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Assessing environmental dependence using asset and income measures: Evidence from Nepal

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ABSTRACT

Understanding rural environmental dependence in a rural population is an important factor in the framing of environmental policy with the dual aim of tackling poverty and conserving nature. Firstly, this study compares the assessment of environmental dependence between poverty groupings based on income and asset measures. Using a composite asset index, we were able to distinguish the asset poor from the asset non-poor. We then combined income data with the asset index, enabling us to disentangle the stochastic and structural nature of poverty. The distribution of poor and non-poor households based on income measures was significantly different from that based on asset measures. The income poor are substantially more dependent on environmental resources than the income non-poor (about 15% difference) while strikingly minimal difference was observed in environmental dependence between the asset poor and non-poor (less than 2% difference). The level of environmental dependence between the poor and non-poor households differs with the choice of welfare measure and combining two of these measures to identify wealth groups provides policy makers with better insight on the variations in environmental dependence.

1. Introduction

Though forests are an integral part of the livelihood of rural households in developing countries, not all rural households are equally dependent on environmental resources. Numerous studies have indicated that the poorer part of rural society is more reliant on the natural resource base, while the richer portion of the society extracts more resources from the environment (Angelsen et al., 2014; Babulo et al., 2009; Heubach et al., 2011; Lepetu et al., 2009; Vedeld et al., 2007; Walelign, 2013), with few notable exceptions (Uberhuaga et al., 2012). A higher dependence on environmental income means that it constitutes a larger share of total income in poorer households. Two facts that prevail in rural areas are mentioned to be responsible for this. First, rural poor households often face an uphill battle to participate in remunerative income generating activities and end up with low return from most activities they engage in. Nonetheless, forests play a more important role in the livelihood of the rural poor than the richer households. Second, poor households have restricted access to key and high value environmental resources (e.g. timber) (Adhikari et al., 2004a, 2004b). As a result, the rural poor often extract environmental products that have lower market values and lower contribution to total income accounting.

Environmental dependence involves households' reliance on the extraction of forest and other non-cultivated environmental resources as another source contributing to households' total income. It is a crucial factor in rural households' coping strategy in times of income/consumption shortfalls (e.g. agricultural slack seasons, negative shocks) and may also play a role in helping move out of poverty through contribution to the accumulation of assets (Angelsen and Wunder, 2003; Vedeld et al., 2007). These contributions of the environment are measured in monetary terms and constitute environmental income in rural households' total income accounting (see e.g. Babulo et al., 2009; Fisher, 2004). Here we use the term 'environmental income' for income from forest and non-forest environmental resources while some other papers (see e.g. Babulo et al., 2009) used the term 'forest and environmental income' instead. On a global average, rural households can exhibit a level of environmental dependence as high as 28% of their total income (Angelsen et al., 2014).

Income has been used as a basis for defining various wealth categories and for investigating the difference in the level of environmental dependence among these categories. Prado Córdova et al. (2013), Hogarth et al. (2013), Yemiru et al. (2010) and Mamo et al. (2007) used income quintiles, Rayamajhi et al. (2012) and Babulo et al. (2009) used income quartiles, Heubach et al. (2011) used income terciles and Walelign (2013) used two poverty groups. Unlike these previous studies, in this paper, we employ both asset and income welfare (instead of just income) to define wealth categories. There are two fundamental reasons for this, both related to the seasonal and transitory nature of income. First, it does not permit any prediction on long-term wellbeing of households (Nielsen et al., 2012, 2013). Accordingly, it does not reflect households' actual level of dependence on

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environmental resources as this might be determined substantially by the income shocks, whether positive or negative. Second, although income measures can provide information on who is non-poor and who is poor, it does not by itself accurately identify the various categories among the non-poor and the poor.[1]

Nielsen et al. (2012) used a method of combining income and asset information to assess environmental dependence. They first defined income and asset quintiles and then assigned households into chronic poor, transient poor, transient non-poor and chronic non-poor by comparing these income and asset quintiles. Two limitations stand out with this method. First, they simply compared the income and asset quintiles to define the wealth categories with no clear threshold defining the categorization, especially in identifying the transient poor from the chronic poor and transient non-poor from the chronic non-poor. Second, they considered only physical and financial assets (e.g. the value of implements and the value of small domestic animals) that can be easily measured and quantified. They did not consider other assets (such as human capital and social capital) in generating asset quintiles. As a result, their method does not include some very important assets in the form of human and social capital which can affect households' wealth status (see Winters et al., 2009 for detailed discussion).

In this paper, we included a wider range of assets in our assessment of households' wealth status — such as education of the household head, highest education attained in the household, age of the household head, trust and help in the community and number of household adult members. Firstly, we compare the poverty distributions (poor and non-poor) based on asset measures as opposed to income measures. Secondly, we provide a more in-depth understanding of the poor and non-poor categories in the study population by combining the traditionally used income measure with a measure of households' asset endowments. We then revisit the issue of environmental dependence and its variation between the poor and non-poor, which is important in the framing of forest policy aimed at tackling poverty and conserving nature. These objectives are achieved using a three year panel dataset, collected under the Community based Natural Forest and Tree Management in the Himalaya (ComForM) project using the Poverty Environmental Network (PEN) data collection instruments in Nepal.

