

Title: The concept limitations to ecosystem services valuation

Abstract (max.1200 words)

The concept of ecosystem services has recently increased its presence in the academic papers (Costanza, Kubiszewski, 2012). The creation of the ecological economics discipline (Costanza, 1991) has boosted research on linkages between natural environment and economic valuation. Three kinds of capital: natural, social and economic and their ratio are the crucial for sustaining development in the future. The ecosystem services are aspect of the natural capital represented in a form of the benefits people obtain from ecosystems (definition provided by Millennium Ecosystem Assessment). This perspective enables to show direct and indirect natural products and processes that contribute to human well-being. In other words, it could be said that the ecosystem services concept commoditised nature. However, the state of environmental pollution and scarcity of natural resources show that if nature is not attributed with any economic value humans tend to developed on its expense. Therefore, scientific research results should be followed by adequate policy changes.

The Economics of Ecosystems and Biodiversity proposed the following three step procedure for development of the ecosystem services concept (TEEB, 2010):

Step 1: Identify and Assess the full range of ecosystem services affected and the implications for different groups in society,

Step 2: Estimate and Demonstrate the value of services,

Step 3: Capture the value of ecosystem services and seek solution to overcome their undervaluation, using economically informed policy instruments.

These steps are simplified, but logically presented. There are problems on each step however. Nature constitutes a complex system which may cause problems for valuation. Providing one ecosystem service is directly or indirectly linked to other services and processes. There are ecosystem services trade-offs and disservices that may increase complexity of setting framework for valuation. Some of the crucial policy questions have already been asked on the European Union level (Table 1).

Table 1 EU policy questions and policy and research action considering ecosystem services.

Policy questions	Policy and research actions
What is the current public understanding of ecosystem services and the benefits they provide? Why should we incorporate the economic values of ecosystem services into decision making?	Raising awareness
How have we advanced our understanding links between ecosystems, ecosystem functions and ecosystem services? More broadly, what is the influence of ecosystem services on long-term human well-being and what are the knowledge constraints on more informed decision making? Which vital provisioning services are produced outside the EU?	Setting and using an analytical framework for ecosystem assessment; Promoting consistency in the typology of ecosystems and ecosystem services
What are the status and trends of the EU's ecosystems and the services they provide to society? What are the drivers causing changes in the EU's ecosystems and their services?	Biophysical mapping of ecosystem services using data and models

<p>What are the economic implications of different plausible futures? How do ecosystem services affect human well-being, who and where are the beneficiaries, and how does this affect; how they are valued and managed?</p>	<p>Monetary and non-monetary valuation of ecosystem services</p>
<p>How might ecosystems and their services change in the EU under plausible future scenarios—including the development of scenarios and options for implementing the 15% restoration target? What would be needed in terms of review of financing instruments? How can we secure and improve the continued delivery of ecosystem services? Can we set priorities for ecosystem restoration within a strategic framework at sub-national, national and EU level? Can we design prioritization criteria for restoration and at which scale to get significant benefits in a cost-effective way? Can we define where to strategically deploy green infrastructure in the EU in urban and rural areas to improve ecosystem resilience and habitat connectivity and to enhance the delivery of ecosystem services at Member State and sub-national level? How to foster synergies between existing and planned initiatives at local, regional or national levels in Member States, as well as how to promote further investments, thereby providing added value to Member States action?</p>	<p>Mapping and valuation of ecosystem services as part of an integrated and stakeholder based approach to sustainable land management and use of natural resources</p>

Source: Maes, J., Egoh, B., Willemsen, L., Liqueste, C., Vihervaara, P., Schägner, J. P., ... Bidoglio, G., 2012. Mapping ecosystem services for policy support and decision making in the European Union. *Ecosystem Services*, 1(1), p. 32.

There have been great improvements in valuation methods. They are mostly divided into use value and non-use value ones which together form Total Economic Value approach (TEV) and those based on resilience value and physical cost which constitute biophysical approaches (Figure 1).

