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ECOLOGICAL SAFETY AS AN IMPORTANT PART OF ENVIRONMENTAL AND PEOPLE SECURITY

The article substantiates the importance of finding and studying methods of restructuring of consciousness in relation to nature, the development of new priorities of interaction between society and the environment as a fundamentally different path of development of civilization. The main characteristics of environmental education as one of the main social aspects of environmental safety at the present stage are given. The essence and assessment of ecological competence as an important integral indicator of learning achievements are defined. It is shown, what features are characterized by global ecological safety and on what the safety of human stay both in the workplace and in the environment is based. The authors show a set of environmental standards, which are important to ensure environmental safety. The problems of environmental security, as well as methods of scientific study of environmental factors are presented. It is shown what impact anthropogenic environmental security has on global environmental security. An analysis of the requirements that should be observed in the construction process, such as planning and development of territories, so that it is not a threat to the environmental safety of the environment in general and individuals in particular is carried out. The basic hygienic principle of the planning organization of the territory of new areas of human habitation as well as reconstruction of old territories is presented. It is shown that to ensure human ecological safety around industrial enterprises and facilities with technological processes it is necessary to create special protections, sanitary and protection zones.

Keywords: environmental safety, standards, facilities, environmental problems

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1. Introduction

Environmental security is the state and conditions of the environment, which provides ecological balance and guarantees the protection of the environment: biosphere, atmosphere, hydrosphere, lithosphere, cosmosphere, species composition of fauna and flora, natural resources, conservation of health and livelihood of people. It is a set of actions, states and processes that directly or indirectly do not lead to vital losses (or threats of such losses) to the natural environment, individuals and humanity; a set of states, phenomena and actions that ensure the ecological balance on Earth and in any of its regions at a level to which humanity is physically, socio-economic, technologically and politically ready [1,7].

Environmental safety is defined in relation to the territories of the state, region, administrative regions and districts, settlements (cities and villages) or national economic objects - oil and gas areas, industrial hubs, plants, factories and other state objects of industry, transport, energy, chemistry, mining, construction, communications, etc.

For a long time there was a conviction: the development of the world economy would be stable and uninterrupted, and natural resources would be inexhaustible. Environmental problems were seen as problems of a technical nature, solved also by technical means. Technological optimism gave rise to illusions about the limitless possibilities of economic growth. And man's rapid technological encroachment on nature, spontaneous and without regard for possible consequences, has caused today's ecological problems.

Recognition of the fact that the nature of the planet is not only the physical environment of mankind, the source of resources for material production, the object of human aesthetic attitude, but above all the basis for the existence of life in all its diversity, is the reason for the inclusion of environmental security in the system of comprehensive security [6,7].

The aim of the article is the analysis of the approaches to the understanding of the concept of "environmental security" formed in the doctrine, taking into account the provisions of international acts, the substantiation of the relationship and interdependence of environmental security and sustainable development. As a result of the study it is shown that environmental security is directly linked with the transition to sustainable development, respectively, the concept of security is based on the concept of sustainable development. Hence, on the one hand, security as a good in sustainable development acquires the complex character of a certain guaranteed comfort of human existence, and on the other hand - acts as a meaningful dimension of sustainable development. A generalizing characteristic of the state of the system, meaningfully associated with its security, is an indicator, the value of which in the synergistic respect is determined by the level of balance of the components' interests, and in the anthropocentric - by the level of balance of socio-economic and techno-environmental security. Even within the model of sustainable development,

a certain level of stability and security must be achieved in order to make the transition to sustainable development possible. The transition to sustainable development is possible only on a global scale, in a coherent and coherent mode of all security objects and actors.

