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Rating assessment of the sustainable development of the Russian entities: a scientific approach

Valoración de la evaluación del desarrollo sostenible de las entidades rusas: un enfoque científico

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ABSTRACT

The relevance of the present study is due to the socio-environmental crisis phenomena, the tool to minimize which is the transition to sustainable development, declared by the President of Russia. The article deals with the problem of assessing the level of sustainable development of the Far Eastern territories of the Russian Federation in terms of compliance with environmental goals of sustainable development of the UN 11-15. The authors use methods of graphic analysis, construction of time series and rating evaluations to assess the level of sustainable development in terms of environmental protection indicators in the subjects of the Russian Far East. As a result of defining the criteria according to the developed scale, the authors conclude that only in 2 regions the level is defined as favorable. The environmental problems of the regions are noted, and the key directions of improving the environmental well-being of the territories under consideration are outlined. As a result, it is determined that the key to solving these problems can be introducing elements of circular economy in the modern economic system.

Keywords: Environmental Protection; Graphic Analysis, Socio-Environmental Crisis; Sustainable Development.

RESUMEN

La relevancia del presente estudio se debe al fenómeno de la crisis socioambiental, cuya herramienta para minimizar es la transición al desarrollo sostenible, declarado por el Presidente de Rusia. El artículo trata el problema de evaluar el nivel de desarrollo sostenible de los territorios del Lejano Oriente de la Federación Rusa en términos de cumplimiento de los objetivos ambientales de desarrollo sostenible de la ONU 11-15. Los autores utilizan métodos de análisis gráfico, construcción de series temporales y evaluaciones de calificación para evaluar el nivel de desarrollo sostenible en términos de indicadores de protección ambiental en los sujetos del Lejano Oriente ruso. Como resultado de definir los criterios según la escala desarrollada, los autores llegan a la conclusión de que solo en 2 regiones el nivel se define como

favorable. Se anotan los problemas ambientales de las regiones y se describen las direcciones clave para mejorar el bienestar ambiental de los territorios bajo consideración. Como resultado, se determina que la clave para solucionar estos problemas puede ser la introducción de elementos de economía circular en el sistema económico moderno.

Palabras llave: Protección Ambiental; Análisis Gráfico, Crisis Socioambiental; Desarrollo sostenible.

1. INTRODUCTION

The systemic crisis that manifested itself in 2020, caused by the world pandemic, environmental and man-made disasters, the instability of prices for energy resources, emphasizes the need for transformation of the Russian economy. The current model of Russia's development, focused on raw materials and export-oriented sectors of economic activity, shows its insolvency. Declared by the Decree of the President of the Russian Federation and the strategy of socio-economic development of the Russian Federation until 2020, the transition to sustainable development requires an acceleration of the trajectory, which is impossible without finding an optimal development model that allows to ensure not only growth of economic indicators, but also to improve the environment, quality of life and reduce social inequality.

The global goal of sustainable development is human survival, which raises the challenges of preserving the biosphere, reducing environmental degradation, and increasing the assimilative potential of the environment. As shown in the figure, the UN has now approved a list of 17 goals, which can be grouped into 4 areas, shown in Figure 1.

