ECOSYSTEM SERVICES MANAGEMENT ISSUES

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Abstract

The main goal of ecosystem services management is to ensure a harmonious relationship between nature and society, so that the diverse benefits provided by nature to people become manageable from the perspective of sustainable development, while also preserving the necessary potential of these services for future generations. However, both in practice and in theory, there is still no clear methodology for the management of ecosystem services.

In this regard, it is important to address issues such as identifying the scope of ecosystem service beneficiaries, clarifying the processes involved in managing these services according to their objectives, and establishing accountability for management outcomes.

This article proposes a model for the management of ecosystem services. A participatory approach to decision-making is also justified, wherein representatives of the local community are involved in management processes and feedback mechanisms are established. The proposed model for the cyclical management of ecosystem services is presented as a novel contribution.

Keywords: Ecosystem scope, ecosystem management goals, participatory management, motivation of beneficiaries, ecosystem services management cycle.

Introduction

Any system consists of separate components, which are interconnected with each other in such a way, that even a change in one of them affects the other components. The eco-systems operating in nature are formed by this principle, because in them, with the considerations of life support and harmonious activity, natural components are interconnected, which interacting with each other within the framework of one system, ensure the existence of life support. Moreover, ecosystems differ not only in scale and diversity, but also in their functions [Khachatryan].

Thus, bacteria, insects, and invertebrate worms are considered to be the components of the ecosystem formed around the stump of a felled tree, which solves the problem of life support, and at the same time has the function of sanitation, carrying out metabolism, decomposing inanimate bodies. The ecosystem of the local forest already includes trees, shrubs, beasts, streams, and meadows, which with their biodiversity provide the nutritional level of animals, enrich the soil cover, expand the forest cover, and contribute to plant photosynthesis and oxygen reproduction. In the regional forest ecosystem, water-rich rivers, lakes, marshes, and wind-protecting mountain ranges are added to the

aforementioned natural diversity, which supports both the expansion of forests and large-scale photosynthesis and the stability of the essential layer of the country's ozone screen [Thughuryan, Grigoryan].

Naturally, the inactivity or absence of each component of the listed ecosystems can disrupt the level of biodiversity, lead to the violation of the ecological balance, and thus, the disruption of the disturbed forest eco-functions [Adams, Larrinaga]. In this regard, human intervention in ecosystem structures should be carried out carefully, so as not to upset not only the environmental balance, but also the set of ecosystem functions, which is extremely important for the survival and sustainable development of society [Famiyeh, Samuel].

And the operations carried out by nature itself, which, by the way, humanity uses for free, are presented as ecosystem services. In practice, ecosystem services are interpreted from different perspectives, presenting them as means contributing to the well-being of mankind, functions of reproduction and expansion of natural resources by mankind, and services contributing to sustainable development. However, all of these are based on a general definition, according to which ecosystem services are the manifold benefits provided by nature to people, the consumption of which ensures the socio-economic stable development of the national population [Magon, Renata Bianchini].

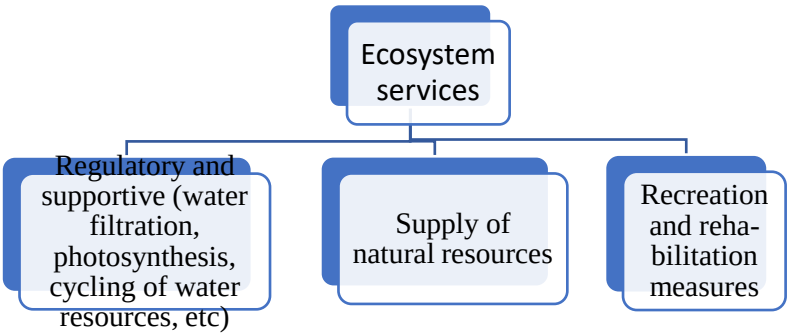
Research results

In general, ecosystem services are represented by the following groups: providing natural resources, regulating the environmental environment, and related to recreation and rehabilitation measures (see Figure 1). At first glance, it may seem that the majority of the ecosystem services provided to humanity fall on the supply of natural resources.

Every day it becomes visible to us what kind of benefits man receives from nature in the form of natural wood, water resources, biological components, and useful minerals, which are used in everyday life and production. In this sense, ecosystem services of natural resource provision are also called indirect services.

However, indirect ecosystem services, which may not be directly visible to people, but perform regulatory and environmental support activities (pollination, water purification, erosion and flood prevention, etc.) are no less valuable. climate control etc.). Thus, the forest cover of the Amazon River basin is called the "lungs of the planet Earth", because a huge mass of spent oxygen is reproduced there, or the evaporation of the oceanic layer ensures the atmospheric circulation of water resources, etc.

Figure 1.



