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**DIAGNOSTICS OF ECOSAFETY REGIONS DEVELOPMENT
IN UKRAINE**

**DIAGNOSTYKA ROZWOJU REGIONÓW UKRAINY
PRZYJAZNYCH DLA ŚRODOWISKA**

**ДИАГНОСТИКА ЭКОЛОГИЧЕСКИ БЕЗОПАСНОГО
РАЗВИТИЯ РЕГИОНОВ УКРАИНЫ**

Abstract

The article reveals the essence of environmentally safety development of the region. An analysis of the ecological situation in the regions of Ukraine is carried out on the basis of indicators of air pollution, water purification and utilization of solid and hazardous wastes. A number of measures have been proposed to improve the status of atmospheric air, water objects, outlines ways of solving the problem of waste utilization in the regions of Ukraine.

Keywords: *region, sustainable development, environmentally safe development, ecological safety, atmospheric pollution, waste management*

Streszczenie


Artykuł ujawnia charakter rozwoju bezpieczeństwa ekologicznego regionu. Analiza sytuacji ekologicznej w regionach Ukrainy przeprowadzana jest na podstawie wskaźników zanieczyszczenia powietrza, oczyszczania wody i utylizacji odpadów stałych i niebezpiecznych. Zaproponowano szereg środków w celu poprawy stanu powietrza atmosferycznego, obiektów wodnych, zarysowano sposoby rozwiązania problemu utylizacji odpadów w regionach Ukrainy.

Słowa kluczowe: *region, zrównoważony rozwój, rozwój bezpieczny dla środowiska, bezpieczeństwo ekologiczne, zanieczyszczenie powietrza, gospodarka odpadami*

Аннотация

В статье раскрыта сущность экологически безопасного развития региона. Осуществлен анализ экологической ситуации в регионах Украины на основе показателей загрязнения атмосферного воздуха, водоочистки и утилизации твердых и опасных отходов. Предложен ряд мер по улучшению состояния атмосферного воздуха, водных объектов, определены направления решения проблемы утилизации отходов в регионах Украины.

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Ключевые слова: регион, устойчивое развитие, экологически безопасное развитие, экологическая безопасность, загрязнение атмосферного воздуха, утилизация отходов.

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Statement of the problem in general outlook and its connection with important scientific and practical tasks.

In order to increase the efficiency of managing the business structures and ensuring an adequate level of quality of life of the population is important to solve the problems of ecologically safe development in the region. In order to ensure the ecological safety of the region, it is necessary to determine and adjust the level of anthropogenic pressure on the territory and to optimize it. Environmental pollution, inappropriate use of natural resource potential, insufficient

level of introduction of environmental innovations lead to an ecological crisis, which is accompanied by a crisis of the socio-economic system of the region. Therefore, special attention should be paid today to the diagnostics of environmentally safe development of the region. It is also necessary to develop and make managerial decisions regarding ecologization of production in the regions, increase its economic efficiency and competitiveness while taking into account the environmental factor.

Analysis of latest research where the solution of the problem was initiated.

The research of problems of sustainable development was undertaken by such scientists as J. Hulse (Hulse J., 2007), F. Jovane, H. Yoshikava (Jovane F., et al. 2008), R. Blinc, A. Zidanssek, I. Slaus (Blinc R., et al. 2007), G. Clarc (Clarc G., 2007), V. Jegatheesan, J. Liow, L. Shu, S. Kim, C. Visvanathan (Jegatheesan V., et al. 2009), E. Gonsz, U. Skirke, H. Kleizenn, M. Barber (Gonsz E., et al. 2007), B. Hughes, P. Johnston (Hughes B., Johnston P., 2005).


Theoretical, methodological and applied provisions of ecologically safe regional development are disclosed in scientific works B. Burkynskiyi, V. Stepanov, S. Khar-ychkov (Burkynskiyi B., et al. 2007), B. Danylyshyn, M. Koretskyi, O. Datsii (B. Danylyshyn, et al. 2006), V. Kravtsiv, P. Zhuk (Kravtsiv V., et al. 2015), N. Pavlikha (Pavlikha N., 2006), N. Semeniuk (Semeniuk N., 2008) etc. However, further research on the diagnosis of regional ecological development is needed.

Aims of paper. Methods.

The purpose of the article is to assess the level of environmentally safe development of the regions of Ukraine, to determine the prospective ways of the ecological situation improvement in the regions of Ukraine.

Methodological basis of the research are general theoretical methods of scientific knowledge, in particular dialectic method, system analysis, fundamental positions of general economic theory. Methods of comparative and structural analysis, statistical

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groupings were also used to analyze the level of environmentally sustainable devel-

opment of the regions; graphical – for a visual representation of the dynamics of indicators.