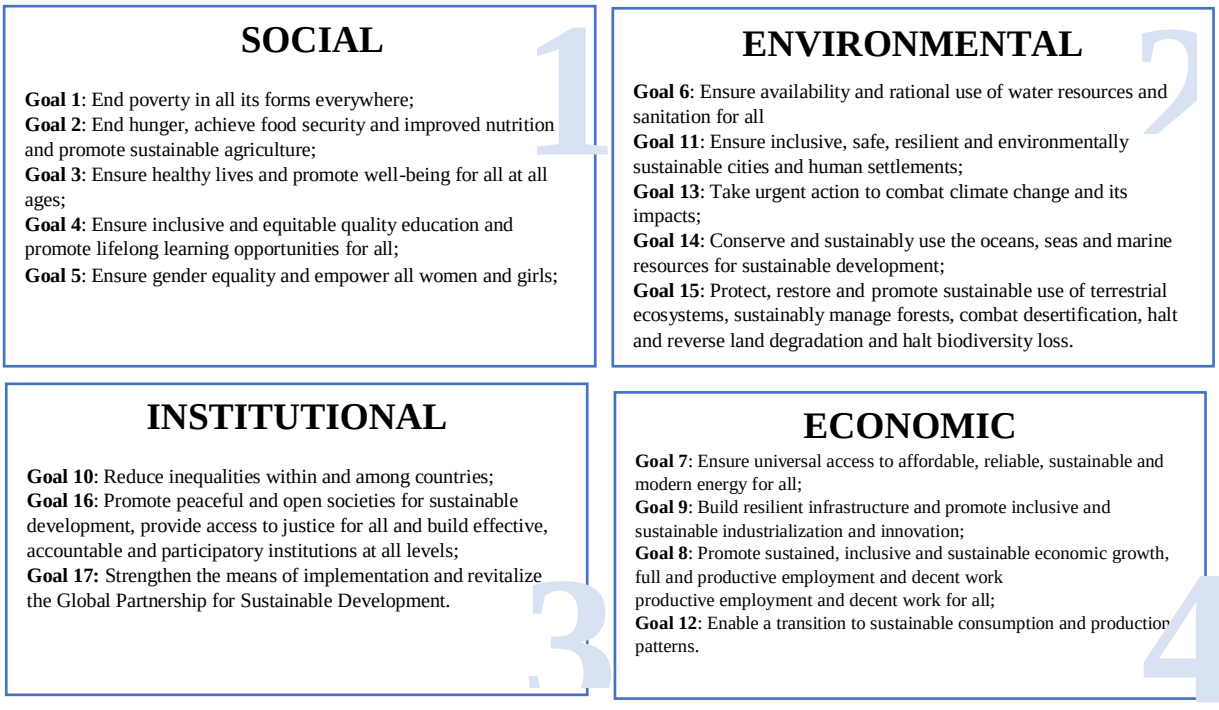

Figure 1. Grouping of the UN Sustainable Development Goals

Despite the fact that these goals have been approved, unresolved scientific problems include insufficient elaboration of the methodology for assessing sustainable development in terms of the implementation of

UN targets, as well as the applicability of these methodologies for remote macroregions in the Far East of the Russian Federation. These methodological problems are caused, among other things, by the specific territorial and geographical features of the Russian territories, as well as, etc. Determining the criteria to assess the achievement of these goals in the state is a complex methodological task. In the Russian economic conditions due to the presence of remote regions, characterized by a high degree of differentiation in the sphere of sectoral specialization, infrastructure provision, the degree of development of natural resource factors, this problem is of particular importance. In this regard, it is important and relevant to study and develop methodological approaches to assess the degree of compliance of the current level of sustainable development with the strategic benchmarks of the global scale.

2. STATE OF KNOWLEDGE

A wide range of studies devoted to the development of the Far East as a macro-region has been found on the scientific problem considered in this article. In the existing works of domestic scientists, the works are devoted to these problems of assessing the sustainable development of the regions. At the same time, the issues of analyzing sustainable development are not adequately studied at the level of the Far Eastern territories (Ratner et al., 2020; Ratner, 2020; Kulakovskiy, 2019; Minakir, 2017; Pyzheva & Zander, 2019; Shaslo et al., 2018). The prevailing majority of the works published in the last five years consider the compliance of the current economic situation in the macro-region with the strategic guidelines declared in the targeted state programs (Beklaryan, 2018; Baklanov & Moshkov, 2016; Kozlova et al., 2016; Alekhin, 2016; Bobylev & Solovyeva, 2020; Glazyrina & Zabelina, 2020; Glazyrina et al., 2020; Koshevaya & Miroshnikova, 2020; Nedoluzhko et al., 2019; Andreev, 2018; Volynchuk & Pestsov, 2020; Lebedinskaya et al., 2018; Titova & Vorozhbit, 2017; Titova et al., 2016), investment development and international economic cooperation with the APR countries.

3. METHODOLOGY

This article opens the series of articles devoted to the problem of evaluating the sustainability of the Far Eastern territories and reveals the results of the study of indicators characterizing environmental protection. The purpose of this study is to assess the conformity of the level of sustainable development of the subjects of the Russian Far East with the UN environmental goals. The subjects of the Far Eastern Federal District of the Russian Federation are the object of the study. In order to fulfill this goal, it is necessary to determine the indicators that correspond to the fulfillment of the UN environmental goals, presented in Table 1.

