

Ecosystem Services – An Agenda for Research in South Asia¹

Ecosystem services make important contributions to human wellbeing. South Asia is witnessing a rapid deterioration of local and regional ecosystems. Many of these ecosystems are exploited beyond what is socially optimal because they exist in either open access or common property regimes. With emerging concerns about climate change, there is further disquiet about the loss of natural areas and their services. This note discusses research priorities for managing South Asia’s ecosystem services, as identified by a group of scientists and practitioners who gathered in Bengaluru, India, to address these concerns.

Ecosystems provide many services that are valuable to humanity. In some cases, these services are directly used, while in other cases, they offer indirect benefits. The Millennium Ecosystem Assessment (MA, 2005) classifies ecosystem services into provisioning, regulating, habitat and cultural services. Provisioning services refer to goods and services, timber products for example, that are directly consumed by humans. Regulating services include such services as carbon

sequestration and storm protection, which control and moderate various earth systems. Habitat and cultural services enable the provision of biodiversity, recreation, as well as sacred and cultural spaces that are important for supporting the physical and social fibre of life on earth.



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Ecosystem Services in South Asia- Priority Issues for Research

- Examination of the contributions of ecosystem services to livelihoods, especially of vulnerable groups.
- Strategies that enable conservation of highly threatened and irreplaceable services such as biodiversity.
- Investigation of resources prone to conflict by assessing benefits to different stakeholders at multiple scales.
- Identification and examination of policy levers most amenable to conserving ecosystem services.

Source: Workshop on *Measuring, Managing and Valuing Ecosystem Services in South Asia*, April, Bengaluru, India.

¹ This Brief, written by Pranab Mukhopadhyay and Priya Shyamsundar, is partially based on participant discussions at a workshop jointly organized by South Asian Network for Development and Environmental Economics (SANDEE) and Ashoka Trust for Research in Ecology and the Environment (ATREE) on ‘Measuring, Valuing and Managing Ecosystem Services’, held in Bengaluru, India during April 14-15, 2014.

The Economics of Ecosystem Services

Ecosystem services are being eroded by human production and consumption activities. Often economic agents are unaware of changes they inflict on ecosystem services. In other cases, the 'opportunity costs' or benefits that accrue to specific stakeholders are seen to outweigh detrimental effects. In still other situations, the impacts of economic activity on services occur too far in the future to value lost services at suitable amounts. Finally, since many ecosystems exist in either open access or common property regimes, they are often exploited beyond what is socially optimal (Sethi and Somanathan 2006)[6]. Cooperative conservation may fail for lack of trust and coordination. A case in point is the failure of nation-states to agree to specific emission targets related to greenhouse gas emissions.

The study of the economics of ecosystem services offers several ways forward, including public investments and changes in institutions and market-oriented strategies (see Figure 1). Since many services are not bought and sold in markets, it may be useful to estimate the benefits of conserving ecosystem services. There are also costs imposed by conservation either because of disservices (such as animal predation) or lost opportunities (coastal mangrove preservation instead of tourist infrastructure). If the benefits accrue to one set of stakeholders and the costs are borne by a different set, this 'mismatch' needs to be rectified both for ethical and practical reasons. Evidence suggests that the mismatch may influence how people, particularly policy makers, make conservation decisions.

The potential for trade-offs among stakeholders as a result of changes in ecosystem services has resulted in the development of 'payment for ecosystem service' schemes in recent years. An important corollary is the analyses of 'opportunity' costs, i.e. the costs to stakeholders from stemming degradation of services. Tools from game-theory, which examine cooperation versus alternate strategies, also provide insights into how best to move forward when the conservation of a service requires coordination with multiple groups and at multiple scales.

Physical changes in ecosystem system services have been widely studied, most frequently in the forestry sector. This has contributed to a well-developed literature on the value of provisioning services. A recent global survey under the Poverty and Environment Network (Angelsen et al. 2014) finds that environmental income accounts for 28% of total rural household income on average. They also estimate that some 77% of this environmental income comes from natural forests. Ecosystem services, at least in this case, play an income-equalizing role because of the additional support they provide to vulnerable communities.

While the direct connection between human wellbeing and provisioning services is well established, fewer studies quantify this relationship with regards to regulating services. One well-known example is an assessment of mangroves in India (Das and Vincent 2009), which suggests that the presence of mangroves contributed to a 54% reduction in deaths from wind and storm damages during the super-cyclone of 1999 in Kendrapada District, Orissa. This kind of storm protection service can only grow in importance as climate change increases the frequency and intensity of extreme events in South Asia.

How much of our ecosystems should we conserve?

