ENVIRONMENTAL ACCOUNTING BY SATELLITE ACCOUNTING

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Keywords: SNA (System of National Accounts), SEEA (System of Integrated Environmental and Economic Accounting), monetary and physical data systems, bridging matrix, SEEA versions, imputed valuation, maintenance valuation, contingent valuation, market valuation, caused and borne costs, repercussion costs, input-output analysis

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Summary

In the 1993 revised System of National Accounting (SNA) the development of several satellite accountings was proposed. The satellite accountings are complementary and loosely linked with the basic system of the SNA. They focus on the fields that have attracted public attention. Of these, priority has been given to the field related to the environment and to the interrelations between the environment and human economic activities, as in sustainable development. The System of Integrated Environmental and Economic Accounting (SEEA), versions I to V, was developed for that purpose.

Both monetary and physical data are necessary in order to describe thoroughly interrelations between the environment and the economy. The SNA was originally a monetary data system. For the physical data system, the SNA relies on the SEEA as a satellite system since it has both data systems. The system that uses physical data extends the description of the environment to include the information of physical flows between the environment and the economy, for instance, use of natural resources, flow of residuals, etc.

On the other hand, the SEEA is extended to evaluate the use of natural assets or the environment. The purpose of the extension is to make possible the comprehensive

measurement of costs and benefits brought about by economic activities and their impacts on the environment.

The SEEA has a structure that can in principle deal with both national accounts system and environmental accounts system, functioning as a bridge between them.

1. Satellite Accounting for Sustainable Development

The United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro in June 1992. It is also known as the Earth Summit and the Rio Conference. The basic theme of the conference was environmentally sound and sustainable development and *Agenda 21*, the action program for sustainable development, was adopted there. Since then, people's interest in the relations between economic activities and the environment has spread all over the world.

In the meantime, at the twenty-seventh United Nations Statistical Commission the System of National Accounts (SNA) was revised, and implementation of the revised SNA was recommended to every country in the United Nations Economic and Social Council. In the 1993 revised SNA, the development of several satellite accountings was proposed. The satellite accountings are supplementary and complementary and are loosely linked with the basic system of the SNA. They focus on the fields that have attracted public attention.

Several fields have been suggested as subjects of satellite accountings. Priority, however, has been given to the environment and the relations between the environment and economic activities, as with sustainable development and *Agenda 21*. The satellite accounting related to the environment and its relations to economic activities is the System of Integrated Environment and Economic Accounting (SEEA).

2. The Development of Environmental Accounting

The linkage to the SNA of various concepts, definitions, classifications, and tabulations of environmental and natural resource accounts has been tried and proposed in the framework of the SEEA as satellite accounting. Five versions of the SEEA have been proposed. The revision of the SNA is a unique opportunity to examine the possibility of the linkage. At present, international consensus has not yet been reached for the fundamental change in the SNA but there is agreement that the SNA should address the issue of its links to environmental concerns. Based on that, the 1993 SNA has set up integrated environmental-economic satellite accounts as a section in which the capital and valuation concepts of the central framework that deal with natural assets are explained. That means that the SNA is to be the point of departure for the development of environmental accounts, developing at the same time the SEEA as satellite or complementary accounts.

The adoption of satellite accounting as environmental expands the analytical capacity of national accounts without overburdening the central framework of the SNA. The United Nations Statistical Commission supports its adoption and requires the use of satellite

accounting for developing the concepts and methods of integrated environmental and economic accounts. This approach was confirmed at UNCED, and in *Agenda 21* it was recommended that systems of integrated environmental and economic accounting (i.e. the SEEA) should be developed and established in all member states as early as possible to function not as a substitute for but as a complement to the conventional accounting system (i.e. the SNA).

3. Handbook of National Accounting to be the Standard

In conformity with *Agenda 21* the United Nations published a handbook setting out the guidelines for the SEEA in 1993, in addition to the SNA manual. It is called *Integrated Environmental and Economic Accounting: Interim Version* (Handbook of National Accounting).

For the time being, the objective of the handbook is to propose the conceptual basis for implementation of the SEEA as the SNA satellite system. This is to be achieved by linking the conventional economic accounts and environmental and natural resource accounts. Finally, the SEEA aims at grasping environmental, economic, and social elements as a unity, and making it effective for sustainable development, giving it integrated data and information. The handbook sets down a standard of the SEEA, which is still being developed. At present, it is better to discuss the SEEA relying on the handbook, especially in view of past trial and error thinking on the treatment of environmental elements in the SNA.