Ecosystem services common classification[1]

[1] Completed by author's.

On the other hand, often enjoying our native nature and spending time relaxing on the shore of the lake or in the high mountains, we do not always realize the fact of the provision of ecosystem services specifically addressed to us. Nature provides us with services that contribute to rehabilitation, to which it is necessary to show a proper attitude, not polluting the environment, and not violating environmental norms [Arbidane et al]. It turns out that, receiving various eco-system services, humanity consumes them as much as possible for the benefit of socio-economic prosperity and thus feels the need to manage this process, otherwise, the services provided by nature's relentless consumption lead to environmental disasters [Li, Dayuan]. Entrepreneurial activity causes great damage to existing ecosystems. Society should have the opportunity to find out what the business world took from nature and then what it returned to nature. Therefore, the management of ecosystem services serves sustainable management and allows evaluation of the eco-efficiency and eco-justice of the enterprise [Savastano, Tshughuryan].

The field of environmental protection has traditionally been regulated by legal and administrative methods. Currently, at the state level and according to the dictates of the law, various control circles are actively operating, which take care of the protection of the environment, the prevention of ruthless exploitation of natural resources, as well as the organization of activities according to environmental norms. for: At the same time, social organizations, "unions of greens", which are concerned about environmental salinization and irrational exploitation of natural resources, are forming at a rapid pace, actively fighting against businessmen and organizations that harm nature. However, while striving for "his greatness" profit, the business tries to remain indifferent, and being able to overcome the environmental administrative, and legal pressures, continues to harm nature, considering the economic benefit to be the priority [Tshughuryan. Savastano].

There are not a few cases, when businessmen purposely pay nature protection penalties and payments knowingly turn to the misuse of natural resources. In practice, situations are created when organizations receive excessive profits by intentionally violating the norms of environmental protection because the subsequent administrative damages and fines are economically "justified" by the misuse of natural resources, with additional income received [Thughuryan et al].

Therefore, if the legal and administrative levers of environmental protection cannot mitigate the "appetite" of businesses to get economic benefit, then the managerial levers of ecosystem services should also be put into action.

The basic problem of economic management of environmental protection in organizations is closely related to the existence of a complete and realistic information system [IFRS-S1]. The intensive exploitation of natural resources at the level of organizations should not be considered only within the framework of the inspection field of land use control, but will also be controlled by the public itself through the implementation of the ecosystem services valuation and management mechanism. It is not possible to implement full economic re-control only through nature conservation and nature use fees.

Therefore, the main directions of maintenance of ecosystem services are:

- determining the boundaries of the ecosystem,
- recording the types of services provided by a specific ecosystem,
- measuring the intended and actual results of ecosystem services and identifying negative deviations by combining them,
- management of negative deviations related to the provision of ecosystem services,
- implementation of managerial decisions on the sustainable development of ecosystem services [Savastano et al].

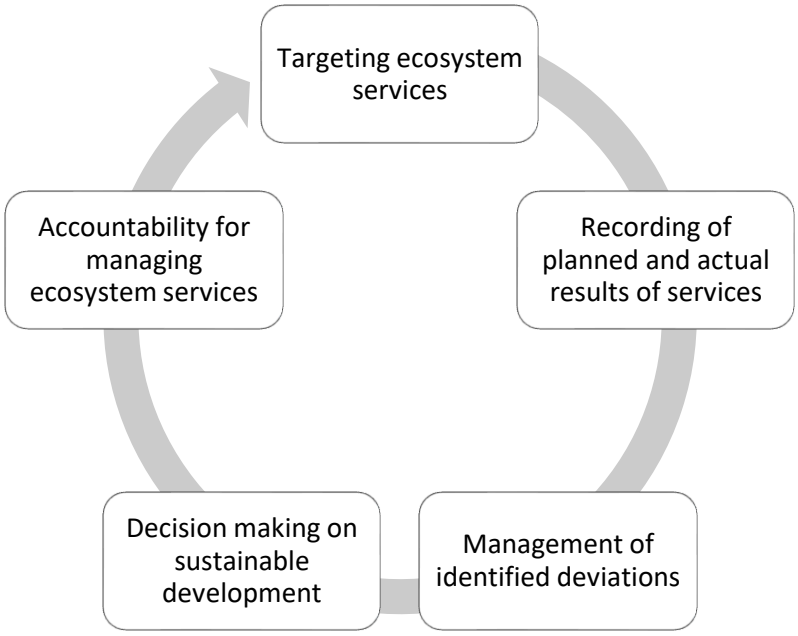
As with any field of governance, the management of ecosystem services begins with the goal-setting phase. However, the specialty here is in determining the boundaries of the ecosystem and targeting specific services. The ecosystem manifests itself at different scales with its multiple functions.

