



# Environmental Accounting

## Where We Are Now, Where We Are Heading

by Joy E. Hecht

Interest is growing in modifying national income accounting systems to promote understanding of the links between economy and environment.

The field of environmental accounting has made great strides in the past two decades, moving from a rather arcane endeavor to one tested in dozens of countries and well established in a few. But the idea that nations might integrate the economic role of the environment into their income accounts is neither a quick sell nor a quick process; it has been under discussion since the 1960s. Despite the difficulties and controversies described in this article, however, interest is growing in modifying national income accounting systems to promote understanding of the links between economy and environment.

### Why Change?

Governments around the world develop economic data systems known as national income accounts to calculate macroeconomic indicators such as gross domestic product. Building a nation's economic use of the environment into such accounts is a response to several perceived flaws in the System of National Accounts (SNA), as defined by the United Nations and used internationally. One flaw in the SNA often cited is that the cost of environmental protection cannot be identified. Consequently, money spent, say, to put pollution control devices on smokestacks increases GDP, even though the expenditure is not economically productive, some argue. These critics call for differentiating "defensive" expenditures from others within the accounts.

Also misleading is the fact that some environmental goods are not marketed though they provide economic value. Fuelwood gathered in forests, meat and fish gathered for consumption, and medicinal plants are examples. So are drinking and irrigation water, whose sale prices reflect the cost of distribution and treatment infrastructure, but not the water itself. While some countries do include such goods in their

national income accounts, no standard practices exist for doing so. When nonmarketed goods are included in the accounts, they still cannot be distinguished from those that are marketed.

Valuing environmental services such as the watershed protection that forests afford and the crop fertilization that insects provide is difficult. Though some experts call for their inclusion in environmentally adjusted accounts, typically neither the economic value nor the degradation of these services is included. On the other hand, however, the alternate goods and services needed to replace them—water treatment plants, for example—do contribute to GDP, which can be rather misleading.

Still another problem is that national income accounts treat the depreciation of manufactured capital and natural capital differently. Physical capital—a building or a machine, for instance—is depreciated in accordance with conventional business accounting principles, while all consumption of natural capital is accounted for as income. Thus the accounts of a country that harvests its forests unsustainably will show high income for a few years, but will not reflect the destruction of the productive forest asset. While opinions vary on how to depreciate natural capital, they converge on the need to do so.

### Which Indicators Are Useful?

Some proponents advocate simple "flag" indicators to alert policymakers to the broad role of the environment in the economy, for example, comparing conventional GDP with environmentally adjusted GDP, or conventional savings with so-called "genuine" savings that account for environmental factors. Both of these indicators can provide valuable warnings of the impacts of environmental degradation on an economy.

However, such flags are less useful in determining

the source of environmental harm or identifying a policy response. For this reason, many economists place primary importance not on the bottom line, but on the underlying data used to build environmental accounts. These data can help answer such questions as how natural catastrophes like the fires that raged in Indonesia in the summer of 1998 may affect economic growth, or how environmental protection policies such as green taxes may affect the economy.

### Who Is Doing This?

Environmental accounting is underway in several dozen countries, where bureaucrats, statisticians, and other proponents both foreign and domestic have initiated activities over the past few decades. Several countries have made continuous investments in building routine data systems, which are integrated into existing statistical systems and economic planning activities. Others have made more limited efforts to calculate a few indicators, or analyze a single sector. Some of the earliest research on environmental accounting was done at RFF by Henry Peskin, working on the design of accounts for the United States.

One of the first countries to build environmental accounts is Norway, which began collecting data on energy sources, fisheries, forests, and minerals in the 1970s to address resource scarcity. Over time, the Norwegians have expanded their accounts to include data on air pollutant emissions. Their accounts feed into a model of the national economy, which policymakers use to assess the energy implications of alternate growth strategies. Inclusion of these data also allows them to anticipate the impacts of different growth patterns on compliance with international conventions on pollutant emissions.

