

Is Economic Value the same as Ecological Value

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It is often argued that ecological principles have to be integrated into economic policies and into the economic decisions of stakeholders. However, to extent to which such an integration is possible is often not clear. The crucial question is what place can be given to nature and the environment in economic theories.

The first obstacle is that economic theory has its own theoretical framework which is based on the idea that economic value is measured on markets. Many parts of the ecosystem, however, are not traded and therefore do not have a market price.

On the other hand, ecological science has its own theoretical framework. Ecological value is, in principle, based on factors such as the complexity of the ecosystem, its connections with other ecosystems, the scarcity of the ecosystem, its vulnerability to environmental pollution, and its contribution to biodiversity. This implies that, in ecological theory, ecological value is not based on market prices. This causes many problems in the field of economic theory as well as in public policy.

Public policy decisions have to be based on certain elements being appropriate to provide sufficient information for that type of decision. In most cases, these elements include physical information, indicating, for example, the number of cars which will probably use a road to be constructed. But, on the other hand, decision makers want to be informed about the costs of the construction of the road. These costs can be calculated within rather well-defined margins.

But what are the benefits of the future use of that road? The simple answer is that it is the number of cars which will use the road. But this information is only expressed in physical terms, which are different from the monetary terms in which the costs of the road are expressed. Therefore, we prefer to 'translate' the physical information into monetary terms. The crucial question is, however, whether we really know all the costs and benefits of the road project if we want to include the environmental aspects, as they are in one way or another connected with economic costs and benefits, and are an integral part of the project.

In that case, we are confronted with questions such as: What are the costs of acid rain resulting from the emissions of acidifying substances by motor cars when they use the road? What are the costs of the global climate change resulting from the increased emissions of CO₂ by these cars? And do we know the costs of the depletion of the stocks of fossil fuel resulting from the increased use of gasoline? We may thus conclude that crucial theoretical and practical questions arise as soon as environmental issues are a substantial part of the project in question.

When environmental questions and problems were not more than an unimportant side effect of economic activities, as was the case many decades ago, these problems could be neglected without having any serious effects on the outcome of traditional economic decision making. However, environmental problems can no longer be seen as a marginal part of the decision-making process. On the contrary, many authorities argue that they are in urgent need of sufficient information regarding the societal costs and benefits in all decisions where environmental issues are at stake, which is quite often the case.

This brings us to the central question to be discussed in this paper: To what extent is integration of ecological values into economic theory possible, given the current theoretical framework of economic theories. In the second section, we will pay attention to the concept of ‘the environment’. What do we mean with this term?

We will pay particular attention to the extent to which the concept of the environment can influence the outcome of the economic process. In the third section, we will concentrate on the possibility of finding a market price based on the discussion of the environmental concept in the previous section. In the fourth section, the attempts to overcome the fundamental problems of the economic valuation of the ecosystems, as they have been developed by economists, will be discussed. Finally, we will indicate in which situations these methods can contribute to the decision-making process when environmental problems are involved. In addition, we will indicate some methods and concepts which can be used in the decision-making process in cases when economic decisions cannot contribute to the value of the ecosystem.

The ‘environment’

In most economic textbooks, it is argued in the first chapter that labour, capital, and natural resources are the three production factors necessary for the production of economic goods wanted by consumers. Most of these textbooks, however, give more information about labour and capital than about these natural resources. What labour and capital are and how they can be used in the economic process is relatively clear, but this is not the case with the concept of natural resources.

Therefore, we need to clearly distinguish what these environmental production factors are. In our view, we have to come to conclusions in all cases where natural resources are used in the production or consumption process, regardless of whether or not they have a price. The crucial point is whether or not they are scarce, as this brings them in the realm of economics. Scarcity can, for example, influence the prices of agricultural products or fossil fuels. However, in many cases, there is no price, not because the goods are not scarce, but because there are no markets for these scarce goods. This is the case with beautiful mountains, wilderness areas, clean water and clean air. They are scarce, but do not have a real price. Therefore, we pay attention to all scarce environmental inputs in the production and consumption process, whether or not they have a price.

Strictly speaking, the environment is restricted to all situations where abiotic elements can be defined. When biotic elements are dominant, we define it as nature. This implies that when we deal with tropical rain forests to be cut by international timber companies, we will define this as a destruction of nature. When, however, acid rain, which is abiotic, destroys the same forest, we define this as an environmental problem. Such a division can have some arbitrary and confusing elements. Nevertheless, we need this distinction to avoid semantic discussions.

