

'Green Economy' Ecosystems in the Forest Sector Services

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The Action Plan for the forestry sector in the conditions of development of the “green economy” says about the need to protect the well-being of all stakeholders, while emphasizing the importance of compensation to providers of environmental services, where feasible. One of the possible mechanisms of this is the mechanism of payment for ecosystem services (PES), while the approaches to the payment process can vary significantly. In order to determine the economic value of ecosystem services and biodiversity, a range of various approaches was developed with recommendations for policy makers and the business community on how to properly take into account the value of ecosystem services and biodiversity in decision-making at the national, international, regional and local levels.

Key words: Biodiversity, ecosystem, environmental, erosion, forest policy, forest services, “green” economy, habitat, flow of load, monitoring, payment for ecosystem services, PES, private, protective functions, public, recreation, subsidies, ownership mode, timber, tourism.

Marking, certification and mechanisms of paying for ecosystem services can complement regulation, encouraging the consumers of ecosystem services to recognize their value and pay.

Application of payment for ecosystem services (PES) should bring changes in the economy of ecosystem management to promote the use of safe practices for biodiversity, so society as a whole will only benefit.

In order to comply with the Action Plan, the schemes of payment for ecosystem services should encourage resource owners to use business practices that will allow to maximize the social benefits under the existing regulations and market incentives.

Thus, the introduction of PES will probably enhance the profitability of environmental measures, which is beneficial to both private landowners and the public. In the absence of PES, landowners may refuse to carry out activities for the protection and rational use of their land resources or provide a particular ecosystem service, unless, of course, there are no other incentives, such as tax incentives or other instruments, such as regulations.

Methodology

The Action Plan for the forestry sector in the conditions of development of the “green economy” (hereinafter – the Action Plan) refers specifically to compensation, where possible, to providers of ecosystem services, while PES is one of the possible mechanisms for this purpose (Richardson, 2013).

There is a potential for consolidation of the existing PES schemes (i.e. for their

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transformation from the initiatives of the local level to the national programs), the introduction of PES schemes in more countries, increasing the efficiency of PES and addressing issues related to ensuring the constancy of environmental services. Later this chapter reviews the possibility of using PES on a broader scale and the associated benefits in terms of the development of the “green” economy. Issues to be addressed include:

- a) Expansion of PES schemes could lead to the creation of conditions for the development of the “green” economy;
- b) PES as a complement to regulation and other measures;
- c) Political aspects of the promotion of PES as part of measures for the development of the “green” economy.

Outcomes

The forestry sector as a source of ecosystem services makes a maximum contribution to the welfare of people and plays an irreplaceable role in the process of creating a “green” economy. As mentioned above, of great importance in this regard is the introduction of PES, as it helps to improve resource management practices beyond the legal minimum, as well as provides rural (and in some cases urban) population with income and sustainable livelihoods (Larsen, 1996).

For example, PES can be a source of additional revenue for the use of sustainable forest management, if there is someone willing to pay for services provided by this practice. It contributes to the development of rural areas and serves as a guarantee that their populations will continue to receive income and have means of subsistence. In addition, PES schemes contribute to the provision of ecosystem services in a sustainable manner, as the fact of the introduction of the payment raises questions about the limitations of ecosystem services and encourages users to take good care and cherish them (Apsalyamova, 2013).

Extension of PES schemes will also improve ecosystems and increase their resilience. Forest-related PES schemes contribute to reducing forest degradation, because they create economic incentives to maintain forest ecosystems in good condition so that they could perform their essential functions and be the source of services. The value of such schemes may increase because of the increased pressure on forests due to climate

change impacts such as pests, diseases and natural disasters (Apsalyamova, 2014).

An additional factor of pressure on the available wood resources in forests can become policy in the field of renewable energy sources use, as the achievement of the ambitious targets requires to dramatically scale up the production of wood. It is therefore extremely important to discuss not only a well-understood role the forests play in terms of biodiversity conservation and timber production, but also the issue of what is necessary to ensure the availability of critical forest ecosystem services. One of the key elements of this discussion will be PES.

Since PES is based on the market relations approach, some observers find it a more effective policy tool than the government intervention.

While PES schemes can be considered as market solutions to environmental problems, they rarely act as free markets in the strict sense of the word, but more often are the mechanism of a mixed type, which involves the market, the state and communities.

