

**Green Accounting : The "Missing Link" between a  
Developing Nation and Sustainable Growth  
PAVAN SUKHDEV, GIST**

Reducing poverty is a key priority for governments in all developing countries. This involves combating disease, providing education, enabling fair access to employment opportunity, and also using natural resources judiciously with regard to their renewability, impact on local environments, and value to local populations. Managing improvements in all these areas, without a formal framework to quantify any of them in monetary terms, may sound absurd; however, that is in fact a reasonable job description for developing country governments. One of my earliest received wisdoms as a young finance professional 20 years ago was that "you can't manage what you can't measure". If that applies to the management of developing economies, then we have probably defined the greatest challenge for developing country governments: how to measure national wealth in order to grow it in a sustainable manner. That is a pre-requisite for framing policies which direct investment into areas which give the best return on investment, whilst avoiding the pitfalls of economic trajectories which expose them to unacceptable or terminal risk.

Much recent work on 'inclusive wealth' measurement (e.g. Arrow, Dasgupta & Maler, 2003) highlights the importance of holistic measures of wealth. National wealth should include not just a measure of manufactured assets and financial assets (physical capital), but also natural capital (oil, other minerals, forests, freshwater resources, cropland, fisheries, etc), human capital (knowledge and skills), and social capital (institutional and legal infrastructure, political maturity, social harmony, etc). Sustainable growth is defined as that which increases per-capita national wealth, defined in this 'inclusive' or holistic manner. 'Green Accounting' consists of modelling and pricing the non-marketed services of environmental assets, calculating the value of education as a generator of future incomes, present-valuing future liabilities in the form of pollution abatement costs and health costs etc. For any accounting period, the overall valuation exercise arrives at a revised value of net assets, and the difference year-on-year is the true measure of national savings, or "genuine savings".

The importance of this holistic approach, and of 'Green Accounting' as a methodology to implement it, cannot be overemphasized. It could make all the difference between a viable and sustainable economic trajectory for developing countries on the one hand, and on the other, one which spells disaster not just for them but for the whole of civilization.

The concept of man's "ecological footprint" can be used to understand why the Western model of development, characterized by a culture of consumerism and by heavy investment in physical infrastructure, is not in fact an option for developing nations. The ecological footprint of a person or a society is the amount of land needed to provide the ecological services corresponding to the consumption needs of that person or society - food, water, energy, housing, waste absorption, etc. This average ecological footprint per person is estimated (e.g. Edward O. Wilson, "The Future of Life") at close to 10 hectares for the United States, but averages at about 1 hectare for developing nations. For every person on earth to reach US levels of consumption with existing levels of technology would require five times the available land area on earth! It appears that the only viable routes for sustainable use of the planet by our species are either to improve energy and materials usage efficiency fivefold, or to recognize and build human well-being in developing nations in a manner that costs the earth significantly less per capita than it did for the Western world, or a combination of the two.

**Accounting - and National Accounting**

During my 20 years in financial markets, I have heard many business leaders proudly declare that "our key assets are our people", meaning that the knowledge and expertise of their people, or their "human capital", is a key source of their business income. However, not one of these leaders' organizations reflects "our people" as an asset in its financial statements - as against land, buildings, cash balances, etc. Staff salary and bonus costs are an expense item in virtually all financial statements; however, with the possible exception of star footballers in football clubs, "people" are never shown as "assets". To be fair, corporate accounts are drawn up strictly in accordance with Companies Acts in respective reporting jurisdictions, to enable shareholders and creditors to get a "true and fair view" of the financial state of affairs of the company. Generally accepted accounting principles (GAAPs) are codified in detail (e.g. UK - SSAPs, USA - FASB rules), severely limiting the ability of any company to be "creative" in its accounting, even if it is for benign purposes. However, no such legislation constrains national governments from accounting for human capital and natural capital, and it is more a matter of convention.

The System of National Accounts (SNA) of the World Bank, which defined the most commonly used accounting convention, was devised as part of the global economic framework put in place after World War 2. SNA uses Gross Domestic Product (GDP) as a key measure of a country's progress, an emphasis which was accentuated by decades of reinforcement through the advisory approach and aid policies of the IMF and the World Bank. Whereas the balance sheet and Profit & Loss accounts of a company show not just income, but also net profit and the change in net asset value over an accounting period, GDP takes no account of changes in the value of a nation's assets - be they natural assets (forests, freshwater, sub-soil minerals, etc) or human assets (health, education, and skills of the population). It may be argued that "intangible" national assets, such as legal and institutional infrastructure, law and order, and quality of life (which are all aspects of social capital), are an excusable omission from national accounting. However, not to record the depletion of natural assets and human assets, which are so essential to wellbeing, cannot be other than a recipe for impoverishment.

