# PUBLICATION INFORMATION



# Local actions for the common good: can the application of the ecosystem services concept generate improved societal outcomes from natural resource management?[1]

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## Abstract

Nature provides a wide range of ecosystem services (ES) that are vital for human well-being and livelihoods. The supply of these services is being threatened by local and global pressures. Managing for the provision of ES can provide a range of benefits that, in economic terms, can be defined as, private, common or public goods. Inspired by the theme 'local action for the common good' of 7th Ecosystem Service Partnership conference held in Costa Rica, this paper examines the key issues in policy and management for production and management of ES in a way that meet the broader common good. The ES approach is not widely understood by policymakers, the general public and the private sector. While the approach is a promising contribution to providing for common good outcomes from the management of natural resources, much needs to be done to ensure that it achieves the dual purposes of maintaining and enhancing the supply of different services and improving the livelihoods of the rural poor in developing countries. Critical areas for further attention are assessments of ecosystem services in developing countries that incorporate local and indigenous knowledge, clear links to policy and decision making, public education and engagement about the value of ecosystem services and payment mechanisms that drive local actions and contribute to local livelihoods.

*Keywords:* Livelihoods, Natural resource management, Land use planning, Ecosystem services, International development

**Highlights**

- Landscapes can provide private, common or public goods and services that are vital for human well-being and livelihoods, but these are threatened by a mix of global and local actions.
- Depending on the circumstances, ecosystem services can be supplied and managed through markets or other policy arrangements to support the provision of common or public goods.
- An ecosystem services approach is a promising concept for land and water management to recognize the wider benefits that ecosystems provide for the 'common good'.

## 1. Introduction

Nature provides a wide range of ecosystem services (ES) that are vital for human well-being and livelihoods. Most of these services can be described in economic terms as "common goods" (CGs) - where enjoyment or use cannot be easily excluded - although some provisioning services such as wood, food and fibre are privately owned and controlled, where use by one party will affect the capacity for use by others. These CGs or ecosystem services are often the product of "common pool resources," comprise a wide variety of natural or human-made resources, and can include village pastures, natural grassland, shrubland, forests, ponds, rivers, lakes and oceans (Ostrom, 1990). Globally and locally, communities, natural resource managers and policymakers face challenges in decision-making that can alter the flow of benefit from ecosystem goods and services necessary for livelihoods, human survival and reducing negative impacts on the environment (Daw et al., 2011, 2015; Lu et al., 2012).

The 'common good', on the other hand, and paraphrasing 18$^{th}$ century British economist Jeremy Bentham embodies the concept of providing for the 'greatest good for the greatest number of people'. In the context of natural resource management, this concept was taken up by the founder of the US Forest Service, Gifford Pinchot, who argued that 'where conflicting interests must be reconciled, the question shall always be answered from the standpoint of the greatest good of the greatest number in the long run' (Pinchot, 1910). According to the Helfrich (2012), common goods are those goods that we compete for their use. Gareth Hardin's (1968) seminal paper 'The Tragedy of the Commons' drew attention to the plight of many CGs that are threatened through uncontrolled and competitive over-exploitation. While many argued that these situations can be rectified through control by governments or by transferring use rights into private hands, Ostrom (1990), and later Agrawal (2001) argued that coordinated local actions and the development of local rules could avoid overexploitation and

provide ongoing benefits to local populations. Local knowledge, local institutions and local actions are therefore of great potential value in managing and using CGs (Agrawal and Chhatre, 2006; Dressler et al., 2010; Ostrom, 2009). However, in many situations, this tragedy is a continuing reality for people whose livelihoods depend predominantly on the availability of CGs and where there is continuing over-exploitation of the resources that supply them (Bezlepkina et al., 2014).

Most of authors define 'ecosystem services' or 'ecosystem goods and services' as the benefits that humans derive from nature. According to TEEB (2010) ES are considered as 'direct and indirect contributions of ecosystems to human well-being'. The ES approach provides a different perspective to traditional thinking on the management of natural resources by recognizing, categorizing and quantifying services provided by man-made and natural ecosystems (Bennett et al., 2015). By assessing and valuing these services, their provision can be incorporated into natural resource management.

Local actions are important in enhancing the supply of services that are vital to provide a healthy environment for human well-being. Inspired by the 7$^{th}$ Ecosystem Services Partnership (ESP) Conference, 2014 with the theme 'Local Actions for the Common Good' this paper examines the link between rural livelihoods, management of ecosystem services and the common good and suggests policy options for implementing the ES approach at a local level (ESP, 2015). While drawing on ideas raised at the conference, the viewpoint represents our thinking.

