

## Greening the GDP: Valuing Natural Capital in India

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**ABSTRACT** It is important to differentiate between *physical capital* as produced means of production in contrast to *natural capital* which is naturally endowed. The latter facilitates a host of ecosystem services<sup>1</sup> that flow through human processes, both societal and economic. Unlike physical capital, natural capital cannot be substituted easily. Therefore, this stock of natural capital processing into the flow of ecosystem functions need to be valued and incorporated in the traditional system of national accounts. This brief makes a case for such assessments. It outlines the timeline of developments with regard to Natural Resource Accounting in India and in other parts of the world, and argues for a comprehensive indicator of India's performance in the context of finding alternative frameworks for sustainable development.

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## INTRODUCTION

*“By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.”*

– Vision of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets<sup>2</sup> 2010.

Developing economies like India—which are characterised by the shift of resources and political focus from the agrarian sector to the manufacturing and services sectors—tend to not only be partially oblivious to its current stock of natural capital, but also exert pressure on environmental goods and services. Ecosystem services, also known as the “GDP of the poor”,<sup>3</sup> are the services provided by the environment and enjoyed by the human community free of cost; these services are absent in the traditional System of National Accounts (SNA)<sup>^</sup> of a country. It is increasingly being recognised that SNA must be re-designed into a more holistic indicator that will factor in not only the value of non-marketed ecosystem services, but also the impact of human endeavours in the form of environmental externalities.<sup>#</sup> The need for an advanced development indicator is essential not only in accounting for the missing tenets of environmental concerns but also in policy engineering to ensure sustained progress. Such improvements to the traditional SNA is known as Natural Resource Accounting or Green Accounting.<sup>@</sup>

Unaccounted negative environmental externalities have loomed large in the purview of natural capital assessments in India. In forest management, for example, such assessments can become catalysts for more environmental sensitivity towards existing populist policies on land use and deforestation. One way to make an economic assessment of deforestation is through creating asset value categories for timber, carbon, and non-timber forest products (NTFPs) and indirectly accounting for the loss of the forest. In traditional accounting of agricultural GDP, output is measured in monetary terms, leaving out externalities such as the depletion of forests and groundwater resources. Policies such as agricultural subsidies have often increased the affordability of chemicals and high-yield variety seeds, which are prime examples of technologies that can lead to land deterioration. These inefficient methods cause detrimental effects including falling water tables, surface water pollution, and rising salinity — yet, such ecological losses are left out in current accounting methodologies.

Chopra and Adhikari (2004)<sup>4</sup> argued that ecosystem goods and services are to be valued to enhance human welfare irrespective of their marketability. This would involve identifying its physical and environmental linkages, followed by the determination of its economic linkages in order to assign a value. For example, the declining quality of freshwater in India can be

<sup>^</sup> The United Nations System of National Accounts is an internationally accepted method of aggregating the measures of economic activity. GDP and its variations, being the most important national account, is technically measured in three ways: Expenditure Method, Income Method and Value Added Method.

<sup>#</sup> The positive or negative (mainly) environmental consequences of economic activities such as production and consumption. It affects consumer utility and production costs beyond the scope of traditional market mechanisms.

<sup>@</sup> The term was ideated and brought into common usage in the 1980s by economist and Professor Peter Woods.

mostly attributed to the mismanagement of industrial waste. In this context, although water quality is indeed tracked from time to time, the lack of assessment of specific externalities hinders a logical and objective analysis of the damage in economic terms through estimating costs of purification of polluted water.<sup>5</sup>

Estimates show that global land use changes between 1997 to 2011 have resulted in a loss of ecosystem services worth US\$ 4.3 trillion to US\$ 20.2 trillion per year.<sup>6</sup> To begin with, the currently predominant socioeconomic setup functions through its dependence on the biodiversity via a well-defined supply chain.<sup>7</sup> However, since these ecosystem services are provided at no monetary cost, the importance of conservation is grossly underrated, especially in the developing world.<sup>8</sup> The interlinkage and interdependence between humans and the environment can be better understood by gaining clarity on the valuation of natural capital stocks and corresponding ecosystem flow services.

