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CEEweb background paper

Theme I: Valuing ecosystem services

Fifth Intergovernmental Conference Biodiversity in Europe

The background paper is prepared by CEEweb for Biodiversity with the participation of Pan-European NGOs. It targets NGOs and other participants of the Fifth Intergovernmental Conference Biodiversity in Europe that takes place on 22-24 September 2009 in Liege, Belgium. The paper is also used and discussed at the NGO preparatory meeting preceding the Conference on 21 September 2009.

Introduction

Nowadays decision makers realise more and more that the current rate of biodiversity loss and ecosystem degradation in combination with the effects of climate change will seriously compromise the wellbeing of the next generations. It is now recognised by many that business-as-usual is not an option for the future. When thinking about methods to address biodiversity loss and degradation of ecosystem services, we should first analyze the underlying causes of the current situation.

The main pressures of biodiversity loss are habitat fragmentation, degradation and destruction, over-exploitation, the spread of invasive alien species and pollution. Significant efforts have been made to address these pressures both on national and international level, yet the global negative trend still continues. Several studies and reports were dedicated to analyzing the reasons of this trend. Their authors have come to the conclusion that the **failure of conventional economics** to recognise the economic values of natural capital and ecosystem services is one of the drivers behind the above pressures¹.

An ongoing project '**The Economics of Ecosystems and Biodiversity**' (TEEB) is about addressing the challenge of finding the "value of nature". The project was initiated by the G8+5 environment ministers in 2007 with the general aim to draw attention to the global economic benefits of biodiversity and the costs of biodiversity loss and ecosystem degradation, using similar approach as in the Stern report². The interim report³ of the project has been prepared and the final report is being completed for CBD COP 10 scheduled for October 2010. The interim report summarises and analyzes the available knowledge and scientific information on ecosystem valuation, and points the way towards future work in this field. The interim report also makes some policy recommendations, as one of the main goals of the study is to give guidance to stakeholders and decision makers.

When analyzing the causes of biodiversity loss, the TEEB report finds that our economic compass is defective due to unaccounted externalities at every level. It recognizes the perverse economic drivers as well as failures in markets, information and policy as significant factors behind this phenomenon. Consequently, it proposes to make adjustments to the current economic framework through the

¹ For example: COMMUNICATION FROM THE COMMISSION HALTING THE LOSS OF BIODIVERSITY BY 2010 — AND BEYOND Sustaining ecosystem services for human well-being, European Commission 2006

² Stern, N. (2006) *Stern Review of the Economics of Climate Change*. Cambridge University Press, Cambridge.

³ The Economics of Ecosystems and Biodiversity (TEEB), European Communities, 2008

internalisation of environmental externalities, the abandonment of perverse economic drivers, as well as the correction of failures in markets, information and policy. It understands the valuation of biodiversity and ecosystem services as a prerequisite to make these changes happen.

While agreeing with the above factors, we would like to think even further, and use a more holistic approach. In our view, we need holistic thinking that considers more than the direct relations between some selected elements of the system. We propose to go beyond assigning value to biodiversity and ecosystem services within the current economic framework. The framework itself needs to be revised, including all its deeply interrelated factors. For this, we suggest using the **Drivers-Pressures-State-Impacts-Responses (DPSIR) model** developed by the European Environmental Agency (EEA), as a tool for system-level analysis. We believe that this model helps us finding the common underlying drivers behind today's crises, from biodiversity loss and degradation of ecosystem services to climate change and growing poverty.

Short introduction to ecosystem valuation and valuation methodology⁴

In the anthropocentric concept of value, ecosystems and the services they provide have value to human societies because people derive utility from their use, either directly or indirectly (use values). People also value ecosystem services that they are not currently using but may use in the future (non-use values). Besides the directly or indirectly used values people also attach a value to the sheer existence of ecosystems and services (intrinsic values) in a non-anthropocentric view. Numerous methodologies have been developed in an attempt to value ecosystems and the services they provide and give monetary value to them.

The estimation and valuation of provisioning services such as fish, wood, corn, etc. is normally easy as these assets are traded on markets. In contrary, valuing supporting or regulating services, such as pollination or water purification is more difficult. Here, a chain of elements need to be assessed from biophysical processes to human wellbeing. Often there is only information on some of the links in the chain and units are in most cases incompatible. Besides these easily or less easily quantifiable benefits there are ecosystem services for which no good valuation methodology exists at present and for which we might won't be able to find a measurement tool ever. For example it is difficult to value cultural services, such as the role of nature in spiritual life or education.