Here we follow Hueting (1984) and De Groot (1992), who argued that it is the functions of nature and the environment which can be used by mankind in the production and consumption processes. These functions therefore have an economic value.

Nature

The economic value of nature is quite complex. Nature is used in the economic process in many ways. Tourists prefer to visit unspoiled landscapes; mountain climbers enjoy mountains when they are not overloaded with human infrastructure such as parking places, ski tows, and cable cars. Furthermore, environmental groups such as Greenpeace argue that nature has an inherent value, regardless of its use in economic processes. Pearce (1993, p. 17) argues that the total economic

value of nature is identical to the direct value + the indirect value + the optional value + the existence value.

The sum of direct value, indirect value, and optional is seen as the use value, while the existence value can be regarded as the non-use value. The sum of use value and non-use value gives us the total economic value. He gives the example of a tropical rain forest, where the direct value includes sustainable timber products, plant genetics, medicine, non-timber products, education, human habitat, and recreation. The indirect value is based on elements such as watershed protection, air pollution reduction, nutrient recycling, and micro-climate. The option value is based on the idea that, even in the case of the absence of current direct and indirect value, the asset can be relevant in the future.

The existence value includes intrinsic values and heritage and cultural values. The concept of biodiversity, which has been used recently in documents of the 1992 United Nations Conference in Rio de Janeiro, deals with use values as well as non-use values. Biodiversity is relevant in agriculture and forestry, so it has a direct use value which is to a certain extent articulated in the price of the product on the market. On the other hand, biodiversity is related to the rich variety of ecosystems all over the world, regardless of their use in market processes (Pearce and Moran, 1994; Barbier, et al., 1994).

Clearly, some of these values can be measured on a market and others not. A tropical rain forest will only have a recreational value if the forest is visited, which is not the case for many very important, isolated rain forests of high ecological value. Nature areas located in the vicinity of significant human settlements in Western countries will have a higher number of visitors living in the neighbourhood than Arctic destinations in the north of Russia.

The ecosystem, which is in principle the same concept as nature, is used in economic processes in many different ways. The agricultural sector, fisheries, and forestry all use the yields of the ecosystem as a product which can be sold on a market. However, the main parts of the ecosystem such as the availability of sufficient water, the level of sunlight, and the fertility of the soil, do not have a price. This use of the ecosystem is based on the ability of the ecosystem to create new life.

Furthermore, the fossil parts of ecosystems functioning in the past can be used in current economic processes. This is the case in the use of fossil fuels, which consist of the cumulations of carbons in the geological past, and minerals which are taken from the earth's crust for construction purposes. The use of these materials will lead to the depletion of fossil stocks, and additionally, when its waste products are emitted, result in serious environmental problems.

Environment

As argued previously, the concept of the environment is based on abiotic elements. Air pollution, water pollution, and the pollution of the soil are the main factors. It is not pollution alone which connects nature and the environment, it is also the so-called cleaning capacity of nature. Pollution can to a certain extent be absorbed by the ecocycles in the ecosystem. As far as pollution can be absorbed or neutralised, the capacity can be regarded as 'a free gift of nature', for which no price exists.

As soon as the level of discharge is higher than the possibility of the ecosystem to absorb and neutralise pollution, the current ecocycles will be damaged with materials which are normally not found in the ecocycles. Pollution with organic materials is different from that with anorganic (in most cases, fossil) materials. Non-organic elements are seldom found in ecocycles, which implies

that the emission of these materials is alien to the ecosystem and will therefore cause serious damage with which the ecosystem cannot cope.

Natural Gist

- The ecological approach, in which the value of ecosystems is based on their ecological value is, from the theoretical point of view, superior to the economic approach, where ecological values can only have economic relevancy so far as some monetary values can be connected with the ecological issue.
- The value of nature and the environment cannot be precisely given because many of its elements are not traded on a market. It is sometimes said that, in that case energy or the ecosystem has to be taken as a measure for value. However, as has been made clear by Martinez Allier (1987), this is not valid. This is a subjective choice which cannot be made without making many political decisions. This leads to the conclusion that the value of nature and the environment is based on political ideas and decisions.
- Economic theories in general do not pay sufficient attention to the problems of nature and the environment. Labour and capital issues attract much more attention; choices made in economic and environmental policies often reflect this situation.
- Many methods to define costs and benefits in nature and environmental issues have been developed. All of them have their limitations. Some of them such as travel cost method and hedonic pricing cannot cope with future situations; others, such as CVM, can do this, but are quite hypothetical. Additionally, this method can only be used in well-defined and limited problems.