Negotiating Trade-offs

Choices about Ecosystem Services for Poverty Alleviation

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Exploring the prospects of the ecosystem services approach for natural resource management and poverty alleviation in India, this paper points out that it is vital to have an understanding of the political economy of negotiations over natural resource use. An appreciation of the synergies and trade-offs between ecosystem services is equally important to develop better strategies for pro-poor ecosystem management. If the distributional outcomes associated with alternative options for natural resource management are neglected, there is a risk that such interventions may fail because of resistance from those who are excluded or those who stand to lose.

This paper is a result of the joint research programme on Ecosystem Services for Poverty Alleviation conducted by the UK National Environment Research Council, Economic and Social Research Council and Department for International Development. The usual disclaimers apply.

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Over the last decade, there have been numerous references to the idea of ecosystem services as a framework for achieving the twin goals of environmental improvement and poverty reduction (Daily 1997). Ecosystem services were the basis of the Millennium Ecosystem Assessment (MA) in 2005 and the report on The Economics of Ecosystems and Biodiversity (TEEB) in 2010. The term has gained increased importance in policymaking and several government and environmental organisations have adopted, or are considering adopting, management strategies that are based on the ecosystem services concept.[1] There are at least four interrelated strands which characterise this emerging paradigm – (i) the measurement of ecosystem service flows and understanding the ecological processes underlying these flows; (ii) understanding the effect of these flows on human well-being; (iii) valuation of ecosystem services; and (iv) provision of ecosystem services through market-based intervention strategies, including payments for ecosystem services (PES).

This interest in ecosystem services is reflected in India and the concept now features in policies and programmes for maintaining the quality of the environment and the sustainability of natural resources for the well-being of societies across the country. A recent example is the National Mission for a Green India approved by the Prime Minister's Council on Climate Change in February 2011. The mission derives its mandate from the National Action Plan on Climate Change (NAPCC) and aims at increasing India's forest cover by five million hectares (as well as improving a further five million hectares of degraded forest) over the next 10 years. One of its key objectives is "improvement of ecosystem services, including biodiversity, hydrological services and carbon sequestration while also aiming to increase forest-based livelihood incomes for three million families".

The mission, by putting "greening" on the agenda of climate adaptation and mitigation, seeks to enhance ecosystem services such as carbon sequestration and storage (in forests and other ecosystems) and hydrological services and biodiversity, along with provisioning services such as fuel, fodder, small timber and non-timber forest products (NTFPs) (GIM 2011). Another example is the recent launch of India's own TEEB study (MoEF 2010) to draw attention to the economic benefits of biodiversity and natural resources. Efforts are under way to develop the framework for strengthening biodiversity conservation programmes and initiating action for assessing the economic value of India's natural capital. Similarly, there are discussions surrounding PES initiatives aimed at achieving the "win-win" solution of both restoring ecosystems and improving the access of the poor to ecosystem services, thus contributing to secure livelihoods for those who depend on them.

While there has been a long-standing recognition of the disproportionate value of livelihoods (especially of the rural poor) based on the health and resilience of natural ecosystems, there has tended to be a relatively narrow focus on provisioning services such as fuelwood, timber, NTFPs and water, each seen as critical in terms of direct contributions to rural livelihoods. The wider regulatory and indirect benefits of natural ecosystems, especially in hydrological services, climate regulation, soil nutrient enrichment and mitigation of flood risks, have usually not been explicitly recognised by policymakers or by the communities that benefit from these ecosystem functions, although they are implicit in a series of community-led as well as policy-driven ecological concerns that have manifested themselves in India since the 1970s.[2]

This is partly because there are relatively few available studies that have demonstrated the specific ways in which natural ecosystems provide these wider societal benefits, even though the basic principles that drive these relationships are now well understood (MA 2005). To this extent, the empirical knowledge base is still fairly limited. Moreover, there are relatively few incentives for decision-makers to incorporate existing knowledge into policies targeting the management of natural ecosystems, given the high degree of conflict and competing demands of diverse stakeholders that characterise many real world situations. Changing resource-use strategies usually involves difficult choices and the political economy of implementing such changes in the face of the entrenched positions of different actors often means that improvements in ecosystem management do not get implemented.