## 2. Ecosystem services, common goods and local livelihoods

As the human population increases, the demand for almost all ES is escalated. In recent years a significant change has occurred in land use to meet the demands of society (Baral et al., 2014a; Carpenter et al., 2009; Wang et al., 2012; Zhen et al., 2014), with a focus on increasing the supply of 'provisioning services' such as wood, food, fibre and materials (Costanza, 2008; de Groot et al., 2002; 2010). In economic terms, these are largely categorised as 'private goods' where individuals or private enterprises control the means of production and supply chains and the use is exclusive and rivalrous (that is, use by one party means that another party cannot benefit (Figure 1).

Unregulated multifunctional landscapes also provide common goods, such as timber, fodder, grazing, clean water, fuel, fish or minerals, where the use may not be excludable but the use by one party means that others cannot benefit (Costanza, 2008; Helfrich, 2012), or their benefits are diminished (Figure 1). Large populations throughout the world depend on these CGs for their livelihoods, food security and rural economies (Villa *et al*., 2014). CGs are particularly important in subsistence economies, where they provide benefits for many millions of rural people.

Other ecosystem services can be categorised as public goods, goods for which general use cannot be excluded but which are 'non-rivalrous' meaning use by one person does not affect the capacity of others to benefit (Costanza, 2008). Such services can include certain regulating services, such as carbon sequestration, or cultural services.

Many studies indicate that, due to the focus on production of private goods, there is unprecedented loss and degradation of other ES provided by natural environments, such as

regulating, cultural or aesthetic services (Inge et al., 2013; MEA, 2005; Wunder et al., 2008). These impacts can have severe consequences for the well-being and livelihoods of many people who are highly dependent on these services (Sunderlin et al., 2005).

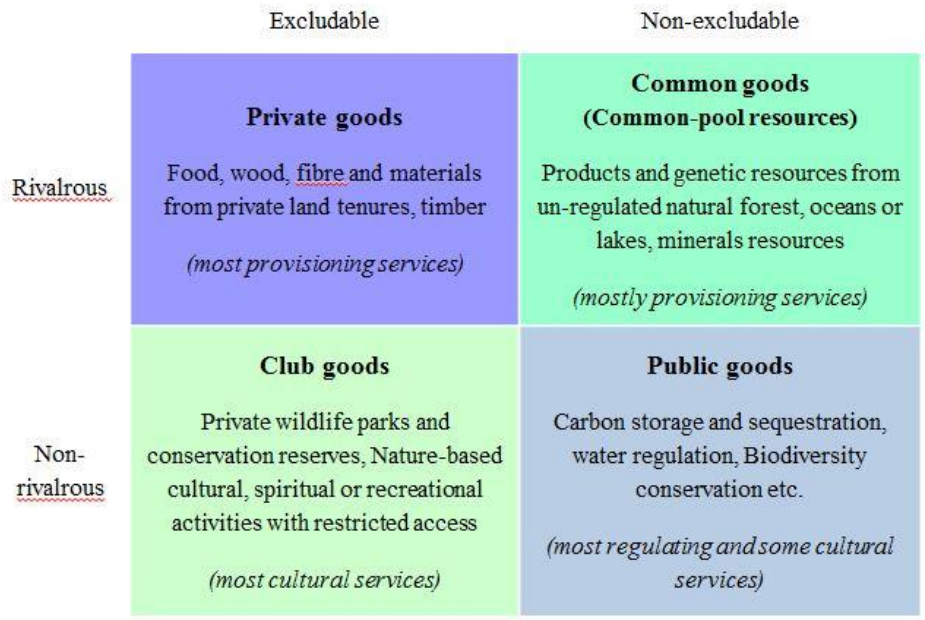


Figure 1: Examples of ecosystem services and different classifications of 'economic goods' (after Costanza, 2008, *Helfrich, 2012*)

## 3. Implementing the ES approach for common or public goods

Recently, significant concerns about ES and livelihoods have been raised and calls made for urgent attention and actions from government and international agencies to focus on the provisions of ES at local to global levels. The Millennium Ecosystems Assessment (MEA), 2005 and The Economics of Ecosystem and Biodiversity (TEEB), 2010 reports drew attention to the economic benefits derived from ecosystem services and biodiversity (Costanza et al., 2014; TEEB, 2010), a scientific approach to quantification and analysis of ES has been

promoted (Villa et al., 2014) and the value of local actions in improving the provision of services has been highlighted.

