



Assessing social values of ecosystem services in the Phewa Lake Watershed, Nepal

Kiran Paudyal^{a,*}, Himlal Baral^b, Rodney John Keenan^a

^a School of Ecosystem and Forest Sciences, Faculty of Science, The University of Melbourne, Carlton, VIC 3010, Australia

^b Centre for International Forestry Research, Jalan CIFOR, Situ Gede, Sindang Barang, Bogor, Barat 16115, Indonesia

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ABSTRACT

Community-based forestry (CBF) has developed through co-evolution of human societies, social values and biophysical systems shaped by long-term community activities. CBF has been practised for nearly 40 years in Nepal and has resulted in the restoration of forest cover to a considerable proportion of the mountain regions. In the Phewa watershed, restored forests are important for the subsistence of local communities and the provision of economically valuable recreation, aesthetic and cultural services for a wider group of stakeholders. In that context, this study aims to assess the social values of ecosystem services (ES) and their relative importance to different stakeholders. Community perceptions and expert opinions to assess and prioritise ES in the watershed were sought through focus group discussions and key informant surveys. There were 23 ecosystem services relevant to the local communities and other stakeholders in the watershed. Sediment retention, recreation and ecotourism, freshwater, firewood and timber were priority ES for local benefits, while recreation and ecotourism, biodiversity maintenance, sediment retention and carbon stock were priority ES for wider (regional – global) benefits. Priority ES revealed key areas of correlation and conflict between different services and between stakeholder groups. For local benefits, trade-offs were identified between provisioning services and regulating, habitat and cultural services. Synergies were predominant between regulating, cultural and habitat services. The study indicated that the social values concept is a promising tool for eliciting people's preferences in the ES assessment and analysis of trade-offs and synergies in developing countries where community involvement is the dominant approach of forest management.

1. Introduction

The ecosystem services framework is increasingly being used as a tool for natural resource management (Chan et al., 2011; Fisher et al., 2009; Lamarque et al., 2011; Lele et al., 2013; Oteros-Rozas et al., 2014). Ecosystem services assessment has been given importance in international initiatives such as the Millennium Ecosystem Assessment (MEA), the Economics of Ecosystem and Biodiversity (TEEB) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (Oteros-Rozas et al., 2014). However, most of these studies have focused on biophysical assessments and economic valuation (Garcia-Llorente et al., 2011; Nieto-Romero et al., 2014; Plieninger et al., 2013; Schroter et al., 2014; Seppelt et al., 2012) while social values have received less attention (Chan et al., 2012; Cole et al., 2015; Martin-Lopez et al., 2012; van Riper et al., 2017). More broadly, community values and, local knowledge have been essential components of natural resource management for several decades (Sherren et al., 2010), although social value has been given a lower priority

(Smith and Sullivan, 2014). Recently, the importance of integrating social perspectives of ecosystem services (ES) has been promoted as a strategy for sustainable development (Caceres et al., 2015; Chan et al., 2012; Martin-Lopez et al., 2012; Nagendra et al., 2013; Reyers et al., 2013).

Social values for ecosystem services represent benefits that ecosystems provide to society (Kendal et al., 2015; Kenter et al., 2015) and the perceived quality of natural ecosystems for human well-being (MEA, 2005; van Riper et al., 2017). They indicate which services are directly experienced by individuals and are tied to intrinsic motivations to own, manage, and protect natural resources (Brown and Fagerholm, 2015). Some recent studies have been focused on social values approach in woodlands and forests (Sherrouse et al., 2014), grasslands (Lamarque et al., 2011), coastal zones and mangroves (Cole et al., 2015), watersheds services (Zagarola et al., 2014) and on a regional scale (Bryan et al., 2010; Raymond et al., 2009). However, their focus has been on cultural services; the social values ascribed to provisioning, regulating and supporting services have largely been disregarded (Plieninger et al.,

* Corresponding author.

E-mail addresses: kiran.paudyal@gmail.com (K. Paudyal), H.Baral@cgiar.org (H. Baral), rkeenan@unimelb.edu.au (R.J. Keenan).

Table 1
Importance of social values for ecosystem services (ES) in planning and management of resources.

Statements	References
It values attributes of the society to the place people live in and to ES as individuals or as a group in a landscape	Scholte et al., 2015; Zoderer et al., 2016
Many ES are co-produced through the integration of ecosystem processes and social actions and ES assessment cannot be separated from the social values.	Lakerveld et al., 2015
Over-emphasizing instrumental values in ES research poses a risk of limiting the voices of people who are most affected by environmental management decisions	Zagarola et al., 2014
It offers a means of quantifying cultural and other services to inform environmental planning and management decisions and elaborates more socially feasible solutions for all ecosystems.	Bagstad et al., 2016; Brown, 2013
It is a useful tool to prioritise ES and trade-offs that link to the stakeholder perceptions.	Iniesta-Arandia et al., 2014

2013). This oversight may be due to a lack of expertise, confusion over defining social values (Felipe-lucia et al., 2015) or methodological difficulties (Bagstad et al., 2016). A growing interest in the use of 'social value of ecosystem services' is not yet methodologically aligned with what is actually being assessed and valued in ecosystem services (Nahuelhual et al., 2016).

