



Making the hidden visible: Economic valuation of tiger reserves in India



Madhu Verma^{a,*}, Dhaval Negandhi^a, Chandan Khanna^a, Advait Edgaonkar^a, Ashish David^a, Gopal Kadekodi^b, Robert Costanza^c, Rajesh Gopal^d, Bishan Singh Bonal^e, Satya Prakash Yadav^{d,e}, Sanjay Kumar^e

^a Indian Institute of Forest Management, Bhopal, India

^b Centre for Multidisciplinary Development Research, Dharwad, India

^c Crawford School of Public Policy, Australian National University, Canberra, Australia

^d Global Tiger Forum, New Delhi, India

^e National Tiger Conservation Authority, Ministry of Environment, Forests & Climate Change, Govt. of India, New Delhi, India

ARTICLE INFO

Article history:

Received 31 March 2016

Received in revised form 18 May 2017

Accepted 20 May 2017

Available online 7 July 2017

ABSTRACT

Tiger reserves in India not only support more than half of the global tiger population and are cornerstones of biodiversity conservation, they also provide a wide range of economic, social and cultural benefits in the form of ecosystem services.

Ignorance of such values influences public policies, including decisions involving investments and allocation of funding, that may impact their protection status with serious implications on human well-being.

Through economic valuation of ecosystem services from 6 tiger reserves in India, we demonstrate that enhanced investment in these tiger reserves is economically rational.

The flow benefits from selected tiger reserves range from US\$769 ha⁻¹ year⁻¹ to US\$2923 ha⁻¹ year⁻¹.

The usefulness of such information for developing incentive-based mechanisms and informing zoning and management of tiger reserves at the landscape level is also discussed.

© 2017 Elsevier B.V. All rights reserved.

Contents

1. Background	237
2. Study sites	238
3. Methodology	238
3.1. Employment generation	239
3.2. Agriculture	239
3.3. Fishing	239
3.4. Fuelwood	239
3.5. Fodder/grazing	239
3.6. Timber	239
3.7. Non-wood forest produce (NWFP)	239
3.8. Gene-pool protection	239
3.9. Carbon storage	239
3.10. Carbon sequestration	240
3.11. Water provisioning	240
3.12. Water purification	240
3.13. Soil conservation/sediment regulation	240
3.14. Nutrient cycling/retention	240
3.15. Biological control	240
3.16. Moderation of extreme events	240

* Corresponding author at: Indian Institute of Forest Management, P. O. Box 357, Nehru Nagar, Bhopal 462003, Madhya Pradesh, India.

E-mail address: mverma@iifm.ac.in (M. Verma).

3.17.	Pollination	241
3.18.	Nursery function	241
3.19.	Habitat/refugia	241
3.20.	Cultural heritage	241
3.21.	Recreation	241
3.22.	Spiritual tourism	241
3.23.	Research, education and nature interpretation	241
3.24.	Gas regulation	241
3.25.	Waste assimilation	241
4.	Results.	241
5.	Discussion.	242
5.1.	Policy	242
5.2.	Practice	242
6.	Conclusion	243
Appendix A.	Supplementary data	243
	References	243

1. Background

Humans as apex species are facing a variety of crises due to loss of biodiversity values (Cardinale et al., 2012). While the costs of biodiversity losses are felt at local level, they often completely go unnoticed at national and international levels due to non availability of robust valuation systems, thereby leading to weaker policies (TEEB, 2010a). Public policies have an essential role to play in ensuring that the main types of benefits from nature are identified and used in decision making – avoiding gross underestimation of the overall value of conservation and sustainable use of biodiversity and ecosystem services. Developing capacity to measure and monitor biodiversity and ecosystems for their provisioning services is thus an essential step towards better management of our natural capital (Daily, 1997).

