); US$ 1.25/ day (at 2005 PPPs) and US$ 1.90/day (at 2011 PPPs) (Ferreira, 2015) are in practice. A range of poverty lines derived from the official poverty lines may allow to comparing the incidence of poverty with the incidence of global poverty. A range of values of poverty lines are used while estimating levels of poverty for four different categories. An index of 100 indicates existing official poverty line. Official poverty lines for both periods are decreased by 10 per cent and increased by 10 percent in three times to make a range of the poverty lines. The results show that levels of chronic poverty are increased as increased in poverty lines. Levels of

transitory poverty (sum of poor to non-poor and non-poor to poor) are at almost constant as increased in poverty lines. However, levels of poor to non-poor are decreased (non-poor to poor are increased) as increased in poverty lines.

Figure 2: Sensitivity of dynamics of overall poverty
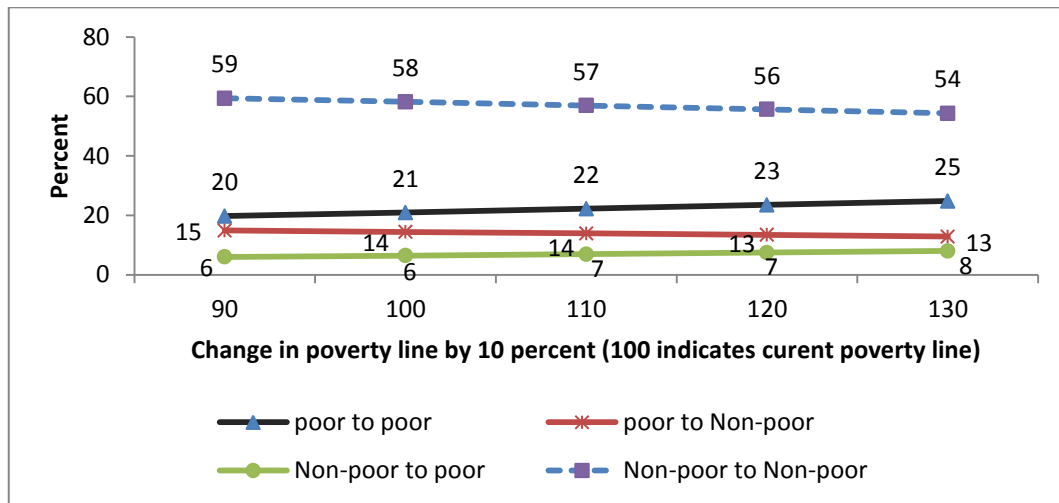
Source: Author

IV. DISCUSSIONS AND CONCLUDING REMARKS

The starting point for reducing poverty in the country is to provide accurate and up-to date data on measuring poverty. A large corpus of cross-sectional poverty studies is found in the literature. An analysis of trends of poverty from the cross sectional data may not be sufficient to design appropriate anti-poverty policies. Poverty is not a static phenomenon. Dynamic analysis of poverty highlights poverty duration and movements into and out of poverty. Panel data is central to obtaining a better understanding of poverty dynamics. Due to absence of actual panel data for Nepal, the paper applies recently developed statistical method by Dang et al. (2014) and Dang and Lanjouw (2013) to construct synthetic panel data using two rounds of cross sections in 2003/04 and 2010/11 to measure poverty dynamics. Under reasonably standard assumptions, the time-invariant household characteristics in the two cross sections can function as the panel connectors that are employed to construct synthetic panel households. Measuring poverty dynamics is widely accepted in recent years because it may cover the processes that are central to the persistence of poverty and its reduction. Dynamic analysis may help to understand between permanent and transient poverty that is important from a policy point of view (Ward, 2016).

The results indicate that almost 40 percent of the populations are vulnerable for poverty in Nepal. Out of this, almost 21 percent are in chronic poverty. There has been hardly any decline in poverty for the Dalit households. Chronic poverty is concentrated on Dalit and some ethnic groups.