The experience of various natural resource management programmes and policies in India highlights the importance of understanding the equity implications of policy choices. Over the past several decades, many interventions have attempted to sustainably manage natural resources while also furthering local social and economic development. However, the mixed outcomes of programmes such as Joint Forest Management, integrated conservation and development (and "eco-development") and watershed development over the years have shown the complex trade-offs that exist between conservation goals and other economic, political and social agendas across multiple scales. For example, as Kerr (2002) highlights in his evaluation of watershed development programmes in India, a potential trade-off arises with poverty alleviation since such programmes often benefit landholders while harming landless people, particularly herders and women.

Hence, despite the fact that watershed projects often ask the poorest, most vulnerable people to provide valuable environmental services to much wealthier landowners, the situation is rarely presented in this way, and analysts and policymakers neglect the poverty-alleviation trade-offs associated with the supply of these "services" (also see Joy et al 2006). Lack of recognition of such trade-offs can lead to disenchantment from ecosystem services-based interventions. Programmes based on ecosystem services can be more explicit about losses, costs and the hard choices associated with alternatives so that they can be openly discussed and honestly negotiated. By not doing so, such interventions may lead to unrealistic expectations and perverse outcomes, and ultimately to unresolved conflict.

In this paper, we discuss the implications of incorporating ecosystem services-based thinking into research, policies, procedures and practices for natural resource management and poverty alleviation in India. In particular, we suggest that trade-offs remain ubiquitous despite the apparent potential that the ecosystem services framework offers for developing approaches that can simultaneously provide ecological stability and livelihoods security. There is increasing evidence that ecosystem management involves making difficult choices between different types of ecosystem services (such as between climate regulation, biodiversity conservation, provision of water or forest products, and so on), and between the competing claims of different groups in society (such as between local resource users and those within the global community concerned about climate change or loss of key charismatic species). Patterns of demand, prices, institutional structuring of markets and changing scientific knowledge are likely to make some services more valuable than others and to changing the balance between different users, leading to trade-offs. Such trade-offs are often not adequately recognised and addressed in policies and programmes, resulting in inequitable outcomes.

This paper is organised into five sections. In the first section, we provide an overview of the evolution of the ecosystem services concept and highlight the issue of trade-offs. The second section discusses approaches to deal with trade-offs in the ecosystem services context. In the third section, we present information on how the ecosystem services approach has evolved and is increasingly reflected in the Indian policy agenda. In the fourth section, by taking examples of specific natural resource management sectors, we discuss how ecosystem services might be affected (explicitly or implicitly) when another service is prioritised by policy initiatives. We also focus on key stakeholders and how they might be differentially affected by these initiatives and the negotiations that might take place between stakeholders over trade-offs. In the final section, we justify the need to understand the politics of negotiations over resource use and the reality of actual decision-making in the context of ecosystem management strategies. We conclude with comments on how an understanding of the political economy of negotiations and trade-offs can assist policymakers and users in making more informed choices over ecosystem services and poverty alleviation.

1 Ecosystem Services: Concept and Trade-offs

The growth of recent interest in ecosystem services has led to several definitions. The MA (2005) defines ecosystem services as "the benefits people obtain from ecosystems". The TEEB study (2009) defines it as "the direct and indirect contributions of ecosystems to human well-being". Although an explicit recognition of the concept of ecosystem services is relatively new, Brauman et al (2007) suggest that the notion that human well-being is related to the functioning of ecosystems is very old. The term "ecosystem services" emerged in the early 1980s to describe a framework for structuring and synthesising the biophysical understanding of ecosystem processes in terms of human well-being (Mooney and Ehrlich 1997). It gained further prominence in the 1990s as a result of attempts to frame the value of biodiversity in economic terms by those concerned with the management of biodiversity and natural resources (de Groot 1992; Gomez-Baggethun et al 2010).

