

CONCEPTUAL ISSUES INCLUDING ENVIRONMENTAL, NATURAL RESOURCES, AND ECOLOGICAL ACCOUNTING

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Summary

Nowadays, much attention is being paid to relations between the economy and the environment, because economic impacts on the environment are increasing. One impact is the disruption to nature caused by human behavior; this is a primary impact and leads to the depletion and degradation of the environment as a natural asset. Another, secondary, impact is the repercussions on humans of environmental degradation, for instance pollution, that originated in human behavior. The third, also more or less a repercussion, is the natural disasters arising from environmental depletion. In order to attain sustainable development the economy and the environment must be coordinated. So, it is necessary to obtain environmental elements in quantity or volume, and the

system of accounting must be extended accordingly. For that purpose, the System of National Accounts (SNA) has been extended with the development of the System of Integrated Environmental and Economic Accounting (SEEA). The SEEA has been environmentally expanded by introducing physical data, and contributes to the SNA by interpreting physical data in terms of monetary data through bridging matrices. The expansion of the SEEA makes it possible for the accounting system to treat natural resources and the ecosystem. Here, the concept of environmental cost appears. From the viewpoint of accounting, environmental costs are classified into costs caused and costs borne, or actual costs and imputed costs. The essence of environmental costs is more explicitly obtained by these classifications.

1. Sustainable Relations between Economic Activities and the Environment

Nowadays much more attention is being paid to the relations between economic activities and the environment. That is mainly because the impacts of economic activities on the environment are increasing, and so are environmental repercussions. The economy and the environment interact and impact on each other. Rapid economic development has enhanced those mutual influences, especially in the developed countries. These influences are usually quite negative, and already many adverse impacts have been brought about by economic development.

The modern economic system is becoming increasingly complicated, and the simple myth of economic growth is no longer credible. In order to deal with these conditions, it is necessary to grasp in detail the elements of the relationship between human economic activities and the environment. For that purpose, the system of accounting must be extended accordingly. The conventional System of National Accounts (SNA) has therefore been extended with the development of the System of Integrated Environmental Economic Accounting (SEEA) as a satellite accounting, which will be discussed in detailed later. First, several environmental problems will be explained to lay the groundwork for what is to be discussed later.

One of the environmental impacts of economic activities is the disruption of nature that originates in human behavior: the depletion and degradation of the environment as a natural asset. Depletion is usually the quantitative loss of natural resources directly but not finally consumed in production, such as mineral resources, forests, etc. where value transfers from materials to the products, and degradation is the comparatively qualitative loss of other natural assets, such as land, rivers, oceans, the air, waters, etc.,

which are more environmentally fundamental. Degradation is often directly detrimental to the ecology. The depletion of natural resources is also detrimental to ecological systems, especially if the resources are biological ones, for instance, a forest. Among the degradation that has taken place—are those of natural views, biological species, etc.

Another environmental impact is repercussions of environmental pollution that originated in human behavior. Environmental pollution is also thought to be degradation of the environment, for instance the emission and transfer of residuals into the environment. The residuals themselves sometimes contain harmful materials. The environment has the faculty of resolving residuals to an extent into harmless materials. However, if the volume of the residuals exceeds that faculty, the part not resolved produce and spread materials harmful to human health. Rarely does the environment itself change harmless materials into harmful ones through chemical reactions, because appropriate biological species, including *Homo sapiens*, have been evolving in harmony with the environment. Almost all repercussions of environmental pollution directly or indirectly originate in human behavior (except for harmful autonomous mutations of viruses, bacteria, etc.). It is usually very difficult to identify the origin of pollutant materials from the result, or elucidate the causality between the origin and the result of pollution. Very often the people who did not bring about the pollution suffer the pollution, this becoming clear after the event.

The third environmental impact is natural disasters caused by disruption of the environment that also originates in human behavior. For instance, too much deforestation will bring about floods. Disruption of a forest is also said to be decreasing the general productivity of the sea. Through rivers, forests supply the sea nutritious materials necessary to marine life, including planktons. This can be said to be a repercussion of environmental depletion from environmental pollution or degradation, but on a larger scale it may be derived from, or related to, changes in the general ecosystem, which consists of many sub-ecosystems—as it were, an inter-ecosystemic relationship—the changes being incurred by deforestation.

With recent events human economic activities and the environment must be coordinated, and an enduring, sustainable relationship must be formed and set up between them.

2. Environmental Accounting

The SNA was revised in 1993, and all countries have been advised to implement it. As

environmental problems increase, the SNA has adopted the data related to elements of the environment, as far as possible. There is, however, a limit to that. The major limit is seen to be that the data of the SNA are only in monetary terms. In the 1993 SNA it was proposed to develop a satellite accounting, including one for the environment, linked and attached to the core system of the SNA. That accounting system was the SEEA.

The central framework of the SNA includes the elements of environmental accounting to an extent. The many items of costs and capital in the natural resource accounts are the ones separate and independent from the other parts in the classification and accounts of assets stock and the assets changes. This is why the SNA could be the starting point to develop environmental accounting. However, some elements of the SNA, especially the ones in the other quantitative changes accounts, should be disaggregated and reclassified in greater detail. Furthermore, the other elements should be added in order to meet the description of elements of the environment and correspond to the linkage with the SEEA.

In the SNA, only produced assets including inventories are explicitly and completely considered in the estimation of net valuation added, which means including the costs of their use. Indeed, the costs of use of produced assets are reflected on intermediate consumption and consumption of fixed capital. Non-produced natural assets—for example, land, mineral resources, forests—are also included within the assets of the SNA as far as they are under the effective control of institutional units. The cost of their use, however, is not explicitly considered in production costs.

Environmental accounting systems were expanded to include environmental costs and the use of natural assets in the concept of costs, capital formation, and capital stock of the SNA. Later they were included through the SEEA, that is to say, complementing with additional data in monetary terms corresponding to physical terms introduced into the SEEA as a satellite accounting of the central framework of the SNA. Generally speaking, there are three approaches to environmental accounting. The first is accounting for natural resources, which focuses on accounting in physical terms. The second is satellite accounting in monetary terms, which is linked with the central framework of the conventional SNA just referred to. The accounting is, of course, more limited than natural resource accounts in coverage of the elements of the environment. The third is the welfare approach, which is related to impacts on the environment. This approach is especially difficult to combine with accounting systems.

The concept of environmental accounting was largely developed in the evolution of the SNA including the conventional, core, or central framework of the SNA and the SEEA as a satellite accounting. The data in the first approach and the third approach were increased in number and number of items, and adopted by and introduced into the second approach through the interpretation from physical into monetary terms, which is the function of the SEEA as satellite accounting of the SNA.

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Biographical Sketch

Emeritus Professor Dr. 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 an Emeritus 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).