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**WEATHER-CLIMATIC CONDITIONS AND FACTORS AS  
RESOURCE OF ECONOMIC DEVELOPMENT**

***WEATHER-CLIMATIC CONDITIONS AND FACTORS AS A RESOURCE  
FOR ECONOMIC DEVELOPMENT.***

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*У статті здійснено аналіз результатів узагальнення сучасних підходів до використання погодно-кліматичних ресурсів у контексті соціально-економічного розвитку та екологічної безпеки. Виявлено основні причини та фактори, які обумовлюють виникнення надзвичайних ситуацій в Україні.*

*Statement of the problem.* Studies of interaction weather-climatic conditions on the economic-ecological development of the region (state) at the present stage are exceptionally important, because contribute to the practical application of scientific research in solving urgent social and economic problems. This particularly applies to situations involving the protection of life and property, protection of the environment and contribute to sustainable development. The problems of providing environmentally safe and technologically living conditions of population, resource independence of the national economy of other countries, as well as improving and greening of technologies related to economic and environmental stabilization and increase the efficiency of natural resources at the present stage of the progressive development of Ukraine are of particular relevance. The solution to these problems determines the resource-environmental security of the state, which is part of the national security of Ukraine. Providing a high-growth regions and the national security interests in the context of Ukraine's integration into the European community raises the problem taking into account current trends and expected changes in economic, environmental, social and political processes in the future.

It should be noted that at the present stage of development the state's economy is very weak forecast mechanism is used. It is expected that the benefits of providing weather-climatic information in different industries will continue to grow, as more and more extreme weather and climate-related events, such as leading to emergency forest fires or floods, increasing the burden on the productive natural resources. Short- and long-term forecast weather-climatic conditions, warnings, hazards, and other meteorological services to provide a noticeable difference in the degree of national preparedness and the ability of states to mitigate or prevent the adverse effects of climate change and variability. The economic impact of natural disasters has increased significantly over the past few decades. The data of the International Federation of Red Cross and Red Crescent clearly indicate that 90% of natural disasters, observed between 1992 and 2001, related to weather and climate. It

should be noted also that the consequences of such disasters is manifested most strongly in recent years. During this same period, the worldwide prevalence of natural disasters have become 622 thousand people and 2 billion people affected by them. According to the estimates of the World Meteorological Organization, the overall economic benefits of modern meteorological service, exceed the national cost of providing such services to 10 times.

In the Third Assessment Report of the Intergovernmental Group of Experts on Climate Change (2001) indicated that, as expected, as a result of anthropogenic climate change on regional and global levels, duration, site of manifestation, the frequency and intensity of extreme weather events will undergo, perhaps even and it is likely changes that the most negative impact on the economic development of regions (states). However, mankind has always lived in a climate shifts, and people have developed their remarkable strategies for survival. Disasters can be avoided or significantly mitigate their effects by anticipating potential hazards, or invest in preventive measures. Therefore, you must pay special attention to the development of strategies for practical application of preventive and preparatory measures, such as risk assessment, early warning of hazardous and natural weather and climatic phenomena [1].

A consequence of the foregoing, the adoption in 2000 of the Law of Ukraine "On state forecasting and elaboration of programs of economic and social development of Ukraine" [2] and in the 2001 edition of the Order of the President of Ukraine "On preparation of a draft strategy for economic and social development of Ukraine for 2002 - 2011" [3].

*The purpose* of this paper is to analyze the results of generalization the modern approach to the use and forecasting weather-climatic resources in the context of socio-economic development and environmental security of our country and regions. The analysis showed lack of research on integrated economic-ecological forecasting and planning interaction between nature and society, as well as timely response to the projected anomalies and spontaneous weather-climatic phenomena. It should be noted that in many countries the problem of predicting elevated to the rank of state policy. At the same time more and more take place in prognostication ecological and economic-ecological trends. However, economic and ecological researches of emerging threats, conflict and crisis situations, including emergencies, hazardous for sustainable development, as the directions of scientific and practical activities are at the beginning of its development (the Law of Ukraine "On the Fundamentals of National Security of Ukraine" [4].

Relevance the problems of environmental safety of society and state, are the focus of this article, due to the following threats:

- increasing the number of emergency situations of natural and technogenic character;
- increasing public attention in the quality of life and, in particular, environmental safety;
- State focus on European norms and standards, including ecological;
- consequences of the Chernobyl disaster;
- a significant level of anthropogenic impact on the environment, etc.

At the state legislative level and in the public mind, this set of problems is defined as a threat to environmental safety. Ecological security is defined as a condition of protection the environment and the vital interests of man and citizen from the possible negative impact of economic or other activities, and threats of emergencies natural and technogenic characterdisasters, their consequences.

