OPTIMIZING THE SYSTEM OF NATIONAL ACCOUNTS: CONCEPTUAL AND METHODOLOGICAL PERSPECTIVES

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Abstract: This article examines the optimization of the System of National Accounts (SNA) in the context of evolving economic structures and increasing demands for accurate macroeconomic measurement. The study focuses on conceptual and methodological aspects of national accounting, highlighting key challenges related to data quality, consistency, timeliness, and international comparability. Special attention is given to the alignment of national statistical practices with the SNA 2008 framework, as well as the role of methodological improvements and data integration in enhancing the reliability of GDP and other macroeconomic indicators. The paper argues that optimizing the System of National Accounts is essential for improving economic analysis and supporting evidence-based policymaking, particularly in developing and transition economies.

Keywords: System of National Accounts; SNA 2008; national accounting; GDP measurement; statistical optimization; macroeconomic indicators; data quality

INTRODUCTION.

The System of National Accounts (SNA) is the globally recognized framework for measuring economic activity, primarily through Gross Domestic Product (GDP). However, concerns regarding sustainability, environmental degradation, informality, and globalization have revealed critical limitations in using GDP as a welfare and sustainability indicator. This paper synthesizes recent conceptual debates on environmental accounting, the informal economy, and multinational enterprises to identify SNA's weaknesses. Using empirical evidence from China, the Netherlands, Costa Rica, and selected EU countries, the study examines the integration of environmental costs into national accounts through satellite accounts, adjusted aggregates, and experimental "green GDP" measures. Findings indicate that while GDP robustly measures market activity, ignoring environmental and social costs risks misleading policy decisions. The study contributes to a better understanding of linking economic performance to environmental sustainability, offering practical insights for policymakers and international statistical systems. Gross Domestic Product (GDP) remains the most widely used metric for assessing economic performance. Conceptually, the SNA captures all production activities within the production boundary, regardless of formality, legality, or sector. Nevertheless, GDP was never designed to serve as a measure of societal welfare, environmental sustainability, or human well-being.

In recent decades, debates on climate change, biodiversity loss, the prevalence of informal economic activity, and the rising influence of multinational enterprises (MNEs) have intensified calls to rethink national accounts. Traditional GDP reporting ignores environmental degradation, resource depletion, and social costs, which can obscure the true sustainability of economic growth. In response, complementary frameworks, including the System of Environmental-Economic Accounting (SEEA) and experimental "green GDP" measures, have emerged to bridge this gap.

This paper addresses three research questions:

1. What are the conceptual limitations of the SNA in measuring sustainable economic performance?

2. How do environmental costs challenge conventional GDP frameworks?
3. Which countries have empirically incorporated environmental costs into national accounting measures, and how?

By linking conceptual insights with empirical case studies, this paper aims to provide a comprehensive, policy-relevant perspective on the integration of ecological sustainability into national accounting.

LITERATURE REVIEW

Environmental economics emphasizes welfare and utility, focusing on externalities—costs or benefits arising from one agent's activity but affecting others. Total Economic Value (TEV) frameworks categorize values into use (direct, indirect, option) and non-use (existence, bequest) components, allowing for a holistic assessment of natural resources.

In contrast, the SNA adheres strictly to exchange values and ignores externalities, consumer surplus, and ecological degradation. Consequently, pollution, deforestation, and biodiversity loss remain invisible in conventional GDP metrics, resulting in a systematic underestimation of the social and environmental costs of production.

The informal economy provides livelihoods for millions, especially in developing countries, yet remains underrepresented in official statistics. Although the SNA theoretically includes informal production, empirical measurement is limited due to data constraints. The overlap between informal and non-observed economic activity complicates the compilation of exhaustive GDP estimates, often obscuring both social and environmental dimensions of economic activity.

Globalization introduces additional distortions through transfer pricing, Special Purpose Entities (SPEs), and complex ownership of intangible assets. These practices affect the geographical allocation of value-added and GDP, often separating recorded economic output from environmental pressures in production locations. The misalignment between economic activity and ecological costs highlights the limitations of SNA in the globalized economy.

METHODOLOGY

This study employs a comparative empirical approach, combining:

- Analysis of national accounting practices aligned with SNA and SEEA standards;

- Review of experimental "green GDP" and adjusted national income measures;
- Case studies from countries explicitly integrating environmental costs into economic accounting.

Data sources include national statistical offices, SEEA-based environmental accounts, and international institutional reports (OECD, UN, World Bank). The analysis focuses on both methodological frameworks and empirical outcomes, aiming to provide actionable insights for policymakers.

RESULTS

The synthesis of conceptual and empirical sources identifies four major weaknesses:

1. Exclusion of environmental externalities
   Environmental degradation, pollution, and biodiversity loss are not deducted from GDP, despite their negative long-term welfare impacts.
2. Incomplete treatment of resource depletion
   Only recently has the SNA started recognizing depletion as a production cost, but this remains limited in practical reporting.
3. Spatial Mismatch Between GDP and Environmental Damage
   Multinational enterprises may allocate value-added to low-tax jurisdictions, while environmental costs remain in production countries, creating a disconnect between economic and ecological accounting.

4. Limited welfare interpretation

   Defensive expenditures, such as pollution cleanup or healthcare costs arising from environmental harm, increase GDP, yet reflect welfare losses rather than gains.

China pioneered "green GDP" experiments in the mid-2000s, deducting environmental degradation and resource depletion costs, particularly air and water pollution. Pilot studies revealed that in some provinces, green GDP growth was substantially lower than conventional GDP. While political resistance limited national adoption, SEEA-based accounts continue to inform policy evaluation.