Managing human-dominated landscapes where there are often competing demands for different goods and services is challenging (Felipe-Lucia et al., 2014). Different types of landscapes provide ecosystem services with different qualities and quantities; however, many of those services are yet to be incorporated into natural resource management decisions (Bateman et al., 2013). Capacity to supply some of these services is being degraded due to a lack of understanding of their value for sustainable livelihoods (MEA, 2005). Can the ES approach be part of a larger solution to global and local environmental challenges? While many suggest it can (TEEB, 2010; Buscher, 2012; Costanza et al, 2014), others critique the ES approach as mainly theoretical, difficult to translate into economic frameworks and costly to implement (Farley, 2012; Lele et al., 2013; Liverman, 2004; McCauley, 2006; Muradian et al., 2010; Nahlik et al., 2012) or that it is just an eye-opening metaphor to complexity (Norgaard, 2010), which continues to promote an exploitative human-nature relationship in a different form (Schroter et al., 2014) and obscuring certain types of values and masking unevenness in the distribution of costs and benefits of resource management decisions (Jax et al., 2012).

*Trade-offs between ecosystem services*

While there may be synergies in the production of ecosystem services, managing multiple ES often requires trade-offs in the management of natural resources in the provision of different types of ecosystem services (Daw et al., 2015; Raudsepp-Hearne et al., 2010) that need to be incorporated into resource management and decision making. Resolution of some trade-offs is relatively straightforward, and the methods to compare them are well understood, for example, the choice of producing certain private goods can be resolved through economic analysis using a comparison of measures such as internal rates of return or net present value.

Providing the basis for analysis of trade-offs between the private or club goods provided by ecosystems (for example provisioning services such as wood, food and fibre) and the wider public benefits of common good services like clean water or carbon sequestration is a key theme in promoting the application of the ES approach. Using an ES approach can support the inclusion of previously unrecognised services into land use and management decisions and identify opportunities for synergies or the requirement for trade-offs between the production of private goods, common goods and public goods (Baral et al., 2014a).

Consideration of trade-offs when there is a reduction in one common good in favour of another – for example, reduced water yields when carbon sequestration is increased due to afforestation (Baral et al., 2013, 2014b) can be more challenging, and the assessment of such trade-offs in complex landscapes is generally poorly understood (Carpenter et al., 2009).

However, these types of studies have largely been undertaken in developed countries with well-established markets (Bennett et al., 2009; Daw et al., 2015; Haase et al., 2012; Maes et al., 2012; Raudsepp-Hearne et al., 2010) and there has been limited research on trade-offs associated with resource management and livelihoods decisions in developing countries, where the decision is not simply a market-based one but may involve consideration of human survival (Bremer et al., 2014; Pinho et al., 2014).

*Economic Assessment of Ecosystem Services*

Assessment and mapping of ES was a major theme at the 2014 ESP conference (ESP. 2015). Many of these studies related to assessments of Total Economic Value (TEV), using various techniques such as hedonic pricing and travel cost (for example, Schuhmann and Mahon, 2014) and this has become more widely popular in the literature. Estimates of TEV are of

some value in decision-making, but government treasuries and or other public agencies seeking to invest public resources or develop policies for the provision of services need an understanding of service production functions to analyse trade-offs for more informed decision-making. However, there has been relatively limited development of economic production functions for different types of ecosystems services that would enable analysis of the trade-offs based on the marginal costs and benefits in the provisions of different types of services and the interactions between them.

*Payments for Ecosystem Services*

Using the market to resolve decisions about management of natural resources and service provision has been promoted through the development of payment systems for common or public goods such as watershed benefits, carbon sequestration or biodiversity conservation (Adhikari and Boag, 2013; Kinzig et al., 2011; Martin-Ortega et al., 2013; Wunder, 2014). Constructing a payment system for certain types of ecosystem services raises the challenge of identifying the beneficiaries and linking them to the service providers through a payment mechanism. It also raises concerns that some public goods, such as carbon sequestration or biodiversity conservation, become private or 'club' goods that are only used and enjoyed by certain people with the capacity to pay (Corbera, 2015; Matulis, 2014; Leimona et al., 2015). This has happened with common goods produced from natural resources such as grazing lands, timber in natural forests or wild catch fisheries, where former common good resources are segregated, and rights to use are allocated through ballot, auction, tender or other processes.