2. Environmental security as a component of national security

Environmental security is based on:

- awareness that humanity is an integral part of nature, fully dependent on its environment;
- recognition of the limited natural-resource (ecological) potential of the Earth and its separate regions, the need for its qualitative and quantitative inventory;
- the impossibility of artificial expansion of natural-resource (ecological) potential in excess of natural-system limitations;
- determining the permissible maximum extraction of natural resources and changes in ecosystems as a living environment;
- transition to resource-saving technologies and the miniaturization of products, to environmentally and economically safe practices;
- recognition of the law of optimality, and in economic management - the principle of reasonable sufficiency in the use of ways of obtaining the benefits of life in the spatial and temporal specific framework (restrictions on the factors of environmental, social and economic risk);
- understanding that without an adequate living environment (integrity of ecosystems) it is impossible to preserve anything living, including its species (including humans) and natural systems of a lower level of hierarchy [11-13].

The analysis of existing problems of ecological safety and researches on development and introduction of technical solutions on reduction of harmful influence on the person and environment allows to ascertain the following. Significant regional danger is caused by production and consumption wastes. Research on their processing and utilization in separate economic complexes is insufficiently developed. In conditions of insignificant volumes of waste use, the situation with their accumulation continues to become more complicated. In most cases, waste disposal sites (landfills) do not meet the established requirements, resulting in contamination of soil, surface and ground water. Environmental hazards associated with the transformation of landscapes are also formed. Persistent organic pollutants pose a particular danger to humans and the environment. The main sources of them entering the environment are storage sites of obsolete and banned for use pesticides, enterprises producing organochlorine products, as well as incinerators and other facilities where dioxins are produced.

The ecological situation related to the current state of water resources is quite complex, since the quality of groundwater and surface water has

significantly deteriorated over the past decades. Targeted study of these problems is just beginning. Different types of harmful physical impacts are weighty factors of ecological hazard formation. Research, in particular, on mitigation of noise pollution and impact of technogenic earthquakes, as well as development and implementation of appropriate technical means are insufficiently developed. Ecological safety is considered as a dynamic component of the regional system which provides its harmonious development in conditions of protection against real and potential anthropogenic and natural influences. The level of safety is mainly determined by the probability of hazard manifestation. This requires a comprehensive study of the conditions of formation of environmental hazards. Ecological hazard is a complex hierarchical structure [3,8,9].

The technogenic component of environmental hazards characterizes the impact on people and the environment associated with technical means and technologies of economic activity, and includes types determined by various factors. From the position of the system approach to environmental safety management, we consider the region as a set of interconnected and mutually influencing subsystems - natural and socio-economic. The natural subsystem creates the background base of threat formation and is the environment of its spatial distribution. Socio-economic contains sources of environmental hazards (objects of economic complexes, communications, etc.). The latter have a corresponding effect on people, the natural environment and technical systems.

In order to prevent a negative impact on the environment and preserve the ecological balance, the legislation provides for special rules to regulate many aspects of economic activities. In particular, it provides for the establishment of environmental standards and norms in order to provide a set of mandatory norms, rules and requirements for environmental protection, use of natural resources and environmental safety.

3. Complex of environmental standards

State standards in the field of environmental protection are mandatory for implementation and define concepts and terms, mode of use and protection of natural resources, methods of environmental control, requirements for prevention of environmental pollution, other aspects related to environmental protection and use of natural resources.

Standardization has a significant role in ensuring the production of competitive and high quality products, contributes to environmental protection, the economical use of natural and other resources as the basis of sustainable development of the national economy.

A set of so-called environmental standards can be considered an important element of environmental security. They are designed to determine the limits of the impact of human activity on the environment so that the quality of the latter

would be favourable for human life and health. Norms in the field of environmental protection define its acceptable state and acceptable levels of negative impact on it. In fact, such standards are a legal way to determine the maximum possible negative impact on nature, in which the environment does not lose the possibility of self-recovery and does not harm human life and health [4,5,10].

