



# Ecological Resource Accounting And Green GDP: Tools For Sustainable Regional Planning

Rupam Kumari

Research Scholar

TMBU Deptt. of Economics

## Abstract

The growing tension between economic growth and ecological degradation has prompted renewed attention to the concept of *Ecological Resource Accounting* and its integration into the framework of *Green Gross Domestic Product (Green GDP)*. Traditional GDP measures fail to account for environmental depletion and ecosystem service loss, thereby offering a distorted picture of real progress. This article examines the role of ecological resource accounting and Green GDP as vital tools for sustainable regional planning in India. By internalizing environmental costs and valuing natural assets—such as forests, water, and soil fertility—these frameworks enable policymakers to assess true economic performance while ensuring ecological balance. The study explores national and international experiences, identifies institutional gaps in India's environmental accounting system, and highlights the importance of decentralized, region-specific valuation of natural resources. It argues that integrating ecological resource accounts into regional development strategies can help bridge the divide between economic aspirations and ecological realities. Ultimately, Green GDP offers not just a corrective economic indicator but a pathway toward holistic sustainability—where growth, equity, and ecology coexist in harmony.

**Keywords:** Ecological resource accounting, Green GDP, sustainable development, regional planning, environmental valuation, natural capital, ecological economics, India, policy integration, sustainability indicators.

## Introduction

Economic growth has long been celebrated as the ultimate measure of progress, symbolized by the steady rise of Gross Domestic Product (GDP). Yet, this conventional indicator, while powerful in its simplicity, conceals an uncomfortable truth: it counts the depletion of forests, the pollution of rivers, and the exhaustion of soil as if they were signs of prosperity. In other words, GDP measures the flow of goods and services but not the erosion of the natural capital that sustains them. As climate crises intensify and environmental degradation accelerates, it becomes increasingly evident that a nation's wealth cannot be measured merely in monetary terms—it must reflect the health of its ecosystems as well. This recognition has given birth to *Ecological Resource Accounting* and the concept of *Green GDP*, tools designed to reimagine how we quantify development and sustainability.

Ecological Resource Accounting (ERA) seeks to incorporate the value of natural assets—such as forests, minerals, water, and biodiversity—into the economic decision-making process. It bridges the long-standing divide between economic and environmental policy by tracking not just income generation but also the depletion or restoration of ecological wealth. Green GDP, in turn, extends this logic to the macroeconomic level by adjusting national income accounts for environmental degradation and resource

depletion. Essentially, it measures *net growth*—growth after accounting for the costs of ecological damage. Together, ERA and Green GDP form the intellectual and policy backbone of sustainable regional planning, allowing decision-makers to assess trade-offs between short-term economic gains and long-term ecological stability.

For a country like India—where regional disparities, resource dependence, and environmental vulnerability are deeply intertwined—the integration of ecological accounting into development planning is both timely and necessary. The rapid industrialization and urbanization of the past few decades have lifted millions out of poverty but have also intensified air and water pollution, deforestation, and groundwater depletion. The paradox of progress is most visible at the regional level: while some states thrive economically, they simultaneously suffer from deteriorating environmental quality and resource exhaustion. A shift toward Green GDP accounting offers a framework for reconciling these contradictions—by aligning regional growth strategies with ecological sustainability.

India has already taken preliminary steps in this direction. The Ministry of Statistics and Programme Implementation (MoSPI) has initiated the *Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES)* project in collaboration with the United Nations, aiming to build a comprehensive database of ecosystem services. However, translating these efforts into regional planning frameworks remains a work in progress. Integrating ecological indicators into district and state-level development plans could provide a more accurate assessment of sustainability and help balance investment priorities across regions.

In essence, ecological resource accounting and Green GDP challenge us to rethink the very definition of progress. They shift the focus from quantity to quality, from exploitation to regeneration, and from short-term profit to long-term prosperity. For regional planners, economists, and policymakers, these tools serve as a compass—pointing the way toward a model of growth that does not consume the future to feed the present. They remind us that true wealth is not measured by what we produce, but by what we preserve.