These economic valuation methodologies are rooted in welfare economics, which measures welfare change in people's willingness to pay and willingness to accept compensation for increased or decreased level of use of ecosystem goods.

There are different types of valuation methods:

- Direct observed behaviour methods: e.g. prices of goods that are traded on markets
- Indirect observed behaviour methods: when goods are not traded on a market their value is estimated indirectly. For example the **hedonic pricing method** compares differences in property prices according to different ecosystems services provided by them (e.g. difference in the price of a house in a green-belt and in a heavily polluted area). The **travel cost method** looks at how much time or money people are willing to invest in visiting a certain area (national park,

⁴ Derived from the Millennium Ecosystem Assessment: Ecosystems and Human Well-being: A Framework for Assessment.

beech, etc.). The „price” of access to the site is an estimation of the value of the site to the individual.

- Cost based methods: the **replacement cost method** values services at the cost of replacing, for example, a water purification service provided by an ecosystem with a new water treatment plant.
- Direct and indirect hypothetical measures: in case there is no market price for a good and an indirect assessment is also not possible people are asked for what they would be hypothetically pay for a good or service. This is called **contingent valuation**. In **conjoint valuation** or **contingent ranking** people are asked to rank a number of services.
- Benefits transfer is not a valuation method itself. The term corresponds to the practice when results obtained through one of the above methods are transferred to another assessment in the case of similar services. This is a widely used practice in ecosystem valuation because of the many information gaps.

Challenges

Ecosystem valuation can be a powerful tool to guide decision making but it is by far not the only aspect that should be taken into account. Its use poses many questions and uncertainties. One of the main challenges involves important **ethical considerations**. Defining the relative value of goods and services of nature has a great impact on the future generations' accessibility to these benefits. Economists generally discount any future benefit when comparing it to a current benefit, since they assume that today's investments and technological change will produce economic growth, so future generations will access the benefit more easily. This assumed growth is the reason for undervaluing future consumption and future enjoyment. Following this logic, there is also a practice for undervaluing future needs for environmental goods and services. However, this should not be like this. We agree with the authors of the TEEB report, that the **discount rate for valuing benefits of nature over a time period of decades should be zero or even negative**, on the basis that future generations will most probably be poorer in environmental terms than those living today.

Another concern of ethics is that there are often **no mechanisms for compensation between stakeholders**: from those who enjoy the service of nature and at the same time damage the environment, for those who have lost as a result (TEEB). An example of this is upstream mining, which causes serious problems for downstream fishing through pollution. In most cases poor people are bearing the costs while the rich enjoy benefits, although in many cases the responsible for environmental degradation are also the rich.

As the TEEB report concludes, **we can only measure those services which are relatively well known and understood**. A large part of the services ecosystems provide are currently not accounted for, because we do not fully understand the underlying biophysical process or we cannot attach monetary value to it. For example, economic tools might not be appropriate to measure spiritual values. Also, ecosystems providing a multitude of benefits might be undervalued in economic estimations. It is highly likely that there are services which we will never be able to measure at all.

We expect that if we put prices on ecosystem services, the market will regulate their use in a sustainable way, but the market never operates ideally – its actors don't always make rational decisions and are often lackingb information. An example might explain this more clearly. According to the controlling mechanisms of economics, if a resource gets scarce (e.g. due to high hunting pressure only the last individuals of a species remain), in principle then price of this resource should rise so much that this

prevents people from overusing it. However, it was showed many times in human history that **market mechanisms failed to prevent the depletion of scarce natural resources.**

Another important challenge is the **compatibility of natural and man-made systems.** Can we really integrate the complex system of nature with all its own rules into the human-made system? There are several concerns about it. The incompatibility of the economic and natural systems becomes predominant if we consider **non-linear changes** and **threshold effects.** These two terms correspond to the fact that natural ecosystems often react to pressures with sudden collapse only after a certain threshold or ecosystem tipping point is reached. One should also consider considerable time intervals in which these changes take place. Nature has a range of negative feedbacks which keep the natural system stable and avoid its sudden shift to a wrong direction. However, when integrating the two systems we lose this important controlling mechanism. **Forests cannot feedback to the economy in a way that it stops deforestation and forest degradation.** The TEEB report promises to deal with non-linear changes and threshold issues as far as possible during their work, but it is questionable if economics is able to deal with such complex phenomena at all. We simply have too little information for example on the role of individual species in an ecosystem, on changes over long time periods, and others. This becomes a problem when we try to merge the two systems: a system of scarce information with a system that was built around the abundant flow of information. These are fundamental differences between the natural and economic systems which make the possibility of ecosystem valuation fundamentally questionable.

