

NOXOLOGICAL APPROACH TO ENVIRONMENTAL PROTECTION AND HUMAN LIFE ACTIVITY SAFETY: RISKS OF MODERN DANGERS

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Abstract

The purpose of the article: The purpose of the article is to theoretically substantiate the noxological approach to the definition of mechanisms to counter the risks of modern hazards.

Materials and methods: The key ideas of the noxological approach in the framework of this study are environmental preservation and human life-activity safety. The research is based on the methodological principles and leading ideas of environmental protection and human life-activity safety, presented in the context of social ecology, the concept of sustainable development of environmental safety, in the environmental paradigm, in the co-evolutionary paradigm of environmental ethics.

Results of the research: The authors attempt to create a theoretical model of noxological approach to countering the risks of modern hazards in environmental preservation and human life-activity safety. The systematization of the basic concepts of the noxological approach as an independent scientific direction is carried out; the regularities and sources of the hazards' emergency are established; the taxonomy of hazards is determined; the prototype of the hazard passport is justified.

Applications: This research can be used for universities, teachers, and students.

Novelty/Originality: In this research, the model of noxological approach to environmental protection and human life activity safety: risks of modern dangers is presented in a comprehensive and complete manner.

Keywords: noxology, risk, danger, hazard taxonomy, risk profiles, noxological approach, principles of noxology, basic categories of noxology.

INTRODUCTION

The problem of modern hazards' risks in the preservation of the environment and the safety of human life-activity has become particularly relevant for a number of reasons.

First, nature is the natural environment of human origin and existence. Its health, ability to work, longevity and well-being depend on the quality of the natural environment. Preservation of the environment is the basis of stability and safety of lifeactivity (Khusainova et al., 2018). The importance and significance of these natural laws of human life support are obvious. However, humanity cannot stop in the constant pursuit of new discoveries in science and technology, in the expansion of economic activity due to the unlimited consumption of natural resources, and nature is gradually losing the ability to self-recovery after the aggressive activities of people. Local environmental disturbances grow into global ones, changing the fundamental properties of the biosphere: chemical composition, temperature, and humidity, radiation background level, water acidity, ozone layer power, etc. As a result, many species of plants and animals disappear; the gene pool becomes scarce, natural landscapes change, the risk of global cataclysms increases (Velieva et al., 2018; Cherdymova et al., 2018).

Secondly, the panic state of modern civilization in the face of global dangers' inevitability initiates the need to find a way out of the crisis, which is acquiring an inexorable apocalyptic character. Traditionally, to protect against the dangers of adverse natural environmental impacts and to prevent other risks, humanity uses the technosphere - a habitat created by people with their own intellectual resources and man-made technical means. By definition, the technosphere is all that man created: industrial, urban, rural, home environment, medical, cultural, educational, etc. areas (Maharani & Subanji, 2018; Martín, Pavlikova and Tavilla, 2018).

Thirdly, the technosphere created by human hands, designed to protect it as much as possible from natural hazards, in modern conditions has become it's opposite and has become the main source of danger risk. The processes taking place in it lead not only to human victims but also to the destruction of the natural environment, its global degradation, which, in turn, causes irreversible genetic changes in people. The creation and experience of the technosphere development in



modern conditions is largely evidence that the formation of high-quality technosphere is impossible without knowledge and taking into consideration of occurrence, impact and mitigation laws (or complete elimination) of the risks lurking in it (Masalimova et al., 2018; Muyambiri & Chabaefe, 2018).

Fourth, the formation of modern hazards' *field* arising from the impact on humans and the environment of substances, energy and information excessive flows expands the range of hazards, the level, and scale of their impact. The negative impact of hazards is manifested to the highest extent in the conditions of the permanent taxonomy dominance of natural, natural - man-made, anthropogenic, anthropogenic and man-made risk profiles of modern hazards. There is a rapidly growing number of risks of extraordinary dangers to regional and global scales, causing irreparable damage to the person, the technosphere and the surrounding natural environment (Shaidullina et al., 2018).

Fifth, the important point according to which risks of modern hazards in constant synergetic movement become the major factor for the lack of expectance and uncertainties in the transformations of social reality: they fundamentally change the lifestyle of the individual and social layers, transform activities of social institutions and government agencies, control systems of multinational corporations and various businesses, enhance risk profiles of modern dangers.