## **THE GREEN ACCOUNTING AGENDA: A BRIEF HISTORY**

One of the benchmarks in the advancement of the Green Accounting agenda was the issuance of a handbook known as the System of Environmental and Economic Accounts in 2003 (SEEA-2003) by the United Nations,

European Commission, International Monetary Fund, Organization for Economic Cooperation and Development, and the World Bank. The United Nations Statistical Commission accepted the SEEA as a statistical standard in 2012.

In early 1990, The United Nations Statistical Division (UNSD) proposed a new accounting framework referred to as the Integrated System of Environmental and Economic Accounts (IEEA) which integrates environmental accounts into the traditional SNA. It led to the conceptualisation of green indicators such as the Eco-Domestic Product (EDP), instead of traditional performance indicators such as the GDP and GNP. The first credible approach towards valuation of world's ecosystem services was conducted by Costanza et al. (1997)<sup>9</sup> that estimated the annual value to be US\$ 16 trillion to US\$ 54 trillion with an average of US\$ 33 trillion. The study highlighted that if ecosystem services actually involved payments, the pricing systems would be completely different and the price of all commodities using these services (either directly or indirectly) would be much higher.

Table 1<sup>10</sup> published by INTOSAI Working Group on Environmental Auditing (2010) traces the major global developments that took place in the system of Green Accounting over time:

**Table 1. Timeline of Key Developments in Natural Resource Accounting**

YEAR	KEY DEVELOPMENTS
1972	The relationship between economic development and environmental degradation was discussed by the international community at the United Nations (UN) Conference on the Human Environment for the first time.

YEAR	KEY DEVELOPMENTS
1970s	Norway constructed the first environmental accounts.
1983–1987	The World Commission on Environment and Development, also known as the Brundtland Commission was set up by UN in 1983. The Commission examined whether nations were misusing their natural and environmental resources and issued a report entitled <i>Our Common Future</i> in 1987. The report popularised the concept of 'sustainable development' as an alternative to reductionist economic growth approach.
Early 1990s	The World Bank's review of environmental accounting listed countries that had developed accounts, the methods used, and the extent of coverage.
1992	The UN Earth Summit at Rio de Janeiro was held to discuss sustainable development and the implementation of integrated environmental and economic accounting.
1993	The first handbook for developing a system of integrated environmental and economic accounting (SEEA) was issued. SEEA-1993 was developed by the UN, but a conclusion on concepts and methods was not reached.
1994	A group of countries active in environmental accounting formed the London Group on Environmental Accounting to share their experiences in developing and implementing the accounts. The collaboration helped develop recommended methodologies for selected parts of the revised SEEA.
1998	The International Organization of Supreme Audit Institutions' Working Group on Environmental Auditing (WGEA) released a report entitled <i>Natural Resource Accounting: An Inventory of Possibilities for Supreme Audit Institutions (SAIs)</i> to inform SAIs about the current state of affairs in the field of environmental accounting. It also promoted the debate regarding the opportunities available to SAIs in this field.
2000	The United Nations Statistics Division (UNSD) and the UN Environment Programme published <i>Integrated Environmental and Economic Accounting - An Operational Manual</i> that was written by the Nairobi Group (a group of government, international, and non-governmental organization experts). The manual contains guidance on implementing parts of the SEEA and provides additional examples on how the accounts are used in policymaking.
2003	The UN, Eurostat, International Monetary Fund, OECD, World Bank, and the London Group released a revised version of SEEA-1993. The revised SEEA made progress towards the standardisation of concepts, definitions, and methodologies.
2004	The UNSD and Food and Agricultural Organization jointly released a draft of the <i>Handbook of National Accounting: Integrated Environmental and Economic Accounting for Fisheries</i> (SEEA-F).
2005	The UN Statistical Commission established the United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEAA) during its 36 <sup>th</sup> session, whose objectives are: (a) to mainstream environmental-economic accounting and related statistics; (b) to elevate the SEEA to an international statistical standard; and (c) to advance countries' implementation of the SEEA.