There is a further contradiction included in the methodology of ecosystem valuation. We aim to modify the priorities of people by putting value on nature, however, with this valuation we further strengthen the practice of people to make decisions for financial reasons instead of valuing nature for itself. In this way, we try to achieve a change of values and attitudes with methods that are based on our old value system.

While ecosystem valuation methods have been widely used and developed in recent years their results remain controversial. The methodological basis has to be further developed. Most studies assess particular services or species and it is difficult to integrate the results. Any integral assessment on a broad scale raises substantial difficulties: how to define a coherent framework; how to deal with limitations in data; how to aggregate values to estimate the global impacts of large scale changes in ecosystems. CEEweb has compiled a collection of case studies for valuating biodiversity and ecosystem services, which can be downloaded from the CEEweb website at www.ceeweb.org/5th_Bidi_in_EU.

The TEEB report has summarized further important aspects concerning the possibilities and limitations for ecosystem services valuation:

1. The focus of valuation should be on marginal changes rather than the “total” value of an ecosystem.
2. Valuation of ecosystem services must be context specific, ecosystem-specific, and relevant to the initial state of the ecosystem.
3. Good practices in “benefits transfer” need to be adapted to biodiversity valuation, while more work is needed on how to aggregate the values of marginal changes.
4. Values should be guided by the perception of the beneficiaries.
5. Participatory approaches and ways of embedding the preferences of local communities may be used to help make valuation more accepted.
6. Issues of irreversibility and resilience must be kept in mind.
7. Substantiating bio-physical linkages helps the valuation exercise and contributes to its credibility.

8. There are inevitable uncertainties in the valuation of ecosystem services, so a sensitivity analysis should be provided for decision makers.

9. Valuation has the potential to shed light on conflicting goals and trade-offs but it should be presented in combination with other qualitative and quantitative information, and it might not be the last word.

Conclusions

Ecosystem valuation can be a very useful tool for making informed decisions. Also its **awareness raising** effect among economists and decision makers could be significant and will hopefully lead to substantial political changes. Therefore ecosystem and biodiversity valuation should be further developed and promoted. Nevertheless putting a price on biodiversity alone cannot ensure the protection of it. Nature is not the only asset that can have a high economic value for humanity. Other assets, such as job security, security from disasters or home security can be valued equivalently high or higher by decision makers. Thus it cannot be expected that through the inclusion of natural assets into the economic equation their protection will be ensured.

Biodiversity loss can only be halted if economic actors realize that **nature is the basis of all socio-economic activities but at the same time also a limiting factor to economy**. This basic paradigm is not included in the TEEB report as a fact but as a question (“Fundamentally, there is the ethical question about the extent to which some life-supporting functions of biodiversity can be fully addressed by economic valuation and be considered as part of possible trade-offs instead of being dealt with as ecological constraints.”) Instead, the TEEB report concludes it is enough to adjust the current economic framework by including the right value for natural resources into it. In our view such an adjustment cannot effectively contribute to reducing the pressures on biodiversity. Biodiversity is fundamentally rooted in the flawed economic framework of our society that is based on cheap natural resources and energy as well as in the belief in constant economic growth. This leads to production and consumption patterns with energy and material intensive products and services which, at the end, lead to the overuse of resources. Economic valuation makes natural resources become part of this defective economic framework and thus won't help economy return to the carrying capacity of the Earth.

In our view economics should aim to make this fundamental link between nature and human activities clear. **Instead of several small changes in the current framework we expect one system-level change affecting the whole economic system**. Furthermore it should aim to raise awareness on the fact that humanity has already stepped over the sustainable limits of production. Setting natural resource caps similar to the emission caps under the Kyoto Protocol would be a logical step in this direction. Flexibility within this given framework could be established through trading schemes, quotas, etc. (e.g. similar to Emission Trading).

The background document prepared by CEEweb is related to the 5th Biodiversity in Europe Conference and is realised with the financial support of the Federal Office of Environment of Switzerland and of the UNEP Regional Office for Europe.



CEEweb for Biodiversity is a network of non-governmental organizations in the Central and Eastern European region. Our mission is the conservation of biodiversity through the promotion of sustainable development.