The relevance of this study also stems from the empirical fact according to which the environmental, social philosophers, sociologists, and economists do not have time to comprehend and make the analytical review of rapidly modifying risk profiles of modern dangers, destroying the integrity of the environment and posing threats to the security of human lifeactivity. The established trends emphasize the special importance of theoretical and methodical substantiation of the noxological approach as an innovative direction to prevent modern hazards' risks to the environment and humans (Kralik et al., 2018).

METHODOLOGICAL FRAMEWORK

The research is based on the methodological principles and leading ideas of environmental protection and human life-activity safety, presented in the context of social ecology, the concept of sustainable development of environmental safety, in the environmental paradigm, in the co-evolutionary paradigm of environmental ethics.

The first methodological basis is the heuristic potential of social ecology, which consists in the fact that it allows the use of environmental ethics' invariants in the design of the noxological approach's conceptual apparatus as an independent scientific study. The significance of this methodological basis is determined by the trends in the creation of a global system of environmental safety, its sustainable development (Lebedeva et al., 2018).

The second methodological basis of the research is the ideas, principles, values, and technologies of the concept of nature safety's sustainable development, which practically represents a concrete strategy of this research. The importance of sustainable development of nature safety and human life-activity is that it determines the need for scientific justification of theoretical and methodical approach to rethinking the principles of human interaction with the environment, providing for the formation of a system of values, value orientations, interests, needs, attitudes, experience of the individual in making new, environmentally-oriented decisions and norms of behavior in relation to the natural environment. In this regard, the dominant place in the concept of sustainable development is given to the principles of equal coexistence of man and nature, equal interaction of ecology, economy, and production.

The third methodological basis of the study is the concept of the environmental paradigm. Strategies for the formation of a new ecological worldview of man, the core of which are not traditional anthropocentric, and environmental ethical values, based on the unity of man and the environment, on the recognition of wildlife all kinds' right to equal with man the value of life on earth, are now the most promising and their importance is only increasing. Man in the environmental paradigm is considered as a part of nature, he is inside nature, inseparable from it, depends on it as well as it depends on him. The environmental paradigm has significantly expanded the interpretation of the ecosystem and the system of relations in it, in fact, has become a new stage in the development of socio-ecological theory based on a wide variety of interdisciplinary links of social Sciences and Humanities, the use of ethical values of environmental protection as a modern strategy to limit the negative impact of human activity on the environment (Rogaleva et al., 2018).

The fourth methodological basis is the co-evolutionary paradigm of environmental ethics, which integrates the key ideas of the relationship and interaction between humanity and the environment as humanitarian conditions for the prevention of risks of modern hazards. The basic principle of the co-evolutionary paradigm – "nature is not a passive object of human activity, but a full-fledged entity of joint, mutually agreed, harmonious co-development with man and society, has the prospects of equal dialogue with humanity, with reality in General", determines the direction of the noxological approach to prevent the risks of hazards:

- 1) The transition from strategies of unlimited progress, unlimited economic growth to ideas about the limits of growth;
- 2) Rejection of nature's economic expansion to the harmonization of the principles of environmental containment and prohibition;
- 3) Change of technological progress and innovation expansion on stability, balance, sustainable development taking into account limits of growth;

4) The transition from the technologies of competition and competitiveness to the expansion of models of collaboration, cooperation, humanitarian coexistence in the global space (Roubalová, Žalec, and Králik, 2018; Merkibayev et al, 2018; Oliveira et al, 2018).

It is proved that the presented methodological foundations play a significant role in solving the problem of this study, as they provide an opportunity to substantiate and prove the effectiveness of the noxological approach as a new conceptual direction to prevent the risks of modern hazards in the environment and in the safety of human life-activity.

