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RESEARCH ARTICLE
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Evaluation of the Effectiveness of the "Green" Growth Policy Pursued at the Regional Level in the Republic of Kazakhstan

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Abstract

The purpose of the article is to evaluate the effectiveness of the "green" growth policy pursued at the regional level. An analysis of various approaches to assessing the sustainability of the socio-economic development of the region is presented. To achieve this purpose, a comprehensive methodology was used, considering territorial factors and sectoral conditions for the development of the regions. Domestic and foreign experience in assessing the sustainability and effectiveness of the territory development were analyzed. Existing methods for assessing the region stability are studied. An integral indicator of sustainable development of the region is calculated, which includes indicators of economic, environmental, and social sustainability. The typology of Kazakhstan regions has been carried out according to the level of their environmental and economic development for the purposes of developing an effective environmental and innovation policy. It has been proved that the list of socio-economic indicators used in the calculation of the integral index makes it possible to determine with a sufficient degree of certainty the effectiveness of the ongoing regional development policy from the standpoint of observing the principles of "green" growth. It has been revealed that the modern model of socio-economic development of the country and its regions requires further efforts to develop adequate indicators of "green" development that consider economic, social and environmental components in a balanced way. The empirical conclusions of the work can find practical application in the process of developing an effective environmental and economic regional policy.

Keywords: Regional Economy, Sustainable Development, Regional Policy, Green Economy, Integral Index

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1. INTRODUCTION

Since independence and after a period of economic recession, Kazakhstan has experienced rapid economic growth, based mainly on the development of the extractive industry. The need to change the economic trajectory by moving away from the resource-based economy, its modernization and diversification, and the transition to an innovative knowledge-intensive economy based on the principles of "green growth" is the main political task today. Thus, according to the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan for the period 2016-2020, the real increase in the gross domestic product of Kazakhstan amounted to 49.3%, while the share of the mining and oil and gas industries in the gross domestic product for the specified period decreased from 20 % to 17%. The volume of expenses for environmental protection is growing every year. If we compare 2017 with 2021, it can be seen that the volume of costs increased by 59.1% and amounted to 417 billion tenge. In the structure of costs, payments for air protection and climate change problems increased by 15.2%, the costs for wastewater treatment increased by 74%, for waste management increased by 62.5% and more than twice for other areas of environmental protection activities.

In addition, one of the essential aspects of modern economic realities is the process of economic regionalization, which means the need to consider regional characteristics when developing practical tools to stimulate the "green" model of the development of the Republic's economy. When substantiating the directions of transition to the green economy in Kazakhstan, the current level of its formation should be assessed, and the differentiation of the country's regions development dictates the need to take into account territorial features when conducting such an assessment (Varavin & Kozlova, 2018).

The sustainability assessment of the territory development (country, region), taking into account the influence of economic, social, environmental, and institutional factors, is a very relevant scientific and applied problem. The issues of determining indicators that allow assessing sustainable development's achievement level remain topical.

The study's relevance is confirmed not only by the global trend and concern for creating favorable environmental conditions but also by considering the exhaustibility of sources of fossil raw materials and the objective need to find alternative ways to develop the energy sector.

The study aims to evaluate the effectiveness of the "green" growth policy pursued at the regional level. To achieve this goal, a comprehensive methodology was used, taking into account territorial factors and sectorial conditions for the region’s development.

Research hypothesis: the region's environmental state and development trend depend on the state's economic, environmental, and social policies.

The research questions are:

- to study the existing methods for assessing the region's sustainability;
- to calculate an integral indicator of sustainable development of the region, which includes private indicators of economic, environmental, and social sustainability;
- to carry out a typology of Kazakhstan regions according to their environmental and economic development level to create an effective environmental and innovation policy.

2. LITERATURE REVIEW

The official definition of a "green" economy used in the scientific literature was given by UNEP in 2009: “it is a system of economic activities associated with the production, distribution, and consumption of goods and services that lead to an improvement in the well-being of people in the long term, without exposing future generation to significant environmental risks and scarcity of resources”.