YEAR	KEY DEVELOPMENTS
2005	Also during its 36 <sup>th</sup> session, the UN Statistical Commission established the Oslo Group on Energy Statistics to contribute to the development of improved methods and international standards for national official energy statistics, and, in particular, to review and contribute to the updating of the UN's handbooks and manuals on energy statistics.
2006	UNCEEA began a Global Assessment project to: (a) assess the current status of national implementation of environment statistics, environmental economic accounting and related statistics; (b) identify priorities and future plans in these areas; and (c) assess impeding factors in the collection, compilation and dissemination of environment statistics, environmental-economic accounting and related statistics.
2007	The UN Statistical Commission adopted Part I of the System of Environmental-Economic Accounting for Water (SEEAW), as an interim statistical standard and encouraged its implementation in countries.
2007	The UN began working on SEEA-E, planned to be adopted by the United Nations Statistical Commission.
2008	The UN, jointly with Eurostat and OECD started drafting the System of <i>Environmental-Economic Accounting for Material Flow Accounts</i> (SEEA-MFA).
2009	The UNSD released reports on the Global Assessment of Water Statistics and Accounts and Energy Accounts.

Source: "Environmental Accounting: Current Status and Options for SAIs," INTOSAI – Working Group on Environmental Auditing (2010): 22.

## GREEN ACCOUNTING IN INDIA: CONCERNS AND ACTION POINTS

Many economists are of the opinion that India's growth rate will fall considerably if environmental concerns and human well-being are taken into account in the traditional national accounts. An article<sup>11</sup> in *The Hindu* in May 2018 argues that through trade, the country is essentially transferring its natural capital to the trade partners (to facilitate high exports); and given the absence of natural capital assessments of land degradation, India's food grain yield can come down significantly in the near future due to declining soil fertility.

The transition<sup>12</sup> from a 'brown economy' to a 'green economy' is mostly hindered by the

problem of capital misallocation<sup>13</sup> between linear wealth creating production processes, on one hand, and on the other, underestimated low-carbon, socially inclusive and environmentally efficient systems. The depletion of natural capital is an irreversible process and the lack of public policy in this regard due to non-computation of such environmental deterioration can be detrimental in the long run.

The Goals 13, 14 and 15 of the United Nations Sustainable Development Goals (SDGs) 2015<sup>14</sup> suggest linkages to the need of Green Accounting in the context of combating climate change, conservation of marine resources, and protection of terrestrial ecosystem, respectively. Goal 15.9 mentions the integration of biodiversity values and

ecosystem services into local and national accounts, development planning and poverty reduction measures. While climate change analysis is mainly perceived as an *ex-post* measure of Green Accounting, the Goals 14 and 15 relating to the natural capital on land and in water requires Natural Resource Accounting (NRA) for both *ex-ante* and *ex-post* purposes. The implementation of NRA in relation to the SDGs 2015 cuts a sorry picture, which is highlighted by a report<sup>15</sup> by Technology and Action for Rural Advancement submitted to the MoEF&CC which mentions that the execution of Goal 14 and 15 in India requires an approximate US\$ 489 billion, out of which the gap is in the vicinity of US\$ 481 billion (or 98.36 percent of the total requirement). The concern is aggravated by the fact that the NRA implementation agenda is only a small part of the 1.64 percent of the available estimated cumulative fund for Goals 14 and 15.

The current Environment Impact Assessment scenario in India has often been cast with doubts due to inadequate methodologies and the qualitative nature of estimation. The lack of objectivity in such studies is a major problem that needs to be resolved to internalise the cost of externalities and reach an efficient outcome in the market for ecosystem services.

### Action points

In 2006, the Kanchan Chopra Committee Report on the Net Present Value of forest land

converted into deforested areas for economic purposes was submitted to the Supreme Court of India. The Green Indian States Trust (GIST) has been one of the foremost players which created environmentally adjusted accounts in 2003. The GIST funded Green Accounting for Indian States Project 2007 was one of the benchmark studies in this area. The former Minister of Environment and Forests, Government of India, Jairam Ramesh was instrumental in the foundation of TEEB (The Economics of Ecosystem and Biodiversity) India Project in 2011 which has conducted a number of studies in this regard but has not succeeded in advancing the agenda of Green Accounting due to their piecemeal approach.