### **Conceptual Foundations of Ecological Resource Accounting and Green GDP**

Traditional GDP accounting, developed during the industrial era, measures the market value of final goods and services produced within a country. However, it ignores the depreciation of natural assets that make production possible. For instance, when a forest is cleared for timber, GDP records the monetary gain but overlooks the loss of biodiversity, soil fertility, and carbon sequestration capacity. Similarly, mining adds to GDP but fails to record the depletion of mineral reserves.

Ecological Resource Accounting (ERA) seeks to correct this oversight by treating natural resources as *capital assets* that can depreciate or appreciate depending on human use. It extends the principles of economic accounting to the environment by incorporating natural resource stocks and flows into national and regional accounts. The System of Environmental-Economic Accounting (SEEA), adopted by the United Nations in 2012, provides a standardized framework for such integration.

Green GDP builds upon ERA by recalculating national or regional GDP figures after deducting the estimated costs of resource depletion and environmental degradation. This adjustment transforms GDP from a purely financial measure into an indicator of *sustainable welfare*. By doing so, Green GDP encourages governments to consider environmental sustainability not as an externality but as an intrinsic component of development.

### **The Need for Ecological Accounting in India's Regional Context**

India's diverse ecological zones—from the Himalayan forests to the Thar Desert and the Western Ghats—are reservoirs of natural capital. Yet, regional development policies have historically emphasized industrial output and infrastructure expansion, often at the expense of ecological integrity. This imbalance has created *regional ecological stress zones* where rapid economic growth coincides with resource exhaustion.

For example, states like Jharkhand and Odisha, rich in minerals, have experienced environmental degradation due to unregulated mining. Punjab and Haryana, the heartlands of the Green Revolution, now face severe groundwater depletion and soil fertility loss. Meanwhile, forested states like Chhattisgarh and Madhya Pradesh continue to underreport the economic value of their ecosystem services.

By incorporating ecological resource accounting into regional planning, states can better capture the trade-offs between economic growth and environmental sustainability. This would allow policymakers to design targeted interventions—such as compensatory afforestation, water budgeting, or pollution taxes—that maintain ecological balance while supporting development.

### International Experiences and Lessons

Several countries have pioneered ecological accounting and Green GDP models. China introduced Green GDP pilots in 2004, deducting environmental costs from regional GDP to evaluate the “true” economic performance of provinces. Though initially controversial, it sparked national debate and policy reforms in environmental governance.

Norway and Canada have long maintained comprehensive natural resource accounts covering oil, gas, forests, and fisheries. The Netherlands uses environmental accounting to guide agricultural and energy policies. Costa Rica’s payment for ecosystem services (PES) program, linked to forest conservation, effectively integrates ecological valuation into economic incentives.

These examples offer valuable lessons for India:

- **Institutional Integration:** Environmental and economic ministries must collaborate, not operate in silos.
- **Data Transparency:** Consistent data collection on resource use, pollution, and ecosystem health is vital.
- **Public Engagement:** Green GDP must not remain a bureaucratic exercise but should inform public debate and regional development agendas.

### Progress of Ecological Accounting in India

India’s commitment to ecological accounting is evolving through several initiatives:

- **Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES):** Launched by MoSPI with UN support, NCAVES aims to develop environmental-economic accounts for forests, water, land, and energy.
- **Environmental Information System (ENVIS):** Provides data on land use, pollution, and biodiversity for policy use.
- **State of Forest Report (FSI, 2023):** Quantifies forest cover and carbon stock, critical components of natural capital accounting.
- **National Resource Efficiency Policy (NREP, 2019):** Advocates resource-use efficiency and circular economy principles.

While these steps are promising, India’s challenge lies in integrating such data into state and district planning frameworks. Many local governments lack technical expertise or institutional support for conducting ecological valuation.

### Methodologies for Green GDP and Ecological Accounting

Calculating Green GDP involves both *physical* and *monetary* accounting. Physical accounting measures the quantity of resources extracted or degraded (e.g., hectares of forest lost, tons of CO<sub>2</sub> emitted), while

monetary accounting translates these losses into economic values using environmental valuation techniques such as:

- **Market-based approaches:** Using prices of natural goods (timber, water).
- **Replacement cost method:** Estimating the cost of restoring or replacing damaged ecosystems.
- **Contingent valuation:** Assessing people's willingness to pay for environmental preservation.

