Environmental Evaluation of Economic Growth: An Agenda For Change

P. Khanna And P. Ram Babu

The study brings out the urgency for following an agenda for ecologic modernization in the process of economic liberalization. Pursuing the target of growth solely in GDP could lead the country away from the sustainability, feel the authors. This concerns warrants a national debate on the present and future scenario of India's economy

SUSTAINABLE development is a process in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional changes are all made consistent with future as well as presents needs. The premises of sustainable development are:

- Symbolic relationship between consumer human race and producer natural systems
- Compatibility between ecology and economy.

The precondition to sustainable development are:

- Equity and social justice
- Endogenous choices
- Economy efficiency
- Ecologic harmony.

The present day environmental problems are not so much due to the lack of Governmental trust as to the direction of its results in legalists, sectorial, media-specific, repair- oriented environmental planning and management that overlook the interactive nature of our common environmental and development concerns. The agenda for change thereby relates to the restricting of economy based on ecological principles.

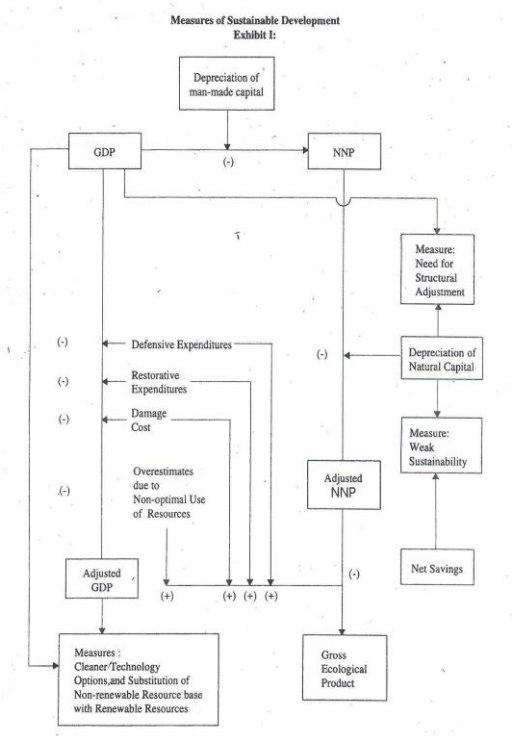
The available indicators of growth do not provide environmentally relevant information about the structure of economy. This paper analyses the economic indicator in vague, and presents a schematic for the incorporation of environmental and resource degradation costs in economic accounting process. The analysis of Indian economy during 1980-95 is also presented to illustrate the utility of the approach in delineating movement towards sustainable developments in India.

Economic Indicators

The national income and output accounts have traditionally served two main purposes:

- Measure of level extent and nature of economic activity
- Delineation of the factors of production, and indicators of living standards.

The links between the measures of income and human well-beings (or welfare) are questionable as the income accounts do not, for example, reflects the equity of the quality of life, ecological loading and environmental degradation; all of which are relevant to human welfare. Also conspicuous by their absence in accounting procedure are the unrecorded production of goods in informal (unauthorized) sectors:



Resources depletion in building in the economy: deterioration in working, living in environmental conditions; and losses due to accidents.

As the gap between increase economic growth and deteriorating quality of life began to widen in 1970s, criticism against GDP as the most important economic indicator has been more articulate, although the critique against the GDP as the sole measure of welfare is as old as the origin of GDP itself, ranging from Boulding in 1950s to Daly in 1970s. The latest club of Rome report, while criticizing the measure of GDP, presents new measure of economic welfare and quality of environment, and calls for redirection of economy.