In 2016, World Wide Fund for Nature - India published a study<sup>16</sup> on valuing the ecosystem services at the Terai Arc landscape in Uttarakhand. It gives an objective approach towards valuation of relevant ecosystem services at a landscape level. Table 2 shows the estimates<sup>&</sup> from the study, highlighting a seminal illustration of such valuation techniques and outcomes. It estimates that the total value of the nine ecosystem services is 19 percent higher than the total income of the region (as per Census 2001). It means that if these services are used for economic benefit, the local community should be compensated by at least 19 percent of the total economic output value of the landscape.

Similarly, elaborate studies have been carried out earlier in India. Badola et al. (2010)<sup>17</sup> assessed the value of the ecosystem

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& The study has applied standard valuation methods to assign monetary values to the nine ecosystem services. In 2005-06 the total value came to INR 227.52 billion (USD 3.5 billion). The same value was estimated to be INR 390 billion (USD 6 billion) in 2015-16, and INR 344 billion (USD 5.3 billion) in 2011-12 by using Wholesale Price Index of the new series with 2004-05 as the deflator.

services at Corbett Tiger Reserve, also in Uttarakhand. Although the cost per visitor at the reserve was estimated at US\$ 2.5, the consumer surplus was large, indicating high willingness to pay for wildlife recreational services. The study on tiger reserves has been extended by the Indian Institute of Foreign Management that published its own report<sup>18</sup> in 2015 on economic valuation of six reserves

across India: Corbett, Kanha, Kaziranga, Periyar, Ranthambore and Sundarbans. In the study, the authors computed conservative estimates of flow benefits from ecosystem services at a range of INR 50,000 to INR 190,000 per hectare per person. In addition to this, the selected tiger reserves are estimated to conserve natural capital stock valued in the range of INR 22 billion to INR 656 billion.

**Table 2. Ecosystem Services Valuation at Terai Arc Landscape**

Item	Value in 2005 - 06 (INR millions)	Methodology
Water for Agriculture	13886.82	Production Function Approaches (obtaining scarcity values) and crop water requirements.
Water for Hydropower	440.68	Benefit Transfer Approach using deflators.
Carbon Sequestration	66078.20	Measured through InVEST and then by using pricing scheme from VER markets.
Tourism (Corbett)	3680.00	Primary survey to estimate travel costs and addition of 15% consumer surplus obtained from Benefit Transfer Approaches.
Drinking Water	2785.64	Multiple methods (literature survey data and meta-analysis) to estimate consumers' willingness to pay.
Fuelwood	41995.50	Secondary data on consumption and primary data on prices were used.
Microclimate Regulation	48011.40	From literature survey.
Fodder	3015.54	Secondary data on consumption and primary data on prices were used.
Religious Tourism in Hardwar	47623.51	Primary survey results of approximately thousand tourists.
<b>Total</b>	<b>227,517.28</b>	

Source: Nilanjan Ghosh et al., "Valuing Ecosystem Services at the Scale of a Large Mammal Landscape: The Case of the Terai Arc Landscape in Uttarakhand," Policy Research and Innovation Division, WWF-India, New Delhi, no. 2 (2016): 17.

India largely failed to meet the Green GDP goals it had set by 2015. This year, the Central Government is slated to launch a five-year project that aims to develop a metric that will measure the 'green' GDP of Indian states to inform policy decisions such as climate mitigation funds and land acquisition.<sup>19</sup> The Green Skill Development Programme (GDSP) under the Environmental Information System (ENVIS) Scheme<sup>20</sup> of the MoEF&CC, Government of India has started a number of training courses for unemployed youths for 'green jobs' in the country. One of the courses, titled 'Forest Management', is to include valuation of Ecosystem Services, Carbon Stock and Green GDP to be facilitated by ENVIS hubs and resource centres at Indian Institute of Science (IISc) Bengaluru, Environment Protection Training and Research Institute (EPTRI) in Hyderabad, and Environmental Management & Policy Research Institute (EMPRI), Bengaluru.