Others argue that there may be cases of unethical use of PES, particularly as a hidden subsidy to ensure compliance with existing laws, which imposes an unfair burden on the state budget, especially when the schemes are fully funded by the government. PES can also be regarded as a mechanism to ensure the “user pays” approach, which is a variation of the “polluter pays” approach and provides that the costs associated with the use of a natural resource should be borne by its user.

PES mechanisms can be more cost-effective than the adoption of stringent measures to ensure the fulfillment of obligations and more progressive, especially when benefits are provided over and above the statutory minimum. Of course, this depends on the specific national and local conditions.

Voluntary PES agreements may be particularly promising in the case of a weak regulatory framework and enforcement capacity, or when there are few or no regulatory bodies (Khuazhev, 2014).

In addition, in many cases, the buyer has the opportunity to enhance their prestige due to the acquisition of reputation of advocate for nature, which they would not have had if only

they complied with the laws.

In the case of flexible PES application, the opportunities to improve the cost-effectiveness compared to indirect payments or other regulatory approaches emerge. Voluntary agreements could be an acceptable alternative to the government rules and regulations, as they allow to find a better comprehensive solution through the participation of various stakeholders.

PES can also serve as a temporary measure to encourage the use of new business practices and technologies that may eventually become economically viable.

Other voluntary approaches, such as certification and marking, can provide remuneration to the landowner, who in the practice of sustainable land use goes beyond the minimum statutory requirements.

They can complement PES or serve as an alternative mechanism. The current issue under discussion is to which extent marking or certification can be considered a type of PES mechanism. Governments could create conditions conducive to the emergence of certification schemes through appropriate laws and regulations and the formation of independent certification bodies. Such independent bodies are extremely important to ensure the credibility of “certification schemes” of the production and distribution chain, for example when the goods can pass through the hands of several various organizations (Khashir, 2014).

The arguments in favor of practical significance and application of PES were presented above, but it must be acknowledged that this approach does not exist in a vacuum and it needs to “win hearts and minds” of governments, private sector and public in countries where it will hopefully find application. Other environmental approaches, while seeming harmless, proved politically explosive, as the observers, and later population, began to express increasing concern about the potential or perceived impacts on land use for food production. It would be unfortunate if an equally bad opinion emerged among the public towards the idea of PES and it was rejected.

Much can be written about the possible political/social impacts of PES and how it will be perceived by the public, while the information described above allows to draw some conclusions

about the positive and negative aspects associated with such issues as “formation of attitude” to PES.

On the positive side, the advantages of PES are:

Improving the reputation of companies

Involvement of companies in PES schemes allows them to enhance their prestige – especially in the market for products such as bottled water, where there is fierce competition. Of course, these companies will position themselves as champions of environmental protection and include relevant information in the promotional content, etc. Companies benefit from this, but it may mean that the reputation of PES will probably rise and fall along with the reputation of these well-known companies.

Ease of understanding:

In most countries, complex systems of taxes, subsidies, penalties and budgetary allocations are used for environmental financing. PES provides an easy link between the use of the environmental service and direct payment for providing it. Any such a system, which can be easily understood by the public, the mass media and those who shape public opinion, can be immediately perceived as something “benefiting” the environment: forests are saved, water availability is guaranteed.

Raising awareness: easily understood PES schemes have proven to be a useful tool to improve public awareness of environmental protection.

Although these advantages are perhaps undeniable, we cannot exclude the corresponding negative aspects:

Payment for the damage

Although the main focus of PES schemes is always on improving the quality and preservation of ecosystems, the press can easily attach to payments made by the company a label of money paid for conscience sake, that is, to somehow make amends for causing irreparable damage to the environment.

The task of any future PES scheme is to remove and dispel the fears of this kind, which, of course, will be announced. Commercial trading schemes are particularly vulnerable to such criticism.

From the foregoing it follows that the forest-related PES schemes are not a universal

solution and do not meet all the needs.

They are a means supplementing the legislation, regulation and the system of monitoring and accounting based on the principles of democracy.

Identification of situations where the system of payment for forest ecosystem services is preferable to environmental legislation is not a simple task: it requires a cost-benefit analysis and the measurement of the political temperature, especially considering the ties of populations in many regions to their forests (Gane, 2007).

The proper functioning of the forest-related PES schemes requires appropriate legislative and institutional framework, as well as measures to ensure their cost-effectiveness.

A combination of several different services can allow to lower operating costs.

As various aspects of forest management and forest tenure regimes are largely dependent on the culture that emerged in a particular area, the introduction of PES will apparently require to realize a wide variety of large-scale projects, rather than applying any one common model (Khashir, 2009).