The definition of "green" growth was first proposed by the Economic and Social Commission for Asia and the Pacific (ESCAP). In 2005, the ESCAP Declaration was adopted in Seoul, in which "green" growth was adopted as a strategy for achieving sustainable development. "Green" growth is a “growth that emphasizes environmentally sustainable economic progress to promote low-emission, socially inclusive development”. South Korea was the first country to develop a "green" growth plan and adopt it as a national economic model (Kasztelan, 2017).

Over the past few years, the idea of a "green economy" has become vital for achieving sustainable development in developing and developed countries (Houssam et al., 2023). Green growth is essential today where countries strive to balance economic development and environmental sustainability (Huang, 2023). Scientific understanding of "green" transformational processes in the modern world has become the subject of research by many foreign scientists (Bowen & Fankhauser, 2011; Johnstone, 2022).

Governments, organizations, and people worldwide have recognized the urgent need to move towards “greener” and more sustainable economy (Liu et al., 2023). Indeed, the world is now focused on achieving green economic development, defined as a combination of low carbon emissions, resource efficiency, and environmental sustainability.

Many scientists have recently made attempts to generalize the conceptual foundations of the "green" economy. In their study, Zomonova and Gomboev (2012) consider practical experience in developing a “green” economy at the international, regional, and national levels.

Klyuchenovich, Zalygina, and Podvorskaya (2012) considered the problems of forming a theoretical and practical basis for transforming macroeconomic models of production and consumption in the direction of a “green” economy.

According to Vavilonskaya (2012), enterprises and investors consider money invested in the environment as an expense without taking into account the real return on investment through increasing the cost of products, improving the image of the enterprise, and opening new sales markets, and environmental indicators have not become the same criteria for enterprises activities as economic and social ones.

Klavdienko (2012) considered the main directions along which the modernization of China's energy sector is being carried out at the present stage, paying particular attention to the measures taken by the People’s Republic of China government to stimulate energy saving, the introduction of technologies for generating “clean” energy, and the use of international technology transfer.

Sampson (2011) examined the relationship between green global economy policies and environmental governance restructuring. He believes that there is no serious movement towards a global “green” economy because the main body for environmental governance is missing.

However, the ongoing research has not adequately reflected a theoretical understanding of the influence of regional characteristics on the national model of the "green" economy formation. Separate areas are covered in the works of Nurgisaeva and Tamenova (2013), Antonova (2013), Fomina (2022), Korchagina (2012), Sharafutdinova, Izmailova and Akhmetshina (2013), Zabelina and Parfenova (2021), Alferova (2020), Shkiperova and Kurilo (2021). Nurgisaeva and Tamenova (2020) analyzed the conceptual foundations of the “green” economy. They believe that its development is one of the most critical tasks for the entire world community to achieve sustainable development of the entire planet Earth.

Antonova (2013), conducting a study to find new factors influencing regions' development, considers the region a relatively independent part of the country, separated in the process of territorial division of labor, differing from other territories in several features.

Fomina (2022) believes that there is a need to consider all aspects of sustainable development: environmental, social, and economic. In this regard, it is relevant to monitor and measure the development sustainability of regional socio-ecological-economic systems the pace of change, and determine the development vector of the main components and their interrelationships.

Shkiperova and Kurilo (2021) emphasize the importance of forming trajectories for the sustainable development of territories, which remains an essential task in implementing regional policy. To make informed management decisions and formulate national and regional policies on sustainable development, it is necessary to have the results of an analysis of the socio-ecological-economic situation.

The scientific literature contains a sufficient number of works devoted to the issues of selecting indicators for measuring the sustainable development of regions. The possibility of creating an indicators system reflecting the social, economic, and environmental spheres of sustainable development, at the same time suitable for regional measurement and interregional comparison, is being discussed. In this regard, it has become relevant to consider the principles of selecting indicators of regional development to establish patterns and differences in forming a system for assessing the sustainability of regional economic development (Alferova, 2020).