Poverty in Nepal is compounded by general uncertainty with respect to livelihood and life, which threatens an even wider section of the population than might be counted as poor. Poverty is an extremely complex phenomenon, which manifests itself in a range of overlapping and interlinked among economic, political and social deprivations. Benefits of development are not widely spread to various sections in society. Some are left behind and some others are not touched by the benefits of development. Various reasons including social structure, planning process and government mechanisms, geographical location among others are responsible for the uneven development in the country. Consequently, chronic poverty in Nepal is unexpectedly high.

Chronic poverty is usually understood as related to structural characteristics of the households and the environment because they experience deprivation over many years, often over their entire lives. In this case, efforts should be paid to design the policies to address the structural problems. It requires long-term and costly interventions such as development of basic infrastructure, redistribution of assets, increasing of economic, social and political inclusion, increasing rates of capital accumulation among others. Transient poverty is usually understood as the result from temporary bad fortunes that reverse when better times arrive. In this case, policies such as increasing credit facilities, increasing access to services, remittances, social safety net programmes that can stabilize short-term income fluctuations may be more appropriate. Differentiating between whether poverty is largely transient or permanent has implications when assessing overall progress toward development goals. Current reduction of poverty in Nepal is generally attributed to the driver of out-migration and is reflected in a sharp growth in the remittances. Remittances can contribute to reduce transient poverty because remittances can play as insurance to support the family against adverse risks and shocks at home.

REFERENCES

Banks, J., R. Blundell, and A. Brugiavini. 2001. "Risk Pooling, Precautionary Saving and Consumption Growth". *Review of Economic Studies*, 68(4): 757-779.

Central Bureau of Statistics (CBS). 1996. *Nepal Living Standard Survey 1995/96: Statistical Report.* Volume I & II. Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (CBS). 2004. *Nepal Living Standard Survey 2003/04: Statistical Report.* Volume I & II. Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (CBS). 2005. *Poverty Trends in Nepal (1995-96 and 2003-04).* Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (CBS). 2011. *Nepal Living Standard Survey 2010/11: Statistical Report.* Volume I & II. Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.

Central Bureau of Statistics (CBS). 2011. *Poverty in Nepal.* Central Bureau of Statistics, National Planning Commission Secretariat, Kathmandu, Nepal.
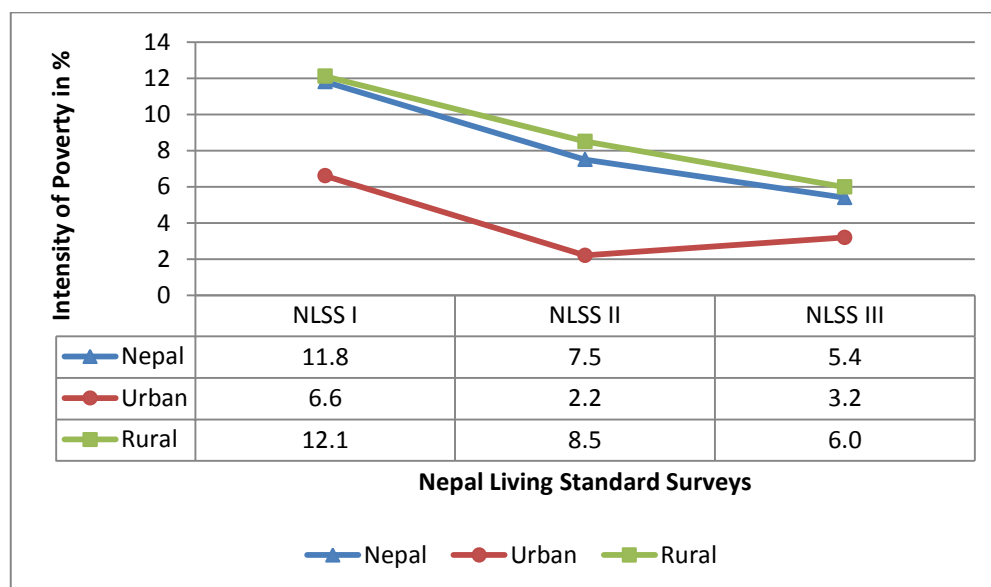
Chaubey, P. K. 1995. *Poverty Measurement: Issues, Approaches and Indices*, New Delhi, India, New Age International (P) Limited publications

Clark, D. and D. Hulme. 2005. "Towards A Unified Framework for Understanding the Depth, Breadth and Duration of Poverty Global Poverty" *Working paper GPRG-WPS-020* Research Group and Institute for Development Policy and Management University of Manchester, UK.

