

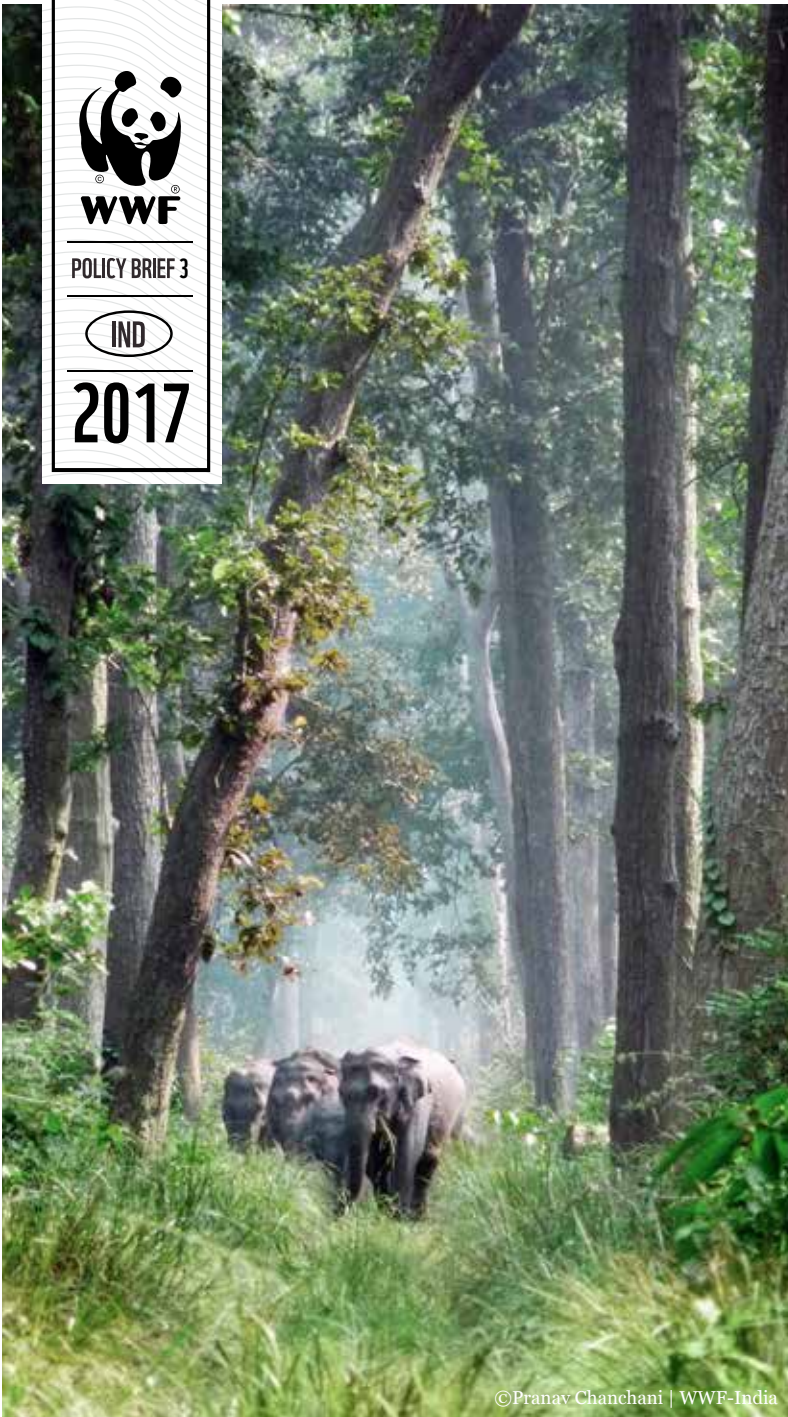


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POLICY BRIEF 3

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Worth at STAKE

Ecosystem service values of the Terai Arc Landscape in Uttarkhand ...

