

Toolkit for Assessing and Managing a Balanced Environmental Management System

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Abstract— In modern conditions of social and economic development of society, an important problem is to increase the competitiveness of regional social systems, which implies technological renewal and expansion of production, intensification of natural resource use processes, etc. At the same time, the solution of modern economic problems of society leads to the disruption of the natural-resource balance of ecological systems formations. Therefore, at present, the preservation of the natural resource potential is the main condition for the balanced development of society.

Keywords—nature management, ecosystem, natural complex, environmental problems, environment

I. INTRODUCTION

In 1972, in Stockholm, at the first World Conference on Environment and Development, the United Nations Environment Program (UNEP) was adopted, reflecting the principles of solving environmental problems associated with water pollution, atmosphere and soil depletion, which led to the organization of international cooperation on environmental protection scientists I.MakHargom, F.Ramad, N.Li, B.Skinner, T.Miller, N.V.Chepurny and others who published scientific works on the problems of interaction between society and nature.

From the perspective of systemic analysis of the global problems in the system "society - nature" are investigated and began the 70-ies of XX century in the framework of the international public organization "The Club of Rome" by American and scholars J. Forrester [1] and D. Medouz [2] et al., whose works analyze the degree of human impact on nature, predict the approach of an environmental disaster and model the development of society as part of further confrontation with nature. At specifically, D. Meadows at book «Limits to growth: the 30-year update» notes that it can be supported by the population. Uncontrolled collapse in the human footprint will come from "[2, P.XI-XII]. The development of J. Forrester and D. Meadows was continued by E. Pestel in his book Beyond Growth, which proposes the rejection of spontaneous self-

development in favor of conscious regulation of the relationship between society and natural objects [3].

In 2018, the fiftieth anniversary of the Club of Rome published a report E. Weizsäcker and A. Wijkman "Come On! Capitalism, myopia, the population and the destruction of the planet," in which scientists recommend to revise the philosophical perception of the world: «we believe it is particularly important to look at the philosophical roots of the current state of the world. We must question the legitimacy of the ethos of materialistic selfishness that is currently the most powerful driving force in the world, and we welcome Pope Francis's initiative in addressing a deeper lying crisis of values, a central issue which the Club of Rome identified many years ago" [4, P.VI]. Thus, the views of the world's leading scientists are unanimous in the question of the need to ensure a balanced nature management processes.

Since the preservation of the quality of the natural environment in modern conditions of the development of society is not ensured exclusively by self-regulation of metabolic processes in nature, the concept of "rational nature management" is justified in the scientific literature. Scientists V.I. Korobkin, L.V. Peredelsky [6] V.G. Sahaev, V.Ya. Shevchuk [7] is characterized as a complex rational nature of scientific and reasonable utilization of natural resources, at which the maximum possible conservation of natural and resource potential, with minimal disruption of the ability of ecosystems to self-regulate and self-restore.

The processes of self-regulation and self-healing are complementary, not synonymous, and characterize the different stages of the response of natural systems to external stimuli. Thus, self-regulation should be understood as the process of preserving the balance of a natural system regardless of external influences [8, p.592], and self-restoration is the response of a natural system to external influence with a view to its regeneration.

Since the organization and economic mechanisms that allow to regulate the processes of the use of natural resource potential by society, while ensuring the

preservation of the functional integrity of ecosystems should be considered as a balanced system of environmental management. It should be noted that the achievement of a balanced nature management process is largely determined by the level of ecological culture, the popularization of ethical standards of environmental management, as well as a change in the mentality of society regarding the interaction between man and nature, which will change the consumer nature of environmental management.

Taking into account that the main goal of a balanced environmental management is to preserve the functional integrity of the ecosystem, the work focuses on the ratings and management tools of a balanced environmental management system, the use of which involves adhering to a number of scientific principles and allows solving actual environmental management problems at different levels of management.

Considering that the main transformations of the components of the natural resource potential in the environmental management process are related to changes in the structure of natural resources, their reserves and involve an assessment of the costs of extraction, use and restoration of natural components, it is advisable to use a set of qualitative, natural and value indicators to assess the environmental management process. Natural indicators allow us to estimate the volume of use of the components of the natural resource potential in physical units of measurement. Qualitative indicators for assessing environmental management provide for determining the structure of natural resources relative to the usefulness of their use (MAC, MPE, carbon dioxide emissions, etc.). At the same time, cost indicators, which include cost, price and rental indicators, make it possible to compare costs with revenues associated with environmental management and resource consumption are of decisive importance. Thus, cost indicators are used in assessing the level of use of a specific type of resource and are calculated as the total and specific costs of its exploration, extraction, processing and use. Price indicators for assessing natural resources are used in the process of buying and selling them and include the cost of storing, storing, and selling natural resources and the customer's profit rate, and rental indicators are used to determine the amount of rent payments for using similar natural resources (land).