*The results of the study.* At present, any area of human activity is not protected from the influence of weather-climatic factors. For a comprehensive study of the influence weather-climatic factors on the economic-ecological development of the region should determine the place of weather-climatic factors in economic development [5]. At the present stage is not enough developed, the impact of weather-climatic factors on the efficiency of the economy, with all the absoluteness of this influence. Issues of human impact on the environment, widely covered in the scientific and popular literature, it is not considered economic damages and losses related to weather-climate change. In this context, as a rule, it is a global transformation of the climate. It should be regarded as obvious, it is impossible to plan for sustainable economic development without anthropogenic impacts the development of the concept sustainable development at the national level. In this regard, the organization research issues influence of weather-climatic factors is very important on the regional and national level. Particular importance is research the following issues:

- an integrated registration of weather-climatic factors in planning for sustainable development of regional economy;
- spatio-temporal distribution measuring economic, ecological and social damage caused by anomalous and natural weather-climatic phenomena;
- methodological aspects to use of weather-climate forecasts in the planning and management of regional economies, given the potential estimation of economic efficiency discussed forecasts;
- methodological approaches to the formation of long-term economic-ecological strategies in the use of natural-resource potential of Ukraine, its components, and the relationship of natural-resource potential with weather-climatic conditions.

In this context, particular attention should be paid to the consideration of the use prognostic information in the regional economy due to the fact that a complex weather-climatic forecasting is the basis for the prevention of hazardous and disastrous phenomena. Consideration of weather-climatic factors in the formation of long-term economic-ecological strategy involves the implementation of an appropriate set of economic-ecological studies and actions that should be now a leading priority.

It should be noted that the economic development taking into account the weather-climatic factors in the Ukraine are practically absent. This factor is a component of natural-resource potential of the region and has a significant impact on practically all economic activity. Interaction between humans and the environment has a significant influence on the degree and pace of economic growth in two directions. On the one hand - this is anthropogenic impact on the natural environment, which is to: - increase the consumption of fossil fuels; - increasing the use of chemicals in agriculture; - extending and increasing the

number of landfill sites; - the degradation of arable land; - decreasing of forest areas; - pollution of soil, rivers, seas and air; - increase concentrations of greenhouse gases. All this leads to a global change of weather-climatic conditions in the region (state) with negative socio-economic consequences. On the other hand there is a negative impact of anomalous natural phenomena on the economic and social life of the region (state). The construction of theoretical models that quantitatively describe the complex of weather-climatic processes that lead to the emergence of extreme weather phenomena, is one of the most difficult problems. Extremely important is the establishment of relevant management theory, which allows to find optimal decisions for long-term economic planning and operational implementation of production activities. A detailed exposition of the theory optimization of economic decisions made based on various types of meteorological information is given in a specially dedicated to this issue, the monographs [6, 7]. According to the theory developed, the choice of decisions should be considered:

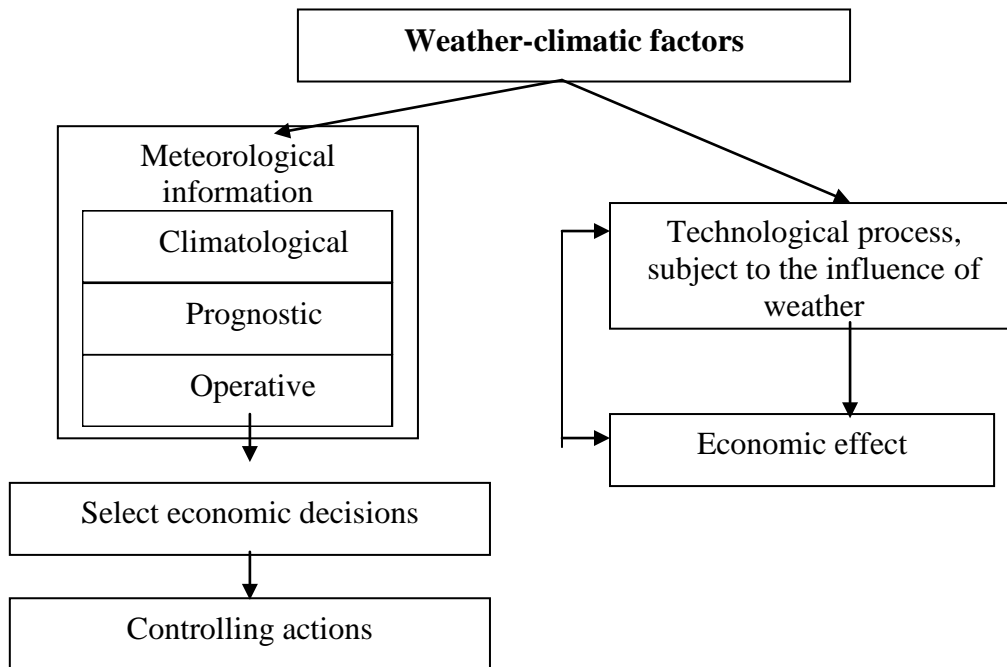
- The natural variability of the influence of weather-climatic factors;
- The actual use unreliable weather forecasts;
- Economic impact of non-compliance actual weather conditions, which are based on the planned economic activities.