Sagan (2004) emphasized that to explain and understand the diversity of regional processes, only the characteristics considered most important in a given period are used. Ramos and Pires (2013) note that measurement systems are often not translated into decision-making towards sustainable development.

According to Korchagina (2012), "sustainable development involves the simultaneous solution of diverse and largely contradictory problems of economic growth, subject to the preservation of the quality of the living environment, assessed primarily from the standpoint of the environment and the social sphere".

Some authors develop the theory of regional economics based on expanding theoretical and methodological approaches to assessing inclusive growth and development of regions (Sharafutdinov et al., 2018).

Zabelina and Parfenova (2021), for a comprehensive assessment of the region's well-being level, proposed supplementing the multiplicative model based on the extended welfare function with a composite environmental index. This index considers people's environmental living conditions, representing an essential aspect of well-being.

It seems logical that for the regions of Kazakhstan, characterized by profound differences in economic specialization, spatial polarization of human capital, varying degrees of investment activity, and diverse natural conditions, it is impossible to create a universal guide to the transition to the "green rails" of development. Naturally, for different types of regions, both the tasks in this area and the tools for solving them will differ.

In this regard, it is significant to carry out a typology of Kazakhstan regions according to their environmental and economic development level to develop an effective environmental and innovation policy. This is possible only based on diagnostics of the ecological and economic state of the region. Therefore, great practical interest is the development of a methodology for calculating the environmental and economic index for regions, considering the environmental sustainability of development in a broad context, including environmental, economic, and social factors.At present, certain theoretical and practical experience has already been accumulated in the indicators creating of sustainable development. However, due to methodological, statistical problems and complexities, there is no generally recognized unified indicator. This justifies the importance of developing an integral indicator of the economic development of Kazakhstan regions, which characterizes the stability degree of the country and its regions, the environmental friendliness of the development trajectory of individual territories. Taking into account the summary assessments of the ecological and economic state of the region in the investment policy will make it possible to develop an environmentally acceptable option for the economic growth of the territory.

The effectiveness essence of the ongoing policy of Kazakhstan regional development from the standpoint of observing the principles of "green" growth is to ensure the coordination of the

economic, environmental and social components of community's growth, subject to priority development, restoration and use of its potential to meet the needs of present and future generations.

The sustainable development goal of any region is the creation of an economically developed region, ensuring the well-being of its citizens by improving the living standards of the population and ensuring its employment; rational use of resource potential based on management system improvement in the conditions of the appropriate legal field and clear interaction between state and regional policies; increasing the efficiency of the production and economic complex.

An assessment of the sustainable development of individual sectors of the region's economy is also necessary in determining the sustainable development. This is an inevitable process, but a particular industry may or may not have the ability for sustainable development. In National report (2010) indicated the main task of implementing the "green growth" policy is to prepare the national economy for the transition to a sustainable development path, the achievement of which in modern conditions requires an immediate rejection of the extensive use of natural resources and the search for more progressive and innovative business models.

Thus, in scientific publications, attempts are made to build a set of key indicators of "green" growth that are important for regional policy, uniting various sectors and society levels. The main problem here is the availability of data, the right balance between the various criteria for selecting indicators, a systematic understanding of the relationships between indicators and the various conditions for using them.

3. METHODOLOGY

To achieve this goal, theoretical research methods were used in the work: analysis - to reveal the theoretical provisions of the concept and identify topics of discussion, synthesis - to determine the key points and the sequence of ongoing changes and additions, and generalization - to formulate conclusions and conclusions.

The source for obtaining research material is the Taldau information and analytical system of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, which ensures their availability and comparability. The chronological framework of the study includes a ten-year time period (from 2012 to 2022), which makes it possible to identify patterns and trends in the green growth policy pursued at the regional level in the Republic of Kazakhstan.

The effectiveness of the ongoing state development policy from the standpoint of observing the principles of "green" growth involves ensuring positive dynamics in the level and quality of the population's life, using new factors and conditions for this purpose, including a balanced reproduction of economic, social and environmental potential localized in a certain territory.