The choice of the method of environmental assessment will be determined by the objectives of the assessment process, the nature of the use of natural resources, as well as the characteristics of each stage of environmental management. Since balanced environmental management provides for the parity of social, ecological and economic interests of society and the environment, it is most appropriate to apply methods for its assessment according to the following sequence: field expedition, cartographic, computational statistical, and modeling of individual components of environmental management. Expeditionary field assessment methods allow you to explore the location

of natural resources, identify features of geological exploration and determine the costs of extraction and development of mineral deposits, mineral resources, etc. Cartographic methods are used in the process of assessing environmental management through nature mapping and sketching and scaling maps. The peculiarity of the use of cartographic methods is the ability to present the main characteristics of natural complexes and socio-economic objects, taking into account their deposits, landscape features and geophysical structure of the territory. The use of computational-statistical methods allows you to create the information base necessary to determine the normative indicators for which the maximum allowable standards of resource consumption are calculated and the use of natural resources is regulated. Their use allows you to perform a feasibility study on the use of natural resources, to monitor their consumption, as well as to assess the potential of the natural resource components of the territory.

Modern conditions of interaction between society and natural systems are characterized by limited resources, increasing needs and a high level of anthropogenic pressures, which predetermines the need to use imitation methods to develop balance-ecological-economic models of territorial complexes and determine the ratio of the volumes of components of natural-resource potential and resource needs for the implementation of various economic activities of territorial systems.

Assessment of the balance of environmental management involves the identification of criteria that characterize the process of using natural resources relative to the level of consumption of components of natural resource potential, while maintaining the functional integrity of ecosystems and environmental quality. To assess the environmental management process, it is proposed to use a set of economic, environmental and social criteria, the comparison of which will allow to evaluate the effectiveness of the use of components of the natural resource potential, the degree of change in the structure of natural resources, as well as the impact of the environment on the life processes of society.

Economic criteria are based on the use of indicators characterizing the expediency and intensity of the use of natural resources, features of the placement and disposal of industrial waste, alternative technologies for the use of resources, as well as the economic specialization of the economic complex. Environmental criteria include the use of indicators characterizing the damage caused to the environment as a result of production and economic activity, the trend of natural changes in the structure of natural resource potential, as well as the influence of factors of the global ecosystem on the development of territorial natural complexes, which will assess the possibility of regeneration and restoration of natural systems. In view of the increasing anthropogenic load on natural systems, the deterioration of the demographic situation, and the need to preserve the regenerative functions of ecosystems, we consider it necessary to define

social criteria for rational environmental management. Social criteria should include indicators characterizing the impact of environmental and economic processes on human activity, which is expressed in the rate of population growth, life expectancy, incidence, labor activity, as well as the level of education.

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So, in terms of spatial scale, balanced environmental management should be considered at the global, regional and local levels. At the global level, the problems associated with the interaction of social systems and natural systems are forming, which requires its assessment as the basis for developing transnational approaches to the global concept of environmental management. At the national level, environmental management defines the general principles and legislative frameworks implemented in the framework of nationwide strategies and concepts that preserve the functional integrity of the ecosystem. At the regional level, the prerequisites of environmental problems should be identified, which will allow the adaptation of modern methods and tools of environmental management to the geophysical features of natural systems of territorial entities. At the local level, environmental management is carried out through state regulation governing the impact of economic entities on the environment, taking into account the need to restore natural systems.

In economics as key received control ciples treat principle scientific validity of planning, optimization, management and principle of the system approach systems the use of which provides increased control efficiency by improving the control structure as its object, considering the influence factors micro and macro in the control subject. Thus, the principle of the scientific validity of environmental management makes it possible to take into account the laws governing the functioning and development of social and natural systems when developing standards for the use of natural resources, which makes it possible to assess the impact of economic and other activities on the environment, taking into account the ecological, economic and social interests of society.