Cruces, Guillermo, Peter Lanjouw, Leonardo Lucchetti, Elizaveta Perova, Renos Vakis, and Mariana Viollaz. 2014. "Estimating Poverty Transitions Repeated Cross-Sections: A Three-country Validation Exercise". *Journal of Economic Inequality*, DOI 10.1007/s10888-014-9284-9.

Dang, Hai-Anh and Peter Lanjouw. 2013. "Measuring Poverty Dynamics with Synthetic Panels Based on Cross-Sections". *World Bank Policy Research Working Paper No. 6504*. World Bank

Dang, Hai-Anh, Peter Lanjouw, Jill Luoto, and David McKenzie. 2014. "Using Repeated Cross-Sections to Explore Movements in and out of Poverty". *Journal of Development Economics*, 107: 112-128.

Deaton, A. and C. Paxson. 1994. "Inter-temporal Choice and Inequality". *Journal of Political Economy*, 102(3): 437- 467.

Ferreira Francisco H. G. 2015. "Measuring Global Poverty Past, Present and Future". *DECRG Policy Research Talk*: November 30.

Hasegawa, H. and K. Ueda. 2007. "Measuring chronic and transient components of poverty: a Bayesian approach" *Empirical Economics* 33:469–490.

Haughton J. and S.R. Khandker. 2009. *Hand book on poverty and inequality*. The International Bank for Reconstruction and Development The World Bank Washington, DC

Jean-Yves D., J., A. Araar, J. Giles. 2010 "Chronic and transient poverty: Measurement and estimation, with evidence from China." *Journal of Development Economics* 91: 266–277.

National Planning Commission (NPC). 2015. *Sustainable development goals 2016-2030 National (preliminary) report.* National planning commission, Government of Nepal, Kathmandu

Pencavel, J. 2007. "A Life Cycle Perspective on Changes in Earnings Inequality among Married Men and Women". *Review of Economics and Statistics*, 88(2): 232-242.

Ward P.S. 2016. "Transient Poverty, Poverty Dynamics, and Vulnerability to Poverty: An Empirical Analysis Using a Balanced Panel from Rural China." *World Development* Vol. 78, pp. 541–553.

World Bank. 2006. "Nepal Resilience Amidst Conflict An Assessment of Poverty in Nepal, 1995–96 and 2003–04" *Report No. 34834-NP* Poverty Reduction and Economic Management Sector Unit, South Asia Region, World Bank

Appendix I: Trend of Incidence of Poverty

	NLSS I	NLSS II	NLSS III
Nepal	41.8	30.9	25.2
Urban	21.6	9.6	15.5
Rural	43.3	34.6	24.5
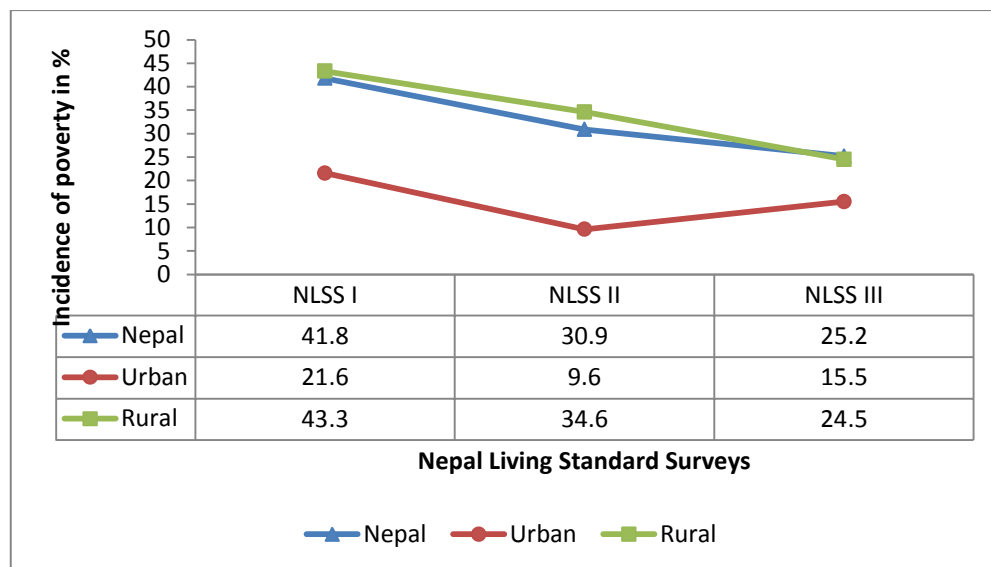
Source: CBS, 1996; 2004; and 2011