Are the contributions of ecosystems to human well-being accounted for in holistic development planning? Most often they are not! Forces of urbanization and industrialization pose threat on the biodiversity thereby impairing ecosystem structure, functions and the consequent ecosystem services, i.e., the benefits obtained by the human community from the ecosystem. This study estimates monetary values of the ecosystem services at the scale of a landscape, in this case the Terai Arc Landscape, to reveal the importance of conserving the biodiversity, even when the pressure points emerge in the forms of extensive urbanization and industrialization. Such values need to be taken into consideration not only from the perspective of conservation, and development planning, but also from the perspective of distributive justice as it is the poor who are more reliant on the ecosystem services.

INTRODUCTION ●

This brief talks of placing monetary values to services provided by the ecosystem at the scale of a conservation landscape in order to demonstrate the importance of ecosystem conservation from an economic perspective. This becomes even more important given the fact that landscapes are subject to forces of increasing urbanization and industrialization that pose a threat on conservation goals. One such landscape is the Terai Arc Landscape, where the traditional economic drivers like agriculture, and modern drivers like industrialization and urbanization are likely to pose threat on biodiversity conservation, thereby impeding on ecosystem structure and functions. This necessitates understanding the importance of biodiversity conservation in the region through the values yielded by the landscape in terms of the ecosystem services.



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ECOSYSTEM SERVICES AND THEIR VALUATION



Ecosystem provides human community with goods and services free of cost like clean air, water, and food, known as ecosystem services. These services entail provisioning of clean drinking water, air, food, decomposition of wastes, climate regulation, soil formation, etc. Since these services are provided for free, their importance is often not understood by human society.

The Millennium Ecosystem Assessment classified ecosystem services into four major categories, namely, provisioning (e.g. food, water and fishery), regulating (e.g. climate regulation and carbon sequestration), supporting (e.g. nutrient cycles and crop pollination) and cultural (e.g. spiritual and recreational benefits, tourism). The Economics of Ecology and Biodiversity in 2010 recognised that these ecosystem services are “GDP of the poor”, as the poor’s incomes and survival are dependent on the ecosystem.

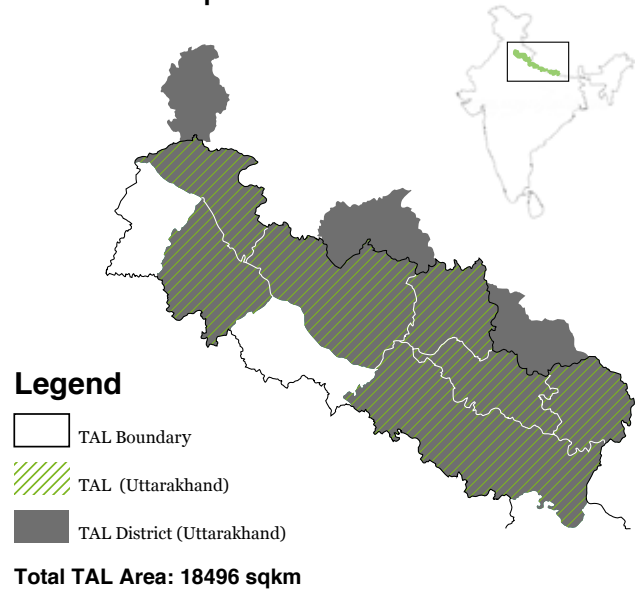
For sustainable management of the natural resources like forests, wetlands, rivers, etc. one needs to set the right conservation goals for flora and fauna, which through their natural functioning, support and sustain these resources, and provide ecosystem services. Societies, economies and businesses therefore inextricably depend on biodiversity through a well-defined supply-chain, whose recognition is obscure in the public domain, especially in India and the developing world.

Monetary values assigned to these ecosystem services provide a basis for understanding the importance of biodiversity conservation to all these entities. Valuation of ecosystem services provides a mechanism for optimizing investments in biodiversity conservation and directing them to where they are most useful. Given society’s increasing demands for employment, income and infrastructure, development decisions tend to maximize short-term economic gains. This can get corrected when ecosystem services are assigned the monetary value.