The principle of a systematic approach to environmental management allows to take into account the nature of the relationship between the components of the natural resource potential, as well as their integrated use in the production and economic activities. It should be noted that the principle of a systematic approach to environmental management implies a comprehensive assessment of the impact of society on the environment and possible environmental risks, which allows to solve environmental protection problems taking into account the types and nature of the use of natural resources within the

framework of global and local environmental protection activities.

The principle of planned nature management implies the determination of the conformity of methods, scales, and rates of use of natural resources with a system of measures that envisage forecasting and preventing negative consequences of nature management, which will ensure the protection and reproduction of components of the natural resource potential. At the same time, the principle of planning ensures that the priorities of the socio-economic development of the territorial system correspond to the main goal of environmental management, which implies an environmental and economic rationale for the efficiency of the use of natural resources with a view to minimizing the human impact on the environment.

The principle of optimizing environmental management involves the use of low-waste and resource-saving technologies, charging for special use of natural resources, for pollution of the environment and for reducing the quality of natural resources. At the same time, the rationale for the expediency of using modern resource-saving technologies should be based on the results of a methodology for comparative environmental and economic assessment of options for the reproduction of natural resources in the process of solving economic problems. Thus, the principle of optimizing environmental management ensures the priority of environmental safety in determining the economic benefits of environmental protection measures.

The effectiveness of environmental management is largely determined by the compliance of the management methods used with the features of the environmental management process, while taking into account the objective patterns that characterize the interaction of environmental, economic and social subsystems of a territorial entity. Thus, administrative, legal, organizational, economic, environmental and socio-psychological methods should be singled out as the main methods of environmental management. Thus, environmental management methods of environmental management imply a scientific substantiation of the limitations of the special use of the components of the natural resource potential, which helps to ensure the preservation of the natural environment. Administrative and legal methods of environmental management involve the development of codes, legal and administrative legislation that limits the consumption of components of the natural resource potential, thereby regulating the special use of natural resources. Organizational methods of environmental management assume the adaptation of modern systems of environmental audit and insurance at the national, regional and local levels, which will coordinate the processes of using components of the natural resource potential in order to prevent excessive anthropogenic pressures on the environment. Economic methods of environmental management involve the use of a system of prices, tariffs, payments, fines and premiums for the special use of natural

resources, which ensures the accumulation of financial resources for the implementation of environmental protection programs and activities. Socio-psychological methods of environmental management involve improving the system of environmental education and upbringing, which will stimulate the development of the spiritual ecological values of society with regard to enhancing the civic position of individuals in order to preserve the natural state of the environment for future generations.

II. CONCLUSION

Evaluation of natural resource use processes and the implementation of a set of principles, methods and tools for environmental management provide solutions to current economic, environmental and social problems of interaction between society and the environment and allow optimizing the use of components of the natural resource potential regarding the economic interests of modern society. Using the proposed approach will allow to achieve the main goal of environmental management - the preservation of the functional integrity of the ecosystem.

REFERENCES

- [1] Jay W. Forrester *World Dynamics*. – Cambridge, Massachusetts: Wright-Allen Press. – 1971. – 145 p.
- [2] Donella H. Meadows, Jorgen Randers, Dennis L. Meadows *Limits to Growth: The 30-Year Update Revised*, 2004. – 363 p.
- [3] Pestel E. *Beyond the Limits to Growth*. – Paris, 1987.
- [4] von Weizsaecker, E., Wijkman, A. *Come On! Capitalism, Short-termism, Population and the Destruction of the Planet*. – Springer, 2018. – 220 p.
- [5] *Regional environmental management: methods of study, assessment and management* / [P.Ya. Baklanov, P. F. Brovko, T. F. Vorobiova, etc.]; by ed. P.Ya. Baklanova, V.P. Karakina. – M.: Logos, 2002. – 160 p.
- [6] Korobkin V.I. *Ecology* / V.I. Korobkin, L.V. Peredelsky. [ed. 8th.]. – Rostov n/a: Phoenix, 2005. – 571 p.
- [7] Sakhaev V.G. *Economy and organization guard surrounding environment*. V.G. Sakhaev, V.Ya. Shevchuk. – K.: Higher shk., 1995. – 272 p.
- [8] Azrilyan A.N. *Big Economic Dictionary* / Azrilyan A, H. [3rd ed., Stereotypical.]. – Moscow: Institute of New Economics, 1998. – 864p.