Environmental income improves household-level poverty assessments and dynamics

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ABSTRACT

Household-level poverty assessments and analyses of poverty dynamics in developing countries typically do not include environmental income. Using household (n = 427 in 2006, 2009 and 2012) total income panel data sets, with and without environmental income, from Nepal, we analysed the importance of environmental income in household-level poverty assessments (Foster-Greer-Thorbecke indices) and dynamics (movements in the Poverty Transition Matrix). Random effects logit and ordered logit models were applied to estimate variables covarying with poverty categories and compared for annual household incomes with and without environmental income. Using the without environmental income data set significantly changed the number of households classified as poor, as well as rates of movements in and out of poverty. Excluding household-level environmental income also distorted estimation of covariates of poverty incidence and poverty dynamics. Poverty incidence and dynamics models including environmental income perform better than those without. Rural poverty studies based on welfare measures excluding environmental income may thus be inaccurate for environmental reliant communities.

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1. Introduction

Poverty reduction in developing countries has been a global priority for more than four decades and its continued relevance is affirmed by the adoption of the Sustainable Development Goals and the UN commitment to pursue poverty eradication (United Nations, 2015). The success of poverty reduction strategies greatly depends on our abilities to target the poor (Krantz, 2001) and the causes of poverty (Krishna, 2007). To achieve this as fast and cheap as possible, we need to understand the nature of poverty and we need to be able to measure it. This paper contributes to enhance the methodological quality of poverty assessments.

Rural livelihoods in developing countries commonly rely on environmental income – mainly from consumptive use of environmental resources (e.g., Byron and Arnold, 1999; Ellis, 2000a; World Bank, 2004). A recent global study estimates that environmental income on average accounts for 28% of rural households' total subsistence and cash income (Angelsen et al., 2014). This income source is currently not captured by standard household surveys, such as the World Bank's Living Standard Measurement Survey, widely used to provide data for poverty assessments (Grosh and Glewwe, 2000). This could, e.g., lead to overestimation of rural, as compared

to urban, poverty (Maltsoglou and Taniguchi, 2004; van der Ploeg, 2012) and inappropriate policy measures (Vedeld et al., 2007). Environmental income generally contributes relatively more to poorer households (Angelsen et al., 2014) and its inclusion in poverty assessments may therefore lead to improved understanding of rural poverty and subsequently more appropriate interventions.

Two decades ago, poverty measures were based on data from cross-sectional household surveys, yielding static snapshots of poverty. The growing availability of panel data sets in the past decade has allowed analysis of the dynamic nature of household poverty. Households move into and out of poverty, e.g. as they experience changes in demographics and access to other livelihood strategies (Baulch and Hoddinott, 2000; Baulch, 2011; Cruces and Wodon, 2003; Dartanto and Nurkholis, 2013; Dhamija and Bhide, 2011; Haddad and Ahmed, 2003; Kedir and Mckay, 2005; Lohano, 2009; May and Woolard, 2007; Muller, 2003; Nega et al., 2010; Woolard and Klasen, 2005). This was originally conceptualized in the spells of poverty approach (Bane and Ellwood, 1986) providing the foundation for understanding the temporal dimension of poverty, as permanent versus transient, leading to work uncovering factors inducing or preventing poverty in given temporal and spatial contexts (e.g. Krishna, 2010).

The aim of the present paper is to analyse the importance of including environmental income in total household income when undertaking household-level poverty assessments in developing countries. Using an

environmentally-augmented household income panel data set from Nepal, we compare poverty assessment and dynamic estimates with and without environmental income. This also allows us to explicitly investigate the role of environmental income in households' movements out of poverty.

1.1. Poverty dynamics, livelihoods, and environmental income

Poverty is multi-dimensional and can be measured in many ways. As our focus is on economics, we adopt a narrow monetary approach to poverty, e.g. ignoring issues related to capabilities, social exclusion, and participation (Laderchi et al., 2003). In this, we follow most previous poverty dynamics studies and subscribe to the microeconomic assumptions that: human behaviour follows rationales of utility maximization, that expenditures reflect the marginal value people place on commodities, and that income and expenditure data can be seen as proxies for consumption, a measure of wellbeing (Laderchi et al., 2003).

The generally accepted spells of poverty approach (Bane and Ellwood, 1986) argues that poverty is either transient, meaning that households experience periods (spells) of poverty interspersed with periods of non-poverty, or persistent. Policy responses to these two forms of poverty are likely to differ: transient poverty should be addressed through insurance and income stabilization schemes (Lipton and Ravallion, 1995) while increases in human and physical assets may be more relevant to overcome chronic poverty (Jalan and Ravallion, 2000). Poverty analysis should hence distinguish household-level transient and chronic poverty.