Consider, for example, a catastrophe, such as violent, unseasonal, flash floods. The ensuing reconstruction of destroyed housing, roads and bridges would show up as an increase in GDP, and therefore as national income. The problem here is that this official "GDP growth" masks a significant increase in poverty - as evidenced by the loss of livelihoods and human lives, hardship and suffering of the displaced poor, loss of livestock and standing crops, loss of rich topsoil, etc - which, if properly and holistically accounted, would be a deduction from national wealth. Furthermore, there is no recognition of the genesis of this ecological disaster - in all likelihood caused by the rampant destruction of forest cover - which had earlier ensured that heavy rainfall was absorbed by forest vegetation and released gradually through the seasons. A policy framer informed by SNA-based growth planning might be forgiven for not allocating resources to initiatives which genuinely address the problem, such as extensive afforestation of watersheds, pre-emptive resettlement away from flood plains, etc.

The emphasis of SNA on GDP as the key measure of growth will probably be studied by future generations as the single most significant design defect in the economic history of mankind. The proper alternative, Green Accounting, entails the estimation of prices for ALL national assets, including natural and human, and their inclusion in the 'financial statement' of the nation, so it is no mean task. However, as we describe below, there is a sufficient body of work and precedent which will enable developing countries to implement holistic Green Accounts, and thus enable citizens and governments to make the right choices - such as defending natural resources and conserving ecosystems rather than surrendering them at throwaway prices to logging interests for a relatively minor economic gain.

The premise on which national accounts were built was to serve primarily as broad indicators of aggregate output. Nowadays, national accounts are used to analyze resource allocation, productivity, growth, and income distribution. Hence, it is necessary to make appropriate adjustments in the framework and in the underlying concepts of national accounting. The UN's new manual on environmentally adjusted accounting (SEEA, 2003) provides an alternative approach across their sample of over a hundred countries. However, for developing countries, it remains insufficient as a policy input, as it still values natural assets primarily as resource inputs into production. It would not, for example, take into account the environmental values of forests, which, for their flood prevention, rainwater storage and drought prevention value alone, are worth significantly more than their accounted timber or carbon values.

#### **Accounting for Human Capital**

One of the earliest attempts to estimate the money value of a human being and to apply that to estimate a country's stock of human capital was made as early as 1691 by Sir William Petty. Table 1 gives the summary of various studies that measured human capital through history. It is noteworthy that the results of many different studies exhibit high ratios (5:1 is a rough median) for the value of human capital : physical capital, a result which underlines the significance of omitting this component from national wealth following the old SNA methodology.

Two approaches are possible; the cost-based approach and the income approach. The cost-based approach estimates human capital based on the assumption that the depreciated value of the dollar amount spent on those items defined as investments in human capital is equal to the stock of human capital. This is a backward-looking method because of its focus on the historical costs of production. The income-based approach (capitalized earnings procedure) measures the stock of human capital by summing the total discounted values of all the future income streams that all individuals belonging to the population in question expect to earn throughout their lifetime. It was first developed by Farr (1853), who estimated the capitalized value of earning capacity by calculating the present value of an individual's future

earnings net of personal living expenses. Jorgensen and Fraumeni (1989) provide a contemporary analysis and framework for the incomebased approach.

**Accounting for Natural Capital**

Not reflecting human capital explicitly in national accounts is a matter of concern, but it has arguably less impact on public wealth than the lack of recognition of natural capital. Health services are universally seen as essential for well-being, and education is an essential input to increase employment. Most governments, be they elected or not, and whether visionary or otherwise, will allocate available budgetary resources to health and education, at worst because they fear the electoral consequences of not doing so. However, with natural capital, the lack of wealth accounting can dangerously accentuate a bad track record of conservation and cause severe losses of public wealth which, nevertheless, escapes public notice.

This is because people are generally not aware of either the economic value of their natural heritage, or the extent of its depletion through bad government policy or poor enforcement of extant regulations. Perverse economic incentives for the destruction of forests arise due to the absence of markets or market prices for the environmental services of forests (see box below). Policy responses, such as more protected areas or steeper penalties for conversion of forest land, are among the answers which would arise if, in the first instance, national accounts valued forests properly.

- Any measure of a nation / region's wealth should include not just a measure of Physical Capital, but also Natural Capital.
- Among others, 'Natural Capital' includes:
  - Oil
  - Minerals
  - Forests
  - Freshwater resources
  - Crop land
  - Pastures
  - Fisheries etc.
- Pursuit of short term development agendas at the expense of natural heritage ends up ruining under valued public assets
- This effectively worsens the well being of the average citizen, in particular the rural poor – in whose name many of the development projects are built

Estimating the value/ ha of sustainable use of forests:

Timber & Fuel-wood	Rs 45,900	\$1,020
Fodder	Rs 6,100	\$136
Non-Timber Forest Produce	Rs 15,700	\$349
Eco-Tourism	Rs 186,000	\$4,133
Biodiversity	TBD	TBD
Carbon Storage	Rs 28,900	\$642
Soil Loss Prevention	Rs 20,400	\$453
Watershed Value	TBD	TBD
Flood & Drought Prevention	TBD	TBD
<b>Total</b>	<b>&gt; Rs 500,000</b>	<b>&gt; \$11,111</b>