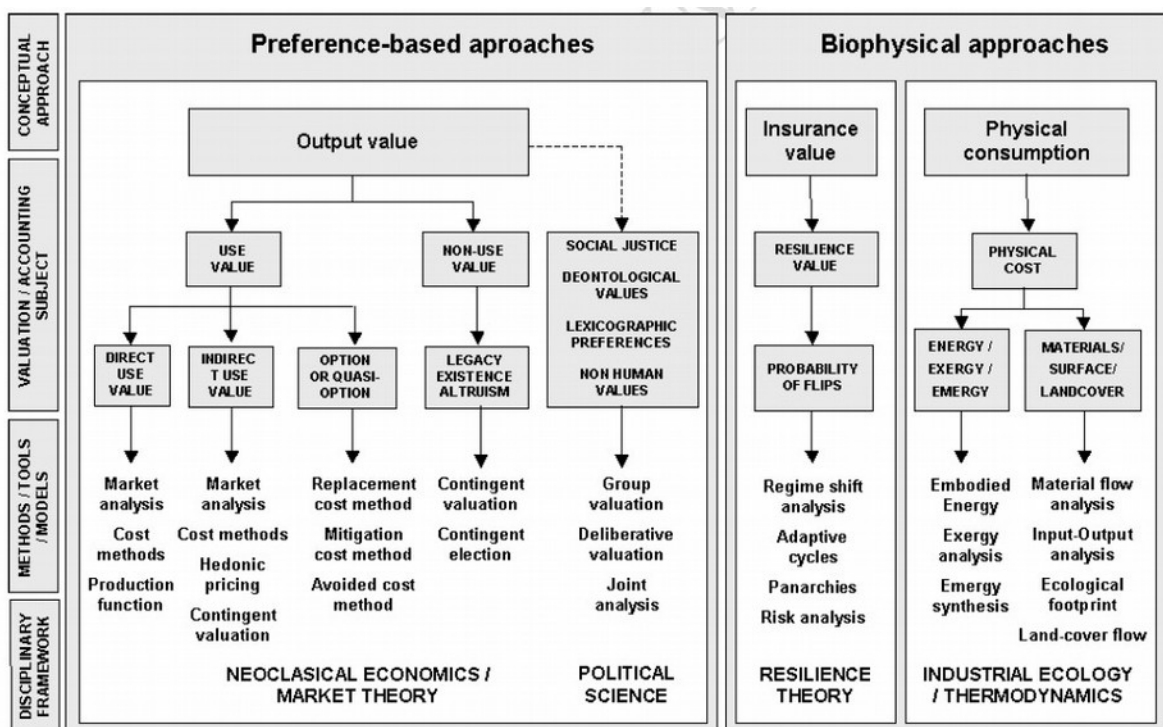


Figure 1 Approaches for the estimation of nature's values. Source: TEEB Foundations, 2010. In: Kumar, P. (Ed.), TEEB-The Economics of Ecosystems and Biodiversity (TEEB): Ecological and Economic Foundations. Earthscan, London. ch. 5., p. 10.

Ecological-economic valuations of ecosystem services undergo certain limitations. In order to deliver global valuation it is necessary to make certain simplifications, for example most famous project counting value of 17 ecosystem services for 16 biomes (Costanza, 1997). There are three fundamental dichotomies proposed (Fisher, Bateman, Turner, 2011): ecosystem services versus benefits; prices versus values; and here and now versus there and then. In 2005 the MA divided ecosystem services into supporting services, regulating services, provisioning services and cultural services. For valuation purposes, however, these are usually end services that have impact of human well-being which are better named as benefits. Taking the recreational benefit for people as the example it is a result of other services such as soil formation, water and air purification, etc. The other point to valuation is to include as many of services involved as possible because that may result in underestimating certain ecosystems and, therefore, making wrong decision based on economic value. The other aspect is to measure and include the quality of provided ecosystems. Furthermore, the interconnections between ecosystems must also be taken into final valuation. That may, however, lead to double or more times counting the same service. On the other hand, one may need to assess the scope of valuation which may be large in case of big and complex ecosystems. The next point is the limitation to market based valuation. That problem is being overcome by more and more sophisticated valuation methods. The last point is the importance of spatial and temporal aspects of ecosystem services. The ecosystem services research has just recently developed measurement methods. The exact comparisons will be possible in not so near future. Comparisons and evaluation, however, are crucial for monitoring policy implementations for ecosystem services.

All in all, it is believed that ecosystem services valuation is important due to the fact that if people do not associate certain value to nature, they are not able to appreciate it and protect it. On the other hand, ecosystem services valuation is the attempt to adjust to the existing economic system that has many conceptual flaws. Should the economic systems be not changed, the ecosystem service concept addresses the issue of commodification of nature in order to protect it.

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