Currently, in foreign practice, there are various approaches to assessing the effectiveness of the ongoing regional development policy from the standpoint of observing the principles of "green" growth, but they are practically not used to manage development in Kazakhstan.

The article proposes to evaluate the effectiveness of this policy according to the methodology of the Institute of Economics of the Ural Branch of the Russian Academy of Sciences (Tsibulsky, 2000). The decision to apply this methodology to assess the effectiveness of the "green" growth policy pursued at the regional level in the Republic of Kazakhstan is explained by the fact that when calculating the integral indicator of sustainable development of the region, territorial factors and sectoral conditions for the development of the region are taken into account.

The methodological principles for constructing an integral indicator are:

- the principle of information security: the information base should be available for all subjects of the Republic of Kazakhstan;

- the principle of simplicity and reproducibility of calculations: the integral indicator should be simple in calculations, based on a limited number of indicators;

- the principle of flexibility: the possibility of transforming the indicator - adding new indicators or excluding irrelevant ones.

In accordance with the identified principles, at the initial stage, the criteria for the stability of regional systems are determined, which will be analyzed to form the appropriate conclusions. To systematize the presentation of the results obtained in the study course, the development of analytical tables was used.

At the next stage, the differences between the regions are assessed based on the calculation of the level of economic, social and environmental sustainability, and then - the integral indicator. The method of comparative analysis based on the method of Euclidean distances is used here. It allows selecting an indicator-ideal, and then assessing the degree of proximity-range of indicators of other regions relative to the ideal value. To conduct such an assessment, the indicators of the regions are expressed in shares relative to the ideal indicator taken as a unit by formula (1):

$$a_i = \frac{x_i}{\max x_i}, b_i = \frac{\min x_i}{x_i}, \quad (1)$$

where ai, bi is the level of development of the i-th region according to the indicator;

xi is the value of the indicator;

max xi, min xi are the ideal value of the indicator, which is taken as the threshold value of the indicators.

Next, the indicators of the levels of economic, social and environmental sustainability are calculated, for which the arithmetic mean estimate is found using the formula (2):

$$Uj = \frac{\sum_{i=1}^{n} a_i, b_i}{n}, \quad (2)$$

where Uj is an indicator of the level of sustainability of each component of sustainable development.

At the final stage, an integral indicator is formed as the arithmetic mean of private indicators (formula (3)):

$$U = \frac{U_{econ} + U_{socia}l + U_{eco\log}}{3}, \quad (3)$$

where Uecon - economic stability; Usocial - social sustainability; Uecolog - environmental sustainability.

Very important in the formation of the integral indicator is the interpretation of the obtained results, for which threshold values are determined. Since the integral indicator is in the range from 0 to 1, an example of ranking the indicator values can be presented as follows (see Table 1).

The following criteria were chosen as the basis for assessing the effectiveness of the ongoing development policy of Kazakhstan from the compliance standpoint with the principles of "green" growth:

- economic: gross regional product (GRP) per capita; investment in fixed assets per capita; average per capita cash income of the population; the degree of depreciation of fixed assets;

- social indicators: the ratio of incomes of 10% of the most and 10% of the least well-to-do population; the proportion of the population with incomes below the subsistence level as a

TABLE 1. Ranking the values of the integral effectiveness indicator of the ongoing regional development policy from the compliance standpoint with the principles of "green" growth

Thresholds	**Interpretation of the effectiveness indicator of the ongoing regional development policy from the compliance standpoint with the principles of "green" growth**
From 0 to 0,1	Unsustainable development
From 0,1 to 0,5	Weakly sustainable development
From 0,5 to 0,7	Medium sustainable development
From 0,7 to 0,9	Sustainable development
From 0,9 to 1	Highly sustainable development
Note: compiled by authors based on source Tsibulsky (2000)	

percentage of the total population; an unemployment rate; share of the economically active population;

- environmental: emissions of air pollutants from stationary sources per capita, the amount of current environmental protection costs, the number of emission sources, the presence of hazardous waste at enterprises.