More recently, a number of resource-dependent countries have become interested in measuring depreciation of their natural assets and adjusting their GDPs environmentally. One impetus for their interest was the 1989 study "Wasting Assets: Natural Resources in the National Income Accounts," in which Robert Repetto and his colleagues at the World Resources Institute estimated the depreciation of Indonesia's forests, petroleum reserves, and soil assets. Once adjusted to account for that depreciation, Indonesia's GDP and growth rates both sank significantly below conventional figures. While "Wasting Assets" called

many to action, it also operated as a brake, leading many economists and statisticians to warn against a focus on green GDP, because it tells decisionmakers nothing about the causes or solutions for environmental problems.

Since that time, several developing countries have made long-term commitments to broad-based environmental accounting. Namibia began work on resource accounts in 1994, addressing such questions as whether the government has been able to capture rents from the minerals and fisheries sectors, how to allocate scarce water supplies, and how rangeland degradation affects the value of livestock.

The Philippines began work on environmental accounts in 1990. The approach used there is to build all economic inputs and outputs into the accounts, including nonmarketed goods and services of the environment. Thus Filipinos estimate monetary values for such items as gathered fuelwood and the waste disposal services provided by air, water, and land; they then add in direct consumption of such services as recreation and aesthetic appreciation of the natural world. While their methodology is controversial, these accounts have provided Philippine government agencies and researchers with a rich array of data for policymaking and analysis.

The United States has not been a leader in the environmental accounting arena. At the start of the Clinton administration, the Bureau of Economic Analysis (BEA) made a foray into environmental accounting in the minerals sector, but this preliminary attempt became embroiled in political controversy and faced opposition from the minerals industry. Congress then asked the National Research Council (NRC) to form a blue ribbon panel to consider what the nation should do in the way of environmental accounting. Since then, Congressional appropriations to BEA have been accompanied by an explicit prohibition on environmental accounting work. The ban may be lifted, however, once the recommendations of the NRC study are made public.

### How to Account?

How environmental accounting is being done varies in a number of respects, notably the magnitude of the investment required, the objectivity of the data, the ability to compare different kinds of environmental impacts, and the kinds of policy purposes to which

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they may be applied. Here are some of the methods currently in use.

*Natural Resource Accounts.* These include data on stocks of natural resources and changes in them caused by either natural processes or human use. Such accounts typically cover agricultural land, fisheries, forests, minerals and petroleum, and water. In some countries, the accounts also include monetary data on the value of such resources. But attempts at valuation raise significant technical difficulties. It is fairly easy to track the value of resource *flows* when the goods are sold in markets, as in the case of timber and fish. Valuing *changes in the stocks*, however, is more difficult because they could be the result either of a physical change in the resource or of a fluctuation in market price.

For environmental goods and services that are not sold, it is that much harder to establish the value either of the flow or of a change in stock. However, even physical data can be linked to the economy for policy purposes. For example, changes in income can sometimes be traced to changes in the resource base or to the impact of environmental catastrophes on the economy.

*Emissions accounting.* Developed by the Dutch, the National Accounting Matrix including Environmental Accounts (NAMEA) structures the accounts in a matrix, which identifies pollutant emissions by economic sector. Eurostat, the statistical arm of the European Union, is helping EU members apply this approach as part of its environmental accounting program. The physical data in the NAMEA system are used to assess the impact of different growth strategies on environmental quality. Data can also be separated by type of pollutant emission to understand the impact on domestic, transborder, or global environments. If emissions are valued in monetary terms, these values can be used to determine the economic cost of avoiding environmental degradation in the first place, as well as to compare costs and benefits of environmental protection.

*Disaggregation of conventional national accounts.* Sometimes data in the conventional accounts are taken apart to identify expenditures specifically related to the environment, such as those incurred to prevent or mitigate harm, to buy and install protection equipment, or to pay for charges and subsidies. Over time, revelation of these data makes it possible to observe links between changes in environmental policy and costs of environmental protection, as well as to track the evolution of the environmental protection industry.