**GAISP - An Indian Example**

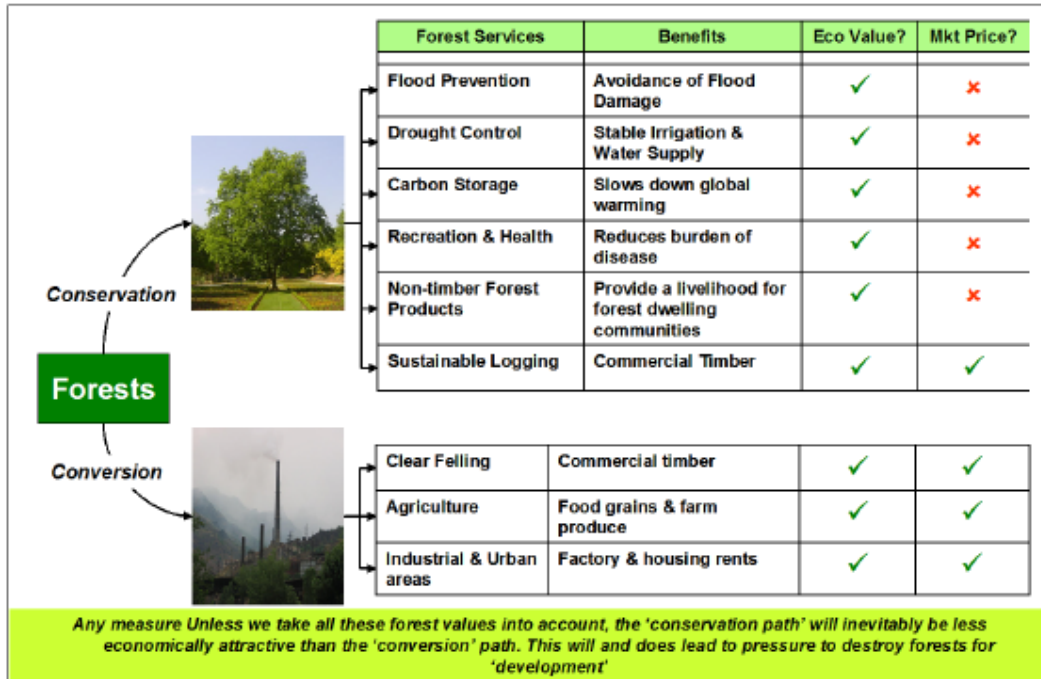
An example of Green Accounting methodology being applied in a developing nation is the recently launched Green Accounting for Indian States Project (GAISP, a project of GIST, the Green Indian States Trust), directed by a small group of professionals including the author. The Union of India has a federal structure, in which the 28 States and Union territories have a considerable and increasing degree of control on environmental, health, and education policies. Availability of primary data is not a problem, however the models being devised are complex and eight suites of adjustments are planned to be modelled over the next two years (see Table).

The aim of this project is to set up economic models for State-wise annual estimates of "genuine savings", i.e. savings after including adjustments for the creation or destruction of human capital and the destruction of natural capital. Publication of these results will enable policy makers and the public to engage in a timely and pertinent debate on the sustainability of growth.

GAISP results will be calculated State-wise, thus the project will enable inter-state comparisons of holistic economic performance to be made in an unbiased manner. GAISP will include in the Capital Account the value of investment in education and public health as well as the depletion of assets such as forest resources, agricultural cropland, grazing pastures, fresh water resources and mineral deposits.

A possible policy consequence of Green Accounting may be gradual increases in budgetary allocations towards improvements in education, public health, and local natural environments. All of these are key

elements of national wealth in India, although at present they do not seem to receive adequate attention and investment to ensure the long-term sustainability of India's economic growth.



Green Accounting for Indian States Project  
Planned Suite of Adjustments

Each of the Green Accounting adjustments to State Domestic Product (SDP) accounts will evaluate a particular area or related set of areas of adjustments, expected to be as follows:

- The Value of Timber, Carbon, Fuelwood, & Non-Timber Forest Produce in India's Forests
- Estimating the Value of Agricultural Cropland and Pasture Land in India
- The Value of India's Sub-Soil Assets
- Eco-Tourism & Biodiversity Values in India
- Estimating the Value of Educational Capital Formation in India
- Investments in Health and Pollution Control and their Value to India
- The Environmental Values of Forests : Water Augmentation, Mitigating Soil Erosion and Flood Damage Prevention
- Estimating the Value of Freshwater Resources in India

*NaturalGist*

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- *Sustainable growth is defined as that which increases per-capita national wealth, defined in this 'inclusive' or holistic manner. 'Green Accounting' consists of modelling and pricing the non-marketed services of environmental assets, calculating the value of education as a generator of future incomes, present-valuing future liabilities in the form of pollution abatement costs and health costs etc.*
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- *'Green Accounting' as a methodology to implement it, cannot be overemphasized. It could make all the difference between a viable and sustainable economic trajectory for developing countries on the one hand, and on the other, one which spells disaster not just for them but for the whole of civilization.*
- *The emphasis of SNA on GDP as the key measure of growth will probably be studied by future generations as the single most significant design defect in the economic history of mankind. The proper alternative, Green Accounting, entails the estimation of prices for ALL national assets, including natural and human, and their inclusion in the 'financial statement' of the nation, so it is no mean task.*
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