

THE MANAGERIAL DIMENSION OF NATURE CONSERVATION BY ECONOMIC APPROACHES

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Abstract:

Ecosystems are assaulted by human activities in a variety of ways resulting in perturbations that impact on their stability, including their ability of contributing to human wellbeing. Halting biodiversity loss is one of the most challenging environmental issues that entered a novel stage by a major paradigm shift brought through the ecosystem approach. This approaches core concept is the one of ecosystem economy. Enabling the ecosystem service economy is a major goal of current policy for biodiversity preservation. This action necessitates a profound integration of ecological and economic knowledge, such as the development of a common concept that allow the needs of conservation to be reflected in economic processes. The ecosystem service concept grounded the design of economic tools for preserving biodiversity by using the anthropocentric model of nature for humans. According to this the existence of ecosystems brings benefits for humans such as carbon sequestration, watershed protection, biomass production, nutrient cycling and others. For these, beneficiaries should be accountable by payments using various schemes. By examining the estimates for the global value of ecosystem services and the financial flows of major programs that are using these schemes it was established the potential and prospects of the ecosystem service economy.

Key words: ecosystem service, payments for ecosystem service, biodiversity offsets, sustainable development, ecosystem management

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1. INTRODUCTION

Preserving a functional ecosystem at global level is recognized as an essential condition of sustainable development. This is built on the premise that the substitutability between the natural capital and other types of capital (human, social, manufactured, financial) is limited, meaning that despite major advances in knowledge development, the complex nature of the ecosphere still situates beyond human's possibility the control and management of processes that are of key importance for the preservation of the global ecological balance.

Nature conservation is amongst the oldest environmental protection activities, since its beginning is dating back in the nineteenth century, well before resource depletion or pollution have been considered a matter of public interest. Nonetheless, according to the findings of the Millennium Ecosystem Assessment (2005) indicate that in the last five decades the changes made by humans in ecosystems resulted in substantial and irreversible loss of biodiversity, significantly reduced the benefits to be obtained from ecosystems by the future generations, and that the degradation of ecosystem service could worsen, becoming a barrier for the accomplishment of sustainable development.

Preventing such evolution is possible and there are a number of options for reducing the negative trade-offs between development and wellbeing on the one hand and the functionality of ecosystems, on the other hand (Bran, 2013). Adopting these options is not straightforward because

it necessitates significant changes in how ecosystem management is approached and applied with far reaching implications in policy making.

One of the options that gained widespread support in the last decades consists in expanding the scope of economy over the less obvious contributions of ecosystems to human wellbeing, contributions which were coined as ecosystem services. Enabling the ecosystem economy is however a great challenge that necessitates a profound integration of ecological and economic knowledge. The results of this process are already observable in operational solutions that are applied by international programs and by certain governments.

The basic motivation for the development of ecosystem economy is to allow the preservation of ecosystem services at a safe level meanwhile allowing development fuelled by economic growth. That is why the bulk of the reasoning is made up by proves of ecosystems' degradation by biodiversity loss and reduced functionality and likely prospects of intensification for this harmful processes.

The development and proper functioning of the ecosystem service economy could be also regarded as a major opportunity for expanding the scope of economy by the commodification of nature. The potential for expansion is considered significant, although there are scarce quantitative estimates. One of the most often cited indications is provided by Costanza et al. (1998). According to their global assessment the annual ecosystem services worth 33,268 billion \$. This represents almost half of the world GDP that was of 77,269 billion \$ in 2014 (Statista, 2016).

Ecosystem service transactions are still burgeoning. Nonetheless, their size and trends could be considered a valid prove of the ecosystem service economy's potential. The first section revisits the ecosystem service concept and explains how it underpinned the development of market based instruments. In the following sections there are analysed data regarding the biodiversity offset market, the European agro-environmental payment scheme, and the REDD+ program that is deployed at global level. In the concluding section, we summarize, derive some lessons to be learned for policy making and businesses, and indicate issues to be addressed with priority by further research.

2. ECOSYSTEM SERVICE – FROM THEORY TO PRACTICE

The ecosystem service concept is underpinned by an anthropocentric model of the human-nature relation. According to this model, nature exists to serve people and in the pursuit of their goals humans will be able to dominate nature. The concept is derived from the one of ecosystem function, being adapted to the relation with humans.