The Costa Rica's experiences provide critical lessons related to trade-offs and synergy among ES that are instrumental in bringing the value of ES into development planning and in achieving synergy between conservation and economic development at landscape level (ESP, 2015; Robalino and Pfaff, 2013). This has been achieved through significant investments of

effort, time and resources from the government and a range of stakeholders to develop mechanisms to protect and enhance the supply of ES such as water yield and quality, soil protection, carbon sequestration and storage, wildlife habitat and aesthetic benefits (Porras et al., 2013, Paudyal et al, 2015). However, establishing linkages between ES producers (e. g., local communities) and users, their interdependence and improved collaboration is critically important to achieve sustainability and to maximize production of important ES in the landscapes (Bennett et al., 2009; Fischer et al., 2015).

Increased provision of ES through payment of ecosystem services (PES) in Costa Rica and biodiversity management in Colombia have been significant achievements (ESP, 2015). The condition of natural resources has been improved as a result of some PES programs, and consequently ES are more abundant (Hecht, 2010).

However, in analysing these programs many experts have expressed concerns regarding the flows of financial benefits to the people who have been managing land to supply ES and the efficiency and effectiveness in the allocation of funds used to 'purchase' services. In Costa Rica, the primary buyer of services is the government through the National Forest Finance Fund (FONAFIFO) with funds provided through part of the proceeds of a tax on gasoline (Pagiola, 2008). The short-term nature of contracts (services are purchased for five years) means there is uncertainty about the provision of services after termination (Rico García-Amado et al., 2013), and suggestions have been put forward for longer-term (e.g., 30 – 50 years) contracts to give greater assurance to both sellers and buyers (Arriagada et al., 2015; Duke et al., 2014). Other issues were the lack of capacity of smallholders and poorer landowners to participate, lack of incentives for afforestation activities and the extent to which the payments are actually resulting in improved provision of services with most funds going to

wealthy landowners with larger land areas to protect forests that may not be under imminent threat of clearing (Porass et al., 2013; Robalino and Pfaff, 2013).

## 4. Ecosystem services and the common good: science for policy and management

Landscapes are characterised by humans and nature and their multidimensional, and dynamic interactions require innovative research considering the many linkages in these social-ecological systems and how these can be incorporated into policy and decision-making frameworks (Reyers et al., 2013). The provision of ES whose regional and global importance derives from these landscapes depends on the actions of local communities, who are often making decisions about their personal survival (Paudyal et al., 2015). The importance of these local actions and decisions and their implications for the provision of public good ES is not recognised sufficiently in research priorities and local or national policies (Asah et al., 2014; Haase et al., 2012). This gap is considered to be a major cause of reduction in the supply of ES (Carpenter et al., 2009; Paudyal et al., 2015). Poverty and land degradation through overuse are often interlinked (Nesheim et al., 2014). Appropriate science and policies need to be enhanced so that a common understanding of the importance of the provision of ES from different land uses can be reached among scientists, stakeholders and policymakers and the actions of local actors can be properly considered (Naeem et al., 2015). The transdisciplinary research to provide evidence-based policy and platforms for decision-making that facilitate interaction between scientists and policymakers is an identified immediate need (ESP, 2015).

Lack of credible and accessible information at appropriate scales is also a barrier to bring an understanding of ES into policy and practice (Sitas et al., 2014). Timely and decision-relevant information is important to successfully incorporate ES into global and national policy decisions. A science-based framework for ES assessments that fosters stakeholder engagement

and understanding and provides outputs relevant to policy decision making is a critical element for further research. This will involve integrated, participatory and transdisciplinary collaboration between researchers, policy makers and practitioners (see also Bennett et al., 2015; ESP, 2015) to understand the multi-functionality of complex landscapes (Lang et al., 2012).

Global networks (e.g., the ESP) are becoming increasingly important in raising awareness of ES. Through recent large-scale initiatives (e.g., MEA, TEEB, Intergovernmental Panel for Biodiversity and Ecosystem Services, Future Earth) and interactive networks, scientists, policy experts and business people are engaged actively in working across the science-policy interface (ESP, 2015; Guerry et al., 2015).

However, these global networks need to translate to the landscape scale, where local decisions and actions drive the provision and ongoing sustainability of different types of ecosystem services. Providing productive, sustainable and inclusive landscapes that can fulfil multiple goals of supporting livelihoods while conserving biodiversity and providing an ongoing supply of public good ES in developing countries is a critical challenge. This will require interdisciplinary research that integrates understanding of local and customary practices to support policy and management decision-making at the landscape level.



