



# Valuing nature: The economics of biodiversity

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## Summary

The failure of society to place a value on nature has resulted in the degradation of ecosystems, a consequent reduction in ecosystem services, and has contributed to a significant decline in biodiversity. The lack of comprehensive methodologies for providing economic valuation for biodiversity and ecosystem services, the results of which can be easily communicated to policy and decision-makers, has hampered efforts to protect, maintain and enhance habitats and species. This paper provides an overview of recent policy, in particular The Economics of Ecosystems and Biodiversity (TEEB) process, and research developments in Europe.

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By defining boundaries around nature areas and using this as a means for exercising control over their use and management, or by providing protection for certain species independent of location, society places implicit value on biodiversity. Apart from a number of notable exceptions, it has been in the latter part of the 20th century that Europe has moved to identify nature reserves, national parks and other sites with special value for wildlife. Thus, in many countries the adoption of (for example) the Bern Convention on the Conservation of European Wildlife and Natural Habitats by the Council of Europe in 1979, resulted in the strengthening of existing or introduction of new legislation; giving many of these sites and species statutory protection for the first time.

The subsequent implementation of the 1979 EC Birds Directive and the 1992 EC Habitats Directive provided for the establishment of a representative system of legally protected areas throughout the EU, known as Natura 2000. These Directives further strengthened existing protected site series at national level, or stimulated countries to define lists of protected sites (where they did not already exist). The Habitats Directive in particular, marked a significant step forward in biodiversity conservation because it introduced a comprehensive and legal protection regime for all plant and animal species of European importance and also for valuable habitats. This regime requires the legal designation of protected areas (Special Areas of Conservation), a strict protection regime for designated species, the maintenance of habitats and species populations in “favourable conservation status”, the preparation of management plans, monitoring arrangements, and nature compensation

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where a project adversely affects a Natura 2000 site for reasons of “over-riding public interest”.

The consequences of providing formal protection for biodiversity were that when any development was proposed that would have an effect on a protected species or area, it should be judged in terms of the ‘significance’ of that effect. The resulting juxtaposition of nature and development begged many questions about the monetary value of nature. Further European legislation also provided drivers for the valuation of nature. For example, the Directive on Environmental Impact Assessment (EIA) of the effects of projects on the environment was introduced in 1985. The EIA procedure ensures that environmental consequences of projects are identified and assessed before authorisation is given. At national level many countries have developed assessment methodologies within which biodiversity is a consideration.

As a response to this, ecologists and environmental economists have therefore developed an array of tools and methods to quantify and monetise the value of protected species and sites, shifting their focus in recent years to whole ecosystems and the goods and services that they provide. The debate about “what is the value of nature” has highlighted the fact that the core concept is complex and multi-dimensional. A key distinction is made between so-called use and non-use values. Use values provided by ecosystems include for example the production of goods (such as seafood and timber), life support processes or regulation functions (such as pollination or water purification), and life-fulfilling conditions or cultural and religious functions. Non-use values are related to bequest and existence functions that can be tied to an ecosystem: bequest value is the benefit derived from knowing a resource will be passed on to future generations; existence value arises when individuals value an asset even though they will never see or use it directly. Moreover, ecosystems have value in terms of conservation of options (such as genetic diversity for future use). This complexity has also generated a range of methods. These can be divided into two main categories:

- Stated preference methods including, for example, the Contingent Valuation Method (CVM), which is frequently used to give nature an economic value by asking individuals to place explicit monetary values upon environmental goods (also referred to as “willingness to pay”); and
- Revealed preference methods which allow the best possible option to be identified on the basis

of consumer behaviour and include, for example, the Travel Cost method (TC), Hedonic Pricing method (HP), Averting Behaviour method (AB), Production Function (PF), Prevention Cost method (PC), and Shadow Pricing Method (SPM).

The advantage of stated preference tools such as CVM is that they can be used to economically measure the full spectrum of use and non-use ecosystem benefits. A disadvantage is that they are based on questionnaires. There is a difference between what people state and how this is revealed in practice. Also, it is difficult to tie an economic value to an ecosystem service through a questionnaire when the general public may be ill informed or unfamiliar with the subject. Revealed preference methods can only be used for a limited number of biodiversity value categories, as they do not allow a monetary assessment of non-use values.