The emergence of the ecosystem services concept is also attributed to the influence of the ecosystem approach, which was adopted by the Convention on Biological Diversity (CBD) in 1995 as the "primary framework" for action (Haines-Young and Potschin 2007; Gomez-Baggethun et al 2010). Attempts to calculate the "value of everything" (Costanza et al 1997) and to calculate the value of particular ecosystem attributes (for example, crop pollination) in relation to standard economic measures, such as gross domestic product (GDP) (Daily 1997) helped place the concept of ecosystem services within the mainstream of concerns about sustainable development in the decade following the Rio Conference (Adams 2009). The importance of ecosystem services grew with its use as the fundamental organising concept in the MA in 2005.

The MA divides ecosystem services into four categories. The most familiar are provisioning services, which provide goods such as food, freshwater, timber and fibre for direct human use. Second, and much less widely appreciated, regulating services maintain a world in which it is biophysically possible for people to live and provide benefits such as pollination of crops, clean water, flood regulation and climate stabilisation. Third, cultural services help construct the world as a place in which people want to live; they include recreation as well as aesthetic, intellectual and spiritual inspiration. Fourth, supporting services are the underlying ecosystem processes that produce the direct services described above, including the preservation of options (MA 2005; Brauman et al 2007). Building on the classification proposed by the MA, in the last decade several scholars and national processes have further elaborated on the classifications and definition of the ecosystem services concept (for example, Wallace 2007; Fisher and Turner 2008; Wallace 2008).

In particular, a distinction is now recognised between the fundamental ecological and environmental processes within ecosystems, the ecosystem services that they provide and the goods that human society enjoys (Fisher et al 2008; Fisher and Turner 2008). Ecosystem functions depend on the interactions that take place among physical and biological processes, including long-term processes such as biological evolution and geological change. These processes in turn give rise to the flows that comprise final ecosystem services, often under the influence of human management. In turn, the goods and services people actually use (for example, timber from a forest or water from a river) depend on appropriation of those ecosystem functions, usually with additional human inputs (forest management or water pipelines) (Vira and Adams 2009).

Ecosystem service trade-offs arise from management choices made by humans, which can change the type, magnitude and relative mix of services provided by ecosystems (Rodriguez et al 2006). Ecosystems produce multiple services and these interact in complex ways, and therefore are affected negatively or positively as extraction of one service increases (for example, food or biomass). Some ecosystem services co-vary positively (more of one means more of another). For instance, maintaining soil quality may promote nutrient cycling and primary production, enhance carbon storage and hence climate regulation, help regulate water flows and water quality and improve most provisioning services, notably food, fibre and other chemicals. Other services co-vary negatively (more of one means less of another) such as when increasing carbon storage in tree-based biomass, there is likely to be reduced run-off and groundwater recharge due to higher evapotranspiration compared with grasslands.

Complicated Trade-off

However, the recycling of evapotranspiration to rainfall at larger spatial scales, its essential role in sustaining biomass for other provisioning and regulating services and its role in regulating excessive soil moisture in wet regions makes this trade-off complicated (Rockström et al 1999; Krishnaswamy et al 2009). The most pronounced trade-offs are between provisioning services and regulating services (Elmqvist et al 2010). Surface accumulation of leaf manure may reduce rainwater infiltration, though its eventual decomposition may increase the water-holding capacity of soils. Grazing of cattle in a forest ecosystem could eventually reduce its productivity through effects on soils (Mehta et al 2008). So ecosystem services have trade-offs and synergies that vary from one ecosystem to another, from one management regime to another. The trade-off could be realised over time, especially when over-extraction of a resource such as fruits from a forest ecosystem could potentially reduce regeneration of the species in the long term, thus eventually endangering the provisioning service itself for future generations (Ticktin and Ganesan 2009).

Further, the link between biodiversity and ecosystem structure and the level or amount of a service is complex (Balvanera et al 2006). Mace et al (2012) point out that biodiversity is important in several different ways in the provision of ecosystem services – as regulator of fundamental ecosystem processes; as a final ecosystem service (for example, in the genetic make-up of species of medical or agricultural importance); and as a good (for example, in the form of rare or beautiful species or places of spiritual, religious or recreational value). Two different ecosystems, natural or managed, could theoretically generate the same amount of a particular service (for example, above ground carbon storage or water yield), but could differ in many other aspects, especially biodiversity. Consumption of a service upstream could also severely affect ecosystem functions and services downstream. In India and elsewhere, abstraction of water for irrigation, industry and drinking has major consequences for the productivity of coastal and marine fisheries (Drinkwater and Frank 1994).