For regional planning, satellite-based remote sensing, GIS mapping, and environmental-economic modeling can provide accurate assessments of resource depletion and land-use change. Integration of such data into Geographic Information Systems enables planners to visualize spatial trade-offs and prioritize conservation efforts.

### Green GDP and Regional Planning: A Synergistic Framework

Regional planning aims to balance economic, social, and environmental objectives across territories. Green GDP complements this process by offering measurable indicators of ecological health alongside economic performance.

- **At the state level,** Green GDP can inform resource taxation, environmental compensation, and infrastructure investment decisions.
  - **At the district level,** ecological accounting can help identify “ecologically sensitive zones,” guiding sustainable land-use patterns.
- 
- **At the community level,** it can empower local governance institutions to manage resources efficiently through participatory budgeting and monitoring.

The integration of ERA and Green GDP into India's *District Planning Committees (DPCs)* and *State Planning Boards* can transform them into engines of sustainable regional governance.

### Challenges in Implementation

Despite conceptual clarity, several practical barriers persist:

1. **Data Gaps:** Many regions lack reliable data on resource extraction, pollution, and biodiversity.
2. **Institutional Fragmentation:** Different departments collect data in isolation, leading to inconsistency.
3. **Methodological Diversity:** Valuation methods vary widely, complicating comparability.
4. **Political Resistance:** Adjusted GDP figures that appear lower than traditional GDP may face political pushback.
5. **Capacity Constraints:** Local governments often lack expertise in environmental economics or GIS-based resource accounting.

Overcoming these challenges requires long-term institutional commitment, investment in environmental data systems, and public awareness of the benefits of ecological accounting.

## Policy Recommendations for Strengthening Green GDP and Ecological Accounting

1. **Institutional Integration:** Establish a *National Council for Green Accounting* to coordinate efforts across ministries and states.
2. **Regional Databases:** Create decentralized ecological accounting cells within state planning departments.
3. **Capacity Building:** Train local officers and planners in environmental valuation and data interpretation.
4. **Legislative Backing:** Mandate the inclusion of environmental accounts in all five-year and annual regional plans.
5. **Public Disclosure:** Publish state-level Green GDP reports to enhance transparency and accountability.
6. **Incentivized Governance:** Link fiscal transfers and central grants to states' ecological performance indicators.
7. **Technology Integration:** Utilize satellite data, AI, and GIS for real-time monitoring of resource depletion.

These measures would not only enhance planning efficiency but also foster a new development culture rooted in ecological prudence.

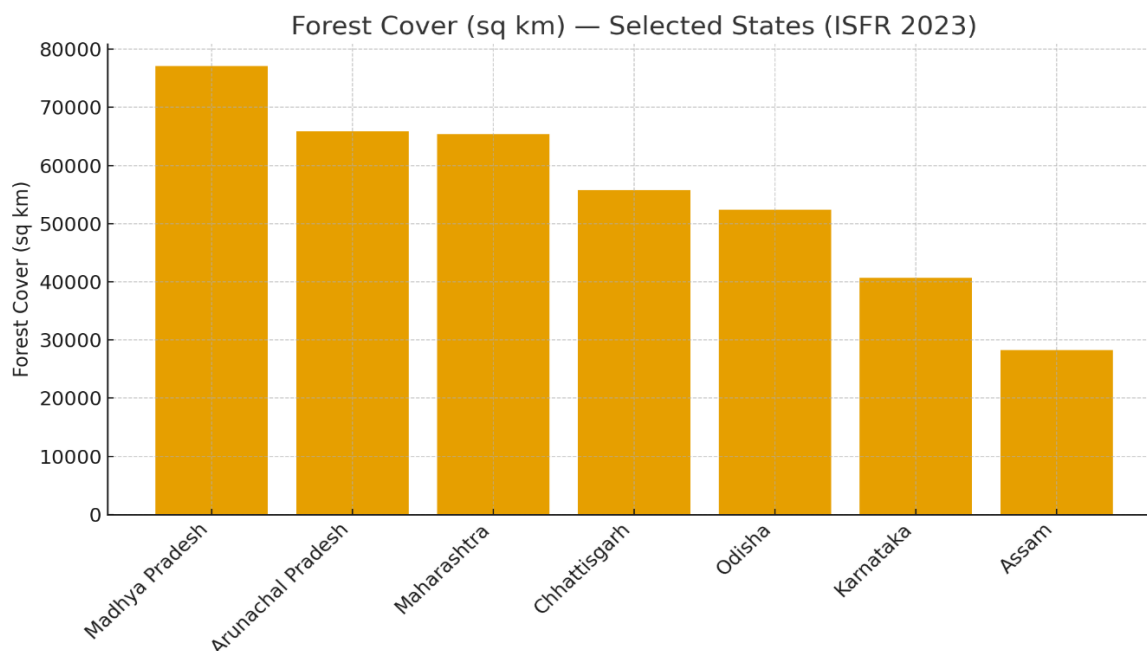
### Future Prospects: Green GDP as a Pathway to Sustainability