An analysis of existing approaches allows us to conclude that there is also no single point of view among scientists when determining the criteria for the stability of regional systems. Some consider the achievability of development goals, the ability of the system to function and develop as a criterion of sustainability, others consider the system to be within the given limits, the zone of stability, others consider balance, adaptability, etc.

4. FINDINGS AND DISCUSSIONS

When choosing a methodology for assessing the sustainability of a region, first of all, it is necessary to determine the approach that will be applied. The analysis of foreign and domestic experience made it possible to single out two main approaches to assessing the sustainability of the socio-economic development of the region.

The first approach uses a set of indicators characterizing various aspects of sustainable development. This complex contains from two to four groups of indicators (economic, social, environmental, and institutional).

The second approach involves the development of one integral indicator that reflects the overall sustainability degree of the territory development. As a rule, this indicator is aggregated from three indicators: economic, environmental, and social. If the value of the indicator increases, this means that we can talk about sustainable balanced development of the region, if it decreases, then we can talk about the instability of the process.

The first approach based on the formation of indicators set is more widely used. These are such methods as the UN Millennium Development Goals, the UN Sustainable Development Reporting Guidelines, the Organization for Economic Co-operation and Development (OECD) indicator system, The World Development Indicators) of the World Bank, environmental accounts of the European Community, indicators of pressure on the natural environment of the Statistical Office of the European Union (Eurostat), etc. (Korchagina, 2012).

At the same time, many researchers see prospects for using an integral indicator that reflects the overall degree of sustainability in the regional socio-ecological and economic systems development. A number of such indicators can be given as:

(1) Environmental Sustainability Index, developed by Yale and Columbia Universities for the World Economic Forum in Davos (2001).

(2) Index of Sustainable Economic Welfare (ISEW), used in a number of European countries (Germany, Great Britain, Austria, the Netherlands). The index was proposed in 1989 by J. Cobb and G. Daly (USA).

(3) Human Development Index (HDI), calculated on the basis of the integration of the three main components that characterize human development (longevity, education, income).

(4) Integrated Environmental Indicators developed by the Worldwide Fund for Nature (WWF): The Ecological Footprint, Living Planet Index.

(5) Inclusive Development Index (Green GDP), proposed in the report "Prosperity in a broad aspect", presented at the UN Conference on Sustainable Development (Rio + 20, Brazil), held in June 2012.

(6) Genuine Savings Index, developed by the World Bank researchers to assess the sustainability of national economies.

The first step in the formation of an integral indicator of the sustainability of the economic development of the region is the definition of indicators.

Indicators of sustainable development of the region are not immutable, once and for all established. They are determined on the basis of internal factors characterizing the economic, social and environmental development of the regions.

After determining the indicators, it is necessary to proceed to the next stage - the assessment of differences by region (formula 1).

Table 2 shows an assessment of differences by region using the example of the East Kazakhstan region for 2012 and 2022.

TABLE 2. Assessment of differences in the sustainable development of the East Kazakhstan region for 2012 and 2022

Indicator	**2012**				**2022**			
	Maximum	**Minimum**	**By East Kazakhstan region**	**ai, bi**	**Maximum**	**Minimum**	**By East Kazakhstan region**	**ai, bi**
Economic Indicators								
Gross regional product, million tenge (+)	5205156,1 (Almaty)	678897,0 (Zhambyl region)	1736853,8	0,33	19066587,1 (Almaty c.)	1387602,0 (Zhetysu region)	3898056	0,20
The volume of manufactured innovative products, million tenge (+)	73279,0 (Pavlodar region)	618,6 (Mangystau region)	33592,5	0,46	528652,6 (Kostanay region)	983,8 (Ulytau region)	58127,5	0,11
Investments in fixed capital, million tenge (+)	1076933 (Atyrau region)	68990 (North Kazakhstan region)	241630	0,22	2910114,2 (Atyrau region)	333149,434 (North Kazakhstan region)	834080,468	0,29
Level of activity in the field of innovation, % (+)	12,7 (West Kazakhstan region)	1,0 (Akmola region)	8,1	0,64	15,2 (North Kazakhstan region)	4,7 (West Kazakhstan region)	8,8	0,58
Average monthly nominal salary of employees, tenge (+)	165975 (Atyrau region)	58415 (North Kazakhstan region	73677	0,47	406166 (Atyrau region)	187501 (North Kazakhstan region)	224700	0,55
∑				0,42				0,35

