MAPPING ECOSYSTEM SERVICES

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2.1. A short history of the ecosystem services concept

Rudolf de Groot, Leon Braat & Robert Costanza

Introduction

A historic overview of the development of the Ecosystem Services (ES) concept in a few pages is almost impossible and unavoidably biased and, for this chapter, we focused on the main events and publications[1].

Most authors agree that the term "ecosystem services" was coined in 1981. It was pushed to the background in the 1980s by the sustainable development debate but came back strongly in the 1990s with the mainstreaming of ES in professional literature and with an increased attention to their economic value.

Over time, the definitions of the concept have evolved with a focus on either the ecological basis as ES being the conditions and processes through which natural ecosystems and their species sustain and fulfil human life or at the level of economic importance, where ES are the benefits humans derive, directly or indirectly, from ecosystem functions. As a compromise, the TEEB (The Economics of Ecosystems and Biodiversity) study (2008-2010) defined ES as the direct and indirect contributions of ecosystems to human well-being. Despite these differences, all definitions stress the link between (natural) ecosystems and human wellbeing (see Figure 1) and the services are the 'bridge' between the human world and the natural world, with only humans being virtually separated from that natural world.

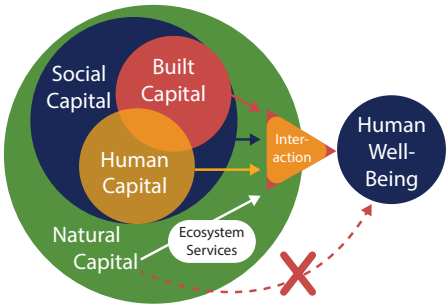

Figure 1. Dependence of Human Wellbeing on Natural, Social, Built and Human capital. Source: Costanza et al. 2014.

The ecological roots

The term ecosystem function was originally used by ecologists to refer to the set of ecosystem processes operating within an ecological system. In the late 1960s and early 1970s, some authors started using the term "functions of nature" to describe the 'work' done by ecological processes, the space provided and goods delivered to human societies.

When describing the flow of ES from nature to society, the need to distinguish 'functions' from the fundamental ecological structures and processes was emphasised to highlight that ecosystem functions are the basis for the delivery of a service. Services are actually conceptualisations ('labels') of the "useful things" ecosystems "do" for people that provide direct or indirect benefits.

[1] Some key publications are listed at the end of this chapter as suggestions for further reading.

The socio-cultural roots

In the late 1960s and early 1970s, a wave of publications was produced which addressed the notion of the usefulness of nature for society, other than being an object to conserve based on ethical concerns. Terms such as functions of nature, amenity and spiritual value were used in addition to, but not replacing, intrinsic values of nature, emphasising the importance to cultural identity, livelihood and other non-material benefits.

This expanding field, recognising the dependence of people on nature, finally led to the coining of the term "ecosystem services" in the early 1980s.

The economic roots

The ways nature provides benefits to humans are discussed throughout economic history from the classical economics period to the consolidation of neo-classical economics and economic sub-disciplines specialised in environmental issues. Some of the classical economists explicitly recognised the contribution of nature rendered by 'natural agents' or 'natural forces'. However, although they recognised their value in use, they generally denied nature's services role in exchange value, because they were considered as free, non-appropriable gifts of nature. The physiocrat's belief that land was the primary source of value was followed by the classical economist's view of labour as the major force behind the production of wealth.

Marx considered value to emerge from the combination of labour and nature: "Labour is not the source of all wealth. Nature is just as much the source of use values (and it is surely of such that material wealth consists!) as labour, which itself is only the manifestation of a force of nature".

In the 19th century, industrial growth, technological development and capital accumulation led to changes in economic thinking that caused nature to lose importance in economic analysis. By the second half of the 20th century, land or more generally environmental resources, completely disappeared from the production function and the shift from land and other natural inputs to capital and labour alone and from physical to monetary and more aggregated measures of capital, was completed. In the second half of the 20th century, environmental problems became a topic of interest to some economists who founded the Association for Environmental and Resource Economists in 1979. The undervaluation in public and business decision-making of the contributions by ecosystems to welfare was partly explained by the fact that they were not adequately quantified in terms comparable with economic services and manufactured capital.

From the perspective of environmental economics, non-marketed ecosystem services are viewed as positive externalities that, if valued in monetary terms, can be more explicitly incorporated in economic decision-making. In 1989, the Society for Ecological Economics was founded which conceptualises the economic system as an open sub-system of the ecosphere exchanging energy, materials and waste flows with the social and ecological systems with which it co-evolves. The focus of neo-classical economists on market-driven efficiency is expanded with issues of equity and scale in relation to biophysical limits and to the physical and social costs involved in economic performance using monetary along with biophysical accounts and other non-monetary valuation languages.

Neo-classical and ecological economists differ markedly regarding their approach to the sustainability concept. The so-called "weak sustainability" approach, which assumes the ability to substitute between natural and man-

ufactured capital, is typical for neo-classical environmental economists. Ecological economists generally embrace the so-called "strong sustainability" approach, which maintains that natural capital and manufactured capital are in a relation of complementarity rather than of one of substitutability. They also differ with respect to approaches to ES valuation. Monetary valuation, costs versus benefits, of marketed goods and services have been primary in neo-classical approaches, while ecological economists tend to show more interest in inclusion of non-monetary and non-market goods and services approaches.

Ecosystem services in policy and practice

In the 1970s and 1980s, ecological concerns were framed in economic terms to stress societal dependence on natural ecosystems and raise public interest for biodiversity conservation. Already in the 1970s, the concept of 'natural capital' was used and shortly thereafter several authors started referring to "ecosystem (or ecological, or environmental, or natural) services". The rationale behind the ecosystem service concept was to demonstrate how the disappearance of biodiversity directly affects ecosystem functions that underpin critical services for human well-being. The 1997 calculation of the total value of the global natural capital and ES was a milestone in the mainstreaming of ES. The Millennium Ecosystem Assessment (2005)[2] constitutes another milestone that firmly placed the ES concept on the policy agenda.

The TEEB[3] study (2010), building on this initiative, has added a clear economic connotation. The interest of policy makers has turned to the design of market-based instruments to create economic incentives for conservation (see Chapter 4.3), e.g.

Although one has to be careful that the concept is not misused, the benefits of greater awareness of the full spectrum of values of nature outweigh the risk and with the adoption of the Aichi-targets (see below) at the CBD convention and the creation of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES[4] in 2012) as described below the ES-concept has been firmly placed on the political agenda. Especially CBD-Aichi Biodiversity Targets 1 and 2 are relevant: Target 1, "by 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably" and Target 2, "by 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems". The efforts to achieve these targets, in Europe coordinated by the Mapping and Assessment of Ecosystems and their Services (MAES[5]) contribute much to greater awareness of the many benefits of nature and help to give them more weight in everyday decision-making (see Chapter 7.1). Recently, the business-world is also waking up to the 'ecosystem services-movement' and created the Natural Capital Coalition[6] to better account for ES and biodiversity conservation in their business models.

Although much has been achieved, even more remains to be done to further develop the ES 'science' and embed the concept in everyday policy and practice to enhance nature conservation and sustainable use of ES which is the main objective of the Ecosystem Services Partnership (ESP), founded in 2008[7].

[2] http://www.maweb.org
[3] http://www.teebweb.org
[4] http://www.ipbes.net
[5] http://biodiversity.europa.eu/maes
[6] http://www.naturalcapitalcoalition.org
[7] http://www.es-partnership.org

Further reading

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