Panel data studies have adopted different approaches to categorizing households depending on the number of waves: (i) in two waves studies, households are categorized as chronic poor if they are poor in both waves (Baulch and Hoddinott, 2000); (ii) in three waves studies, the chronic poor households are those classified as poor over two periods (Jalan and Ravallion, 2000); and (iii) in studies with at least four waves, the chronic poor can be identified through trajectories (Baulch, 2011; Calvo and Dercon, 2007; Duclos et al., 2010; Foster, 2007, 2009; Porter and Quinn, 2008). Few data sets of more than two waves are currently available and the spells approach is still the most commonly used. However, although some panel data sets are available, an important gap in the literature is lack of environmentally-augmented income data sets in studies of poverty dynamics in rural communities of developing countries; with the exceptions of panel data sets from Cambodia (Jiao, 2015) and Malawi (Chilongo, 2014) and pseudo-panel data from repeated cross-sections from different households in the same village in Uganda (Jagger, 2010). Given the importance of environmental income to rural livelihoods, this may limit the effectiveness of policy interventions guided by studies that do not include this income source.

A number of key conceptual questions must be answered before undertaking analyses of economic mobility (Baulch and Hoddinott, 2000). Which economic metric should be used to assess the level of wellbeing? Income is widely used but criticised for its stochastic nature (Nielsen et al., 2013) and failure to reflect consumption (Bradbury et al., 2001); while consumption tends to have a lumpy nature (Lister, 2004). Second, when are households poor? Poverty lines – the minimum income required for an adequate life – estimated based on costs for location-specific baskets of goods, assume that households below the line (the poor) experience qualitatively different lives compared to those above the line (the non-poor). This assumption is found in both economic, rights based, and capability approaches to poverty (Laderchi et al., 2003). Third, what should be the unit of analysis? Typically, income surveys focus on the household as individuals in a household are assumed to pool their resources and have the same living standards; households are commonly defined based on kin and cohabitation (Ellis, 2000a). In this study, the metric of welfare is the annual household income per adult equivalent unit (Cavendish, 2000) and households are defined as poor when below the national poverty line.

Rural development thinking has in the last decades commonly applied a livelihoods perspective (Ellis, 2000a; Scoones, 2015). This implies a focus on people's assets, i.e. their basis for constructing a livelihood, their access to livelihood strategies, as mediated by factors such as institutions, the realized livelihood portfolio, and resulting outcomes. Livelihood investigations focus on how people make a living, rather than simply identifying the poor, and thus have the potential to more accurately inform poverty reduction strategies. Almost all livelihood studies, however, have been based on static data, i.e. snapshots of livelihood situations (Scoones, 2009), and have rarely included environmental income. The latter is here defined as the "capture of value added in alienation or consumption of natural capital within the first link in a market chain, starting from the point at which the natural capital is extracted or appropriated" (Sjaastad et al., 2005; pp. 45). This income source appears of high economic importance to poorer rural livelihoods in developing countries (e.g. World Bank, 2004; Angelsen et al., 2014). Many environmental products are used mainly for subsistence, e.g. fodder, wood for tools and wild foods, while firewood, timber and a few other products provide the bulk of cash incomes (e.g. Ameha et al., 2014; Angelsen et al., 2014; Christensen et al., 2008; Meilby et al., 2014; Uberhuaga et al., 2012). Recent research has quantified household-level environmental income in 333 villages in Africa, Asia and Latin America and found that households rely on environmental products to support current consumption, especially among lower income households (Angelsen et al., 2014), while this income was less important as safety net and in seasonal gap-filling (Wunder et al., 2014). An unanswered question is whether environmental income contributes to household capital accumulation and thereby movements out of poverty (Angelsen et al., 2014). In the present paper, we contribute to answering this question.

2. Study area

Nepal has a population of 27.5 million people, with a gross national income per capita of 700 USD in 2012 (World Bank, 2013). >25% of the population has an income below the national poverty line of 19,261 Nepali Rupees (NRs; based on 2010/11 prices), with >80% of the population living in rural areas (CBS, 2013) where the incidence of poverty is three times higher than in urban areas (Maltsoglou and Taniguchi, 2004). Rural household reliance on environmental income is substantial (Meilby et al., 2014; Rayamajhi et al., 2012), especially from forests.

Household income data were collected in three rural sites where livelihood strategies typically involved some degree of environmental reliance (Meilby et al., 2014; Nielsen et al., 2013; Rayamajhi et al., 2012). An overview of the three research sites is provided in Table 1. Sites were purposely selected to: (i) cover the three main physiographic zones of Nepal (lowlands in Chitwan District, middle hills in Kaski District, and mountains in Mustang District); and (ii) include areas where households were engaged in officially recognized community based forest management – community based forest management is widespread in Nepal, with approximately 18,000 forest user groups in the country (DoF, 2011). The names of the local communities and user groups are omitted to ascertain anonymity; district names are used for reference.

3. Methods

3.1. Data collection

Structured household surveys were applied to estimate total annual household incomes in 2006, 2009, and 2012. A total of 507 households (24% of the total population) were randomly selected in 2006 (sampling intensity differed across the sites to ensure a sufficient high number of observations in each site for site-level analyses not included in this paper). Data collection and management followed the guidelines and procedures of the Poverty Environment Network (Angelsen et al., 2011; PEN, 2007, 2008). This included adoption of the prototype