The Hypothesis of the Study

The problem of preventing the risks of modern hazards in the preservation of the environment and human life-activity safety is the subject of close attention of civil society, scientists, specialists, government and public representatives, entrepreneurs. Interest in it has gone beyond local and regional scales and has acquired a global character. However, to date, a scientifically system-based approach to solving the problem of modern hazards' risks in the environment and in human life cannot be traced. There are reasons for this, due to the nature-consuming psychology of humanity, which difficultly change the principles of anthropocentrism on co-evolutionary and environmental principles. Existing research, reflecting the local and regional practical experience of rescuers, firefighters, emergency specialists, volunteers, preventing the consequences of hazards, cannot independently solve such a system problem by definition. It is difficult to overestimate the importance of the axiological approach in the search for solutions to these problems. Understanding the importance of theoretical substantiation of the noxological approach as an independent scientific direction of solving the problem of modern hazards' risks to the environment and to humans, initially involves:

- Systematization of basic concepts of noxology as an independent scientific direction;
- Definition of hazard field;
- Establishment of features of expansion the structure and content of modern hazards' risk profiles;
- Definition of hazard taxonomy;
- Justification of the danger passport's prototype.

RESULTS AND DISCUSSION

Scientific comprehension of the problem of modern dangers' risks in the preservation of the environment and the safety of the individual's life-activity determines the need for the design and implementation of noxological approach's theoretical model

- 1. As the first component of the model, the methodological content of the noxological approach's concept is substantiated, which is concentrated:1) on the content of the ideas of nature centrism of social ecology, the value bases of the environmental paradigm, co-evolutionary ideas of sustainable development of environmental and human security; 2) on implementation of strategic, operational and prognostic purposes to prevent modern dangers' risks in preservation of environment and safety of human life-activity.
- 2. The second component of the model is the theoretical basis of the noxological approach: a set of key concepts and principles that reveal the essence of modern hazards' risks.

Key Concepts

In the study of this problem, we relied on the following concepts:

- noxology (Greek. noxo danger) the branch of knowledge about the dangers of the material world of the Universe, studies the origin and cumulative effect of hazards, reveals the features of dangerous zones' emergence and the impact on the material world, assesses the damage caused by hazards to man and nature, and also considers the principles of minimizing the dangers in the sources of occurrence and determines the mechanisms of protection against them within dangerous zones;
- Risk is a basic element of danger. Risk algorithm: perception and analysis of risk situations definition of risk levels definition of risk profile the creation of risk portfolio;
- Hazard risk profile a set of basic typical features: 1) the origin of hazards: natural (nature), natural man-made, anthropogenic, anthropogenic and man-made, man-made; 2) the size of the impact zones: local, regional, interregional, global; 3) the degree of completion of the danger: potential, real, realized;
- Danger the Central concept of noxology. These are human properties and a mandatory component of the environment that can cause damage to living and non-living matter:

1) from the point of view of human security, danger is a negative property of the material world systems that lead to loss of health or death; 2) from the point of view of environmental protection - danger is a negative property of the systems of the material world, leading nature to degradation and destruction; 3) from the point of view of the technosphere, which has



now become the main source of hazard risk, the formation of a high-quality technosphere is impossible without knowledge and taking into consideration of the laws of occurrence, impact, and mitigation (or complete elimination) of the dangers' risks hiding in it. The risk of danger in relation to other material objects exists always and everywhere;

- Techno sphere habitat created by people with their own intellectual resources and man-made technical means. By
 definition, the technosphere includes everything that is created by man for a comfortable and safe life: industrial, urban,
 rural, domestic environments, medical and preventive, cultural and educational, etc. zones.
- 2) Principles of noxological approach:
- The principle of unity and indivisibility of man and nature: man is unable to abolish or change the laws of nature; they
 are objective and act against his will;
- The principle of transition from the economic expansion of nature to the harmonization of the principles of environmental containment and prohibition;
- The principle of transition from strategies of unlimited progress, unlimited economic growth to ideas about the limits of growth;
- The principle of transition from the focus on technological progress and innovation to focus on stability, equilibrium, sustainable development, taking into account the limits of growth;
- The principle of transition from competitive technologies to the expansion of models of cooperation, humanitarian coexistence in the global space;
- The principle of negation of absolute security: absolute security of the person and the integrity of nature are unattainable. There are natural hazards, processes of resource consumption, recycling of human waste, production, are inevitable anthropogenic hazards, man-made, techno sphere-based, natural;
- 3) The third component of the model is represented by a set of developments aimed at increasing the level of human knowledge about the risks of modern hazards.

