



Analysis

Linking ecosystem services with the constituents of human well-being for poverty alleviation in eastern Himalayas



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ABSTRACT

Dependence of rural poor on local ecosystems for livelihood has potential to accelerate loss of ecosystem services. In this study, we use ecosystem services concept to investigate poverty and ecosystem interactions in the Darjeeling district, West Bengal, India which is a part of the eastern Himalayan biodiversity hotspot. First, we assessed multidimensional poverty in six villages (57 households) in the region using household surveys. Chronic poverty existed in all the six villages in the study area and the cash income per capita per day was US\$ 0.16–0.34 which is far below the international standards of defining poverty on income basis. Second, we identified five direct and three indirect drivers of ecosystem change through semi-structured interviews with the head of the households. Then we identified linkages between ecosystem services and basic human needs. These linkages were used to identify measures to improve livelihood of rural poor. The major outcome of this study is in highlighting the ecosystem-based approach to improve livelihood of rural poor.

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1. Introduction

It is now globally acknowledged that efforts to alleviate poverty require understanding of the dynamics of ecosystems (and ecosystem services) on which livelihood of rural communities depends (Barrett et al., 2011; DeClerck et al., 2006; Fisher et al., 2013). Despite this acknowledgment at global level, lack of empirical evidence of these linkages is the main barrier that prevents successful integration of poverty-alleviation and biodiversity conservation efforts in biodiversity rich regions (Adams et al., 2004). Successful integration measures require understanding the interactions between poverty and ecosystem services. Moreover, it needs to establish links between the constituents of human well-being and the corresponding ecosystem services (Fisher et al., 2013). This information can then inform policy and practice to undertake measures to enhance those ecosystem services in order to address the particular aspect of poverty.

The Himalayas provide an important context to explore poverty and ecosystem services issues as they are rich in biodiversity but are also vulnerable to anthropogenic pressures (Bawa et al., 2007; IPCC, 2007, 2014; MEA, 2005; Pandit, 2013). Local and global efforts to integrate poverty alleviation and biodiversity conservation have so far remained elusive in this region (Bawa et al., 2007, 2008). This region is host to growing number of poor (with per capita income less than US \$ 1.25 per day; World Bank, 2012), who are dependent on ecosystem services

(such as, fuelwood, non-timber forest products, and livestock grazing) for their livelihood (Bawa et al., 2007, 2012; Fisher and Christopher, 2007; MEA, 2005; Narain et al., 2008; Reddy and Chakravarty, 1999; Tiwari, 2008). This region has witnessed significant increase in agricultural land use at the cost of loss of forestland (Semwal et al., 2004) thereby adding to the ecological stress in the region (Eriksson et al., 2009; Karan and Iijima, 1985; Shanker et al., 2005; Shrestha et al., 2012; Xu et al., 2009). Poverty assessments in the region are largely based on cash income – which is only one (and incomplete) measure; a more comprehensive poverty assessment requires understanding various factors that lead to poverty (Cohen, 2010). World Bank reports indicate chronic poverty in this region (World Bank, 2012) but do not shed any light on how livelihoods of rural poor are intricately linked with ecosystems and how they can be improved. Understanding these linkages allows specific measures to be adopted which can enhance ecosystem services and improve livelihood of rural poor (Wratten et al., 2013). In this study, we explore how linkages between livelihood supporting ecosystem services and some of the constituents of human well-being through various measures can supplement efforts to improve livelihood.

The relationships between poverty and biodiversity loss (and consequently loss of ecosystem services) are recognized by major policy initiatives globally such as the United Nations Millennium Development Goals (UN, 2000), the Millennium Ecosystem Assessment (MEA, 2005) and the recent agreements during the Rio + 20 Summit (UN, 2012). Yet, attempts to simultaneously measure poverty and assess linkages between ecosystems and communities are limited (Barrett et al.,

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2011). This is partly due to the lack of tools and frameworks that include poverty assessment as well as impact and dependence of communities on ecosystems. Poverty implies deprivation of material and welfare (Scherr, 1999) and is multifaceted with context specific causes (Alkire, 2007; Barret, 2005; Ferreira and Lugo, 2013; Sen, 1985). While its meaning is clear, its measurement is complex. Development organizations work on different indicators to assess poverty due to its multifaceted nature and the complex causes and consequences. Due to lack of economic activities in remote and biodiversity rich regions, it is often difficult to assess incomes and social status. One tool that measures the multidimensional aspects of poverty has been developed by the United Nations' International Fund for Agriculture Development (IFAD), an agency for reducing rural poverty. This Multidimensional Poverty Assessment Tool (MPAT; Cohen, 2009; Cohen, 2010) takes into account basic needs and measures of well-being. It does not focus on income or consumption-oriented indicators. Instead, it assesses fundamental and universal dimensions of rural livelihood and, thus, of rural poverty (Cohen, 2010). This tool measures multidimensional poverty based on the objectives of poverty reduction initiatives and provides more reliable assessment, resonating with earlier works on poverty assessment (Hicks and Streeten, 1979; Sen, 2000; Sullivan, 2002, 2006). The theoretical construct of the tool is based on Maslow's theory of basic needs and includes basic needs such as food and nutrition security, water supply, and sanitation (Maslow, 1943). It also captures the rural well-being indicators such as gender equality and non-agricultural assets (Cohen, 2009).