Table 1 - Definition of Statistical Indicators

UN Environmental Goal	***Statistical Indicator***	***Connecting***
Goal 6: Ensure availability and efficient use of water resources and sanitation for all	Fresh water use	*Reverse*
Goal 11: Ensure openness, safety, resilience and environmental sustainability of cities and human settlements	Discharge of polluted wastewater into surface water bodies	*Direct*
	Emissions of pollutants into the atmospheric air	*Reverse*
Goal 13: Take urgent action to combat climate change and its effects	Share of captured and decontaminated air pollutants in the total amount of waste pollutants from stationary sources	*Direct*
	Expenditures on environmental protection	*Direct*
Goal 14: Conserve and sustainably use the oceans, seas and marine resources for	Volume of recycled and sequentially used water	*Direct*

UN Environmental Goal	*Statistical Indicator*	*Connecting*
sustainable development		
Goal 15: Protect and restore terrestrial ecosystems and promote their sustainable use, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss	Discharge of polluted wastewater into surface water bodies	*Reverse*

Based on Table 1, each indicator should be analyzed by taking into account its relationship to the goal. The direct connection means that with the improvement of each indicator the achievement of the goal comes closer, while with the reverse connection the closer the achievement of the goal is, the lower the value of this indicator.

The study was conducted for all eleven subjects of the Far East, and the indicators according to which the environmental condition was analyzed included data on the atmosphere, hydrosphere, and nature protection. These include emissions of air pollutants from stationary sources, capture of air pollutants from stationary sources, share of air pollutants captured and neutralized in the total amount of pollutants emitted from stationary sources, use of fresh water, volume of recycled and sequentially used water, discharge of polluted waste water into surface water bodies, and environmental protection costs. Thus, dynamics was calculated for each of the indicators, as well as the specific weight of each subject in the total volume of the Far East for each of the indicators. Based on the dynamics for the period from 2005 to 2019, the average value was found, and according to this, each subject was assigned a certain score from 1 to 11. After that, the scores for all seven indicators were summed up, summarized, and each subject received a final score. The resulting summary table is presented below, and according to it regions can be divided into the following zones: critical from 32 to 36, low from 36 to 40, medium from 40 to 44 and high from 44 to 48. The distribution is presented in Figure 2.

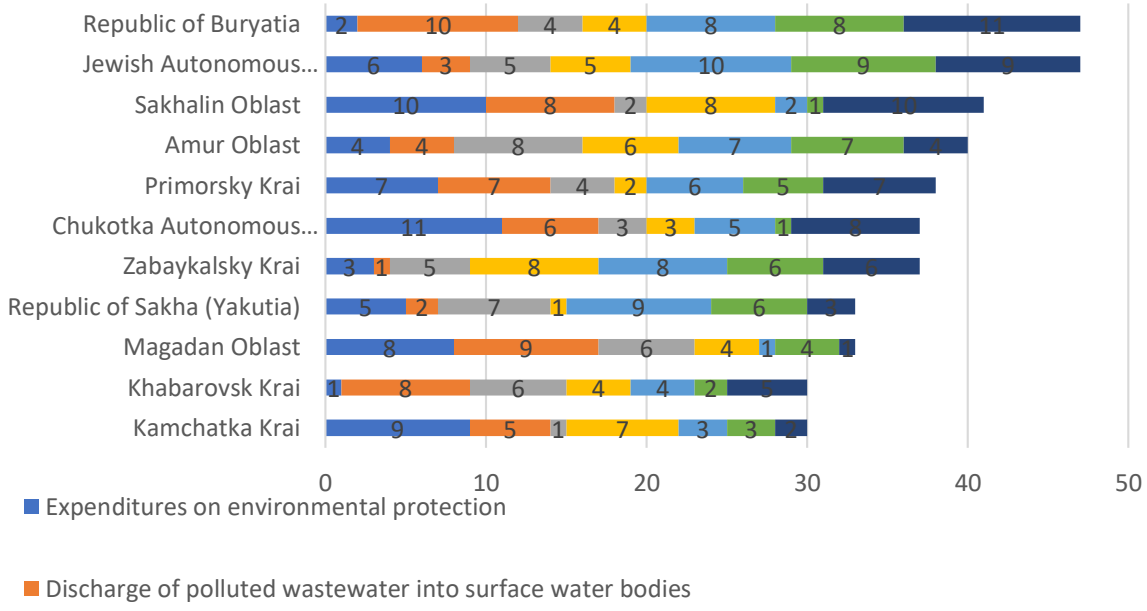

Figure 2. Scoring distribution of regions according to the level of sustainable development

The subjects with the most attractive indicators for environmental and economic development, i.e., those that lie in the green and blue zone, identified as a result of the study, can act as a driving force capable of increasing the level of sustainable development in the Far East, reorienting the region's economy toward a greener one that aims to preserve or minimize harm to the environment and improve the quality of life of the population.