Establishment of environmental standards is a forced measure of legal regulation of the environment. They are criteria for evaluation of legality of behaviour of subjects of environmental legal relations and determine the degree of effectiveness of environmental legal norms. Among ecological norms are distinguished:

a) standards of maximum permissible concentrations and levels of pollutants in the environment and levels of harmful physical and biological impacts on it;
b) standards for maximum permissible emissions and discharges of polluting chemical substances into the environment;
c) standards for the use of natural resources.

Environmental standardization is based on three indicators:

- medical (the maximum level of threat to human health, its genetic program);
- technological (the ability of the economy to ensure compliance with certain limits of impact on humans and the environment);
- scientific and technical (the ability of scientific and technical means to control compliance with the limits of exposure to all its parameters).

It is true that the actual application of environmental standards proves their inability to fully form a safe environment. First of all, it is impossible to establish standards for all harmful substances and their compounds. The consequences of the impact on human life and health of harmful substances within the norms are not fully studied. Usually they do not take into account the specifics of the region, do not analyse the impact of complex compounds that exist in nature and society.

A new direction of integrated sanitary and hygienic standardization is the development of a system of indicators that determine the overall characteristic of the purity of water, air, and soil. They are formed by means of a list of indicators with established limits, or total relative indicators (quality indices). Such indicators are still at the stage of experimental development, but are sometimes already used by designers.

In addition to environmental regulations and standards, the environmental requirements established by law for certain types of activities are also important for ensuring environmental safety. They provide for a certain set of environmental standards and regulations, rules for the use of equipment and machinery, as well as set other restrictions on the implementation of harmful activities. There are environmental requirements for location, design, construction, reconstruction, commissioning and operation of enterprises, structures and other facilities. They are also defined for location and development of settlements, application of plant protection products, mineral fertilizers, oil and oil products, toxic chemicals and other preparations.

4. Ecological safety as a subject of complex scientific research

Peculiarity of a complex of sciences, studying the problem of ecological safety, is caused by specificity of the phenomenon of ecological safety, its versatile character, internally contradictory, organically connected with all major spheres of the vital activity of society.

Emerging and evolving as a product of the interaction of natural and social processes, it requires the attention of natural, technical, and social sciences. However, this rather broad typology of sciences does not cover the entire problem of environmental security. In addition to those mentioned, it is also the subject of study by many of other sciences.

Undoubtedly, the problem of environmental security is, first of all:

- a social problem, since we are talking about such consequences of anthropogenic activity, which have a pronounced social character and threaten the conditions of life of society;
- a natural-scientific problem, since it affects the processes taking place in the biosphere in an essential manner and on an ever-increasing scale;
- an industrial-technical problem, because it concerns productive activities associated with negative changes in the environment;
- agricultural problem, because agricultural production depends on its solution (reduction of land degradation, pest control, improvement of crop yields, etc.);
- a medical problem related to human health;
- a military science problem, because it can be used as a means of military-political pressure.

A comprehensive study of environmental security includes various forms of its study, such as monodisciplinary or interdisciplinary, integrated. Each of them has inherent advantages, allowing to reveal those or other sides or aspects of this condition.

If we take monodisciplinary, interdisciplinary and integrated forms in that hierarchical relationship leading from partial to general in environmental security research, then interdisciplinary research can be seen as a higher form in relation to monodisciplinary, and integrated research as a higher form to interdisciplinary research. In addition, the very inconsistency of the creation of ecological safety affects the subjects of different sciences, contributes to their development and the emergence of the newest scientific directions [2,14,15].

The concept of "anthropogenic ecological safety" can play an essential methodological role in individual scientific research. The ecological problem is characterized by the fact that, born on the edge of natural processes and social activity, it attracts natural, technical, social, medical and other sciences, requiring interaction between them and the surrounding reality.

Each of the sciences of the socio-ecological complex, reacting in its own way to the aggravation of the ecological situation, expresses this reaction in its own concepts.