The next phase of India's development must reconcile rapid economic growth with ecological resilience. As India moves toward its Sustainable Development Goals (SDGs) and net-zero commitments, Green GDP can serve as the bridge connecting environmental sustainability with economic ambition.

By adopting Green GDP, India can:

- Monitor progress toward SDG 8 (Decent Work and Economic Growth) and SDG 15 (Life on Land).
- Strengthen environmental governance at local levels.
- Promote intergenerational equity through sustainable resource use.

Ultimately, the shift toward ecological accounting represents not a constraint but an opportunity—an opportunity to design policies that ensure prosperity without peril.



### Sources :

- Forest Survey of India (FSI). *India State of Forest Report (ISFR) 2023* — national totals and state-wise forest/tree cover. [fsi.nic.in+1](http://fsi.nic.in+1)
- MoSPI — *NCAVES / Natural Capital Accounting & Valuation of Ecosystem Services* (project overview and methodological notes). [MOSPI+1](#)
- NITI Aayog — *Composite Water Management Index (CWMI)* (for linking water indicators to regional ecological accounts; I can fetch state-level CWMI scores if you want them in the same table). [NITI Aayog+1](#)

### **Findings:**

- The ISFR 2023 data shows large spatial concentration of India's forest resources: a few states (Madhya Pradesh, Arunachal Pradesh, Maharashtra, Chhattisgarh and Odisha) together account for a large share of forest area. This matters for ecological accounting because natural capital is spatially concentrated — regional Green GDP adjustments should therefore be sensitive to local resource endowments (carbon stocks, biodiversity, forest ecosystem services). [Press Information Bureau](#)
- National totals (ISFR 2023) — forest cover (715,343 sq km) plus tree cover (112,014 sq km) — underline why ecological accounting must include both forest and trees outside forests (TOF), since TOF is a large and economically important category for rural livelihoods and local ecosystem services. [Press Information Bureau](#)

### **Conclusion**

The pursuit of sustainable development demands a radical rethinking of how we define and measure progress. Ecological Resource Accounting and Green GDP offer precisely that: a framework that balances economic ambition with ecological integrity. The findings of this study underscore that economic growth, when stripped of its environmental context, is an illusion—mere arithmetic divorced from reality.

India's progress toward Green GDP accounting, though nascent, holds transformative potential. By institutionalizing ecological accounting, strengthening data systems, and integrating sustainability indicators into regional planning, India can redefine development as *regeneration rather than depletion*.

The lessons from global experiences affirm that Green GDP is not a substitute for economic growth—it is its ethical evolution.

For policymakers and planners, the message is clear: protecting natural capital is not an act of charity toward nature, but an investment in the future. As India charts its path toward a sustainable and equitable future, ecological accounting must serve as both its mirror and its map—reflecting the true cost of growth and guiding the nation toward prosperity that endures. The journey from economic growth to sustainable development is not merely a shift in policy—it is a transformation in perspective. *Ecological Resource Accounting* (ERA) and *Green GDP* represent this paradigm shift, urging us to view nature not as an infinite warehouse of resources but as a living capital whose health determines the longevity of human prosperity. The article, through theoretical foundations, international experiences, and India's ongoing initiatives, underscores a profound realization: economic progress that erodes the ecological base is self-defeating, while growth that regenerates natural wealth ensures enduring welfare. In the Indian context, the need for integrating ecological accounting into regional planning has never been more urgent. The rapid pace of urbanization, industrialization, and agricultural intensification has brought remarkable gains in output but heavy costs in terms of deforestation, groundwater depletion, and air pollution. Traditional GDP, which counts production but not depletion, paints a deceptively optimistic picture. Green GDP corrects this illusion—it recalibrates the measure of prosperity by deducting environmental costs, thus reflecting *net* economic well-being. When ecological depletion is factored into regional accounts, states like Chhattisgarh, Odisha, and Jharkhand—though rich in minerals—appear less prosperous once environmental degradation is internalized. Conversely, states investing in forest conservation and renewable energy show resilience and long-term sustainability in their economic structures.