Appendix II: Trend of Intensity of Poverty

	NLSS I	NLSS II	NLSS III
Nepal	11.8	7.5	5.4
Urban	6.6	2.2	3.2
Rural	12.1	8.5	6.0

Source: CBS, 1996; 2004; and 2011

Appendix III: Trend of Severity of Poverty

	NLSS I	NLSS II	NLSS III
Nepal	4.7	2.7	1.8
Urban	2.7	0.7	1.0
Rural	4.8	3.1	2.0

Nepal Living Standard Surveys

Legend: Nepal — Urban — Rural
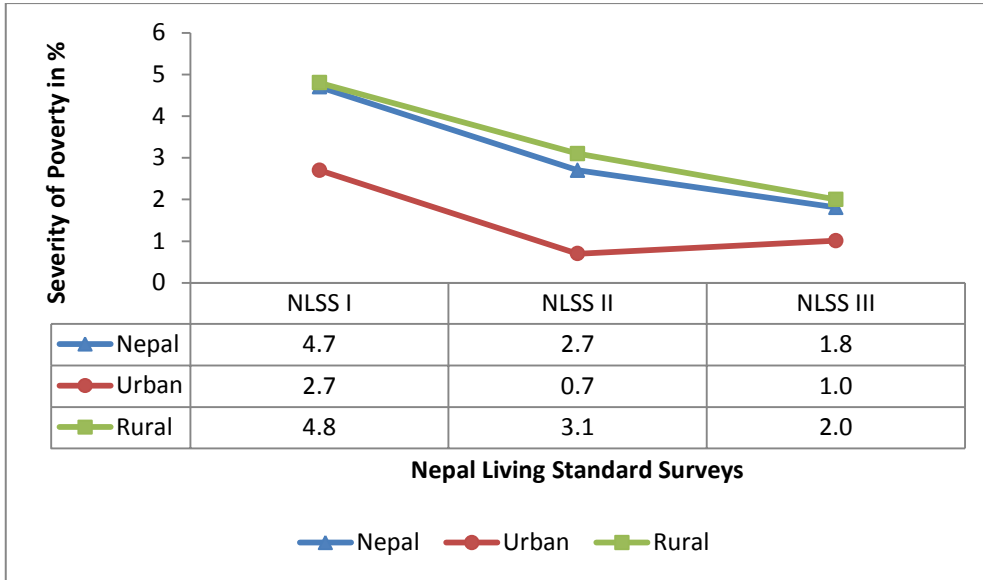
Source: CBS, 1996; 2004; and 2011

Appendix IV: Poverty and Levels of Education

	Illiterate	5 or less	6 to 7	8 to 10	11+
NLSS I	50.9	35.7	28.5	19.8	11.4
NLSS II	42.0	28.2	23.3	8.4	1.6
NLSS III	33.5	27.0	19.5	12.9	7.1