Exposition of main material of research with complete substantiation of obtained scientific results. Discussion.

The key directions of sustainable development of regions according to the National Paradigm of Sustainable Development of Ukraine are the provision of a single integral model of social, economic and ecological development of the region; growth of the welfare of the population of the region; provision of dynamic socio-economic growth; preservation of the environment and rational use and reproduction of natural raw material potential; satisfaction of the needs of the population of the region on the basis of development of a highly efficient economy and management system of the economic complex; stimulating structural changes in the region's economy (Paton B., 2012, p. 72).

Environmental safety is one of the most important landmarks for the regional sustainable development. It ensures the constancy of the spatial system, determines the optimal level of load on the ecological component.

According to the concept of sustainable development, socio-economic development of the region should ensure the ecological safety of people's lives. Although, any influence of economic development on the state of the environment is negative in relation to its quality, as there is an increase in the technogenic load. At the same time, the possibilities of introducing resource-saving and environmentally-friendly technologies are increasing and the level of ecological culture of the population increases.

The main principle of the environmentally sustainable development of the region is the transition to environmentally balanced models of production and consumption and the elimination of the relationship between

the economic development of the region and environmental degradation.

The complexity of ensuring the environmentally sustainable development of regions and the country as a whole in the context of transformation processes is due to the fact that the current ecological and economic situation in Ukraine is characterized by the dominance of nature-rich industries and industries with raw material export orientation etc. Over the past decade, the industrial structure of the country has increased the importance of nature-intensive, environmentally aggressive industries (metallurgy, fuel and energy) and decreased the share of more environmentally friendly industries (machinery, light industry) (Potapenko N., 2001, p. 28-29).

The analysis of scientific literature has shown that the environmentally safe development of the region is an integral part of sustainable spatial development, the basis for solving the problem of harmonizing the goals of social and economic development with the principles of environmental safety.

In our opinion, the ecosafety development of the region should be considered as a systemic category that combines social, economic and ecological components, the interaction of which involves the transition to environmentally balanced production and consumption patterns, increasing the efficiency of nature management, the development of environmental infrastructure.

In order to enhance the environmentally safety development of the regions of Ukraine, it is necessary to determine its preconditions, namely the state of the eco-

logical situation. In particular, it is necessary to analyze the indicators of air pollution, water purification and utilization of solid and hazardous waste.

In Ukraine, in recent years, we have seen a decrease in emissions of air pollutants from stationary and mobile sources of pollution. It should be noted that in 2017 emissions to the air in Ukraine amounted to 2584.9 thousand tons, which is half as much as in 2014. This tendency can be explained by

the decline of the economy in 2015. Also, as of 2012, we observe a tendency reduction of emissions into the air from mobile sources of pollution (State Statistics Service of Ukraine, 2018)

Analysis of data on pollutant emissions into the air from stationary sources of pollution in the regional context for 2011-2016 has shown that the most contaminated regions are Dnipropetrovsk, Donetsk and Ivano-Frankivsk regions (Table 1).

Table 1. Volumes of emissions of pollutants into the air from stationary sources of pollution for 2011-2016, thousand tons

Region	2011	2012	2013	2014	2015	2016	The share of the region in Ukraine in 2016, %
Ukraine	4374,6	4335,3	4295,1	3350,0	2857,4	3078,1	–
Vinnitsa region	87,3	101,3	149,5	124,5	134,7	119,8	3,9
Volyn region	7,6	7,3	6,6	4,3	4,7	4,7	0,2
Dnipropetrovsk region	950,4	962,0	940,5	855,8	723,9	833,0	27,1
Donetsk region	1525,9	1514,8	1448,1	1043,0	917,6	981,4	31,9
Zhytomyr region	19,0	18,5	17,2	10,9	9,0	9,3	0,3
Zakarpatska region	17,2	8,1	7,7	3,9	4,4	4,9	0,2
Zaporizhzhia region	229,3	207,6	245,9	206,7	193,7	167,0	5,4
Ivano-Frankivsk region	221,8	196,7	202,9	228,8	223,9	196,7	6,4
Kyiv region	113,6	129,4	111,9	96,2	78,1	98,2	3,2
Kirovograd region	15,2	16,8	15,7	11,8	14,2	11,8	0,4
Lugansk region	472,0	447,6	442,0	197,8	115,2	155,5	5,1
Lviv region	129,4	130,7	121,4	100,2	102,4	103,1	3,3
Mykolaiv region	25,7	25,1	20,4	15,9	15,8	13,9	0,5
Odessa region	30,5	28,2	26,2	23,2	26,1	26,4	0,9
Poltava region	72,3	67,9	66,6	62,9	55,6	56,2	1,8