Finally, ecosystem services can be a function of scale – spatial or temporal. Dense, indigenous forests have higher evapotranspiration compared to other types of vegetation (especially exotic plantations) and that could result in lower water yields in streams and groundwater locally (Bruijnzeel 2004), although under certain conditions and in the long term this may not be the case (Bruijnzeel 2004; Zhou et al 2010; Bonell et al 2010). However, evapotranspiration from large forested regions could play a role in rainfall regimes through recycling of evapotranspired water vapour (Eltahir and Bras 1994) and there is an emerging hypothesis suggesting that forests in some regions (the Amazon or Congo) attract rain clouds to the interior of continents (Makarieva and Gorshkov 2007; Sheil and Murdiyarso 2009). So the trade-off between high biomass and lower water yield may operate only on a local scale and on a larger regional scale, there is possibly synergy between forest cover and regional rainfall.

Overall, for effective decision-making, it is important for policymakers to include a comprehensive view of ecosystem service trade-offs and synergies. As Rodriguez et al (2006) point out, policies need to acknowledge that, in many instances, short-term demands on ecosystem services will affect the long-term, large-scale provision of these or other services. Political economy also suggests that there are likely to be trade-offs among different users of services (for example, remote beneficiaries of biodiversity values, local users of forestland or different downstream users of water). The challenge for decision-makers is to recognise the inherent complexities of ecosystem management and acknowledge trade-offs while adopting interventions that promote efficient resource use as well as distributional equity.

2 Dealing with Trade-offs in Ecosystem Services

Decision-makers may be focused on reducing poverty, increasing food production, strengthening resilience to climate change or producing energy. Development projects and policies intended to meet these goals often go forward unwittingly at the expense of nature – a dam to produce electricity reduces sediment flows and alters temperature gradients, shifting biodiversity structure, and a national plan to expand agriculture may increase deforestation, leading to soil erosion and could, in some circumstances, result in downstream flooding. Ultimately, development goals may be undermined as the effects of these trade-offs are felt by people who depend on nature for their livelihood and well-being, whether it is fish stocks for food, protection from downstream flooding or spiritual sustenance.

Although there are circumstances in which synergies may emerge between particular objectives, there are usually opportunity costs associated with any strategy for ecosystem management (Tallis et al 2008; Carpenter et al 2009; Vira and Adams 2009) and stakeholders within the system are differentially exposed to these costs. Market mechanisms (such as PES) may allow for novel strategies to exploit potential synergies, but these are unlikely to eliminate the reality of trade-offs that characterise many decision contexts (Redford and Adams 2009). This reality is increasingly recognised in the recent literature and a fertile area of current research involves empirically demonstrating the extent of spatial and temporal overlap between ecosystem service flows from particular landscapes as well as the ways in which different stakeholders benefit from these flows over space and time (Fisher et al 2008; Naidoo et al 2008; Bennett et al 2009; Nelson et al 2009; Elmqvist et al 2010).

These assessment processes enhance our understanding about the relationships between ecosystems and human well-being in specific contexts and develop associated methods to measure, map and monitor the impacts of change in both the ecological and socio-economic domains. However, in most cases, while assessment processes can make trade-offs explicit, they are usually unable to provide clear guidance on how to reconcile competing objectives. There are two particular problems in this context – first, consistent, rational and fair rules for social choice are notoriously difficult to determine (Arrow 1951); and second, even if society were able to agree on a set of rules for social choice, the local political economy often constrains the extent to which socially desirable decisions can be implemented because powerful local actors with entrenched vested interests oppose changes to the status quo (Hope et al 2007).