Conservation decisions necessarily involve a variety of trade-offs among different stakeholders and between the current and future generations. In this context, valuing changes in ecosystem services becomes a requirement. While we will not be able to value all of what nature provides, where there are measurable direct and indirect uses, valuation can make 'invisible services more visible'. Valuation is particularly useful in understanding the implications of specific policy, market or demographic changes on ecosystem services, where there are identifiable impacts on human well-being.



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About 18 years ago, a group of researchers (R. Costanza et al. 1997) asserted that planet Earth's aggregate value of ecosystem service flows was some \$33 trillion per year (in 1995 \$US). Expectedly, this claim caused quite a ripple and some found the number astonishingly large. In a follow-up article, (Robert Costanza et al. 2014), use new research to suggest that the annual flow of ecosystem services would amount to \$125 trillion per year (in 2011 at 2007 \$US) in comparison to global GDP of \$75.2 trillion per year. They also suggest a loss of ecosystem services at \$4.3 to 20.2 trillion per year due to land use change from 1997 to 2011. While such large numbers will always be controversial, this and related literature point to the importance of ecosystems. It is also clear that identifying the value of changes in ecosystem services is useful, particularly if this can be tied to policy levers (Ferraro et al. 2012).

Global Attention to Ecosystem Losses

The global community has made significant strides in raising awareness of the importance of ecosystems and institutionalizing their preservation. One of the largest efforts was the Millennium Ecosystem Assessment under UN stewardship. This was succeeded by the TEEB initiative of the UN Environment Programme (UNEP), which attempted to identify the benefits of biodiversity. More recently, concerns over the continued and rapid deterioration of ecosystem services have led to the formation of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) in 2012. IPBES, like Inter-Governmental Panel on Climate Change (IPCC), hopes to galvanize global attention to the hazards of losing ecosystem services.

One strategy to ensure continued attention to ecosystem services is by accounting for their role in national wealth and income. Thus, the UN Statistical Division has developed Experimental Ecosystems Accounts. Similarly, the Wealth Accounting

and Valuation of Ecosystem Services (WAVES) partnership led by the World Bank encourages nation-states to integrate the value of ecosystem services into national accounts (see www.wavespartnership.org). UNEP recently launched a program called Valuation and Accounting of Natural Capital in Green Economy (VANTAGE) to build capacity among countries to account for changes in ecosystems.

In India, the Ministry of Environment and Forests (MoEF) commissioned an assessment of knowledge gaps in three ecosystems: forestry; wetlands; and marine and coastal systems ((Parikh et al. 2012). It found that there is a larger body of literature on forestry in India than on wetlands or marine and coastal systems. Based on that assessment, MoEF and the German Development Aid Agency (GTZ) initiated a set of research studies in India. Regrettably, broad assessments such as this are not available for other parts of South Asia.

Figure 1: **Reasons for the decline in ecosystem goods and services and identified solutions**



Ecosystem Services in South Asia – Key Issues

In an effort to operationalize a research agenda in South Asia related to ecosystem services SANDEE (South Asian Network for Development and Environmental Economics) partnered with ATREE (Ashoka Trust for Research in Ecology and Environment) to start a dialogue among ecologists, economists and other stakeholders at a workshop titled “Measuring, Valuing and Managing Ecosystem Services”, which was held in Bengaluru, India during April 14-15, 2014. Some of the results emerging from these discussions are identified below.

There is a need for multi-disciplinary analyses of the inter-linkages among ecological and economic systems.

An inspection of the TEEB database shows that only 62 studies of the 1,310 studies identified are from South Asian biomes. This low contribution to global understanding of ecosystems is

partly driven by South Asia’s limited capacity to undertake integrated ecological-economic analyses and inadequate coordination among disciplinary practitioners.

Topical studies with clear links to policies need to be prioritized. There are many contexts where the policy community is ready to act. These low-hanging policy fruit need to be exploited to provide decision-makers with evidence based solutions. Some of this research may fall outside traditional boundaries of conservation research. Thus, ecosystems research needs to be expanded to include policies and programs that drive short and long-term changes in ecosystem services.

Conflicts associated with the use of ecosystem services and trade-offs between conservation and poverty reduction need attention. South Asia is home to the largest number of poor, many of whom depend significantly on ecosystem services. Nature also provides services and disservices, both of which need to be examined and valued. Research that focuses on areas of conflict among stake-holders will contribute to urgently needed solutions. However, such research needs to be particularly cognizant of the different value systems of diverse stakeholders.

Conservation of non-substitutable services needs to be prioritized. The degree to which natural capital is substitutable by other forms of capital emerged as an important consideration. If revenues from ecosystem use are re-invested either as natural or physical/human capital, then the change in services may not lead to a loss in human welfare (Arrow et al. 2004). This assumes that ecosystem services are malleable and substitution is possible, which will not always be the case. Research must give precedence to services that are under threat of degradation and have low substitutability



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Some Practical Research Considerations

Researchers at the Bengaluru workshop identified three practical components of good ecosystems services research:

- Teams with expertise from multiple disciplines. While ecosystem services are better examined by natural scientists, this needs to be done with social scientists in order to understand impacts on human well-being.
- Large enough scale and budget to accommodate integrated analyses. The duration of such projects needs to be sufficiently long (eg., five years) to understand inter-connectedness among physical and socio-economic attributes.
- Scope beyond administrative boundaries. Since ecosystem services are not confined to state or national borders, research that is not restricted by administrative borders is likely to be most useful.

