"Summary of article by Salah El Serafy and Ernst Lutz: Environmental and Resource Accounting: An Overview" in Frontier Issues in Economic Thought, Volume 1: A Survey of Ecological Economics. Island Press: Washington DC, 1995. pp. 240-243

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"Summary of article by Salah El Serafy and Ernst Lutz: Environmental and Resource Accounting: An Overview"

(This summary is based primarily on the overview chapter of a volume of papers selected from a series of workshops sponsored jointly by the World Bank and the United Nations Environmental Programme, although it also draws on some of the individual papers in the volume to clarify particular issues.)

Economic activity used to be small, but present levels of population and economic growth have been putting increasing pressure on the environment and natural resource base. Under these circumstances, there is little justification for economists' neglect of the role of the environment as a resource base and a sink for wastes. Economists have been treating the side effects of production and consumption activities on the environment as externalities. However, since someone must pay the costs of these externalities, the true costs of all activities should be internalized, and income generation should be clearly differentiated from the depletion and degradation of natural resources.

SHORTCOMINGS OF THE CURRENT NATIONAL INCOME MEASURES

Income accounting measures such as GNP, GDP, and Net National Product (NNP), are useful to economists and development planners as indicators of short- to medium-term changes in the level of economic activity and as tools for stabilization and demand management policy. However, these measures fail as indicators of long-term sustainable growth or welfare, and policies based on these figures could be faulty. While a number of shortcomings of national income accounting have been pointed out in the past, this volume addresses shortcomings with respect to environmental and natural resource issues as they relate to the proper measurement of income and variation in assets.

THE NECESSITY OF MEASURING SUSTAINABLE INCOME

Income is sustainable by definition: if it cannot be sustained, then it is wrongly estimated. Sustainable income may be perceived as the amount that can be consumed in a given period without reducing possible consumption in a future period. "Sustainable" income is analogous to Hicks' concept of income: "we ought to define a man's income as the maximum value which he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning."[1]

To arrive at "sustainable" income, two adjustments need to be made to the conventionally calculated NNP. These are subtractions for defensive expenditures (DE) and for depletion and degradation of natural capital (DNC). These adjustments would yield the sustainable social net national product (SSNNP), i.e., SSNNP = NNP-DE-DNC.

DEFENSIVE EXPENDITURES

Production and consumption result in unwanted side effects such as pollution, thus necessitating cleanup activities to counter these effects. These activities are called defensive expenditures. At present, the costs of defending the environment are treated as income generating, i.e., as final expenditures, but such outlays should instead be counted as intermediate expenditures. There are many proposals as to how this accounting can be done.[2] Two problems encountered in adopting some of these proposals are the lack of consensus on how natural capital should be treated conceptually, and the problem of actually measuring the level of environmental services and damages.

THE DEPLETION AND DEGRADATION OF NATURAL RESOURCES

The present system of national accounts[3] treats human-made assets differently from natural resource assets. The former are valued as productive assets and their depreciation is written off against the value of production. The depletion of natural resource assets may or may not be similarly treated as depreciation in existing accounting systems. If privately owned they may be depreciated, but in a large number of cases the loss of natural assets shows up as income in the accounts as they are being used for productive or consumptive activities.

The underlying logic of treating the depletion of natural resource assets as income and not depreciation is based on the implicit, though inappropriate, assumption that natural resources are abundant and have no marginal value, resource depletion and sale being treated as a means of promoting economic growth. However, such growth can be illusory if it is not recognized that the apparent increase in income is obtained at the cost of a permanent reduction in wealth. One way to mitigate the wealth-reducing aspects of natural resource depletion is to direct part of the receipts from the sale of natural resources into new productive investments. Proper income accounting would aid policy makers in bringing about this redirection.

Two approaches have been proposed to deal with the depletion of natural resources: the depreciation approach and the user cost approach. The depreciation approach is straightforward and similar to the method of depreciating human-made capital. The effects of the depreciation approach on the present System of National Accounts (SNAs) would be to leave GDP unchanged, but to eliminate the entire proceeds from the sale of natural resources from the NNP. In effect, the depreciation approach does not capture the income advantage that accrues to the possessor of a natural resource compared to those who have no such possession. This outcome is unsatisfactory, so the user cost approach has been proposed.

The user cost approach splits the revenue from the sales of a depletable resource into a capital element (the user cost) and a value added element. The user cost represents asset erosion, which

should be hypothetically or actually reinvested in alternate assets so that it generates income after the depletable resource has been totally exhausted. The ratio of true income (X) to receipts net of extraction costs (R) is given by the formula

$$\frac{X}{R} = 1 - \frac{1}{(1+r)^{n+1}}$$

where n is the number of years over which the resource will be depleted, and r is the discount rate, both of which are exogenous and should be determined independently.
R - X would be the user cost that should be set aside for capital investment and excluded from GDP. The formula does not indicate an optimal rate of depletion.

OTHER ISSUES

The present SNA does not contain an explicit environmental dimension, so some economists and environmentalists advocate a system of environmental accounts independent of the present SNA. It is argued that accounts should be in physical (as opposed to monetized) terms. The advantage of accounts in physical terms is that one will get a sense of the direction and rate of change in the quantity and quality of resources. These physical accounts can be constructed as satellite accounts around the present SNA. To the extent possible, these satellite accounts should be "monetized" and combined with standard GDP and NDP measures to provide an estimate of sustainable GDP/NDP. It is hoped that eventually empirical and conceptual work will lead to an SNA that can be constructed without the intermediate step of satellite accounts.

Notes

1. John R. Hicks, Value and Capital 2nd ed. (Oxford: Oxford University Press, 1946), 172.
2. Chapters 4, 5, 6, 9 and 10 of the volume address this question in detail.
3. That is, the system that has been in use since 1968. The new SNA, issued in December 1993, goes some way in the direction of the proposals contained here.