One way in which trade-off decisions have been quantified is through the use of economic analysis. As Carpenter et al (2009: 1309) point out, "If people's preferences over two or more services are known and can be expressed accurately in the same units of value, for instance in monetary terms, then making the trade-off decision is (at least conceptually) straightforward and involves a simple cost-benefit calculation". However, they proceed to argue that such cases are rare, because preferences are unknown or difficult to determine, or are difficult to express using a common metric. In a recent review paper, Dasgupta (2010: 9) confirms that estimating marginal economic values for ecosystem services is "a formidable problem". Moreover, while economic values provide one input into decision-making for ecosystem services, they are rarely sufficient; ascribing values to ecosystem goods and services is but "one small step in the much larger and dynamic area of political decision-making" (Daily et al 2009: 23).

A study at the Bhoj Wetland in Madhya Pradesh examined these related issues of people's preferences to trade-offs in agricultural land-use change to understand under what conditions a shift to organic farming may reduce/diffuse pollution run-off into an increasingly eutrophic wetland, which provides 40% of the city of Bhopal's two million domestic water users (Hope et al 2008). Farmer age, location and literacy mattered in targeting intervention efforts as well as support during the transitional period for certification to sell organic produce. Importantly, the research suggested that higher organic prices could provide a self-enforcing institutional mechanism, linking increased farmer incomes and reduced pollution to the regular process of organic land certification.

Multi-criteria decision-making (MCDM) techniques provide another way of dealing with the incommensurability of outcomes across different dimensions (social, economic and ecological) as well as uncertainty of consequences (Simpson and Vira 2010). As Ananda and Herath (2009) show in their extensive review, MCDM techniques are increasingly sophisticated and offer considerable potential for use in ecosystem management and planning, but warn that these should not be seen as providing prescriptive answers to resource management problems. MCDM techniques are best seen as helpful inputs to political decision-making, particularly in deliberative and participatory processes, as they provide a useful analytical structure within which stakeholders can discuss competing policy objectives.

In this context, Solomon and Hughey (2007: 651) suggest that such tools are "dialogue tools", which provide "an informational, procedural and structural platform for enhanced communication on environmental problems" by helping to make trade-offs explicit, but cannot be seen as alternatives to normal policy negotiation processes. Indeed, Friend and Blake (2009: 27) warn that an over-reliance on technical approaches to resolving trade-offs may be problematic, as such techniques reduce the "inherently political dimension of negotiating competing visions" to "a managerial and technocratic process". Instead, co-production of knowledge through collaborative learning between experts and lay participants may be a more productive way to develop knowledge systems for ecosystem management (Roux et al 2006). Such knowledge systems can assist decision-makers when confronted with the ubiquitous reality of needing to make informed choices, for which they need heuristic tools to understand and deal with trade-offs.

Moreover, it is important to remember that the institutional environment and political process within which decision tools are used is as important as their technical design (Adams et al 2003; Simpson and Vira 2010). What most trade-off analyses neglect is the reality of actual decision-making in the context of ecosystem management strategies. At the field level, decisions typically involve iterative processes of consultation, negotiation and compromise. How do conflicting stakeholders make choices in specific empirical situations? What are the relative roles of different actors and how do they exercise power in this process? Whose values and interests are reflected in final outcomes and to what extent can outcomes be seen to enhance social well-being? What are the institutions and structures of governance that enhance effective decision-making? These are difficult questions, but are critically important if improved ecosystem management is to be harnessed as a tool for sustainable poverty reduction.

3 Ecosystem Services Approach in Indian Policy Context

While explicit reference to the term "ecosystem services" is relatively new in India, the concept has been in practice for a long time. One of the earliest examples of a policy decision, specifically recognising and valuing ecosystem services, in India dates back to 1899. The Periyar River in the princely state of Travancore (now in Kerala) was dammed in 1895 for irrigating drylands in Madras Presidency (now in Tamil Nadu). Threats to forest cover from the expansion of tea plantations led to the designation of the catchment area of the reservoir as a wildlife sanctuary, mainly to regulate the sediment load into the reservoir.