Dangers Field

It represents a set of processes and phenomena of the biosphere and technosphere, outer space, social and other systems that radiate danger to the object of protection. Each source of danger is characterized by the presence of the level, zone, and duration of action. To describe the source of danger from the standpoint of its negative impact on humans and nature, the indicator of material waste (emissions, discharges, and waste) is used. The intensity of energy radiation and the risk of exposure are determined by the concentric principle.

Factors of the first hazard concentration have a direct impact on humans: hazards associated with climate and weather changes in the atmosphere and hydrosphere; hazards arising from the absence of regulatory conditions of activity on illumination, on the content of harmful impurities in the surrounding space, on electromagnetic and radiation emissions; dangers arising in residential (urban) places of buildings of residential or industrial areas and on objects of activity; at implementation of technological processes and operation of technical means both at the expense of imperfection of equipment, and at the expense of its misuse by operators of technical systems and the population in life; dangers arising from the lack of public awareness about the safety of life.

Factors of the second concentration of hazards caused by the presence and the absence of waste treatment of production and life; emergency hazards arising from natural phenomena and man-made accidents in residential areas and other objects of activity; insufficient attention of production managers to the safety of work, which creates conditions for the wrong organization of jobs, violations of working conditions, water pollution, food.

Factors of the third hazard concentration lack of necessary knowledge and skills of designers of technological processes, technical systems, buildings, and structures; lack of an effective state security management system across the industry, region, country; insufficient level of development of personnel training in the field of environmental protection and human life-activity safety.

Taxonomy of Danger

Characteristic signs of the dangers of the first level:

- 1) Origin of danger: it is determined by the influence of natural, natural-man-made, anthropogenic, anthropogenic and man-made, man-made hazard profiles.
- 2) The nature of the streams of danger. All life flows according to their risks are divided into mass, energy, and information, therefore, the emerging dangers should be perceived as mass, energy, and information.



- 3) Flow intensity. According to the intensity of exposure, all risks are classified as dangerous and extremely dangerous. Dangerous flows exceed the maximum permissible limits no more than several times. If the levels of exposure flows are above the tolerance limits, the situation is considered extremely dangerous.
- 4) the duration of exposure to the object of protection is differentiated to constant, variable and impulse hazards. Permanent ones active during the working day, days, usually associated with the conditions of human stay in industrial or domestic premises, with his/her presence in the urban environment or in the industrial zone. Variable hazards are typical for the conditions of realization of cyclic processes (noise, vibration). Impulse (short-term) effects of danger are typical for emergencies, as well as for volley emissions, avalanches.
- 5) Types of danger zones: industrial, domestic and urban, emergency zones.
- 6) Dimensions of hazard zones. By the sizes of influence zones, the dangers are classified on local (household, production), regional, interregional and global.
- 7) The degree of completion of the exposure process to the object of protection. They are divided into potential, real and realized.

The potential hazard is a General hazard not related to the space and time of exposure. The presence of potential dangers is identical to the axiom – all people are mortal. The real danger is always associated with a specific threat of negative impact on the object of protection (human, nature). Realized danger – the fact of real danger's impact on a person or habitat, which led to the loss of health, death, destruction of nature.

Characteristic signs of second-level hazards:

- 1) The ability of protection's object to distinguish or not to distinguish the risk of danger. The object of protection, as a rule, has the selective ability to identify the dangers by the senses.
- 2) In view of hazards' negative impact on the object of protection, they are divided into harmful (oppressive) and traumabased (destructive).
- According to the number of persons exposed to dangerous effects, the danger is divided into individual, group and mass.

Harmful – negative impact on a person, which leads to deterioration of health or disease. Trauma-based impact – a negative impact on a person that leads to injury or death.