Social Indicators								
The share of the population with incomes below the subsistence level in % of the total population, % (-)	10,4 (Mangystau region)	1,7 (Astana)	6,1	0,28	8,1 (Mangystau region)	1,9 (Astana)	4,8	0,40
Funds ratio (ratio of 10% of the most and 10% of the least wealthy population), times (-)	6,2 (Akmola region)	3,0 (Mangystau region)	6	0,5	7,45 (Almaty c.)	3,23 (Shymkent)	6,78	0,48
Life expectancy at birth, years (+)	73,25 (Astana)	66,51 (North Kazakhstan region)	67,68	0,92	76,75 (Astana)	70,7 (North Kazakhstan region)	72,07	0,94
Depth of poverty, % (-)	1,8 (South Kazakhstan region)	0,2 (Almaty)	1,5	0,13	1,9 (Mangystau region)	0,3 (Astana)	1,1	0,27
∑				0,46				0,52
Environmental Indicators								
Air pollutant emissions from stationary sources per capita, kg (-)	847,0 (Pavlodar region)	8,0 (Almaty)	105	0,08	23772,9 (Pavlodar region)	23,21 (Turkestan region)	2785,6	0,01
The volume of current costs for environmental protection, thousand tenge (+)	18777275 (Atyrau region)	381525 (Astana)	9285217	0,49	76753130 (Atyrau region)	1948430 (Turkestan region)	40108281	0,52
Number of pollutant emission sources, units (-)	22114 (Atyrau region)	5150 (Astana)	18194	0,28	28904 (Atyrau region)	5456 (Shymkent)	22234	0,25
∑				0,28				0,26
Note: compiled by authors								

An analysis of the indicators of economic, social and environmental development of Kazakhstan regions, selected to calculate the integral indicator for assessing the development sustainability of the regional system, allows us to state that in 2012-2022 their values have changed. Consequently, changes have also taken place in the ongoing policy for the development of Kazakhstan regions from the standpoint of observing the principles of "green" growth.

Further, according to formula 2, the indicators of the levels of economic, social and environmental sustainability were calculated. Before proceeding to the analysis of the stability indices dynamics of Kazakhstan regions, it should be noted that certain changes occurred in the administrative-territorial division of the Republic of Kazakhstan during the analyzed period.

So, in 2018, Shymkent became a city of republican significance, and the South Kazakhstan region was renamed the Turkestan region. In 2022, three new regions were created: Abay (separated from the East Kazakhstan region, formerly known as Semipalatinsk), Zhetysu (separated from Almaty region, formerly known as Taldy-Kurgan) and Ulytau (separated from Karaganda region, formerly known as Dzhezkazgan). Thus, due to the absence of Abai, Zhetysu

and Ulytau regions in 2012, a comparative analysis of the dynamics of economic, social and environmental sustainability indices for the above regions was not carried out.

Analysis of the dynamics of the index of economic stability of the regions of Kazakhstan in 2012 and 2022 is presented in Table 3.