## 5. Sustaining ES: working beyond the science

Consolidation of fragmented knowledge, research results and best practices about ES and transfer of that knowledge to communities and policy-makers is a significant challenge in mainstreaming the ES approach in decision making (Bennett et al., 2015; Sitas et al., 2013). Regular meetings and interactions among scientists, practitioners and policymakers would

provide for improved communication among them (Holt and Hattam, 2009). Multi-stakeholder forums and discussions among experts and those impacting on ES can create a context conducive to robust management of CGs, supporting transfer of technologies and management tools and create 'ownership' of the process (Kunseler et al., 2015). However, social acceptance of these technologies and management tools is a key, at all levels, for translating policies into practice (Kunseler et al., 2015). The ES concept is still not well understood by policymakers, the general public or many in the private sector (Waage and Kester, 2014). Private investment in ES is occurring in some places, for example hydro-electric power generators are investing in watershed management activities in Latin America, SE Asia and the Himalayas (Bhatta et al., 2014; Huang et al., 2009; Kosoy et al., 2007; Lurie et al., 2013; Martin-Ortega et al., 2013). The benefits of improved watersheds are enjoyed and paid for by the shareholders of the company and buyers of the electricity.

An alternative management for some types of services might be public-private partnerships. Linking some services that can privatised, like carbon sequestration under a carbon market, to a public good like biodiversity conservation may allow for revegetation and habitat restoration at the scale of investment required to meet conservation objectives (Baral et al., 2014a). However, providing a basis for private sector investment in CG benefits or resources is proving challenging, from both supply and 'ownership' perspectives (Kapambwe and Keenan, 2009). An enabling policy environment and investment climate that is conducive to sustainable business is a pre-condition for success in this endeavor.

## 6. The way forward

The 2014 ESP conference was focused on the notion that local actions can support the provision of ecosystem services to benefit the collective well-being and common good of

humanity. Achieving improved livelihoods of local people through maintenance or enhanced supply of ES will depend on both local action to maintain the provision of common goods, such as timber, grazing, fodder, fuel and fisheries and on investment from global and national levels to support the provisions of 'public good' type services such as carbon sequestration and biodiversity conservation (ESP, 2015). The role that market and payment mechanisms might play in supporting the future provision of different types of ES is still forming.

The most pressing need is to be able to value ecosystems and the services in a way that allows for valid consideration of trade-offs with other social and economic concerns, including the immediate subsistence needs of many local people. This requires quantification of ES and the development of economic production functions of different services so that the marginal costs and benefits in the provision of different types of ES. This should include subsistence values of different landscapes. Commodification and trade through the development of private markets for current public or common good services may not be the most effective, efficient or equitable way to manage the maintenance and supply of ES (Costanza et al., 2014). Linking the value of common or public good services to livelihoods of the poor in developing countries is a continuing challenge.

A wider coverage of research and meaningful representation from different regions of the world would improve the quality of dialogue around the question of provision of ES and the improvement of livelihoods in developing countries. Integrating local and indigenous knowledge into the global discussion of ES, there is a need to increase participation from developing countries and indigenous communities (Naeem et al., 2015). International initiatives and networks such as the ESP need to engage actively in capacity building and application of principles and research results in the field to ensure a wider understanding of the ES approach and its application to action at the local level.


Figure.2: Potential linkage between ecosystem services assessment and valuation to the national and international policy arena, payment and incentive mechanism that helps local actions to improve the common goods

Despite the increasing level of research and awareness, the knowledge and practice to incorporate ecosystem services into decision making regarding natural resources remains insufficient (Bennett et al., 2015). Assessment, evidence-based policy setting and education are required to drive local actions to enhance ecosystem services that benefit the common good (Figure 2). While there are many feedbacks and interactions between these components, this provides a framework for linking the key elements in the process of improving the provision of ecosystem services. Common and public good ecosystem services and sustainable rural livelihoods can be enhanced through the following actions:

- quantifying the full range of ES and their wider economic and societal benefits;

- research and management practices for ES in developing countries where land management actions are critically important in ensuring the provision of ES at both local and global scales;
- fostering strong partnerships among research institutions, international and government agencies, and civil society organizations to maximise the benefits to the poor while still maintaining the capacity of ecosystems to provide services,
- building a platform for compilation of ES assessment and management tools to bring ES knowledge into policy and practice;
- promoting the ES concept in development assistance; and
- developing efficient, equitable and sustainable mechanisms for long-term payments for delivery of ecosystem services that contribute to the improvement of local livelihoods.

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