4. RESULTS

The best indicators of the level of environmental and sustainable development according to the rating assessment were recorded in the Jewish Autonomous Region. At the same time, the results of the analysis show that one of the weak points in the region is the condition of water resources of the autonomous region, which belong to the Amur River basin. Discharge of polluted wastewater into surface water bodies since 2005 remains at a steadily high level, on average, each year the indicator shows an increase of 10%. According to the report on the state of environmental development of the subject of the Russian Federation from 2019, it is necessary to state that in dynamics since 2013 the water quality of rivers of the subject has deteriorated from the level of "weak pollution" to "dirty" and "very polluted".

The average level of environmental development was recorded in the Chukotka Autonomous District, the Sakhalin Region, and the Republic of Buryatia. Chukotka Autonomous District as the least populated subject of the Far Eastern Federal District demonstrates an increase in the volume of polluted wastewater. There is also a decrease in atmospheric pollutants, as well as a lack of growth in the volume of recycled and sequentially used water. The situation is due to the lack of treatment facilities in the region.
Evaluation of environmental indicators demonstrates that the worst results are observed in the Republic of Sakha (Yakutia), Khabarovsk Territory, Kamchatka Territory and Magadan Region. In these constituent entities of the Russian Federation, the level of sustainable environmental development on the scale reaches a critical level.

The Khabarovsk Krai falls into this category due to the negative and insufficiently positive dynamics of the development of the studied indicators. The condition of the region's atmospheric air is particularly critical. According to data from the Federal State Budgetary Institution "Far Eastern Hydrometeorological Service", exceedances of standards for chemical oxygen demand (COD) of up to 1.3 times were recorded in the Amur River near Khabarovsk, which may indicate the entry of difficult to oxidize organic substances in the water. The increase in the content of pollutants in the atmospheric air was caused by anthropogenic pollution, including forest fires, as well as unfavorable meteorological conditions (weak wind, stagnant air) for the dispersion of harmful impurities in the surface layer of the atmosphere. At the same time, a favorable trend is the annual decrease of polluted wastewater discharge, by 4% on average. This is achieved by commissioning a deferrization and demanganization complex at the Amur water intake point in Komsomolsk-on-Amur and by reconstructing the head water treatment facilities in Khabarovsk.

Sakhalin Oblast, which scored 40 points in the assessment, demonstrates an average level of sustainable development; the unfavorable trends that slow it down include, first of all, an annual 5% decrease in the share of collected and polluted substances. At the same time, the Government of the Sakhalin Region together with the Ministry of Natural Resources and Environment launched a pilot project in the region to introduce technologies aimed at reducing greenhouse gas emissions, and to work out a methodology of forming a system of verification of greenhouse gas emissions and absorption accounting". Secondly, the subject was not allowed to take the first positions by the low rating on the dynamics of the indicator Volume of recycled and sequentially used water. At the same time, the regional authorities are planning to modernize treatment facilities in three settlements of the district - Aniva, Taranay and Novotroitskiy. This will improve the environmental situation.

The following environmental problems are observed in the Republic of Sakha (Yakutia): land disturbance and insufficient reclamation, failure to provide the population with quality drinking water, low provision of settlements with sewage and wastewater treatment systems. This is confirmed by the results of the assessment: among all regions of the FEFD, Yakutia has the highest average growth rate over 15 years in the use of fresh water, while its treatment system is at a low level. Specialization of this constituent entity of the Russian Federation in the types of economic activity "Extraction of minerals" and "Production and distribution of electricity, gas and water" also poses a significant threat. This leads to the fact that the bulk of the negative impact on the environment falls on industrial enterprises that are not ready for the transition to the principles of sustainable development and rational use of environmental resources. Re-equipment of the average enterprise requires significant investments, which requires state support.