In this regard, it will be necessary to solve a number of important issues concerning, for example, the negative impact on forests and other ecosystems, permanence and complementarity.

Application of this approach will also require to take steps to build capacity. Particular attention should be paid to ensuring the rights of ownership, as land use issues are often at the basis of schemes that provide compensation for the restriction of particular land use practices (e.g. logging) or the financing of special measures for managing specific land categories (Kenis & Lievens, 2015).

Some successful schemes have been developed thanks to the demand, i.e. when the society and the business circles were willing to pay for forest-related environmental services. In any case, consultations with all relevant stakeholders are of an extremely great importance, and a particular attention should be paid to how extensive they may be in the case of forest services.

Links should be maintained not only with suppliers or buyers of ecosystem services, but also with policy makers and the general public, as political support is often required, especially in the early stages of the scheme development.

Pilot projects are often a good way to demonstrate the importance of PES and the results obtained, while, as noted above, the effectiveness of the scheme should be monitored in the broadest sense of the term, which is required for support from donors for the long term.

The valuation is based on the concept of total economic value. The total economic value can be viewed from two angles: in terms of use values and non-consumptive use values.

Use values can be divided into direct use values, indirect use values and deferred values (Khashir, 2014).

The direct use value can be derived from the actual price paid for ecosystem services, for example for wood. Thus, the valuation often does not involve any difficulties and is based on the summation of the many services that can be used directly and have market prices (wood, food, firewood, fishing).

In addition to industrial activity, the direct use may also involve non-industrial activities, for example activities providing only the necessary means of subsistence.

Indirect use values are associated with regulating and supporting ecosystem services, such as water cycling, nutrient cycling, filtering pollutants, pollination, etc.

Indirect use value refers to “indirect benefits that provide ecosystem services related to the maintenance and protection of nature and the human environment”, such as maintaining the quality and flow of water, conservation of forest biodiversity, recreation, aesthetic enjoyment and spiritual values.

Deferred value is the value related to preserving the opportunity for people to enjoy the ecosystem in the future. We are talking about ecosystem services that today have a low value, but can get much more value in the future, possibly due to the emergence of new information or knowledge. This category may include the conservation of biodiversity, so that in the future it was possible to discover the medicinal plants that can be used in pharmaceuticals.

Non-consumptive use values can be divided into existence and bequest values. Existence values are associated with the willingness of people to pay money in order to ensure the continued existence of the relevant

ecosystems. This value ensures the existence of a forest or watershed for people, even if they do not use them directly.

Bequest value is the value arising from the desire to preserve the pristine ecosystem for future generations, so that they were able to use it in accordance with their own preferences (Khuazhev, 2014).

In order to calculate the total economic value of ecosystem services, the information about the preferences of individuals is collected, suggested by their market operations directly related to ecosystem services (method of direct assessment of the market value). If such information is not available, information about prices can be obtained from other market transactions indirectly related to the service or benefit subject to valuation (the method of the revealed preference). When there is neither direct nor indirect information, hypothetical markets can be created to obtain the necessary data (method of the stated preference).

Methods of direct assessment of the market value **include**

- a) Valuation techniques based on market prices – they are often used in the case of resource-providing services, such as timber and water supply.
- b) Valuation techniques based on costs, which are essentially an assessment of costs that may be incurred in the case of substitution of benefits provided by the ecosystem with the benefits derived artificially.

These may include a method of non-incurred costs (i.e. costs that would have been incurred in the case of absence of the ecosystem service; for example, the cost of such service as flood protection, calculated based on the valuation of damage that could be caused in the event of flooding), a method of replacement costs (the costs of replacing ecosystem services with artificial technologies; for example, the valuation of the cost of groundwater recharge on the basis of the costs associated with obtaining water from an alternative source) and a method of costs of mitigation or restoration work (the cost of mitigating the loss of ecosystem services, such as the costs of flood defenses in the absence of wetlands that serve as floodwater receptors).

- a) Methods based on production functions – methods that allow to estimate the contribution of a particular ecosystem to the output of other goods or services which are traded at the current market; for example, trees act as windbreaks within the agroforestry system and thus contribute to a higher yield.

Methods of the revealed preference are based on the results of observations of what the individuals opt for in existing markets related to the ecosystem service that is the subject of valuation (Apsalyamova, 2013).