Similarly, MEA provides ecosystem services concept to understand human impacts and dependence on ecosystems. Ecosystem services are the benefits that humans derive from ecosystems (Daily, 1997). These are divided into four categories based on their functions – provisioning (food production, fuelwood, freshwater etc.), cultural (education, recreation, spiritual values, health and gender equality etc.), regulating (water purification, erosion control, hazard protection, etc.) and supporting (soil health, pollination, nutrient cycling etc.) (MEA, 2005; Wratten et al., 2013). Ecosystem-based approach encapsulates three dimensional sustainability – social, economic and environmental (Sandhu, 2010). This approach identifies, classifies, describes and communicates the benefits that people derive from ecosystems in a language which a wide range of stakeholders can understand (MEA, 2005). It also includes integration of biodiversity and ecosystem services into overall adaptation strategy. This concept is increasingly being applied for sustainable development interventions aimed at poverty alleviation, through its focus on prevention and reduction (Angelsen and Wunder, 2003; Duraiappah, 2004; Fisher et al., 2013). Poverty prevention includes practices to support livelihood of people living under poverty line through enhancement of ecosystem services. Poverty reduction includes measures to move people above poverty line. However, current literature primarily deals with the value of aggregated ecosystem services for poverty prevention and reduction (Daw et al., 2011). Some studies argue that the aggregated ecosystem services do not allow conclusions regarding the benefits from local ecosystems such as; what benefits are driven from ecosystems and who has access to those benefits? For example, a forest may be rich in natural resources with very high value for the ecosystem services. But in the absence of any mechanism to access these ecosystem services, forest dwellers continue to live in poverty. In contrast, there are recent examples, where protected areas have contributed to economic development and reduction in poverty, for e.g., in the case of tourism development in Thailand's protected areas (Sims, 2010). However, this does not always transform into poverty-reduction for forest dwellers as it might increase local inequality (Sims, 2010). Therefore, the linkages between forest ecosystems services (as benefits) and the basic human needs (constituents of well-being) need to be clearly identified for better management of ecosystem services and poverty alleviation.

Our study focuses on the eastern Himalayan region to understand the poverty–ecosystem services interactions. First, we assess multidimensional poverty in the study area to determine the socio-economic status of villagers. Second, we identify the drivers of ecosystem change and linkages between ecosystem services and some of the constituents of human well-being. Third, we identify measures to address particular aspect of poverty and improve livelihood of rural poor. We conclude by discussing how these linkages can provide meaningful contributions to simultaneously address poverty and environmental degradation.

2. Material and Methods

2.1. Study Site

This study is located in the Darjeeling district in West Bengal, India, which is a part of the eastern Himalayan biodiversity hotspot (Fig. 1). This region accounts for 11% of India's faunal and 10% of its floral biodiversity. Human population in this district has grown more than 14% in the last decade alone (Government of India, 2013). The number of poor families (with per capita income less than US \$ 1.25 a day) in the district was higher (46.4%), compared to national average in India (32.7%) (SECC, 2011). There are two key protected areas near Darjeeling – Singalila National Park and Sanchel Wildlife Sanctuary, which are home to both native floral and faunal biodiversity. There are a number of forest villages in proximity to these protected areas. Forest villages were established by the forest department of the State Government for forestry operations under section 28 of the Indian Forest Act, 1927 (Government of India, 1927). These villages include land for cultivation and other uses permitted by the Government. Residents in forest villages remain deprived of access to most development programs as the land on which these villages are located is recorded as forest. It is estimated that the number of forest villages in India is about 10,000 (Sarin and Springate-Baginski, 2010). As no agency other than forest departments can undertake any development work on forest land, most of these settlements remain outside the jurisdiction of any local government or development agency. Hence, forest villages provide a unique context to understand the relationship of local communities with forest ecosystems in order to identify livelihood opportunities to alleviate poverty and maintain ecosystem services.

We employed two stage sampling methodology to select villages and then households. The first stage was selection of the villages in each cluster (region) and the second stage was the randomized sampling of the households within selected villages. In this study, 6 forest villages were selected on the basis of their proximity to the respective protected site in two clusters. Three villages were close to Singalila (region 1; total 17 forest villages) and three near Sanchel (region 2; total 27 forest villages). Details of these villages and its inhabitants are provided in Table 1. Each household in forest village had access to limited land (average 0.4 ha) for farming activities – which is the main source of livelihood for villagers. Apart from farming activities, most of the villagers seek casual work in road building or towns to supplement their incomes. These villages were surrounded by protected area and reserved forest. Reserved forest is the area outside protected area where forest villagers have right of way, right of pasture, right to forest produce and right to a water stream as permitted under section 20 of the Indian Forest Act, 1927 (Government of India, 1927). In 2006, the Government of India has enacted the Forest Rights Act to recognize the rights of forest dwellers (Government of India, 2006). However, at the time of our survey, we did not observe any changes in development patterns, after the enactment of the Forest Rights Act 2006. This might be due to early days in the implementation of the Act. We speculate some positive changes in terms of the economic development in the forest villages after the implementation of the Act

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