The National Biodiversity Action Plan (NBAP) 2008,<sup>21</sup> recognises that policy decisions in India have been insufficient due to inappropriate valuation of natural resources and "non-visibility" of environmental damages. Green Accounting is needed in the fiscal and environmental planning of the government and other financial institutions to afford the optimal financing of conservation projects. Although fiscal instruments such as taxes are used as a proxy to value ecological resources—and in turn generate revenue towards conservation programmes — such methods need serious categorical evaluation to make the schemes feasible. The NBAP 2008 mentions as one of its core targets, the "valuation of goods and services provided by biodiversity, and use of economic instruments in decision making process."

The objective of such valuation is mainly to create environmental markets to ensure the appreciation of ecosystem services and move towards a cleaner environment. The reason why such markets fail is the lack of information and knowledge and the non-participation of various stakeholders. This information asymmetry causes the divergence between market prices and the value of environmental resources, causing the disorganisation of environmental markets.<sup>22</sup> Greening the GDP—based on the notion that economic value can be assigned to ecosystem services—is an important step towards filling this environmental knowledge gap.

To accomplish the idea of NRA, the NBAP 2008 focuses on valuation models justified through pilot studies and creating a system of maximum revenue generation for environmental conservation, coordinated by the Ministry of Environment, Forests and Climate Change (MoEF&CC) and the Ministry of Statistics and Program Implementation (MoSPI), Government of India. The addendum to the NBAP 2008<sup>23</sup> highlights the Target 2 of the Strategic Plan for Biodiversity 2011-12 which states that by 2020, biodiversity values have to be embedded in the national accounting and decision-making processes.

The assessment of Green GDP at the state level in India will add to the Net State Domestic Product of the states. This is apart from aiding a variety of policy decisions, among them those relating to climate adaptations, compensation mechanisms for displaced migrants, judicial proceedings in environment-related cases, and decisions relating to linear infrastructure enhancement. NRA is bound to make Cost & Benefit analyses easier for various public infrastructure



projects whilst bringing in scale efficiency and accounting dexterity.


## CONCLUSION

The EU observes<sup>24</sup> that environmental accounts are crucial in identifying and answering some key questions related to the dynamic linkages between the economy and ecology, ie, “Which industry is emitting most greenhouse gases? How do patterns of consumption and production affect the environment? What is the effect of economic policy measures, such as an environmental tax on the generation of waste or air emissions? How fast is the environmental economy growing and how does it compare with the rest of the economy?”

Proper government policies with regard to land use, for example mineral extraction, have often been absent. The lack of impact assessments has caused faulty cost-benefit analyses of such projects. Therefore, the aspect of considering import alternatives has not been adequately explored,<sup>25</sup> which could come at a lower environmental cost.

The Companies Act (2013) in India made it compulsory for large companies to invest a substantial amount of their profits in

Corporate Social Responsibility (CSR). The bigger concern, however, is whether optimal investment decisions can be made in the absence of an environmental indicator that reflects the current status of environmental hazards as well as assets. The way forward is to have trust in the natural capital assessment agenda of such large companies as a part of their CSR functions vis-à-vis institutional efforts to develop advanced Green Accounting methodologies.

According to various experts, Environmental Accounting exercises in China in 2004-07 was halted abruptly due to the fear of appalling results, corruption in the concerned departments and political concerns.<sup>26</sup> Imperishable growth, especially for developing countries can only be established by deviating from a reductionist neoclassical growth approach to a more holistic and ecosystem perspective of development via the application of Green Accounting. Although this form of accounting is impeded by problems such as inefficient computation methodologies as well as lack of data and of political will, it is imperative to reach a comprehensive indicator of a nation’s performance to outline alternative sustainable development frameworks. 

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## ENDNOTES

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