Since the early 1980s many proposals have been made to modify the national accounting system considering environmental elements. In the process of discussion, it has become clear that thoughtful consideration could not be given to environmental elements within the concept of market transactions, flows and stocks, of the SNA. On the other hand, most national accounts experts have been thinking it impossible to change by a large margin the conventional national accounts, that is, the conventional SNA. These two incompatibilities must be synthesized. That is the reason for setting up the satellite accounting system to record the relations between the environment and the economy.

4. The Necessity for Two Data Systems

Conventional national accounts—the SNA—are used to analyze economic structures and development of the market economy. For that it is sufficient if monetary data are available. Certainly, monetary data relevant to production, employment, capital formation, consumption, income distribution, saving, and financial transactions have been properly necessary for both short-term and long-term economic policies. As they are evaluated in the market, they have been recorded in monetary units or terms. The data included in the national accounts are obtained directly in monetary or value terms through economic surveys and administrative records, so generally there is no problem of valuation there.

By contrast, additional data are necessary to describe the interrelationship and interactions

between the environment and the economy. They usually can not be obtained in monetary terms. In the satellite system of environmental accounts such data are included in another data system, that is, in a physical data system, but can be closely related to the conventional national accounts. In this approach two data systems are necessary. One is the data system of the conventional national accounts system, that is, the monetary system of the conventional SNA as a core system. The other is the integrated environmental and economic accounting, that is, the physical as well as monetary system of the SEEA as a satellite system.

As mentioned before, UNCED required the development of the SEEA as a satellite system of the SNA. In the end, the two systems are unified in the relations between the core and the satellite system.

5. The Structure of the Satellite Accounting System

The satellite accounts system is much freer than the conventional national accounts system in the creation of concepts and the valuation of elements, as they are not limited by monetary terms. The valuation of the satellite system need not consist of market valuation made in the conventional national accounts.

The objective of the environmental accounting system is to monitor and analyze the environmental changes caused by economic activities and the repercussions of the former on the latter, giving the effective data essential to integrated environmental and economic policies. The objective could not be effectively achieved without the close relationship and linkage between economic and environmental data systems. Moreover, it is possible to set up an economic or econometric model containing both economic and environmental factors or mathematical variables in its functions.

Here, some consideration is to be made about the method of linkage between the SNA and the SEEA. As to the relations between the SNA and the SEEA are required on one hand flexibility, or experimental character, is required on the one hand and close linkage on the other hand. The two requirements seem at first sight to be inconsistent, for the conventional national accounts system is comparatively rigid in structure and rather limited in scope.

These seemingly inconsistent requirements must be synthesized without sacrifice of the capacity to experiment, especially the ecological character of the satellite system and the steadiness of the national accounts system. This is the reason for the flexibility of linkage or combination itself between the two accounts systems. That means that the satellite system is to be divided into several modules, which are combined in mobility to the core or conventional national accounting system according to different degrees of integration. The application of the same concepts is desirable to both the core and the satellite accounts as far as possible. When different concepts are required, bridge table is necessary that elucidates the conceptual differences and links new data to the conventional national accounts.

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Biographical Sketch

Professor Ichiro Kaneda, born February 22, 1934, in Tokyo, Japan, gained his bachelor's degree in Tokyo University in 1962 and his doctorate in Tokyo University in 1982. He is a professor at Niigata Sangyo University and ex-president of the same university, having served as president from 1988 to 1996. His fields of specialization are environmental and food economics, mathematical economics, and regional economics. His main recent scientific publications are Economic, technical and political aspects of LNG carriers in comparison with NG pipelines (based on the paper he was invited to present at the U.N. Symposium on Natural Gas Transport and Utilization in Northeast Asia, Beijing, December 2000), *Bulletin of Niigata Sangyo University* (Faculty of Economics), **23**, June 2001; *NHK-Books: The Japan Sea Economic Rim* (The Economic Region Surrounding the Sea of Japan) [in Japanese] (Tokyo: NHK Publishing, 1997); *Economics and Philosophy of Organic Production by Global Nature* (ecological and agricultural economics) [in Japanese] (Tokyo: Chuo-keizai-sha Publishing, 1996); and The change of the viewpoint on the Japan sea rim, *DBI Economic Review* [in Korean] (Daegu Korea: Daegu Banking Institute, 1995).