Elsewhere, in Himachal Pradesh (then part of Punjab), British colonial foresters and bureaucrats debated the value of conserving forests for enhancing and maintaining an adequate streamflow for hydropower generation. There is a fascinating account of the bureaucratic response to real and assumed conflict of interests between the resource needs of pastoral communities and competing state-sanctioned use such as timber production and, in a specific case study, generation of hydroelectric power from the 1870s to the 1990s (Saberwal 1999). In the latter, curbs on grazing were enforced on an experimental basis to gauge any resultant enhancement of winter flows. This Uhl Valley experiment in watershed hydrology may well have been the first one of its kind ever done in India (Krishnaswamy 2000), although Saberwal (1999) and Agarwal et al (2007) point out its limitations because of struggles that local residents undertook during the 1970s to re-establish their grazing rights.

Another well-known example of managing natural systems for the provision of hydrological services was the conservation of forests to protect the water sources of Shimla town from pollution and degradation. This was carried out for many decades in the 19th and 20th century leading to the establishment of the Shimla water catchment sanctuary in 1958 under the municipality of Shimla. In terms of management regimes to sustain provisioning services, the example of *soppinabettas*, forest areas set aside and managed to sustain the supply of leaf manure to areca nut farmers in Karnataka dates back to the 19th century (Nagendra and Gokhale 2008).

Historically the Indian state has also experimented with returning tenure to local communities to let them manage their local forests as an option to reduce conflict and provide broader ecosystem services. At different points in the past century, the government allocated rights in local forests back to communities so as to provide incentives to them to protect the vegetation. The logic was that while biomass benefits could largely go to communities, the environmental service benefits – such as watershed service benefits of reduced erosion – would have both local and wider benefits. Examples include the *van* (forest) panchayats in (what is now) Uttarakhand since the 1930s and the Kangra forest cooperatives in (what is now) Himachal Pradesh since the 1940s. The numerous state-level JFM programmes, started after 1990 and aimed at restoring degraded forestlands for providing goods and services, make available weak tenure with an element of conditionality – the forest department can disband the local forest protection committees (Agarwal et al 2007).

The first example of scientific studies that demonstrate the hydrologic trade-offs between tree plantations and maintaining stream discharges for hydroelectric power are from the Nilgiris in Tamil Nadu where large-scale plantations of eucalyptus have been raised since the 1860s on native high montane grasslands, resulting in reduced streamflow for downstream ecosystem services, including hydropower generation (Samraj et al 1988; Sharda et al 1988; Sikka et al 2003; Chand et al 2009). Typically, only one ecosystem service is studied in isolation and rarely have there been studies of "bundles" of ecosystem services.

The current emphasis on ecosystem services and poverty alleviation can be attributed to three key influences. One, from the 1970s, there has been a shift in natural resource management policies to participatory approaches. Two, there was a new wave of research in the 1990s focusing on environmental valuation and accounting procedures, particularly in the context of goods and services provided by forest ecosystems and their contribution to human well-being. Three, and more recently, influenced by the evolution of the concept at the international level, several pilot projects such as PES initiatives and the government's attempts to develop a more integrated framework to address environmental challenges (such as the Green India Mission) have led to more frequent use of the concept in various natural resource management policies and programmes.

Participatory forest management and soil and water conservation programmes from the 1970s were among the earliest large-scale interventions that emphasised ecosystem services, although they did not use this terminology. For example, the Sukhomajiri village watershed management project initiated in the 1970s is often cited as a model of how people's involvement in soil and water conservation and forest protection can lead to enhanced incomes, both improving the ecosystem and contributing to poverty alleviation (TEEBcase 2010). Subsequently, the shift from top-down, command and control environmental protection policies to more participatory and user-based approaches led to a proliferation of such initiatives. The watershed development programmes implemented by various government and non-governmental agencies since the 1990s with the objectives of raising agricultural productivity, improving soil and water conservation, conserving natural resources and alleviating poverty are further examples of initiatives aimed at achieving "win-win" solutions by focusing on ecosystem management (Kerr 2002).

Along with these developments, several valuation studies (particularly of forests) from the 1990s brought the ecosystem approach and ecosystem goods and services to the attention of policymakers (for example, Agarwal 1992; Chopra 1993). These studies drew the attention of policymakers to the need for some form of ex ante economic appraisal of environmental goods and services from forests and for the value of forest resources to be integrated into national accounts (Gundimeda et al 2007). Subsequently, several valuation studies to assess forest services, ecological conditions, the consequences of losing these services and alternative management options, the economic value of forest services and their contribution to livelihoods and human well-being raised further awareness of the total economic value of forest ecosystems (for example, Chopra and Kadekodi 1997; Verma 2000; Chopra et al 2002; Gundimeda et al 2007; Mathur and Sachdeva 2003).