Thus, if the ecosystem related to the water basin of the river is considered, then it can include just one tributary or, on the contrary, from all tributaries to the entire area of the river delta. Or, when discussing the scope of management of the services received from the water basin of the river, only direct services (water intake for irrigation purposes, fishing), as well as indirect services (evaporation of water and support to the atmospheric cycle of water resources, development of tourism in the area of the water basin), can be targeted. Naturally, it is practically difficult to target all the services of the ecosystem for management, but based on the current problems of sustainable development, a choice is made between them with managerial goals.

The selection of ecosystem services for management purposes is followed by the assessment of intended outcomes and then the measurement and valuation of actual achievements (see Figure 2). Perhaps, this stage of management is relatively complicated, because the measurability of service delivery results presents practical difficulties.

Thus, if the direct services provided by the water basin of the river can be measured and valued (water, navigation, fishing), some indirect service results (human recreational recreation, fauna improvement) have practical difficulties in measurement and evaluation.

Figure 2.



Ecosystem services management cycle[2]

When managing ecosystem services, local community involvement in decision-making is important. Thus, Non-ferrous metal ore reserves have been discovered in a mountain located 30 km from a rural settlement, the open-pit mining of which is planned for 20 years, and as a result, the mountain is completely worn out and disappears. The plain formed on the mountain site is planned to be used in the future for the production of agricultural crops.

[2] Completed by authors.

The population of the rural community does not agree with the decision to exploit the mining industry, and in this regard presents its positive and negative positions.

Positive justifications from the point of view of socio-economic reforms

a) the exploitation of the mine will open new jobs for the villagers of the community,

b) deductions from the royalties collected from the extraction of non-ferrous metal ore will be made to the village community budget,

c) the ore mining organization will regularly provide financial support to the cultural life of the community,

d) the contamination of atmospheric air as a result of open-pit mining of ore requires the prevention of diseases, and for this purpose The mining company will provide health care support to the community population,

e) the cost of ore extraction in a closed way increases threefold, and labor productivity decreases by half

Negative positions from the perspective of the provision of ecosystem services:

f) the mountain adjacent to the rural community plays a protective role against wind flow, and after the completion of the mine operation, the entire rural area will be exposed to strong winds, damaging the crop yield, the mountain acts as a natural water catchment area and contributes to the consolidation of the community's water supply during snowmelt and rainy months with its steep streams,

h) open-pit mining of ore increases the dust content of the surrounding air tenfold, damaging both the health of the community population and the production of agricultural products,

the mountain is also a pasture for livestock, and in the event of ore exploitation, the villager is deprived of large-scale pastures.

Taking into account the above-mentioned positive and negative positions, a decision is made to exploit the mine in a closed way in favor of, which sharply reduces the economic efficiency of mining, but on the other hand, ensures the possibility of sustainable development of ecosystem services.

Table 1

Change in ecosystem services	Ore mining	
	Open way	Close way
Impact of winds on yield reduction	yes	no
Decline in the catchment area capacity	yes	no
Diseases caused by sand dust	yes	partly
Decrease in pastures	yes	partly
Improvement in the social situation of the community	yes	yes

Decision making directions within ore mining outcomes scope

Conclusions

Ecosystem services are the diverse benefits provided by nature to humans, the consumption of which ensures the sustainable socio-economic development of the population. In this regard, the management of ecosystem services is currently receiving special attention, since the incorrect behavior of humanity towards the surrounding environment leads not only to environmental disasters, but also to failures in sustainable development.

The need for ecosystem services management stems from a number of motivations.

a) humanity has a close behavioral relationship with nature and directly affects the environment, therefore there is a need to make this interaction manageable,

b) nature, in turn, influences the well-being of humanity, supplying goods, providing the necessary conditions for life, and therefore, there is a need for the provision of ecosystem services to be as manageable as possible,

c) the sustainable socio-economic development of society fundamentally depends on the management of ecosystem services, when people consciously consume natural resources in a way that allows future generations to also benefit from ecosystem services,

d) the management of ecosystem services is not a single vector and implies not only the provision of goods and services by humanity In addition to the assessment of the use of natural resources, an assessment of measures aimed at protecting the environment is carried out by society, so that the potential for providing ecosystem services becomes manageable.

Therefore, we propose a new conceptual model for ecosystem services management, is distinguished by the following features:

First, the final results of ecosystem services provision will be defined previously, which should be measurable within the framework of management objectives.

Second, the proposed management framework uses special monitoring, that makes it possible to identify service objectives and deviations from them.

Third, management decisions are implemented aimed at eliminating actual negative deviations from ecosystem services objectives.

Fourth, ecosystem services management is proposed to be implemented in a cyclical manner, when accountability for management results is introduced to beneficiaries, on the basis of which updated service objectives are revised and a new management cycle begins for them.

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