One challenge of combining asset and income measures, to capture the transitory nature of poverty in our assessment of environmental dependence, is the creation of a composite asset index as different types of assets are measured in different units. In the current study we employed the livelihood weighted approach (Adato et al., 2006) to derive a single asset index as this approach has some important advantages which we highlight later. This enables us to use the combination of income and assets to add to the knowledge base on environmental dependence in rural populations through the empirical analysis of its variation among the non-poor and poor sections of the population. We used the national poverty line as a threshold to determine household's poverty status (poor or non-poor).

The remainder of the paper is organized as follows. In Section 2 we describe the distinction between the structural and stochastic nature of poverty while the methodology in presented in Section 3. The results from our case study country is presented in Section 4 and then discussed in Section 5. We conclude in Section 6.

2. Distinguishing stochastic from structural nature of poverty

Using income/consumption measures to inform on the welfare of a population was the norm for many years and is still being practiced today, although more and more with support from other measures (Adato et al., 2006; Naschold, 2012, 2013; Nielsen et al., 2012). However, asset based poverty measures are generally considered more suitable for forward looking policy design because a household's economic well-being is dependent on the composition of its asset endowments (Naschold, 2012) and can also be seen as a measure of structural well-being (Carter and May, 2001). Another forward looking approach in the literature includes the assessment of households' vulnerability to poverty (Haughton and Khandker, 2009; Ligon and Schechter, 2003; Morduch, 1994). This approach often measures the probability that households fall into income/consumption poverty based on households' income/consumption expenditure, its variance (risk) and the monetary poverty line, and on the basis of the estimated probability households are categorized into different vulnerability categories. In shortly, often a household is labelled as vulnerable if its estimated probability of falling into poverty is greater than the average of the estimated probability of falling into poverty (Haughton and Khandker, 2009). This analysis has often been entirely based on income or consumption poverty. However, the growing literature on other poverty measures has highlighted the weaknesses of monetary (i.e. income/consumption) poverty measures while trying to fill the knowledge gaps, answering questions left unanswered by these measures. Sahn and Stifel (2003) and Carter and Barrett (2006) summarized the weakness of income/consumption poverty measures as being unable to distinguish those who were poor because they did not have the required asset base to allow them to exit poverty from those who were poor because of some unexpected event (shock). Similarly, they were unable to distinguish those who were non-poor and could be expected to remain non-poor from those who were temporarily non-poor and would soon drop below the poverty line, again because they did not have the required asset base to allow them to sustain a non-poor status. The use of monetary poverty measures combined with asset poverty measures is a method that allows the distinction between these two groups of poor and non-poor in a given population (structural and stochastic poor and non-poor).

The structural poor are households that have low incomes and low asset endowments, while the stochastic poor are households that are considered poor by chance (i.e. have low incomes), but have an asset base to be non-poor in the future. The structural non-poor include households that are non-poor because of income measures and also have high asset endowments, while the stochastic non-poor are households that are registered as non-poor by chance (i.e. have high incomes) but do not have the asset base to stay non-poor in the future. By definition, these categories exhibit different characteristics and this is true in their levels of environmental dependence. The importance of identifying these groups in a population has been addressed in other studies (Adato et al., 2006; Carter and May, 2001; Naschold, 2012, 2013), however no study has thus far attempted to analyse the variation in environmental dependence between them.

Three steps were followed to distinguish the two types of poor and the two types of non-poor. Firstly, we determine households income

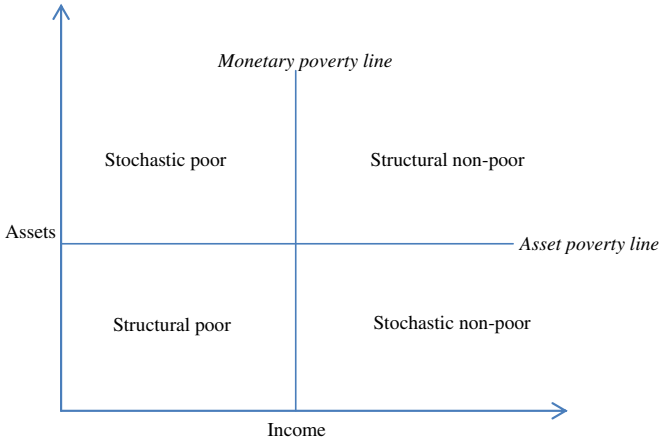

Fig. 1. Stochastic and structural poverty grouping.

[1] We acknowledge the multi-dimensional nature of poverty which may allow deprivations in health and nutrition to be considered as part of an expanded poverty concept (Morduch, 1994) that is not being accounted for in our analysis.