Danger Passport

A necessary condition for a competent assessment of danger's risk, their negative impact on people and the environment, as well as while the selection of protective measures in the process of eliminating or localizing the impact of danger. It is a prototype of a regulatory document, which are fixed:

- 1) Field of danger:
- Production shops, educational institutions
- Urban (residential) places of buildings of residential or industrial areas
- Natural zones
- Household areas
- 2) The risk profile of hazards:
- Natural
- Natural-man-made
- Anthropogenic
- Anthropogenic-man-made
- man-made
- 3) Nature of hazard:
- Dangerous
- Extremely dangerous
- 4) Hazard risk duration:
- Constant





- Variable
- Impulse-based
- 5) Measures to prevent:
- Local (local)
- Regional
- Interregional
- Global

CONCLUSION

All the fundamental problems of our time are connected with the environmental specifics caused by the trends of the global crisis. In the current difficult conditions, the importance of understanding is established, in solving the global environmental problem of human survival it is necessary to be based on new strategies and ideas about the progress of civilization. It is necessary to abandon the ideas and values of unlimited economic growth, the expansion of nature in favor of environmental containment and prohibition, sustainable development, taking into account the limits of growth, the expansion of humanitarian coexistence in the global space. Accordingly, the study of the problem of noxological approach to the protection of the environment and human security is productive in terms of the accumulation of creative knowledge about the changes taking place in the modern environment.

- 1. It is established that noxology, as a concept involved in the discourse of the Sciences, has a special range of definitions. In the course of the research, two approaches to the understanding of this concept are substantiated:
 - Noxology the branch of knowledge about the dangers of the material world of the Universe, studying the origin and cumulative effect of hazards, describing the dangerous zones and indicators of their impact on the material world, assessing the damage caused by hazards to man and nature, as well as considering the principles of minimizing the dangers in the sources of their occurrence and determining the mechanisms of protection against them within the dangerous zones; 2) noxology prototype of the danger as individual's feature and compulsory component of the environment that could harm living and nonliving matter.
- 2. It is defined, the involvement of noxology as the prototype of a danger in the discourses of the various Sciences, on the one hand, creates an interdisciplinary space for the study of this phenomenon, on the other, determines categorical *confusion*, which in turn makes it harder to understand the noxological approach to the protection of the environment and the safety of human life-activity as an independent scientific direction. In this regard, the importance of the basic concepts and principles systematization of the noxological approach is increasing. The study revealed the transformation of the noxological approach's basic concepts, due to the integrative interaction and mutual influence of established methodological principles. It is proved that the established risks of hazards are expanding. An understanding is formed, the risk of danger is present in any process, phenomenon. The process of development of the danger field's new framework is accelerating.
- 3. The idea of noxology about the dangers of the material world in this study is reflected in the design of noxological approach's theoretical model to the protection of the environment and security of human life-activity. The essence of this approach is based on the methodological principles and leading ideas of environmental protection and human life-activity safety, presented in the context of social ecology, in the concept of sustainable development of environmental safety, in the environmental paradigm, in the co-evolutionary paradigm of environmental ethics.
- 4. At this point, the content of key concepts and basic principles is determined that make up the theoretical framework of noxological approach. The leading element of the theoretical model is a practice-oriented complex including:
 - Structure and content of the hazard field;
 - Hazard risks diagnosis;
 - Systematization of risk profiles of modern hazards;
 - The structure and content of dangers' taxonomy;
 - Justification of the prototype of the danger passport.
- 5. In the course of the monitoring study, it was established that the noxological approach is an innovative strategy of environmental protection, tolerant human interaction with the environment, sociability, goodwill and creativity in the conditions of their life. At the same time, the level of psychosocial well-being of the environment (7 points at possible 9) is directly related to the assessment of risks of danger in the environment. Other indicators: tolerant interaction (6 points out of possible 9); sociability (5 out of 9); goodwill (6 out of 9); creativity (7 out of 9); fear (6 out of 9);



satisfaction with activities (8 out of 9) indicate the willingness of people to overcome the emerging risks of hazards, which indirectly confirms the effectiveness of the use of a practice-oriented set of the noxological approach's model.

6. The materials of the article have a practical application. Knowledge of the nature of hazards, hazard risk profiles will help to avoid, localize or eliminate them in real life. This knowledge is also useful in the development and implementation of techniques and new technologies in the field of environmental protection, as well as in management decisions that regulate the risks of modern hazards in the preservation of the environment and human life-activity safety.

The study does not exhaust all aspects of the problem identified. Their further development involves a more detailed consideration of the psychological characteristics of modern hazards' risks and their regulation as a guarantee of environmental sustainability and safety of human life activity.

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