STUDY AREA

The Terai Arc Landscape (TAL) covers the states of Uttarakhand, Uttar Pradesh and Bihar and the bordering areas of Nepal, and is spread over approximately 49,500 sq. km. TAL in India covers approximately 30,000sq. km. The natural vegetation in TAL-India consists of sal forests, riverine forests, mixed forests, grasslands and open scrubs, and is inhabited by a large variety of mammals including tiger, elephant and rhinoceros, and more than 8 million people according to 2011 census. TAL in Uttarakhand is among the most densely populated rural areas in the country and most of its local communities are dependent on forest for their survival. During last two decades, population here increased by 54.6%, which is 9% above the country's average. The dependence of the community on ecosystem services was traditionally high, and the valuation exercise conducted in this study reflects on that.

Uttarakhand part of Terai Arc Landscape



METHODS

The values have been estimated for only nine ecosystem services of the TAL, as shown in Table 1, using the standard valuation methods that entail production function approaches, surrogate pricing, benefit transfers, etc. It is not humanly possible to account for the entire gamut of ecosystem services. Further, in order to avoid the problem of double counting, the supporting services, often defined as services that are necessary for the production of all other ecosystem services, have not been taken into consideration. These make the estimates highly conservative. Further, the values have been estimated for 2005-06 as that is a normal year. Values are affected by market conditions, and certified emission reduction (CER) markets, based on which carbon sequestration values have been estimated, moved to slump after the global meltdown of 2008. Further, the impacts on downstream have not been considered. The values have then been inflated to 2015-16, using the WPI deflators.

RESULTS AND DISCUSSION

The sum of the values of the nine ecosystem services in 2005-06 was INR 227.52 billion (US\$3.5 billion). The same value turned out to be INR 390 billion (US\$6 billion) in 2015-16, and INR 344 billion (US\$5.3 billion) in 2011-12 by using Wholesale Price Index of the new series with 2004-05 as the deflator.

In 2005-06, the total income of the TAL districts, as estimated, was INR 191 billion. This is based on the estimates of population given by Census 2001, and district per capita income estimates by the Central Statistical Organisation. Therefore, the nine ecosystem services (estimated as INR 227.52 billion) yielded 19% more value than the total income of the region. It can therefore be argued that if the landscape ecosystem is destroyed through land use change, one needs to compensate the local community in TAL Uttarakhand by spending 19% more than the total value of the economic output of the landscape.


TABLE 1

SELECTED ECOSYSTEM SERVICES	VALUE IN MILLION INR
Water for Agriculture	13886.82
Water for Hydropower	440.68
Carbon Sequestration	66078.20
Tourism (Corbett)	3680.00
Drinking Water	2785.64
Fuelwood	41995.50
Microclimate Regulation	48011.40
Fodder	3015.54
Religious Tourism in Hardwar	47623.51
Total	227,517.28

Value of Selected Ecosystem Services in Terai Arc Landscape in Uttarakhand in 2005-06

POLICY IMPLICATIONS

1. The values that we have arrived at are approximations, conservative, and “tip of iceberg” estimates. Yet, they are indicative of the fact that the contribution of the TAL ecosystem in Uttarakhand to the human community is at least INR 390 billion or USD 6 billion, which by itself is higher than the income of the community of the region.
2. More than half the population in the TAL – Uttarakhand is living below poverty levels and an earning member of a household earns as little as US\$ 1.9/day. The ecosystem dependency of these households is higher than those earning average per capita incomes. Hence, any policy towards land-use change in the landscape and ground actions leading to land use change in the wildlife habitats and corridors should be considered very carefully.
3. While land use change is planned, one needs to assess on how much of the habitat will be destroyed due to that. In those cases, poorer people will lose out a substantial amount of their “GDP” or “incomes” provided by the ecosystem, and they need to be compensated for the loss to the tune of the damage caused to them. However, this compensation would not take into account other economic impacts from the loss of services such as flood control, water recharge, and soil retention, which could lead to huge costs due to disasters incurred such as floods and landslides.
4. If valuation is considered from the long term development perspective, then it will be clear that the cost of damaging ecosystems and disrupting their services will be higher than the short term gains from some planned projects resulting from urbanization and industrialization.

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