While these data are of obvious interest, some people argue that looking at them in isolation can be misleading. For example, while end-of-pipe pollution control equipment is easily observed, new factories and vehicles increasingly are lowering their pollutant emissions through product redesign or process change rather than relying on special equipment. In such cases, no pollution control expenditures would show up in the accounts, yet environmental performance might be better than in a case where expenditures do show up.

*Value of nonmarketed environmental goods and services.* Considerable controversy exists over whether to include the imputed value of nonmarketed environmental goods and services in environmental accounts, such as the benefits of an unpolluted lake or a scenic vista. On the one hand, the value of these items is crucial if the accounts are to be used to assess trade-offs between economic and environmental goals. Otherwise, the accounts can end up reflecting the costs of protecting the environment without in any

way reflecting the benefits. On the other hand, some people feel that valuation is a modeling activity that goes beyond conventional accounting and should not be directly linked to the SNA. The concern underlying their view is that it is difficult to standardize valuation methods, so the resulting accounts may not be comparable across countries or economic sectors within a country.

*Green GDP.* Developing a gross domestic product that includes the environment is also a matter of controversy. Most people actively involved in building environmental accounts minimize its importance. Because environmental accounting methods are not standardized, a green GDP can have a different meaning in each project that calculates it, so values are not comparable across countries. Moreover, while a green GDP can draw attention to policy problems, it is not useful for figuring out how to resolve them. Nevertheless, most accounting projects that include monetary values do calculate this indicator. Great interest in it exists despite its limitations.

### Toward Consensus on Method

Environmental accounting would receive a substantial boost if an international consensus could be reached on methodology. The UN Statistics Department has coordinated some of the ongoing efforts toward this end since the 1980s. In 1993, the UN published the System for Integrated Economic and Environmental Accounting (SEEA) as an annex to the 1993 revisions of the SNA. SEEA is structured as a series of methodological options, which include most of the different accounting activities described above; users choose the options most appropriate to their needs.

No consensus exists on the various methods that the UN recommended. In fact, SEEA is now undergoing revision by the so-called "London Group," comprised primarily of national income accountants and statisticians from OECD countries. The group's work will be an important step toward consensus on accounting methods, but the process will be lengthy. Development of the conventional SNA took some forty years.

### Toward Widespread Use

A number of steps can be taken now toward the goal of ensuring that environmental accounting is as well

established as the SNA. First, information must circulate freely about existing environmental accounts and how they are contributing to economic and environmental policy. Ongoing work needs to be identified and systematically reviewed and analyzed to learn lessons, which may inform the design and implementation of future accounting activities. The Green Accounting Initiative of the World Conservation Union has embarked on this effort, and a number of other organizations are calling for similar activities. Use of the World Wide Web may facilitate access to unpublished work, although it will require a concerted effort to obtain accounting reports and seek permission to load them on the Internet.

Second, development of a core of internationally standardized methods will contribute to willingness to adopt environmental accounting. Experts in the field—including economists, environmentalists, academics, and others outside of the national statistical offices—should take a proactive role in tracking the work of the London Group and insist that the standard-setting process involve participants representing a spectrum of viewpoints, countries, and interested stakeholders. An opportunity exists for research institutes to take a lead in identifying the financial resources needed to facilitate a broader standard-setting process, and to elicit a full range of voices to build a consensus on methodology.

Finally, and perhaps most importantly, the more countries institutionalize construction of environmental accounts, the greater the momentum for more of the same.

Still, building accounts—like developing any time-series statistics—will not happen overnight. Their construction will require sustained institutional and financial commitment to ensure that the investment lasts long enough to yield results. But the experiences of Norway, Namibia, and the Philippines show that such a commitment can pay off; it is a commitment that more countries around the world need to make.

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