Since 2000, several pilot initiatives have sought to introduce PES, particularly for watershed protection services (Agarwal et al 2007), and an increased recognition of the potential of the ecosystem services framework (for example, Hussain and Badola 2010) has led to an increasing use of the concept in policymaking. One such example is that of payments to farmers to adopt biodiversity-friendly practices and restore ecosystem services in the Shencottah gap between two important wildlife reserves (FERAL 2010). The Palampur Water Governance Initiative, where the Palampur municipal council is paying the residents of Bohal village to identify, adopt and maintain spring-friendly practices in the upper catchment to ensure water supply to the town, is another example (Agarwal et al 2007).

Following MA (2005), a combination of factors such as India's role in several inter-governmental initiatives related to biodiversity and climate change, a burgeoning number of reports (for example, TEEB 2010) and pilot projects and demand for ecosystem services both from public authorities and consumers (for example, urban water supply) have led to increased awareness about the ecosystem approach among policymakers and practitioners. The NAPCC released in 2008, outlining existing and future policies and programmes for climate mitigation and adaptation, is an important example of recent initiatives incorporating this concept. It identifies eight core national missions, of which two – the Green India Mission and the National Mission on Sustaining the Himalayan Ecosystem – explicitly refer to the ecosystem services approach. The NAPCC emphasises the overriding priority of maintaining high economic growth rates to raise living standards, while also seeking to identify measures that can yield co-benefits for addressing climate change effectively (GOI 2008).

4 Political Economy of Trade-offs in the Indian Context

The current emphasis on ecosystem services in India does not adequately recognise the importance of trade-offs. There is considerable emphasis on understanding the biophysical aspects of ecosystem service provision and on refining economic valuation techniques to estimate the value of the services provided. Most interventions, whether participatory forest management, biodiversity conservation or watershed development, involve some form of restriction on existing patterns of resource exploitation to generate ecosystem services for other users. While these interventions help to improve the condition of resources, they generally lead to a loss of livelihoods and development opportunities for at least some individuals or groups. However, such trade-offs are rarely made explicit or systematically evaluated in advance and the distributional consequences of ecosystem service-based interventions are not discussed in any detail.

Experience of implementation suggests that these trade-offs are pervasive. For example, Kerr (2006) in a review of watershed programmes highlights that participatory approaches have worked well on a small scale, but hydrological relationships cover a larger scale and many projects with their multiple objectives have often faced trade-offs among the interests of different stakeholders. Some of the key challenges have been uneven distribution of benefits and costs of technical interventions, multiple and conflicting uses of natural resources, multiple and overlapping property rights regimes and the difficulty of encouraging social groups to organise around a spatial unit defined by hydrology.

Biodiversity conservation and poverty alleviation programmes and policies have shown that win-wins are difficult to realise despite good intentions (such as under the India Ecodevelopment Project) and that compromise, contestation and conflict are more often the norm. A recent example of conflict is between the provisions for critical tiger habitats and the recognition of community rights under the Forest Rights Act (FRA) 2006, which has revived old debates about choices between "tigers or tribals" (Taghioff and Menon 2010). The declaration of the Biligiri Rangaswami Temple (BRT) Wildlife Sanctuary as a tiger reserve and subsequent recognition of the community rights of the Soliga tribe in the sanctuary highlights the nature of such conflicts (Kumar 2011). The sanctuary, which is home to more than 30 tigers, has been inhabited by Soligas for centuries. Under the FRA, their community forest rights (CFR) have been recognised and they can collect, own and dispose of minor forest produce (MFP) from the reserve. However, conservationists concerned about the declining tiger population have opposed this (Khajane 2011).