Application of social values in landscape management and planning are manifold (Table 1). A few studies have used social values and local preferences (Scholte et al., 2015) and they highlight the relevance of social values in ES assessment and valuation in landscapes that have been shaped by long-term community activities (Iniesta-arandia et al., 2014; Lakerveld et al., 2015; Martin-Lopez et al., 2012; Oteros-Rozas et al., 2014), such as community-based forestry. In fact, community-based forestry (CBF) has developed through co-evolution of human societies, social values and biophysical systems (Zoderer et al., 2016) and is driven by societal priorities, considering what society wants from their forests. This, in turn, is governed by both traditional practices and locally developed rules and regulations. CBF often implicitly incorporates different ES values, but these are often not transparent to local communities or wider users and decision makers. Linking the social values concept to CBF is, therefore, a potentially innovative tool for stimulating thinking regarding the importance of ecosystem services from community forests (Pandey et al., 2016, 2014).

In Nepal, community-based forestry emerged following a series of catastrophic policy failures prior to 1970. These resulted in an environmental crisis due to massive deforestation that triggered widespread landslides, raw materials shortage and water scarcity in the mountain regions and flooding in the plains (Gautam et al., 2004). The success of CBF in the restoration of Nepalese mountain landscapes has been widely recognised (Maraseni et al., 2014, 2005; Maraseni and Pandey, 2014; Paudyal et al., 2017c). However, local people have not fully realised the benefits of this restoration resulting from their activities. Local people can realise greater benefits if an ES approach is mainstreamed into community-based forest management (Paudyal et al., 2017a, 2016), with a focus on meeting the needs of local communities and providing rights, justice and equity in the distribution of benefits accruing from efforts to restore degraded watersheds (Cronkleton et al., 2017; Paudyal et al., 2017b).

Recent research has explored the relationship between ecosystem services and community-based forest management (Birch et al., 2014; Paudyal et al., 2017a). Appropriate method to assess the social values would contribute to a broader understanding of this relationship (Pan et al., 2016). Priorities are determined by socially and individually-held values (Al-assaf et al., 2014) however, these values and attitudes regarding natural resource management vary between rural and urban populations (Hicks et al., 2013; Williams et al., 2017). In the case of CBF, a significant variation in the selection of priority ecosystem services has been observed between rural and urban people. Rural people are more emotionally attached to forests and surrounding landscapes compared to urban people, as a result of regular interactions with landscapes in various facets of life (Pan et al., 2016; Williams et al., 2017) and it is necessary to identify these differences for effective

management decisions (Bryan et al., 2010; Kumar and Kumar, 2008).

Multiple interactions occur between ecosystem services in community-managed forests because they provide numerous benefits to several users (Briner et al., 2013). Understanding such interactions and associations (positive and negative) is required for managing multiple ES (Bennett et al., 2009). Trade-offs occur when an improvement in one ES results in a decline in another (Howe et al., 2014) or among stakeholders when a particular ES is prioritised by one stakeholder at the expense of the preference of others (McShane et al., 2011). Conversely, when stakeholders assign similar priorities to multiple ES, synergies can emerge (Hicks et al., 2013). Synergies and trade-offs create opportunities and conflicts, and their study can provide decision-makers with information to maximise benefits and transparently address conflicts (Bennett et al., 2009; Crouzat et al., 2016; Hicks et al., 2013).

This study aims to assess perceptions of the social values of ecosystem services resulting from community-based forestry and to assess and prioritise ecosystem services for different stakeholders based on these perceptions. An additional aim was to identify areas of agreement (synergies) and conflict (potential trade-offs) among priority ES. The study was undertaken in the watershed of Lake Phewa (hereafter Phewa watershed in western Nepal where six upstream community forest user groups (CFUGs), downstream business people and experts were consulted using mixed methods research to record their perceptions and opinions.

2. Social valuation framework

Many frameworks have been used for ES assessment and prioritisation (Boyd and Banzhaf, 2007; Costanza et al., 1997; de Groot et al., 2002; MEA, 2005; TEEB, 2010). It has been suggested that monetary valuation frameworks are incapable of accommodating public values and preferences (de Oliveira and Berkes, 2014; Kumar and Kumar, 2008; Ulgiati et al., 2011) and that economic models and valuation methods are limited to represent the entire social values, instead of signaling that economic values exclude social values. These approaches are also not appropriate in developing countries, because of a lack of expertise, data and time (Paudyal et al., 2015) and a lack of well-established ES markets (Caceres et al., 2015). Instead, non-economic evaluation and assessment offer ways of understanding underlying social preferences that may be hidden by monetary language (Chan et al., 2012; Martin-Lopez et al., 2012). Researchers have therefore called for a new approach which integrates economic, ecological and social values (Felipe-lucia et al., 2015; Lopes and Videira, 2013) and that can bridge the gap between research and policy decisions and promote people's participation in the decision-making process for ES management (Lopes and Videira, 2013).

The conceptual framework developed in this study is comprised of three major components: context, method and value articulation, which provides a coherent base for the assessment of ES (Fig. 1). Each component contributes to social valuation decisions and promotes social learning, starting with context and society and then focusing on evaluation methods that elicit social preferences and articulation of values

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