Kamchatka Krai has the lowest rating indicator, - which puts the Krai in the territory of Far East with the critical level of ecology. Kamchatka Krai historically uses the most expensive energy resource in the world energy technology - combustion of hydrocarbon fuel at the diesel power plants, thermal power plants, boiler houses. In addition, this technology is an environmentally polluting energy production. The territory of the region emits at least 15 thousand tons of harmful substances in the form of sulfur and nitrogen compounds, and dust. At the same time carbon dioxide CO_2 is emitted into the atmosphere as a product of hydrocarbon fuel combustion, equal to the amount of fuel burnt, which amounts to 1,8 million tons per year. In the Magadan region, the main sources of pollution are the activities of mining enterprises, pollution and alteration of river massifs by hydroelectric power plants, surface washout from the undeveloped territories of settlements during the periods of snow melting. High negative impact in the region is caused by high level of pollution of sewage, drinking and natural waters caused by anthropogenic factor.

Low levels of sustainable environmental development are registered in Zabaykalsky Krai, Amur Oblast and Primorsky Krai. Zabaykalsky Krai and Amur Oblast are included in the rating due to a decrease in the growth rate of environmental expenditures. Thus, on average, funding for environmental protection in the regions annually decreases by 4-5%. in Zabaykalsky Krai by 48% in 2020 compared with the previous year. Local authorities find it very difficult to solve this urgent problem, since the regions are subsidized and therefore largely dependent on the federal budget, which allocates almost no funds for the environment. These trends emphasize the need to increase expenditures on the protection of surface and underground water from depletion and pollution during the development of placer deposits - this problem arises because of the lack of responsibility of producers who operate mining fields. The situation in the regions is far from the best in such an important sphere as water use. The low place in the rating of the subject of the Russian Federation is also due to a high level of discharge of polluting wastewater, the average annual growth over the last 1.5 decades is 18% in Zabaykalsky Krai and 9% in the Amur region.

Primorsky Krai also received 39 points in the rating, falling into the zone with a low level of ecology. However, the discrepancy with the average and high level indicators is small, which means that Primorsky Krai has every chance to improve the state of the environment. For example, in the village of Glazovka, the fourth waste-sorting complex in Primorsky Krai is being installed. Commissioning of the facility will allow sorting waste from the Lesozavodskiy urban district and part of the Kirovskiy district. Now the specialists are assembling the process equipment, the complex will be put into operation in March. Its capacity will amount to 10 thousand tons of waste per year in one shift. The startup of the enterprise will allow selecting useful fractions - glass, plastic, paper, tin, aluminum cans and polyethylene suitable for recycling. Hazardous waste will be sorted separately, which will then be sent to specialized recycling companies.

Since various environmental indicators were used during the development of the rating, including water, it can be assumed that the problem of low rating is related to this. The large number of ports, fishing leads to the deterioration of the quality of coastal waters and the death of their inhabitants.

5. CONCLUSION

The developed and tested methodology for assessing sustainable development in the context of key environmental indicators has such advantages as ease of use, the possibility of bringing the data into a comparable form, because it is based on the analysis of growth rates. This allows, on the one hand, to analyze the dynamics of indicators development, on the other hand, it makes it possible to conduct regular monitoring of changes in the current position of the regions in the rating. This methodological approach can be used to assess the compliance of the UN sustainable development goals with the current situation. Of course, this methodology can be refined and expanded by indicators, defined indicators for economic, institutional and social goals, which is the prospect of further research. In addition, a separate topic is the development of organizational and economic mechanisms aimed at increasing the level of sustainable development of the Far East as a macro-region.

Thus, modern challenges of the world system, including globalization, the crisis of the resource-raw model of development, the introduction of the fourth industrial revolution, emphasize the need to implement organizational and economic mechanisms aimed at increasing responsibility for the aggravating environmental problems due to the limited natural resources. With the increased requirements in the field of ecology, resource efficiency and social responsibility, the possibilities of modern technologies in the near future it will already be easy enough to trace the entire path of the added value chain from the initial material to the final product. This will undoubtedly reduce the competitiveness and development prospects of companies that do not fit into these global trends. The resulting reduced demand for non-renewable sources, such as oil, will hit the Russian economy even harder, given its budgetary structure of raw materials.

In our opinion, an important strategic tool on the path of sustainable development, will be the application of the concepts of circular economy, the basic principles of which involve accounting and assessment of the potential value of waste production, differentiation of resources used, savings from the use of renewable resources, increasing the lifetime of the product produced.

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