SANDEE

The South Asian Network for Development and Environmental Economics (SANDEE) is a regional network that seeks to bring together analysts from the different countries in South Asia to address their development-environment problems. Its mission is to strengthen the capacity of individuals and institutions in South Asia to undertake research on the inter-linkages among economic development, poverty, and environmental change, and to disseminate practical information that can be applied to development policies. SANDEE's activities cover Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka.

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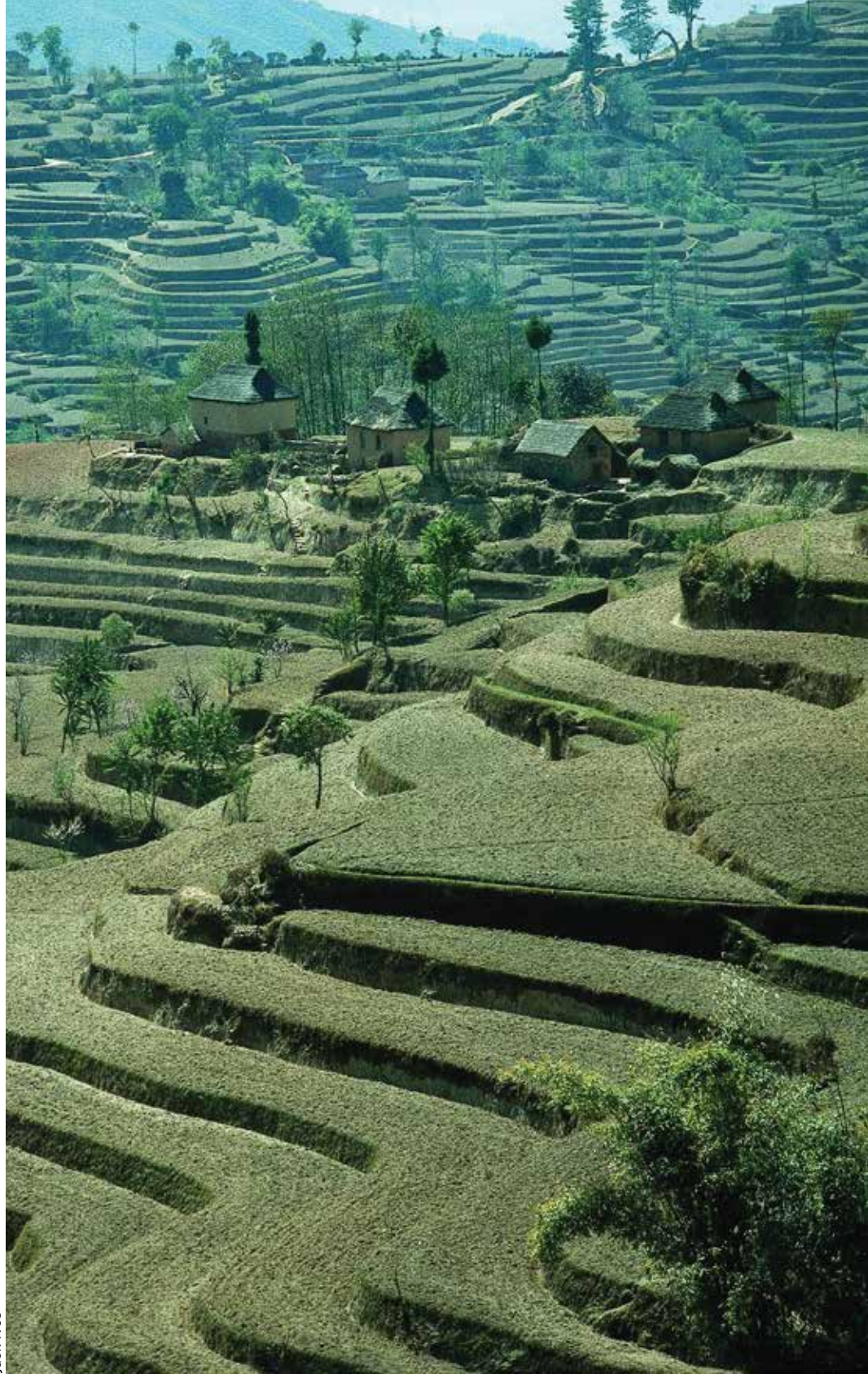
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