Ecosystem service had a fast track evolving in no more than two decades from the initial form of ecosystem functions and goods to applications for the implementation of environmental and agricultural policies. Along this evolution, Gomez-Baggethun et al. (2010) outline several stages: origin and genesis – corresponding with the early stage of environmental protection; scientific agenda – having as milestones the works of Costanza et al. (1998); and the political agenda – enabled by the results of the MEA report and the positive experience of similar approaches in climate change mitigation.

By the ecosystem service concept it is envisaged to create an operational linkage that allows the integration of nature's contribution in economic transactions. It could be also considered a particular case of the externality concept, since ecosystem services are benefits for humans without involving their specific action or direct influence for having it.

There are distinguished four types of ecosystem services: support services; providing services; regulating services; and cultural services. These categories were used for the most comprehensive global assessment – the Millennium Ecosystem Assessment. They facilitate economic evaluation, although in specific contexts careful interpretation is necessary in order to avoid double counting of the contributions (Boyd and Banzhaf, 2006). It is important to keep in mind that ecosystem services are components of the nature and not processes and flows. Further,

some of the benefits should be considered as potential and not real value, since they could improve wellbeing only by certain interventions.

By the ecosystem service concept it is acknowledged that the characteristics of the ecosystems could be different as long as the ecosystem is in equilibrium and the flow of energy and substance is maintained within steady limits.

These theoretical grounds were used to design new tools to be employed for ecosystem management, but also for integrating nature conservation goals in sector policies regarding agriculture, forestry, tourism etc. (Nijkamp et al., 2008). These include the ecosystem approach principles and economic tools like payments for ecosystem services and biodiversity credits.

The ecosystem approach principles could be considered an intermediary application stage for the ecosystem service concept. These principles provide guidelines for ecosystem management in its shift from the traditional approach focusing on species and exclusion of economic activities toward the novel approach focusing on the functionality of the ecosystems and that encourages a balanced proportion between conservation and economic valuation. One of the most developed projects based on these principles is the European ecological network Natura 2000.

The payments for ecosystem services (PES) are schemes by that the beneficiaries of ecosystem service pay the providers of these services (Petrescu, 2014). Since ecosystem services fall in the category of non-rival goods, the most effective method for supplying them is the unique payment by a monopsony. Exclusion should be created by policies and regulation, because there are situations then it is impossible to exclude somebody from being a beneficiary.

PES are aiming a trade-off between conservation and use by transferring the administration of natural resources from governmental bodies to private actors that respond to monetary incentives. The design and implementation of PES supposes costs such as:

- Technical studies for establishing the linkage between the structure of the ecosystem and the services provided by it;
- Establishing an organization that manage, monitor and support the program;
- Monitoring and renegotiation of contracts;
- Browsing for buyers and sellers.

Biodiversity credits or biodiversity offsets are based on the premise that what should be avoided is the net loss of biodiversity. Within such system an investor should invest an amount established in accordance with the ecological importance of the disturbed ecosystem in the preservation or restoration of another ecosystem. The prerequisite of this system is the legal binding for investment project. USA, Australia, and United Kingdom are hosting the most advanced biodiversity credit schemes. A similar approach is unfolding at EU level by the habitat banking scheme.

3. BIODIVERSITY OFFSET MARKETS

In 2010, the global market of biodiversity offset reached 3 billion \$ (Madsen et al., 2011). It is deployed through tens of programs that comprise more than one thousand offset banks worldwide. The annual market size is of 2.4-4.0 billion \$, although because some of the programs are not transparent this should be considered an underestimation. From one region to another there are differences in the progress of such transactions according with the provisions of environmental law.