Levels of Education

Legend: NLSS I — NLSS II — NLSS III
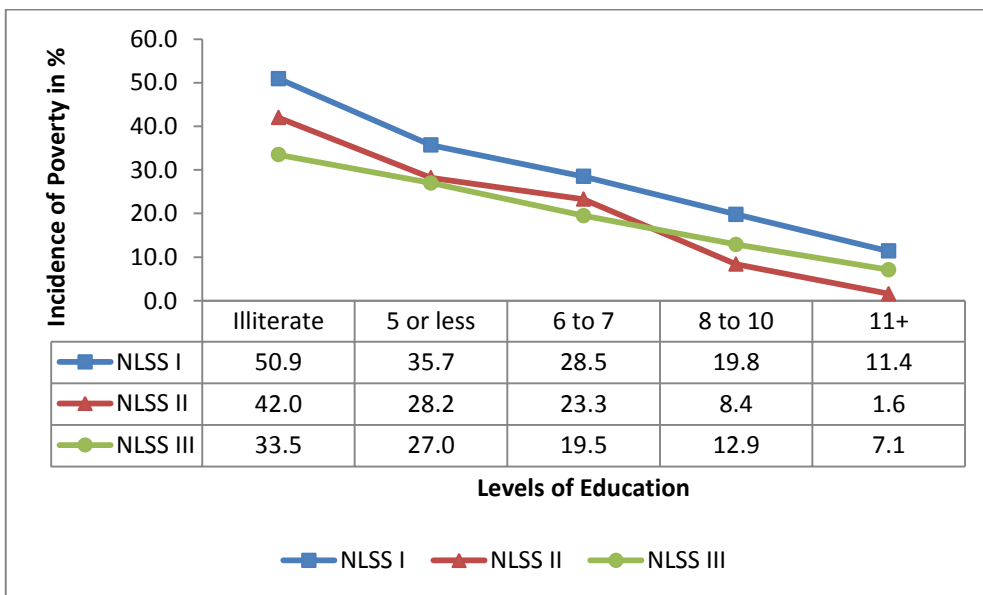
Source: CBS, 1996; 2004; and 2011

Appendix V: Poverty and Household Size

	1	2	3	4	5	6	7 or more
NLSS I	7.7	14.5	22.9	28.1	35.9	43.8	49.7
NLSS II	7.2	11.0	11.7	19.3	24.9	33.5	41.4
NLSS III	3.3	7.4	7.5	12.8	21.1	32.4	37.6

Household Size
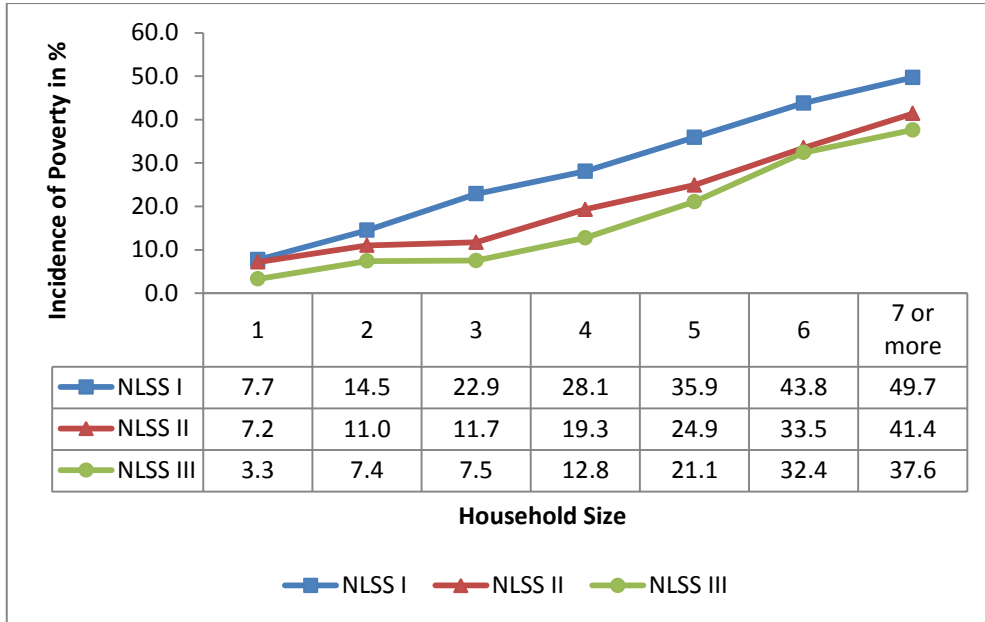
Source: CBS, 1996; 2004; and 2011

Appendix VI: Poverty and Number of Children

	0	1	2	3 or more
NLSS I	23.5	39.9	49.4	56.9
NLSS II	13.7	29.3	41.6	54.0
NLSS III	12.3	25.2	41.5	46.6

Number of Children

Source: CBS, 1996; 2004; and 2011