Rivne region	17,1	14,9	12,0	11,6	10,2	9,1	0,3
Sumy region	35,9	30,2	30,5	27,0	17,5	19,8	0,6
Ternopil region	20,4	20,9	15,9	8,2	8,5	9,0	0,3
Kharkiv region	174,1	197,6	210,3	150,5	53,4	100,2	3,3
Kherson region	5,8	6,4	6,0	7,2	8,9	9,7	0,3
Khmelnitsky region	18,7	16,4	17,2	17,1	18,3	21,7	0,7
Cherkassy region	62,2	69,4	73,1	66,7	57,5	52,3	1,7
Chernivtsi region	3,8	2,9	2,7	2,5	3,2	3,0	0,1
Chernihiv region	49,5	45,8	43,7	41,9	33,9	37,1	1,2
m. Kyiv	33,3	32,9	31,9	31,4	26,7	34,3	1,1

Source: compiled by the State Statistics Service of Ukraine.

In 2016, out of 47 cities in the regions of Ukraine, where regular monitoring was carried out, in 22 cities the atmospheric air by the integral indicator was characterized by high levels of pollution. These are the regions where powerful enterprises of the metallurgical, chemical and petrochemical industries and fuel and energy complex are located. In these regions there is a high level of atmospheric air pollution.

The main measures aimed at improving the atmospheric air in the regions of Ukraine are:

- Improvement of technological processes (including the transition to other types of fuel and raw materials);
- Construction and commissioning of new gas treatment plants and facilities;
- Increasing the efficiency of existing treatment plants;
- Elimination of sources of pollution, which made it possible to reduce emissions of pollutants into the atmosphere;
- Implementation of other measures, which made it possible to reduce emissions of pollutants into the air.

Analyzing volumes of discharged polluted return water in surface water facilities by regions of Ukraine, it should be noted that


surface water continues to belong to the number of contaminated natural resources. Gradual reduction of water consumption is reflected in reducing the amount of wastewater discharged. So, in 2016, in surface water objects, 698 million cubic meters of waste water was thrown, which is almost 2.5 times less than in 2013. In the regional section most of the water was thrown off by powerful industrial consumers (Dnipropetrovsk, Donetsk, Zaporizhzhia regions).

The following factors influence on the ecological state of the surface waters of the regions of Ukraine: soil pollution, atmosphere, change of landscape structure and technogenic overload of the territory, inefficient work of sewage treatment plants.

In order to improve the status of water bodies, a number of measures aimed at stimulating the rationalization and ecologization of water use, which include:

- Development of innovative water-saving technologies;
- Increase of investment activity in relation to the construction of modern and reconstruction of existing water treatment and water treatment facilities;

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- Stimulation of the development of environmentally friendly, anhydrous, shallow, recyclable and repeated-successive technologies in order to reduce the volume of contaminated wastewater and protection of water sources;

- Financial and economic stimulation of the implementation of innovative water-saving projects;

- Creation of effective market levers of ecological and economic regulation of water resources relations, which will enable to provide adequate financing of water and water protection activities;

- Implementation of the system of ecological and economic instruments for the promotion of water-saving production and consumption;

- Development and implementation of water saving policy, its periodic correction in accordance with the processes of state development, its control and evaluation of the results of the implementation of this policy;

- Implementation of the water management strategy taking into account the provisions of the eu water framework directive 2000/60 /eu;

- Attraction of additional financial resources, including using the mechanism of public-private partnership;

- Intensification of cooperation in the middle of newly created institutions - communities that are interested in preserving the environment in their territories.

The peculiarity of the structure of waste generation in Ukraine due to the raw material orientation of the economy is the high share of mining waste (rocks and mineral products rich in minerals – slimes, tails, etc.) in their composition – over 75%. At the same time, less than 2% of communal waste is spent. The largest amount of waste is formed at the enterprises of mining and smelting, coal, chemical industry and energy.

An analysis of the total amount of waste accumulated during operation in specially designated locations in the regions of Ukraine during 2012-2016 has shown that this indicator has increased in the Dnipropetrovsk, Zakarpatska, Kirovograd and Lviv regions (National report on the state of the environment in Ukraine, 2017, p. 308).

In general, as regards hazardous waste, it should be noted that today, due to the lack of perfect technologies for the disposal of unsuitable pesticides, offered on the domestic market, it is justified to export unsuitable pesticides from Ukraine to neutralize. For a long time in the country the issues of utilization and processing of hazardous waste that are stored in landfills and special landfills and on the territory of enterprises remain unresolved. The problem of building utilization, disposal complexes and new modern disposal sites is also not solved. At the same time, the pollution of the environment with toxic industrial waste has reached a level that negatively affects the health of the population.