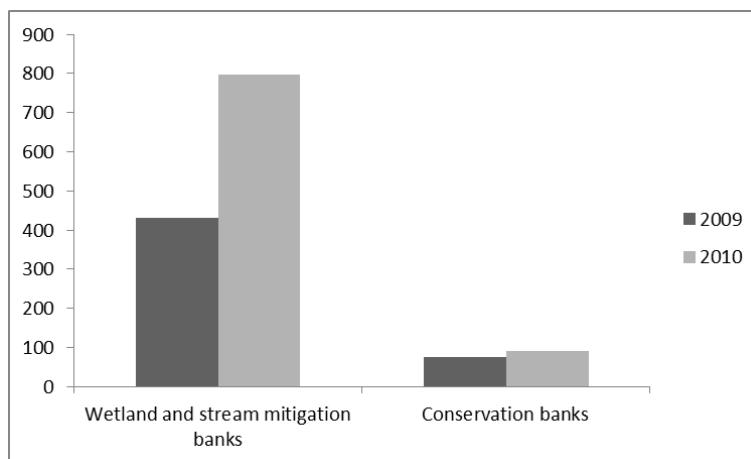


Figure 1. Number of biodiversity banks in US

Source: own elaboration using Madsen et al. (2011) data

In Europe the offset of ecosystem or biodiversity loss is gaining momentum as effective policy tool. The initial steps were made in United Kingdom, France, and Sweden. By the green infrastructure strategy and the goal of halting net loss by 2020 the EU could be considered a region with enabling conditions for boosting the ecosystem economy. Payments for ecosystem services, biodiversity offsets, and private sector investment in green infrastructure are considered innovative tools for increasing the financial resources need for nature conservation.

In North America the regulatory framework approved in 2008 favours the development of offset schemes. Thus, biodiversity banking schemes spread from California throughout all over the US, but also in Canada. There are two types of banks: wetland and stream mitigation banks and conservation banks. The number of both increased significantly from 2009 to 2010 (figure 1).

Latin America frames ecosystem service economy transaction mainly by PES schemes. The same is true for Africa, but the progress here is slower. Vietnam and Japan are most advanced in Asia, the governmental intervention being of great importance.

Australia has a state-level biodiversity and banking program. BioBank and BrushBroker are programs implemented in New South Wales and Victoria where they assisted more than 300 transactions.

It could be concluded that global interest in biodiversity offsets is increasing, the trend being maintained even under the impact of the financial and economic crisis.

4. AGRI-ENVIRONMENTAL PAYMENTS

These payments offset the losses faced by farmers who avoid technologies that have impact on ecosystems. The participation of farmers is voluntary, but the decision involves a long term commitment of at least five years (Jovanovic and Ilic, 2016). Such measures include: extensification of farming; low-intensity pasture management; preservation of landscape, diversification of crop rotation, endangered species and varieties, conservation of high natural value habitats etc.

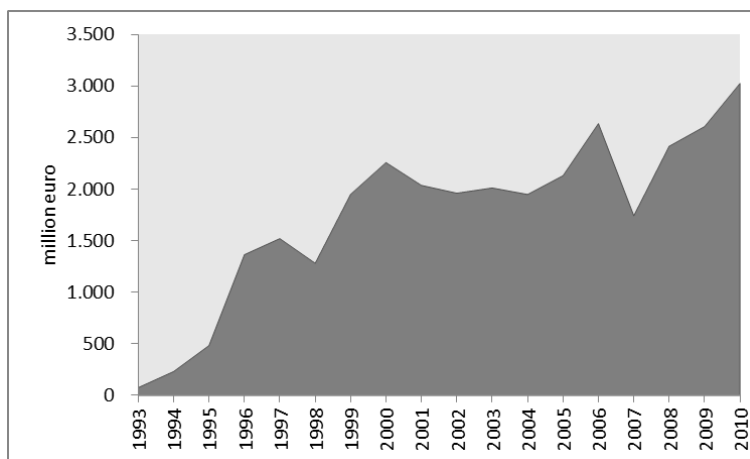


Figure 2. EU expenditures on agro-environmental measures

Source: own elaboration using Eurostat data

EU expenditure for agro-environmental measures is upward, reaching 3 billion euro in 2010 (figure 2). It accounts for 22% of the rural development expenditure. The real size of offsetting by agro-environmental measures is higher, because national governments also have a contribution. Thus, the amount spent for offsetting the benefits of ecosystem service provided by agricultural land is of around 5 billion euro.

One fifth of the EU's utilized agricultural area is enrolled in agro-environmental measures, representing 38.5 million hectares. From one Member State to another there are important differences in the size and proportion of these areas. The largest area is recorded for the United Kingdom being of almost 8 thousand hectares and representing almost half of the agricultural area (45.1%). The largest amounts spent for agro-environmental payments were in Austria (1.44 million euro); Finland (0.93 million euro); Germany (0.66 million euro); France (0.51 million euro) and Sweden (0.47 million euro).

5. REDD+

Aiming to buy time for completing a successful post-Kyoto climate change strategy after the REDD+ program consists in global payments for ecosystem scheme that fights against deforestation, which represent the main source of greenhouse gas emissions in the developing countries.