A measure of economic welfare should reflects besides 'Classical' material welfare, as describe by system for National Accounts (SNA), the following aspects:

- Non market production

Various parts of production that are not address to consumption, but are needed to repair damage caused by

the economic system itself (defensive costs)

- EEnvironmental damage that is not 'repaired'
- Reduction in future welfare caused by production/consumption today
- Question of (income) distribution.
- The value addition from economic activities arising out of the ameliorative investment in the environmental quality caused by the economic development itself needs to be subtracted from the GDP include:
- Costs of unsustainable cultivation of soil
- Loss of natural areas
- Costs of Air pollution control
- Costs of noise pollution control
- Costs of water pollution control
- Long-term environmental damage
- Defensive environmental expenditures
- Defensive societal costs
- Future reduction in economic welfare
- Depletion of non-renewable resources.

The Chapter 8, Agenda 21 of the Earth Summit calls the Governments to:

……..expands exiting system of ration economic in accounts in order to

integrate environmental and social dimentions in accounting frameworks; including atleast satellites system of natural resources in all member states

Exhibit II : Integrated Environment and Economic Accounts (1980-90, 1991-95)

Item	Change during (1980-90) (Rs. crore)	Annual Growth Rate	Change during (1991-95) (Rs. crore)	Annual Growth Rate
Economic Accounts				
GDP	+2,02,354	+5.66% (Without accounting for environmental degradation)	+87,721	+4.43% (Without accounting for environmental degradation)
Environment Accounts				
• **Air Environment**				
Damage to health and ecology due to Air Pollution	-26,772	-11,308		
• **Water Environment**				
Ground water mining				
— Quantitative decline	-96,900	-48,877		
— Quality degradation	-24,985	-13,386		
Surface water				
— Pollution avoidance cost	-1,014	-512		
• **Land Degradation**				
Productivity losses due to land degradation	=1,38,750	-61,768		
Land rejuvenation cost	-24,000	-10,668		
• **Forest Cover Decline**				
Loss of services/values	-2,704	-1,337		
Total environmental and ecological damage costs	-3,15,125	-1,47,856		
Adjusted growth in GDP (Accounting for Environmental degradation)	-1,12,771	-4.92%	-60,135	-4.74%

Source of data :

1. National Accounts Statistics, 1995, Central Statistical Organization.
2. India's National Income Statistics, October, 1996, Centre for Monitoring Indian Economy.

(8.42)…….'

The statistical offices are responding slowly to the commitment. With the latest reversion of the system of national accounts (SNA), the UN is aiming at the paradigm of integrated environmental and economic accounting (SEEA) with a framework to compile environmental data, be it physical or monetary, in a form consistent with the SNA structure. This 'satellite approach' towards environmental accounting was developed jointly by the UN Statistical Division and the World Bank, and pioneered by two countries studies in Mexico and Papua New Guinea. Within the SEEA, two measures, viz. depletion of natural resources and environmental costs are included that allow the calculation of 'environmentally adjusted net domestic products ' (EDP).

The imputation follows the restoration /avoidance cost approach. However, the data could also be organised to compute a set of indicators including measures of need of structural adjustment, Cleaner Technology Options,

- Resourses and environmental accounts in non-monetary units either to accompany conventional accounts, or to appear separately as satellite accounts
- Resource use and environmental damage monetization to adjust conventional GNP/GDP measures.

While there is no international agreement on the Purpose or the utility of green accounts, different countries have taken recourse to environmental accounting with a view to: •

– seeking an indicator of sustainability pursuasive purposes

design of environmentally benign sectoral policy responses.

One dimensional sustainability indicators such as the Gross Ecological Product (GEP), or the Environmentally Adjusted Net Domestic Product (EDP) provide the extent of environmental and resource degradation unaccounted for in the economic accounts, and their time series reveals the direction in which the economy is moving, viz. towards sustainability or away from sustainability. The computation of Gross Ecological

Product or Environmentally Adjusted Net Domestic Product involves environmental valuation which is ridden with uncertainties and controversies between ecologists and economists. The second indicator, viz. growth of economy towards/away from sustainability, is amenable to computation with recourse to estimationsof relative sectoral growth rates, resource use, and emission intensities thus minimizing uncertainties.