The Green India Mission, which proposes a shift from the traditional focus of merely increasing the forest cover to increasing its quality and improving provision of ecosystem goods and services, is an important response to global REDD+ (Reducing Emissions from Deforestation and Forest Degradation) initiatives (MOEF 2011). REDD+ is a global initiative to not only better manage and save forest resources, thus contributing to the fight against climate change, but also provide the important benefits of livelihoods improvement, biodiversity conservation and food security services. However, as the experiences of other countries have shown, there are several technical, social, economic, ethical and governance challenges, some of which are already well recognised and being negotiated and resolved (Ghazoul et al 2010).

In India, the social, economic and political challenges tend to be the least discussed or even recognised in the policy arena. For example, with the increasing demand of land for urbanisation, mining, infrastructure development and food production, there is a significant challenge to the objective of increasing forest cover in the country as proposed under the Green India Mission. While increasing forest cover might improve the provisioning services of forest-dependent communities, forest-degrading activities support the livelihoods of other groups who are typically distant from the forest. An evaluation of the full range of economic, social and political costs and benefits, and, more importantly, their distribution, must be undertaken to assess the feasibility of the ambitious aims articulated by the mission.

The recent controversy surrounding forest clearances for industry and mining is an example of the classic environment versus economic development dilemma and how politics affects trade-off decisions. The decision to scrap the nascent "go and no go" strategy of the Union Ministry of Environment and Forests to protect particular ecologically-sensitive coal-bearing areas (Thakur 2011) highlights the wider political economy of trade-offs between industrial development and environmental conservation. The opening up of forested Hasdeo-Arand in Chhattisgarh for mining is another prominent example of this (Anon 2011). As Jairam Ramesh, former Minister of State for Environment and Forests, said in a lecture, "The Indian political system must be ready to make tough choices and trade-offs between the objective of attaining economic growth of 9-10% and maintaining the ecological balance. These choices are not technocratic or scientific ones, but political choices" (Sridhar 2011).

5 Conclusions

If improved natural resource management is to be harnessed as a tool for sustainable poverty reduction, there is a need to better understand the broader political economy of decision-making and the distributional consequences of particular policy choices, underpinned by the latest biophysical understanding of trade-offs and synergies between ecosystem services. Analysis of trade-offs involving different stakeholders is one way to support decision-making concerning options for protecting or enhancing ecosystem services, while simultaneously benefiting the most marginalised and vulnerable groups in society. Although complex, it is important to undertake a careful analysis of the processes involved in negotiating ecosystem services trade-offs.

Current initiatives in India have tended to adopt technocratic, and sometimes outdated, approaches to identifying ecosystem service flows and attributing economic values to them. They have neglected concerns of the wider political economy context that surrounds potential interventions in the natural resource sector. The essence of trade-off thinking is acknowledging not only the gains but also the losses – real, potential and perceived – incurred by various choices and actions to improve ecosystem management. We argue that the real power of trade-off analysis in the ecosystem services context comes from its ability to bring diverse actors to the common recognition that hard choices are often the norm – one which is often not forthcoming when problems are framed as potential win-wins. We do recognise, however, that trade-off analysis is not in itself a panacea for better ecosystem management, but suggest that an explicit recognition of the distributional implications of policy choices improves the likelihood of equitable and just decision-making.

NOTES

1 These include, among others, the recognition of ecosystem-based adaptation as an important response to the threat of climate change by the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on Biological Diversity (CBD), the International Union for Conservation of Nature (IUCN), the Worldwide Fund for Nature (WWF) and the World Bank, as well as the promotion of ecosystem approaches in national environmental decision-making, such as by the UK's Department for Environment, Food and Rural Affairs (DEFRA).

2 These include, among others, grass-roots mobilisation in defence of forest rights in the Chipko movement and other local forms of protest and control (including sacred groves and other types of community forests), the growing concern of the central government over loss of forest cover and diversion of forestland (and the enactment of the Forest Conservation Act in 1980 as well as the National Forest Policy of 1988), the ban on green felling in high altitude areas in the early 1980s and the interventions of the Supreme Court in forest protection since the mid-1990s. A number of these can retrospectively be seen as incorporating a concern for ecosystem services, but were not explicitly expressed in these terms.

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