These include the following two methods:

- a) Travel cost method (TCM), which is based on the logical assumption that recreation involves costs (direct costs and expenses imputed by alternative possibilities). This

Table 1: Possible types of economic value and their relation to different categories of forest goods and services

Direct use value	Use value		Non-consumptive use value	
	Indirect use value	Deferred value	Existence value	Bequest value
The value of the produced, consumed or structure-forming benefits that you can get and consume or enjoy directly	Services arising from the environment	The value represented by preserving the opportunity of receiving of goods and services from ecosystems at a later stage, including ecosystem services, which currently have a low value, but can get much more value in the future due to new information and knowledge	The value that gives people the knowledge that something exists, even if they never plan to use this	The value arising from the desire to preserve the ecosystem for future generations
Wealth	Regulatory services	All services	All services	Supporting services

method is most appropriate to determine the recreational values associated with biodiversity and ecosystem services.

- b) Method of hedonic pricing (HP), which uses information about how much people are willing to pay for particular environmental characteristics. For example, higher prices for real estate in the picturesque woodland could be one of the parameters to evaluate the environmental benefits that are specific to the recreational area (Reddy & Wilkes, 2015). Changes in the level of biodiversity, ecosystem quality and ecosystem service, for example, a clean air or a scenic view, lead to a change in the cost (value) of the property.

In order to decide which of the two methods should be used as part of studies on the valuation based on the identified preferences, it is important to know whether there are substitute markets.

DISCUSSION

The methods based on the revealed preferences require qualitative data on transactions, as due to market imperfections and shortcomings of policies you can get distorted assessment of the monetary value. Therefore, methods of evaluation based on the identified preferences are usually expensive and time costly.

Valuation methods based on stated preferences, which are also called “valuation methods based on simulation models”, allow to modulate the market and demand for ecosystem services based on the results of surveys on hypothetical changes in the mechanism of ecosystem services.

There are three main types of such methods:

- a) Poll valuation method, where people are surveyed with polls on the matter of how much they are willing to pay for the provision of ecosystem services at a higher level or better quality or, conversely, how much compensation they are willing to receive for their loss or degradation.

Under this approach based either on individual readiness to pay (RP) or their willingness to accept compensation (WAC), a variety of formats in order to obtain a measurable price of pseudo market subsistence resources can be used

to conduct surveys. For example, the respondents may be asked in the poll to declare their willingness to pay to cover the costs of improving water quality in the river or lake, so that they could swim or fish there.

- a) Method of modeling the decision choice, which is an attempt to simulate a human decision-making process, for which they can choose from several different options (experimentation with the choice of alternatives), after which they must rank their preferences for different things (preference ranking by the respondent) and select one of two different things (pairwise comparisons).
- b) Valuation method based on group preferences, which combines techniques based on stated preferences and the elements of political science.
- c) Methods based on stated preferences are often used to assess non-consumptive use values. In connection with the use of hypothetical markets, the questions about the validity of the estimates arose. In addition, it is often hard for the respondents to give an exact answer, because they do not always master the subject.
- d) Valuation methods are usually tied to a particular place. It is important to carefully analyze their costs and benefits and take into account the fact that the cost of many values is tentative, because the valuation was based on prices for goods or services that are similar in nature or a hypothetical situation.

CONCLUSION

Quite different is the method of multi-criteria analysis (MCA), which is not based on economic analysis. Experience has shown that it is very useful in cases where multiple values of ecosystem services are measured and compared. MCA allows to formally integrate multiple values, after a relative weight was assigned to each of them. The result is a ranking of preferences, which serves as a basis for decision-making when selecting different options.

In each context, it is necessary to determine the basis for the payment of

compensation for ecosystem services, choose the most appropriate method, as well as take into account the economic and socio-economic preferences and conditions of potential buyers of ecosystem services. The issue of affordability, especially in view of the fact that ecosystem services are often subject to the preservation and improvement of rural areas, which tend to be poorer, should also be taken into account.

In some cases, it may be unnecessary to resort to comprehensive valuation methods.

The benchmark for determining the remuneration of the forest owner could be the cost of forestry operations necessary to maintain a certain ecosystem service. However, in most cases it will be difficult to separate the costs associated with any particular service from the forestry costs in a more general sense.

Integration of the values of biodiversity and ecosystems into the economic system and the system of national accounts is a complex project, which is already being realized by some governments. The understanding and the development of definitions and measures to ensure the integrated management of land use and planning in this area are an important first step towards the application of PES in areas with different ecosystems.

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