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THE ASSIMILATION POTENTIAL OF THE ENVIRONMENT AND ITS ECOLOGICAL AND ECONOMIC SIGNIFICANCE

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ABSTRACT

The paper discusses the issue of further strengthening of the interrelationship and interdependence of ecological and economic systems in modern times, which indicates the need to develop new approaches and methods to ensure a balance between the activities of society based on the ecological strategy and the nature management. One of the constituents of the mentioned multifaceted problem is the comprehensive study of the ability of the biosphere to maintain a certain resistance to anthropogenic impact. This ability of the environment is precisely its assimilative potential, which as a specific natural resource is discussed and characterized, the concept of the capacity of the assimilation potential of this environment and the factors on which it depends is provided. In addition to the ecological purpose of the assimilation potential of the environment, its economic evaluation and practical significance are presented. Despite the difficulty of its quantitative assessment, one of the methods of determination available in the literature is presented. The list of problems related to the practical implementation of the economic assessment of the assimilation potential of the environment is also provided. The necessity of more in-depth study of the mechanism for managing the assimilation potential of the environment, in order to develop methods for its rational use and conservation of natural resources, is justified.

Keywords: assimilation potential; anthropogenic load; economical assesment; environmental damage

JEL: Q51, Q53, H23.

1. INTRODUCTION

In modern times, in the context of various environmental problems, the priority of realizing interests in the relationship between society and nature is changing. Since any production, distribution and consumption of products is associated with the use of natural resources and their impact on the environment, the role of the natural factor and the influence of the ecological system on the economic system are constantly increasing. Given the global trend of environmental pollution, the need to develop a new, environmentally oriented

society and to correlate its activities with environmental management has become apparent.

The biosphere has a certain resistance to anthropogenic impacts on the environment through its neutralizing properties and assimilation potential. This ability of ecological systems is one of the important features of maintaining the state of the environment. The duration of the harmful effects of most toxic substances is limited due to the physicochemical and biological processes taking place in the environment. These processes determine the existence of assimilation potential of the environment. (1)

2. THEORETICAL BACKGROUND/ LITERATURE REVIEW

The assimilation potential is the ability of the surrounding natural environment (atmosphere, water resources, soil) to take upon itself various anthropogenic impacts, up to a certain level, over a long period of time without major changes. Therefore, assimilation potential is the limited ability of the ecological system to neutralize and decontaminate a certain amount of harmful emissions without profound changes in the environment (2).

Some synonyms for the assimilation potential are: assimilative capacity; ecological potential; absorption potential. (3), (4)

The concept of assimilation potential is based mainly on the fact that changes in the ecological system caused by certain anthropogenic impacts are permissible (acceptable).

The assimilative capacity of the environment is a specific natural resource. Due to the large-scale impact on the environment, there was a danger of disturbing the balance of ecological systems and the concept of limiting the assimilation potential of the environment arose, which is often called the capacity (volume) of assimilation potential.

The capacity of assimilation potential is determined by the self-cleaning ability of the ecosystem, the neutralization of pollutants, biological diversity, the dynamics of ecosystem processes, and the timely ability of transformation or separation of chemical compounds

to reduce the effects of negative external impacts.

The rate of assimilation capacity depends on many natural and technological factors and the physico-chemical properties of pollution agents. However, the determining factors are biological processes. For example, when assessing the assimilative capacity of water bodies, three main processes can be distinguished: hydrodynamics, microbiological degradation of pollutants, and bio sedimentation (biological deposition). (2)

The landscape and biochemical features are of great importance in the formation of assimilation potential on land, and contain numerous natural and anthropogenic factors. The limitation of the assimilation potential of the environment has created the need for its rational use, which has further increased interest in terms of both ecological purpose and its economic evaluation and quantification (5). The economic importance of assimilative capacity as a special feature of the natural environment is reflected in its ability to achieve economies at the expense of nature protection costs. This economy determines the overall public benefits and, at the same time, indicates the value of the assimilation potential.