Ways of solving the problem of utilization of waste should include:

- Formation of a modern waste recycling system, taking into account European experience;

- Improvement of the regulatory framework;

- Construction of new waste incinerators and waste recycling plants;

- Separate sorting and processing of household waste;

- Increase of fines for the disposal of unsorted garbage in specially not allocated places;

- Recycling of packaging for different products;

- Restriction of circulation of plastic goods.

In order to carry out an assessment of the ecologically safety development of the regions of Ukraine, we have calculated the

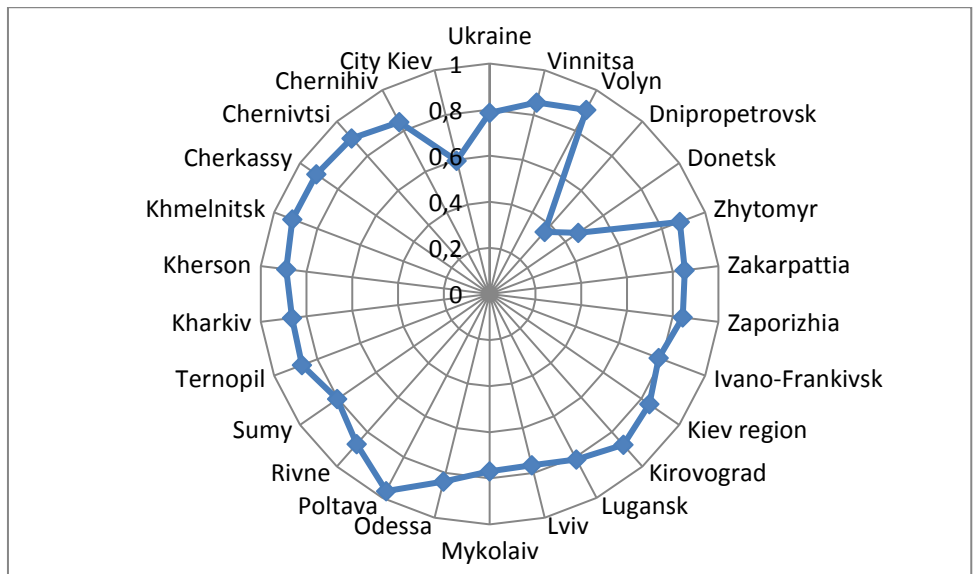
ecological index based on the statistical data that determine the ecological situation in the regions. Such indicators are the amount of accumulated waste, the volume of water pollution and the volume of emissions of pollutants into the air.

It should be noted that more precisely the ecological situation is transmitted not by absolute but by relative values, since the regions of Ukraine are rather differentiated by quantitative characteristics. Therefore,

the statistical indicators, expressed in absolute terms, were recalculated in relative terms. Since the indicators have a different dimension, then aggregation requires their reduction to one basis, that is, it requires a preliminary valuation of values. After the corresponding calculations we got the value of the ecological index.

The ecological situation in the regions of Ukraine by the ecological index in 2016 is graphically represented in Fig. 1.

Fig. 1. Ecological situation in the regions of Ukraine by the partial ecological index in 2016



Source: compiled by the author.

This indicator is evenly distributed in almost all regions of Ukraine, except in Kyiv, Donetsk and Dnipropetrovsk regions. Significant deterioration of the ecological state is the radioactive, chemical and physical pollution of the air basin, surface and groundwater by industrial enterprises, destruction and pollution of the land. Enterprises are emitting metals, methane, carbon monoxide, sulfur oxide, ni-

trogen oxide, ammonia and other substances into the atmosphere. The best ecological situation was observed in the Poltava, Khmelnytsky, Cherkassy, Chernivtsi and Volyn regions.

Proceeding from the main tendencies of negative changes in the state of the environment in Ukraine and its regions, we see the need for the ecologization of social production, that is the introduction of resource-saving and environmentally-

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friendly technologies and technological processes, methods of rational management of natural resource potential, through which, with maximum reception of high-quality of the public product will be ensured the preservation of the quality of the environment as an important factor in the quality of life of the population.

The ecological development of the country and its regions at the present stage should

consist in the transition from the implementation of certain environmental measures to the development and implementation of the concept of comprehensive environmentalization of social production and other areas of activity, the creation of a system of state incentives for resource saving and environmental development, bringing them in line with the requirements of sustainable development strategy.

Conclusions.

Consequently, the results of the research shows that the level of environmental safety in Ukraine and its regions is not high enough, and measures to improve it are not fully effective. Diagnostics of ecologically safe development of regions of Ukraine provided the basis for determining the asymmetry of its components and the main problems in the environmental sphere,

which are characteristic of certain regions of Ukraine. Implementation of measures to improve the status of atmospheric air, water bodies and solving the problem of waste utilization will not only promote the ecological and economic efficiency of enterprises, but will also ensure sustainable and balanced economic growth in the regions of Ukraine as a whole.

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