Anthropogenic ecological security can be expressed because of a number of functions, among which it is necessary to specify the most important:

- generalizing, allowing to highlight what is basic and most essential, which at the same time covers the individual scientific concepts of this type;
- integrating, helping to concentrate the results of various studies;
- systematizing, contributing to transformation of various knowledge about ecological safety from scattered conglomerate into a single system;
- heuristic, allowing to use the concept of "ecological safety" as a generalizing ideal model in individual sciences;
- value, orienting different sciences to the common goal - achievement of full ecological safety with corresponding evaluation of those or other researches and their results.

The specificity of the integrated approach to the study of environmental security is determined by its multifaceted nature and the need to study it from different sides, using the methods of natural technical and social sciences. As the transition from research activities to practical ones, the integrated approach is transformed from the study of environmental safety to its achievement.

Insufficient consideration of the multifaceted links of production with the environment leads to negative environmental consequences. Miscalculations of practical activities are added to the methodological errors of scientific research. Concretely, the synthesis of the imperfection of scientific methodology in the assessment of ecological safety and the imperfection of technologies used together with the miscalculations of their practical implementation is the main prerequisite for anthropogenic ecological crises.

Environmental security is a peculiar socio-natural and scientific reality, the study of which must be carried out with the help of methodological tools. It must be found and adapted to the study.

The main tools selected for such research are methodological approaches. Of course, they do not exist by themselves, independently of the object and subject of research, but in abstract terms it is possible to single out some of them as means that would be expedient to use in the process of research.

Approaches and methods of scientific cognition turn out to be the closest in their features. Usually two points characteristic of the approach are distinguished:

- the ability to fix the general orientation of the research (the method is characterized by the way in which the research is conducted);
- uncertainty (the method is a clearer category).

The methodological approach implies some primary stage preceding the main part of the study. To identify the necessary approaches to the problem of ecological safety means not only to carry out a preliminary stage of research, but

also to determine the nature of ecological danger, which, in turn, becomes an important prerequisite for practical actions to overcome it.

Methodological approach is stated in the presence of the following circumstances:

- objective necessity in the formation of this approach;
- an appropriate key concept capable of transforming into a methodological approach under certain conditions;
- scientific environment, which would contribute to the development of the instrumental side of the concept and turn it into an approach;
- constant use of this concept as a means of cognition [2].

5. Environmental safety requirements for planning and development of territories

Planning of territories at the local level is carried out through the development and approval of general plans of settlements and is ensured by the relevant local councils and executive bodies. The development of the territories shall be carried out by means of siting and construction of new facilities, reconstruction, restoration, capital repairs, streamlining of the existing urban development objects, expansion and technical re-equipment of the enterprises. All objects of development shall be placed taking into account the requirements for environmental protection, urban planning and sanitary-hygienic norms.

In addition, measures for sanitary cleaning, decontamination and disposal of domestic and industrial waste must be developed. Standards for permissible emissions and discharges of substances and microorganisms, restoration of the natural environment, land reclamation, landscaping, and other environmental safety measures must also be complied with. In particular, when selecting land for a new settlement or its redevelopment, an assessment of conditions of hygienic importance is required, namely:

- analysis of natural-climatic conditions with a comprehensive assessment of solar radiation, humidity, temperature and wind conditions throughout the area to be developed;
- assessment of the natural environment's potential capacity for self-purification;
- analysis of compliance of the environmental quality (atmospheric air, water, soil) with hygienic standards;
- ensuring radiation safety of the territory for the population;
- possibility of centralized water supply, sewerage, efficient treatment and neutralization of industrial, household and special waste;
- peculiarities of engineering preparation of the territory and organization of landscaping, etc.

It is also necessary to locate the settlements on the territories that meet the basic hygienic requirements, with quiet, low-cross-country relief, with slopes sufficient for the natural runoff of atmospheric precipitation (1-6%).

The main hygienic principle of the planning organization of the territory of the new settlements or those subject to reconstruction consists of functional zoning which assumes a rational mutual distribution of all elements of the settlement and provides favourable living, working and rest conditions for the population.