The article's analysis reveals that India is steadily building the institutional and statistical foundations for ecological accounting. The *Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES)* project, the *Environmental Information System (ENVIS)*, and the *State of Forest Report (ISFR 2023)* mark ~~substantial progress in developing datasets and frameworks for measuring environmental assets. Yet, the~~ true test lies in translating these into actionable regional planning tools—where district and state development plans are guided not only by fiscal or industrial indicators but also by ecological ones. The decentralization of ecological accounts to local governance bodies such as *District Planning Committees (DPCs)* and *Panchayati Raj Institutions* can ensure that natural resource management becomes participatory, transparent, and regionally tailored.

Globally, lessons from countries like Norway, Costa Rica, and China demonstrate that ecological accounting is not an abstract ideal but a practical governance tool. These examples show that when nations quantify environmental loss and reward conservation through fiscal incentives, sustainable growth follows naturally. India, with its vast ecological diversity and regional disparities, can pioneer a new model of “Green Federalism” where ecological stewardship and economic prosperity reinforce each other. However, challenges persist—data gaps, lack of trained personnel, inter-departmental fragmentation, and political reluctance to adopt metrics that may initially lower GDP figures. Overcoming these obstacles demands both political courage and societal awareness. Building public understanding of Green GDP is crucial, for sustainability cannot be achieved by bureaucratic decree alone—it must be culturally embraced.

In conclusion, Ecological Resource Accounting and Green GDP are not mere accounting tools; they are philosophical correctives to humanity's exploitative mindset. They remind us that wealth built on ecological debt is fragile and fleeting, while prosperity grounded in regeneration is enduring and just. As India marches toward becoming a global economic power, embracing Green GDP will allow it to lead not just in growth, but in wisdom—demonstrating to the world that development and nature need not be adversaries, but allies in shaping a truly sustainable future.

## References:

1. Central Statistics Office (CSO). (2013). *Framework for the Development of Environmental Statistics and Environmental Accounts in India*. Ministry of Statistics and Programme Implementation, Government of India.  
<https://mospi.gov.in>
2. Ministry of Environment, Forest and Climate Change (MoEFCC). (2023). *India State of Forest Report 2023*. Forest Survey of India, Dehradun.  
<https://fsi.nic.in>
3. United Nations Statistics Division (UNSD). (2014). *System of Environmental-Economic Accounting 2012: Central Framework*. United Nations, European Commission, FAO, IMF, OECD, and World Bank.  
<https://seea.un.org>
4. National Institution for Transforming India (NITI Aayog). (2022). *India's Progress on the Sustainable Development Goals 2022*. Government of India.  
<https://www.niti.gov.in>
5. Ministry of Statistics and Programme Implementation (MoSPI). (2020). *Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) India Project Report*. Government of India in collaboration with the United Nations Statistics Division and the European Union.  
<https://mospi.gov.in>
6. United Nations Environment Programme (UNEP). (2021). *Measuring Progress: Environment and the SDGs*. United Nations Environment Programme.  
<https://www.unep.org>
7. World Bank. (2021). *The Changing Wealth of Nations 2021: Managing Assets for the Future*. Washington, DC: World Bank Group.  
<https://openknowledge.worldbank.org>

---

8. Kumar, P., & Managi, S. (2009). *Ecosystem Services, Economy and Sustainable Development: The Indian Context*. *Ecological Economics*, 68(11), 2783–2789.  
<https://doi.org/10.1016/j.ecolecon.2009.06.011>
9. United Nations Development Programme (UNDP). (2022). *Human Development Report 2022: Uncertain Times, Unsettled Lives – Shaping our Future in a Transforming World*. United Nations.  
<https://hdr.undp.org>
10. Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. HM Treasury, Government of the United Kingdom.  
<https://www.gov.uk/official-documents>