The programs potential benefits include immediate income gains, cost-effectiveness, ecosystem services, and poverty reduction (Iftime, 2014). The barriers that could prevent the successful functioning of the program are interferences with the rights of indigenous forest dependent people, overriding ecosystem services others than carbon sequestration, failing to make distinction between natural forests and plantations and others. The countries that set a positive example are also seen as "donor countries" and are developed states such as: Norway, Denmark, Spain, Japan, Luxembourg, and Switzerland. Together, these countries committed and deposited 269 million \$ to be allocated for the management of the program by the UN and for supporting national programs in 23 developing states.

By far, the largest donor country is Norway with a deposit of 234 million \$, followed by EU seen as a sole entity with 14 million \$ and Denmark with almost 9 million \$. The national support ranges between 460 thousand \$ in Philippines and 7.37 million \$ in Congo. On average, national support is of 3.7 million \$.

6. CONCLUSIONS

The ecosystem service concept grounded the design of economic tools for preserving biodiversity by using the anthropocentric model of nature for humans. According to this the

existence of ecosystems brings benefits for humans such as carbon sequestration, watershed protection, biomass production, nutrient cycling and others. For these, beneficiaries should be accountable by payments using various schemes. By examining the estimates for the global value of ecosystem services and the financial flows of major programs that are using these schemes it resulted that currently the ecosystem service economy is worth of around 8 billion \$. This size is well below the world nature conservation expenditure of 50 billion \$ and also much lower than the amount estimated to be necessary (around 300 billion euro).

Nonetheless, the global value of ecosystem services is comparable with the world GDP, indicating that along with the improvements in the management of market based tools commodification of nature by the transaction of ecosystem services will result in a major opportunity for value added creation. Management of these schemes is however a challenge and necessitates further advance in methodology development for the analysis and evaluation of ecosystem services.

BIBLIOGRAPHY

1. Arriagada, Rodrigo, Perrings, Charles (2009), Making payments for ecosystem services work, *Ecosystem Services Economics*, available at: <http://www.ecoservices.asu.edu/pdf/UNEP%20Working%20Paper%201.pdf>
2. Boyd, James, & Banzhaf, Spencer (2006), What Are Ecosystem Services? The Need for Standardized Environmental Accounting Units, *Resources for the future. Discussion papers. (RFFP Discussion Paper 06-02)* Washington, DC: Resources for the Future.
3. Bran, Florina. (2013), Green economy-component of sustainable development, *Quality – Access to Success*, 14(3), 21-35.
4. Bull, Joseph W., Suttle, K. B., Gordon, A., Singh, N. J., & Milner-Gulland, E. J. (2013), Biodiversity offsets in theory and practice, *Oryx*, 47(03), 369-380.
5. Chiba, Tomoyo, Matsushita, Kazuo (2013), Payments for Ecosystem Services in Japan: the Private Sector's Approach in the Rural Areas, *International Journal Sustainable Future for Human Security*, 1(2), 68-76.
6. Costanza, Robert, d'Arge, Ralph, De Groot, Rudolf, Farber, Stephen, Grasso, Monica, Hannon, Bruce, ... Raskin, Robert G. (1998), The value of ecosystem services: putting the issues in perspective, *Ecological economics*, 25(1), 67-72.
7. Gómez-Baggethum, Erik et al. (2010), The history of ecosystem services in economic theory and practice: from early notions to markets and payments schemes, *Ecological Economics*, 69(6), 1209-1218.
8. Iftime, Elena (2014), Green Diplomacy-A New Type Of International Cooperation (II), *Ecoforum Journal*, 3(2), 117-123.
9. Jovanović, Sonia, Ilić, Ivana (2016), Infrastructure as important determinant of tourism development in the countries of Southeast Europe, *Ecoforum journal*, 5(1), 288-294.
10. Madsen, B., Carroll, N., Kandy, D., & Bennett, G. (2011). *Update: state of biodiversity markets*. Washington, DC: Forest Trends.
11. MEA (2005). *Ecosystems and human well-being*. Washington, DC: Island press.
12. Nijkamp, Peter, Vindigni, Gabriella, Nunes, Paulo Ald (2008), Economic valuation of biodiversity: A comparative study, *Ecological economics*, 67(2), 217-231.
13. Petrescu, Dacia Crina (2014), Payment for ecosystem services-instrument for biodiversity management, *Quality – Access to Success*, 15(S1), 272-277.