In all cases, the initial stage of research is the construction of meteorological-economic model that reflects the specific features of the economic problem and the main interaction in the weather - weather information - the consumer system. Author's interpretation of the scheme "weather - weather information - the consumer" is shown in Fig.1.

The objectives of the methodological support and of emergency situations is not only the forecasting of dangerous natural phenomena, but natural-technological hazards [8]. It should be noted that the concept of risk, its existence and influence on the life of man is inseparable from the story. In various sectors of the economy the risk is manifested in various ways, sometimes dramatically, sometimes implicitly. However, it is not always clear to read and an integral part of human existence.

Among the threats that affect the choice of direction for the development the state, society and the individual, all belong to the majority of techno-industrial and natural-ecological hazards.

The influence of techno-industrial and natural-ecological hazards can be manifested through the emergency situation (ES) natural and technogenic disasters (Emergency situation - a violation of people's living conditions in the facility or area due to accident, disaster, emergency, or other factors which lead (could lead) to the death of humans, animals and plants, extensive material damage and (or) cause a time the environment). In the event of ES is interference of natural hazards and potentially dangerous objects, which leads to a synergistic effect on people, economic entities and the environment. As a consequence - the overall effect is other than the impact of each hazard separately. That is why the assessment of hazards and analysis of ES for the natural and technogenic objects are held in a complex - to account for their interaction.



**Fig. 1. The structure of relationships in the "weather - weather information - the consumer" system.**

The state protection of population and the environment from the hazards various types of technogenic and natural is the natural-technogenic safety. Ensuring sufficient level of natural-technogenic safety of the individual and society as a whole depends on objective factors (the technical condition of potentially dangerous objects, the current system of protection from emergency situations of natural and technogenic, monitoring of natural processes and phenomena), as well as the random component, which is human factors and other factors, the impact of which it is impossible to plan and predict.

The main reasons and factors that contributes to emergency situations in Ukraine include:

- The continuous growth of anthropogenic impact on the environment;
- Anomalous natural processes and phenomena;
- Unsatisfactory technical state of of production facilities (in particular of life support facilities);
- Unsatisfactory compliance and safety standards in the sectors of the economy.

Thus, as a recommendation, it should be noted the need to: - maintain the readiness of emergency response forces to respond to natural force majeure events; - compliance with regulatory and legal documents on environmental protection, safety, labor protection and environmental safety in industry, construction and other areas and spheres of activity; - the organization of operative study forecasting materials, risk maps of emergency situations coming from management forecasting and timely information to the relevant services of the responsible authorities about the possibility of deterioration.

*Conclusions and prospects for further research.* Economic criteria for sustainable development in Ukraine at present do not consider important enough, but not defined in terms of value "services" associated with decreased risk of life the population, with a reduction in the level of economic-ecological damage caused by anomalous natural phenomena. The above facts constitute a significant drawback. As production is directly dependent not only on economic, social, political, ecological and other factors, but also on weather-climatic factors (and not in the least). However, if the national statistical services revenue impact on the production of economic and social factors is reflected in the documentation, the proceeds of the effectiveness the use of weather-climatic factor is practically absent.

At the same time, taking into account this factor, due to the increasing scale of social-economic losses in regions of Ukraine, is essential for sustainable development.

In this paper, weather-climatic conditions and the factors considered as a resource for economic development in the region (state), and in fact as a new category of "weather-climatic resources" from the standpoint of the theory natural-resource potential (eg, N.F. Reimers [9]) and its multidimensionality.

Thus, the weather-climatic resource (WCR) can be seen in the following directions:

- WCR is a unique integral resource intensively used for the development of regions, the state of humanity, ie, WCR - is a system and an integrated set of diverse natural processes and phenomena that have a significant impact on the economic (cost) and other human activities.
- WCR - is a significant part of the natural-resources potential, which is involved in the socio-economic sector of the regions and states.
- WCR - is the ability of natural systems, how to produce useful work, and without prejudice to give the required society nature of the products.

Responding to the suggestion, the weather-climatic resources can ultimately be seen as the natural conditions and forces of nature, which are: - considered essential for life and economic activity; - either directly or indirectly involved in the sphere of productive and unproductive activity people.

Thus, WCR - is the object of anthropogenic impact, which, when anomalous deviations, impairs vital activity society [10].

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#### Abstract

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**Weather-climatic conditions and factors as a resource for economic development.**

The article analyzes the results of generalization modern approaches to the use of weather-climatic resources in the context of socio-economic development and environmental safety. Identified the main reasons and factors that lead to emergency situations in Ukraine.