ECNC Brief

Ecosystem services and biodiversity

The natural environment provides people with goods and services that are fundamental to human well-being. These 'ecosystem services' are essential to society and, ultimately, all human welfare and livelihoods depend on them for fundamental necessities such as clean air, clean water and food production.

Background

The most widely accepted classification of ecosystem services is found within the United Nations Millennium Ecosystem Assessment, which establishes four categories: provisioning services, which are the products obtained from ecosystems such as food, fibre, fuel, building materials, fresh water and genetic resources; regulating services which are defined as the benefits obtained from the regulation of ecosystem processes such as climate regulation, water purification, hazard protection, pollination and pest regulation; cultural services which include ecotourism (nature-based tourism) and non-material benefits that people obtain from ecosystems such as recreation aesthetic and spiritual values; and supporting services which provide the basic infrastructure for life on Earth such as nutrient cycling, soil formation and primary production.

The failure of society to place a value on nature has resulted in the degradation of ecosystems (TEEB)[1], a consequent reduction in ecosystem services and has contributed to a significant decline in biodiversity. Whilst more research is needed to fully understand the many relationships between biodiversity and ecosystem services, in certain circumstances high levels of biodiversity in an ecosystem can provide a level of insurance against major disturbance, increasing the capacity of the ecosystem to recover to its original state; this is termed ecosystem resilience[2].

Functioning terrestrial, coastal and marine ecosystems produce multiple services and the multifunctional nature of ecosystems therefore needs to be taken into account in their management. However, in the last 50 years ecosystems have been modified by humans more than in any other period; for example, by focusing on the delivery of a single service, such as conversion of grasslands, peatlands or forests to agricultural land, ecosystems are simplified; thereby reducing their capacity to provide a broader range of services and reducing their resilience. Unsustainable use of ecosystem services can ultimately result in damage to the ecosystem, increasing: the potential to approach their ecological tipping points[3]; and the impact of environmental risks like flooding or water pollution. The degraded service may be in some cases irreplaceable by artificial alternatives or need expensive engineering investments to recover; exemplified for example at global and European levels by the marine fishing industry.

The economics of ecosystems and biodiversity (TEEB) initiative highlights 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. TEEB is based on the

1 TEEB, 2010. The Economics of Ecosystems and Biodiversity. http://www.teebweb.org/InformationMaterial/TEEBReports/tabid/1278/Default.aspx
2 Ecosystem resilience is the capacity of an ecosystem to withstand perturbations without losing any of its functional properties.
3 The term 'tipping point' (or 'critical threshold') refers to the point at which abrupt shifts in the state of an ecosystem compromise the provision of an ecosystem service.

argument that while nature provides human society with the vast diversity of benefits (ecosystem services), which 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. 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. Because the value of ecosystem services is difficult to measure in terms of market prices, threats to ecosystems are continuing to rise because of the way in which different land uses are valued (e.g. the price of land for construction or the value of a crop it will produce).

In spite of sustainable development being an overarching long-term goal of the EU, the fundamental role of ecosystems for providing goods and services to society has not yet been acknowledged in European policies. Policymakers need improved evidence of the values of ecosystem services and the benefits they provide to society and economy to contribute to better decision-making whilst incorporating the ecosystem-based approach into sectoral policies. 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.

The core concept of valuing nature is complex and multidimensional. An array of tools and methods has been developed to quantify and monetize the value of protected species and sites, whole ecosystems and the goods and services that they provide. A key distinction is made between so-called use and non-use values. Use values provided by ecosystems include: production of goods (such as seafood and timber); life support processes/regulation functions (such as pollination or water purification); 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 (e.g. 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.

From: Jones-Walters, L. and Mulder, I. (2009) Valuing nature: the economics of biodiversity. Journal for Nature Conservation. 17 (2009) 245—247

ECNC's position

ECNC:

- believes that ecosystem services should be explicitly recognized and maintained by EU legislation and therefore incorporated into decision- and policymaking frameworks at all levels;
- supports the integration of measures for the maintenance, restoration and creation of ecosystems that offer vital ecosystem services, within business, industry and other key sectoral best practice; (and within this context, calls those responsible for the development of biodiversity conservation policies to focus more attention on the social and economic aspects of biodiversity);
- supports the sustainable use of ecosystems, in particular in relation to their exploitation by rural communities for supporting their quality of life (e.g. for, pro-biodiversity business, eco-tourism/nature-related tourism, agricultural products, fuel, water, building materials, medicinal herbs, etc.);
- advocates that the local communities which rely most directly on ecosystem services and which face the most serious and immediate risks of ecosystem degradation, should be actively involved in decision-making processes;
- stresses the importance of the ecosystem approach for socio-economic development and to maintain long-term capacity of ecosystems to produce goods and services for human use;
- believes that provisioning services should not be obtained at the expense of regulating, cultural and supporting services;
- believes that we can halt current degradation of ecosystems without negatively affecting human welfare and economic development;
- recognizes that it is essential to develop methodologies to assess ecosystem services values (whether economic or not) which will be generally applied and contribute to better decision-making;
- accepts that it is fundamental to take into account the spatial and temporal scale at which ecosystem services are delivered to manage trade-offs between the provision of different services;
- recognizes that ecosystems and the services they provide are essential for mitigation and adaptation to climate change;
- stresses the importance of studying and documenting the relationship between biodiversity and ecosystem services to underpin relevant policies;
- believes that well-managed ecosystems are fundamental to maintaining ecosystem resilience.

Key actions and recommendations

Include:

- influencing policymakers to incorporate the ecosystem approach into policy delivery ensuring that policies take into account the costs and benefits to the natural environment;
- working in collaboration with other sectors and involving key stakeholders, including rural communities and traditional societies, to assure that policies and practice reflect all needs;
- increasing knowledge and facilitating participatory processes to promote the concept of ecosystem services and its relation to biodiversity;
- developing easily understandable and usable valuation methodologies and tools, applicable in a market-driven economy, to assess ecosystem services and to support consideration of ecosystem services by economic sectors;
- developing alternative methods to investigate and assess the values associated with ecosystem services;
- collecting and promoting successful examples/best practice (from all over the world) and bringing them to the attention of relevant stakeholders;
- delivering a "learning by doing"/stakeholder participation approach during the implementation of related projects and programmes;
- analysing and integrating the synergies of ecosystem services, biodiversity and climate change adaptation and mitigation, increased connectivity and maintenance of diversity within areas of nature conservation;
- emphasising the multifunctional use of ecosystems and stressing the risks of extensive ecosystem modifications and degradation; and monitoring that human activities do not place them at risk.

More about ECNC

ECNC is an independent European expertise centre for biodiversity and sustainable development. ECNC stimulates cooperation between science, policy and economy for the sake of biodiversity and people in Europe. It does so by providing sound scientific expertise in support of governmental policies and by promoting the integration of biodiversity considerations into other sectors of society. ECNC combines vision with practical approaches and applicable expertise.