Monetary valuation of ecosystems is often applied to the comparison of alternative forms of land use, such as cattle ranging, agriculture, or real estate. The Total Economic Value (TEV) approach aggregates the main function-based economic values provided by a given ecosystem. However, the aggregate TEV of a given ecosystem’s functions, or combinations of such systems at the landscape level, may not be equivalent to the total system value. The continued functioning of a healthy ecosystem is a complex process that represents more than the sum of its individual functions or components; there is therefore a (hidden) value attached to the “completeness” of an ecosystem in terms of the composition of its species assemblages and habitats. This makes the TEV approach, like other economic valuation approaches, inherently imperfect in accounting for the full economic value of nature areas and landscapes. In addition, the TEV approach does also focus on how much of an ecosystem’s economic value is actually reflected in the real economy at present, who are the beneficiaries, and how many jobs are directly and indirectly sustained.

Indeed, Pavan Sukhdev in his preface to the recent and highly influential publication “*The economics of ecosystems and biodiversity: an interim report*” (TEEB-European Communities 2008), states that “we are still struggling to find the value of nature” and that this lack of valuation is “an underlying cause for the observed degradation of ecosystems and the loss of biodiversity”. The Economics of Ecosystems and Biodiversity (TEEB) process, is similar to the Stern Review of the economic costs of climate change (Stern 2006) and is supported by the German Federal Ministry for the Environment, Nature Conservation, and

Nuclear Safety and the European Commission (DG Environment). TEEB is the most recent and topical initiative which has addressed the economic value of ecosystem services; it also seeks to develop a range of economic tools and policies to take proper account of this value. It is based on the argument that while nature provides human society with the vast diversity of benefits (ecosystem services), they are predominantly public goods with no markets and prices so are rarely detected by our current economic approach. As a result (in essence, of having no explicit financial value) biodiversity is declining, ecosystems are being degraded and humanity is suffering the consequences.

TEEB is being delivered in two phases and takes its inspiration from ideas developed in the *Millennium Ecosystem Assessment (2005)*; the first phase has demonstrated the significance of ecosystems and biodiversity and the threats to human welfare if no action is taken to reverse current damage and losses. It argues that no break should be placed on the legitimate aspirations of countries and individuals to achieve economic development; however, it is essential to ensure that such development takes proper account of the real value of natural ecosystems. This is central to both economic and environmental management. The main report was accompanied by a number of studies which are also available on the TEEB website ([http://ec.europa.eu/environment/nature/biodiversity/economics/index\\_en.htm](http://ec.europa.eu/environment/nature/biodiversity/economics/index_en.htm)). These include: a case study on ecosystem accounting (for coastal Mediterranean wetlands); a study on the economics of the conservation of forest biodiversity; reviews on the economics and biodiversity loss specifically in relation to scoping the science and economic analysis and synthesis; and an evaluation of the costs of policy and action in relation to not meeting the 2010 target to halt the loss of biodiversity within the European territory. The message is that certain ecosystems will be damaged beyond repair unless urgent action is taken. However, some countries are taking action already in relation to developing the economics of ecosystems and biodiversity. This has included rethinking subsidy payments, rewarding currently unrecognised ecosystem services and making sure that the cost of ecosystem damage is accounted for (by creating new markets and promoting appropriate policies) and measuring the costs and benefits of ecosystem services.

TEEB has commenced its second phase which will include published guidance and recommendations

on the use of valuation methodologies, early engagement with key stakeholders who are likely to use the valuation work and the publication of a policy toolkit for policy makers and administrators. The latter will support policy reform and environmental impact assessment with the help of sound economics in order to foster sustainable development and better conservation of ecosystems and biodiversity.

TEEB is clearly timely for a number of reasons; not least the current financial crisis which is acting as a driver for governments to develop economic stimulus packages that could lead to larger national budget deficits and smaller budgets to manage and invest in “public goods” such as nature areas. There is an opportunity to factor-in investments in ecosystems as part of these packages and the United Nations Environment Programme has responded by launching the Green Economy Initiative, which aims to build the case for including investments in ecosystems, renewable energy, and sustainable building and construction. However, without having an adequate understanding of the net economic benefit of nature areas, a proxy for our global environmental infrastructure, and how many jobs are directly and indirectly sustained, it will remain difficult for governments to justify and incorporate investments in ecosystems and nature areas as part of these packages.

It is therefore to be hoped that the approaches that will be made available through the TEEB process may establish new tools that can provide policy-makers with easily digested information that they can trust (and which can contribute to the overall effort in relation to the valuation of ecosystem services). Better informed decision making will assist in the delivery of increasingly sustainable development and should result in an improvement in the outlook for biodiversity, ecosystems and the provision of goods and services, well beyond 2010.

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