Natural Resource Accounts

- The Integrated Economic and Environment Accounting framework for India has beeh a subject of debate since the

last decade. A pilot multi-institutional study, sponsored by the Ministry of Environment and Forests in 1995 and coordinated by the National Environmental Engineering Research Institute (NEERI), aims at evolving Natural Resource Accounting framework for India, and its illustration in Yamuna river sub-basin. Another study, covering the whole country, aiming at the estimation of the extent of environmental and resource degradation during the last decade and a half, as an instrument for alerting the decision makers, and emphasizing the significance of environmentally benign paradigms of socio-economic development leading to equity in quality of life, and minimal ecological loading and environmental degradation has also been carried out by NEERI. The salient finding of this study are presented here.

Exhibit III: Annual Growth Rates of Gross Domestic Product (GDP) and Environmentally Adjusted Net Domestic Product (EDP) during 1980-90 and 1991-95 for different countries

Substitution of Non-renewable Resource base with Renewable Resources, Weak Sustainability, and Gross Ecological Product (Exhibit I) that could provide a compass for internalizing environmental concerns in the process of socio-economic decision making.	Rate of growth during 1991-95 (%)		Remarks
	GDP	EDP	
After a decade of research on inclusion of such concerns into national accounts, two broader approaches have emerged:	4.43	-4.74	The resources and environmental degradation due to informal sector and consumption activities are also included
• Resource and	NA	NA	• Only the use of resources and environmental services utilized in production activity is accounted
	1.0	0.41	• The 1991-95 figures are obtained using the data upto 1993 • The growth rate figures corresponding to EDP are that of Index of Sustainable Economic Welfare (ISEW)

NA—Not Available

Note: For other countries relevant time series data are not available. The integrated environmental and economic accounting for Mexico in the year 1986 reveals that the contributions of forestry and oil sectors were 0.54 and 3.50 to GDP; and -0.08 and -0.20 to EDP. The capital output ratio for the economy dropped from 37.05 to 9.69 after incorporation of corrections for resources and environmental degradation which constituted 44.8% of GDP.

The economic and environment accounts for India, delineated in Exhibit II,. include: .

- degradation of air quality, with concomitant health and ecological damages
- unsustainable utilization of ground water resources, and pollution of surface with bodies
- degradation of " land mass due to erosion, salinity, and water logging
- degradation of forest cover. The issues related to the loss of bio-

- Degradation of air quality, with concomitant health and ecological damages
- Unsustainable utilization of ground water resources, and pollution of surface with bodies
- Degradation of land mass due to erosion, salinity and water logging
- Degradation of forest cover.

The issue related to the loss of bio-diversity, flora and its crown density,
Fresh water aquatic ecological resources, coastal and oceanic resources and non-renewable energy resources are not included in in the calculation. The accounting period (1980-95) is chosen in the view of the availability of data on resources degradation.

Economic Accounts

The country's Gross Ecological Product (GDP) at constant prices increases during 1980-90 by rs. 2,02,354 crores, thus registering a growth of 73.5%; while the increasing during 1991-95 was Rs. 87,721 crore, a growth of 21%

Environmental Accounts

Air environment

The combine damage of human health and ecologicalk function of vegetation due to air pollution was Rs. 26,772 and 11,308 crore during 1980-90 and 1991-95, respectively.

Water Environment

The ground water mining has cause quantitative and qualitative impairement to the ground water resource. The avoidance costs of ground water decline (mining) and degradation are estimated at Rs. 96,900 and Rs. 24,985 crore,

during 1980-90; and Rs. 48,877 and 13'386 crore during 1991-95, respectively. The avoidance cost of surface water pollution are estimated at Rs1,014 crore and Rs. 512 crore during the same periods.