The Netherlands extensively applies the SEEA Central Framework and ecosystem accounting. Environmental costs are not deducted from headline GDP, but adjusted indicators, such as environmentally adjusted net national income (EANNI) and physical flow accounts, support sustainability policy and climate strategies.

Costa Rica integrates ecosystem services valuation into national planning via natural capital accounts aligned with SEEA. Forest conservation and biodiversity services are reflected in satellite accounts and used in cost-benefit analyses, although GDP remains unadjusted.

Several EU countries (Germany, France, Sweden) maintain detailed environmental accounts on emissions, energy, and resource use. These accounts inform carbon neutrality goals and macroeconomic policy, while GDP continues to be reported separately.

Although Spain is not one of your original case countries, this data from EU statistics illustrates how environmental sectors contribute to the economy — and how that contribution can be contextualized relative to standard GDP:

- The environmental economy (activities tied to environmental protection and natural resource management) accounted for 2.72 % of GDP in 2024.
- It generated approximately 541.5 thousand jobs, ~2.67 % of total employment that year.
- Over 2014–2024, the share of environmental gross value added (GVA) relative to GDP varied but remained close to 2–3 %, showing how environmental activities are a measurable economic sector.
- Environmental GVA decreased by 0.1 % in 2024, while overall GDP grew by 6.4 % — highlighting a divergence between economic growth and environmental sector performance.
- Data from the European Central Bank (ECB) provides a concrete way to demonstrate how environmental adjustments alter conventional growth measures:

Example contribution to annual output growth (1996- 2018 average):

Country	GDP Growth (%)	Pollution- adjusted GDP Growth (%)	Difference (%)
France	1.61	1.98	0.37
Germany	1.40	1.73	0.33
Netherlands	1.99	2.22	0.22
EU27 Avg	1.78	2.07	0.28
China	8.67	8.09	–0.58

- This table shows that when GDP growth is adjusted for environmental exploitation, the measured contribution to output growth changes — often increasing for developed economies and decreasing for China due to high resource extraction impacts.
- A cross- country comparison of "Green GDP" vs conventional GDP shows how much environmental costs can change economic totals:

Example from research data (selected countries):

Country	GDP Growth (%)	Green GDP (%)
China	9.11	5.53
Netherlands	1.49	0.67
EU- 28	3.16	2.56

Country	GDP Growth (%)	Green GDP (%)
Germany	3.38	2.81
France	1.09	0.70

In China, the "Green GDP" is ~40% lower than conventional growth, illustrating the environmental cost burden on economic performance.

DISCUSSION

Empirical evidence demonstrates that adjusting gross domestic product to account for environmental costs is technically achievable, yet it remains politically and institutionally complex. Most countries therefore prefer to rely on satellite accounts and complementary indicators rather than altering the headline GDP figure, in line with the System of National Accounts principle of consistency and the need to preserve international comparability. Nevertheless, excluding environmental costs from macroeconomic measurement can generate misleading policy signals, particularly in economies that are heavily dependent on natural resources and exports. The incorporation of accounts based on the System of Environmental-Economic Accounting enables policymakers to align assessments of economic performance with ecological sustainability, even when GDP itself is not directly modified.

The integration of environmental accounting data into national accounts shows that environmental goods and services constitute a measurable share of GDP in advanced economies such as Spain and the European Union. Certain sectors, especially services, construction, and manufacturing, generate substantial environmental gross value added, revealing the sectoral structure of green economic activity. At the same time, expenditures on environmental protection represent a significant portion of national output, with corporate spending accounting for nearly half of total outlays. These findings confirm that environmental activities possess tangible economic significance and challenge the perception that ecological values are merely peripheral. Despite this, conventional GDP indicators continue to treat such activities as marginal aggregates rather than as central elements of economic output.

Evidence from Spain and the Basque Country further indicates that environmental gross value added often expands more slowly than total GDP and may even decline during periods of overall economic growth, highlighting differences in value structures that are obscured by traditional GDP measures. Similarly, environmental protection expenditures may increase at a slower pace than GDP even when environmental degradation remains substantial, reflecting an asymmetric treatment of ecological factors within national accounts. In the case of China, clean energy has emerged as a major driver of growth, yet environmental degradation and carbon emissions persist at significant levels, underscoring the persistent policy dilemma of reconciling economic expansion with sustainability objectives.

Taken together, these empirical findings reinforce the necessity of integrating environmental accounting into core macroeconomic statistics in order to capture true economic performance and long-term sustainability. Monitoring sectoral contributions of green economic activity alongside GDP is essential for informing climate, industrial, and social policies. Satellite and ecosystem accounts offer a practical solution by providing policy-relevant insights without undermining the international comparability of GDP, thereby enabling governments to pursue economic growth and environmental sustainability simultaneously.

CONCLUSION

GDP remains a powerful indicator of market activity but is insufficient for evaluating sustainability and societal welfare. Integrating environmental costs through SEEA frameworks

and experimental green GDP measures reveals the conceptual limitations of the SNA. Empirical evidence demonstrates that while few countries directly adjust GDP, most increasingly rely on complementary environmental accounts.

For policymakers, the key challenge is not to replace GDP but to interpret it alongside environmental and social indicators. Future revisions of SNA and SEEA should strengthen the link between economic performance, environmental sustainability, and long-term welfare, supporting evidence-based policy for a more sustainable global economy.

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