From an economic point of view, it is worth noting that, in addition to saving costs for the cleaning of polluting substances, the assimilation potential of the environment also allows avoiding the damage caused by pollution. Thus, the avoided loss - the cost savings for avoiding environmental pollution - determines the economic assessment of the assimilation potential of the environment based on the cost approach. (6)

The economic assessment of assimilation potential is determined by its importance in the process of cost formation and the results obtained. The existence of such potential allows some of the waste from the production process to enter the environment and thus saves the costs of cleaning up the pollutants. At the same time, it is the resilience of territorial ecological systems against a certain anthropogenic load, the ability to recycle and disinfect waste, thereby avoiding damage. In such a case, the basis of the economic assessment of assimilation potential is the cost, to prevent pollution or the amount of damage avoided.

If anthropogenic activity is within the limits of assimilation potential, then ecological and economic damage does not occur, and in cases of excess, the balance of ecosystems is disturbed, and the environmental damage is obvious.

The difficulty in quantifying the assimilation potential is related, firstly, to the diversity of anthropogenic impacts and, secondly, to the determination of the safe level for each type of impact.

For practical purposes, the economic evaluation of the assimilation potential can be equated to the costs

required to reduce the amount of emissions to the minimum possible value of the maximum permissible emissions (MPE) and the maximum allowable discharge (MAD) for the atmosphere or hydrosphere in the area under consideration. (2)

As already mentioned, the quantitative assessment of the assimilation potential of an ecological system with great accuracy is quite difficult, because it is necessary to take into account a wide range of factors affecting its rate.

One of the methods of economic assessment of assimilation potential is based on the following image: (2)

$$Ea = MPE (C + Y) 0,5 - (AE - MAD) Y;$$

Ea - economic assessment of assimilation potential;

MPE - maximum permissible emissions in tons or tons/year;

AE - actual emissions in tons or tons/year;

MAD - actual level of emissions in tons or tons/year;

C - average costs per unit of emissions;

Y - average cost of capturing a unit of emissions at the area under consideration.

The given formula determines the assimilation potential of the environment, only for one emitted substance. Obviously, the full estimate of the assimilation potential consists of the sum of each emitted substance in the area under consideration. Despite many studies on these issues, there are quite serious problems in the practical realization of the economic evaluation of the assimilation potential of the environment, namely:

-Due to the complexity of quantifying the assimilation potential of the environment, it is difficult to determine the amount of polluting substances that the environment can receive without changing its basic properties;

-In fact, there is no consensus on the assimilation potential of the environment as a natural resource. This circumstance and the difficulty of its precise quantification do not allow assimilation potential to be considered as an object of ownership;

-In the absence of an object of ownership, it is impossible to resolve the issue of the distribution of rights to use this resource;

-There is also a problem with the objective economic assessment of the assimilation potential of the environment, as it does not belong to anyone, and is currently used for free in many cases.

-A mechanism for managing the assimilation potential of the environment is needed, because, in modern practice, there is a place for so-called "free access" (availability), and this leads to the fact that much more polluting substances enter the environment than the corresponding to the assimilation potential rate.

One of the principles of the concept of sustainable, joint development of humans and the biosphere devel-

oped by D. Meadows points to the importance of the issue: (6);

-The emission intensity of pollutants should not exceed the capacity of the environment to absorb them; (7)

CONCLUSIONS

Thus, the economic assessment of the assimilation potential of the natural environment is an important tool (mean) for determining the cost of its exploitation and use, as well as for developing effective methods for protecting and restoring natural resources. Also, one of the main issues with assimilation potential as an ecological-economic category is finding a compromise between the interests of industrial activity and environmental protection issues.

Currently, modern society faces an important task based on the rational use of nature's wealth and productivity, not only to preserve it but also to prevent the future negative consequences of improper interference with the natural environment.

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