Land *Environment*
The productivity and ecological function losses due to land degradation, and costs involved in rejuvenation and reclaimation of degraded landmass during 1980-90, and 1991-95 are estimated at Rs. 138750 and Rs. 24000 crore; and Rs. 61768 and Rs. 10668 Crore, respectively.
Biological *Environment*
The forest cover declaim during the periods 1980-90 and 1991-95 has resulted in loss in productivity and ecological services offered bt the forest amounting to Rs. 2704 crores; and Rs. 1337 crores, respectively.
The salient issue in computation of adjusted growth in GD, as delineated in Exhibit II, are:

- Health damage cause due to air pollution are based on air population exposure, and morbidity and mortality figures that are attributable to respiratory ailments
- Ecological damage cost due to air pollution include vegetation loss, loss to ground water recharge, and soil erosion
- Losses due to quantitative and quality degradation due to excessive withdrawal contamination are estimated
- Avoidance costs for surface water contamination from domestic and industrial waste water arwe estimated
- Costs associated with land degradation are prodsuctivity losses of land under cultivation by assuming aggragate cropping pattern. A period of three years is assumed for land rejuvenation through soil erosion con troll programme in water sheds
- Loss of forest services/values is estimated based on the changes in forest cover with resources to the guidelines of the ministry of Environmental and forests on benefit –costs evaluation of project invoving diversion of forest land mass.
- Biodiversity losses are not include in the estimation of total environmental and ecological losses
- Monetized value of natural resources used for growth in GDP has not been conclude in the calculations of Environmental Accounts.

The annual growth rate of gross domestic products and environment tally adjusted net domestic product for some other countries is delineated in Exhibit III

Policy Implications

The following observations ensue from Exhibit **II** with relevance to policy formulations:

- The environmental damages have increased during the period spanning 1991-95 in comparison to the period between 1980-90
- The economic activity during 1991- 95 is characterized by larger growth in environmental costs related to water and air pollution, whereas . the land degradation and forest cover decline

continued with the trends observed during 1980-90

- The environmental damage to landmass continued to outpace improvements in agricultural production. This combined with the loss of cultivated land for urban expansion seriously jeopardises country's food supportive capacity.

The analysis brings out the crying need for pursuing an agenda for ecologic modernization in the process of economic liberalization. Solely perusing the targets of growth in GDP could lead the economy away from sustainability compromising the growth of future generations.

Ecologic Modernization

Ecologic Modernization aims at raising the levels of both ecologic and economic efficiency by increasing material and energy effectivity in production and consumption processes in order to minimize the expense on environmental protection while keeping the cost of natural resource exploitation within acceptable limits. In effect, ecologic modernization aims at restructuring of economy based on

Ecological principal. A few example of ecological modernization are outlined below as an illustrated:

Manufacturing sector: transition to production processes which save or recycle raw materials and save energy substitution of ecologically harmful with harmonious products, application of biotechnology for substitution of non-renewable carrying capacity based planning of industrial estates, ecological grouping of industries

Energy Sector: rational use of primary energy, greater use of regenerative energy sources, decentralization of supply, improvement in combustion processes

Agriculture sector: eco-cultivation and biotechnological impro- vements, promotion of organic manures and biocides, development of land-use plans compatible with species and ecosystem types.

Construction industry: use of renewable and environmentally compatible building materials, land and energy saving designs, labour-intensive designs

Transport sector: reduction in specific energy consumption of motor vehicles, reduction in total number of motored kilometers, provision of efficient public transport systems.

The sociocultural roots of our present environment crisis lie in the paradigms of scientific materialism and economic determinism which fail to recognize the physical limits imposed by ecological systems on economic activity. The economics must expand within ecosystem which have limited regenerative capacities. Contrary to the neoclassical theory of continuous material growth, economic activities directly undermine the potential for development through over-exploitation of natural resources, and indirectly compromise future production through the discharge of residuals. The entrenchment with entrenchment with quantitative growth as a major instrument of social policy is thus quite paradoxical.

It is this concern that warrants a country wide debate on the present and future scenarios of India's economy with a view to delineating strategies for urgent policy shifts.

The authors are Director and Dy. Director, respectively of the National Environmental Engineering Research Institute, Nagpur