The value of such ecosystem goods and services is increasingly being recognized, both in terms of socio-economic benefits and in terms of their contribution to other aspects of human well-being, through direct and indirect use as well as non-use values (Costanza et al., 2014, 1997). Often these benefits cannot be measured in monetary terms, including the value of protection against natural hazards or the contribution to cultural identity and sustenance. While many feel putting a price on nature and thus commodifying it is either impossible or ethically unsound, the contrary argument that without doing so ecosystem services are at risk of being left out of economic analysis and decision-making is also difficult to contest (Kallis et al., 2013). For example, economic analysis can help in determining the quantity of goods such as fuelwood and fodder that can be allowed for extraction by local communities based on the trade-offs with other services as water regulation from the forest.

India holds about sixty percent of the world's wild tiger population wild (Jhala et al., 2015; WWF, 2016) and is considered to have the best chance for saving the population of this magnificent animal in the wild (Dinerstein et al., 2007). Conservation of India's national animal and vegetation gains significance on account of its role in the context of sustainable food chain. Its presence is vital in regulating and perpetuating ecological processes and systems (Walston et al., 2010). Tiger is also an umbrella species whereby its protection also conserves habitats of several other species, thereby ensuring continuity of natural evolutionary processes in the wild. The Project Tiger, launched in 1973 by the Government of India, now includes 50 tiger reserves across the country, covering over 2 per cent of India's geographical area (NTCA, 2015).

Originally most of the tiger reserves in India have been established to protect landscape features and wildlife including tiger and for biodiversity conservation with genetic, species and ecosystem diversity. The primary objective of establishing such tiger

reserves under Project Tiger has been to ensure continuity of natural evolutionary processes (Jhala et al., 2015, 2010). However, many tiger reserves also conserve a wide range of ecosystem services and provide social, economic and cultural benefits. Often, establishment of such reserves could be justified in terms of these ecosystem services alone (Badola et al., 2010). For instance, Periyar Tiger Reserve protects watershed of Periyar Lake that irrigates more than 900 km² of agriculture in neighbouring rain-shadow regions (Shukla, 2011).

Tiger conservationism in India has a long history. However it is a paradox that as the emphasis on conservation movement has increased over the years with increase in tiger population, so too has the rate of loss of tiger habitat (Jhala et al., 2015, 2010). Estimating monetary values of ecosystem services from biodiversity can help in making conservation more appealing and benefits from biodiversity more visible to policy makers. Moreover, it is important to recognize that intrinsic value considerations are not the only solution to biodiversity conservation, particularly in developing regions such as India which are exposed to increasing threats to biodiversity but are home for a large majority of world's poor. Therefore, arguments based on intrinsic considerations are often trumped by the needs for survival.

While conservation initiatives till now have largely focused on in-situ conservation of tigers by establishing tiger reserves in India, there has not been any major assessment of the economic value of tiger reserves in terms of ensuring the flow of essential ecosystem services that subsequently accrue to local, regional, national as well as global beneficiaries. In the light of growing developmental pressures, there is an urgent need to provide stronger argument for conservation of the wild and thereby good reasons for enhanced investment in these tiger reserves. Economic valuation is increasingly being used as a tool to communicate the values emanating from natural ecosystems to the policy-makers as well as the need to invest in green endowment and thus help in prioritizing investments and allocation of funding at state and national level (TEEB, 2010b). Further, many benefits from tiger reserves flow outside the administrative boundaries of tiger reserve and economic valuation can help reflect the true value of benefits accruing outside.

A pilot study was thus commissioned with the support of the National Tiger Conservation Authority to highlight the economic contribution of tiger reserves to the society and mainstream concerns associated with tiger conservation in policy debates (Verma et al., 2015). In this paper, we outline the methodology used for estimating economic values of various ecosystem services for selected tiger reserves in India and present the results.

We still do not have adequate information or understanding about ecosystems, all the species, and the various ways in which these enhance human well-being that we can objectively estimate

Download English Version:

<https://daneshyari.com/en/article/6463444>

Download Persian Version:

<https://daneshyari.com/article/6463444>

[Daneshyari.com](https://daneshyari.com)