The territory of the settlement, taking into account the predominant functional use, is divided into agricultural, industrial and landscape and recreational areas.

The rural area is designed to accommodate the housing stock, public buildings and structures, social, cultural and household institutions, the intra-village street and road and transport network, green spaces and places of public use. It may also accommodate separate utilities and industrial facilities, the construction of which is permitted in the vicinity of residential development.

Industrial enterprises and related facilities, complexes of scientific institutions with pilot production facilities, utility and warehouse facilities (bases, warehouses, garages, car parks, etc.), enterprises for the production and processing of agricultural products are located on the industrial territory. Here are also created sanitary protection zones of industrial enterprises, objects of external transport, roads of suburban and suburban communication.

Landscape and recreational territory is formed by suburban forests, forest parks, forest shelter belts, water reservoirs, recreation areas and resort areas. Lands of agricultural use and other lands, together with parks, gardens, squares, boulevards of the rural territory form a system of landscaping and recreational areas also belong to this territory. In these areas are allocated zones of different functional purposes - residential development, public centres, industrial, scientific, scientific-production, municipal and warehouse, external transport, mass recreation, resort (in the presence of medical resources), etc.

In order to control the condition of the sanitary and environmental regime of cities and major industrial centres and other settlements, there are maximum permissible concentration standards (MPC) of harmful substances in the air, water bodies, soils, the excess of which is dangerous for people. Protective, protective and sanitary protection zones are created around industrial enterprises and facilities with technological processes accompanied by emissions of harmful substances into the environment in order to ensure living conditions and environmental safety of people. And in the neighbourhoods and neighbourhoods of urban and rural settlements, territories (green areas) are arranged, including forest parks and other zones with a limited regime of natural resource use.

During the improvement, territories are necessarily allocated for the placement of green spaces, necessary to create aesthetics of settlements, the possibility of recreation and recreation of the population. They are the object of

independent legal regulation. They include tree, shrub, flower and herb vegetation of natural and artificial origin in a particular area of the settlement.

A distinction is made between green areas for general and limited use, and for special purposes. Green areas for general use are located in the territory of city and regional parks, specialized parks, parks of culture and recreation, the territories of zoos and botanical gardens, city gardens and gardens of residential areas, squares, boulevards, forest parks, etc. These areas are characterized by free access of citizens for recreation.

Green spaces of limited use sprout on the territories of public and residential buildings, schools, children's institutions, higher and secondary specialized educational institutions, healthcare institutions, industrial enterprises and warehouse areas, sanatoriums, cultural, educational and sports and recreational facilities.

As for special purpose green spaces, they are located along thoroughfares and streets, in areas of sanitary protection zones around industrial plants, high-voltage power lines, etc. This also includes forest reclamation, water protection, wind protection, anti-erosion, plantings of nurseries, flower farms, and roadside plantings within populated areas.

Sanitary and urban planning rules and regulations for the construction and reconstruction of cities require the design, construction and expansion of cities to provide for the maximum preservation and use of existing green spaces. They define the optimal size of green areas per capita and require that urban and regional general or specialized parks, squares, and gardens must be developed.

6. Conclusion

From the perspective of a global approach to security, any aspect that threatens the survival of the planet and its nature must be seen as a security threat. Death by nuclear catastrophe or death by lack of air is still death. The pace of global change is much greater than scientists have previously assumed. If left unchecked, these processes will become irreversible.

Environmental problems are problems of entirely new dimensions. Even with unlimited resources, the ozone layer cannot be restored. Without eliminating the causes, global warming cannot be stopped.

The difference in levels of economic development affects the ability to defend against environmental threats, and environmental degradation affects economic development, weakening its potential. According to UN experts, environmental losses due to pollution exceed the cost of measures aimed at combating it. Security is becoming an overarching category that integrates most of the problems of protecting the population from any threats.

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