TABLE 3. Index of economic stability of Kazakhstan regions

Region	2012	2022	Increase↑/Decrease↓
Akmola	0,18	0,35	+0,17↑
Aktobe	0,41	0,42	+0,01↑
Almaty	0,29	0,29	0,00
Atyrau	0,65	0,64	-0,01↓
West Kazakhstan	0,47	0,26	-0,21↓
Zhambyl	0,31	0,25	-0,06↓
Karaganda	0,40	0,53	+0,13↑
Kostanay	0,27	0,49	+0,22↑
Kyzylorda	0,32	0,34	+0,02↑
Mangystau	0,35	0,33	-0,02↓
Pavlodar	0,48	0,41	-0,07↓
North Kazakhstan	0,16	0,37	+0,21↑
Turkestan	0,35	0,31	-0,04↓
East Kazakhstan	0,42	0,35	-0,08↓
Astana city	0,42	0,57	+0,15↑
Almaty city	0,55	0,65	+0,1↑
Note: compiled by authors			

An analysis of the index dynamics of economic stability of Kazakhstan regions for the period from 2012 to 2022 shows that in almost half of the regions (Atyrau, West Kazakhstan, Zhambyl, Mangystau, Pavlodar, Turkestan, East Kazakhstan regions) the stability of the economy has decreased. And only 9 regions ensured the growth of economic stability. The greatest decrease in the indicator is noted in the West Kazakhstan region. In the West Kazakhstan region, a decrease in the index of economic stability was facilitated by a decrease in the volume of manufactured innovative products, which in 2022 decreased by 20.4% compared to 2012 (2012 - 24804.9 million tenge, in 2022 - 19753, 0 million tenge), as well as a decrease in the level of activity in the field of innovation from 12.7% to 4.7%, i.e. almost 3 times.

Analysis of the dynamics of the index of social sustainability of the regions of Kazakhstan for the period in 2012 and 2022 is presented in Table 4.

TABLE 4. Index of social sustainability of Kazakhstan regions

Region	2012	2022	Increase↑/ Decrease↓
Akmola	0,46	0,58	+0,12↑
Aktobe	0,65	0,61	-0,04↓
Almaty	0,68	0,66	-0,02↓
Atyrau	0,60	0,85	+0,25↑
West Kazakhstan	0,54	0,62	+0,08↑
Zhambyl	0,57	0,69	+0,12↑
Karaganda	0,55	0,58	+0,03↑
Kostanay	0,53	0,62	+0,09↑
Kyzylorda	0,51	0,67	+0,16↑
Mangystau	0,58	0,59	+0,01↑
Pavlodar	0,53	0,61	+0,08↑
North Kazakhstan	0,41	0,52	+0,11↑
Turkestan	0,49	0,58	+0,09↑

East Kazakhstan	0,46	0,52	+0,06↑
Astana city	0,77	0,92	+0,15↑
Almaty city	0,85	0,53	-0,32↓
Note: compiled by authors			

As for the index of social sustainability, its best value was noted in Atyrau region, which was able to strengthen its positions, ensuring an increase in the indicator by 0.25 points. Also, in 12 regions of Kazakhstan, an increase in this indicator is observed.

The largest decrease in the indicator is noted in Almaty (-0.32). A negative impact on the social stability index, which caused its decline, was exerted by such a factor as the share of the population with incomes below the subsistence minimum in % of the total population, the coefficient of funds (the ratio of 10% of the most and 10% of the least well-to-do population).

Analysis of the dynamics of the index of environmental sustainability of the regions of Kazakhstan for the period in 2012 and 2022 is presented in Table 5.

TABLE 5.Index of environmental sustainability of Kazakhstan regions

Region	**2012**	**2022**	**Increase ↑/ Decrease ↓**
Akmola	0,27	0,20	-0,07↓
Aktobe	0,34	0,36	+0,02↑
Almaty	0,34	0,15	-0,19
Atyrau	0,42	0,43	+0,01↑
West Kazakhstan	0,24	0,34	+0,1↑
Zhambyl	0,32	0,41	+0,09↑
Karaganda	0,42	0,27	-0,15↓
Kostanay	0,41	0,21	-0,2↓
Kyzylorda	0,34	0,40	+0,06↑
Mangystau	0,19	0,21	+0,02↑
Pavlodar	0,52	0,29	-0,23↓
North Kazakhstan	0,29	0,14	-0,15↓
Turkestan	0,30	0,53	+0,23↑
East Kazakhstan	0,28	0,26	-0,02↓
Astana city	0,37	0,34	-0,03↓
Almaty city	0,50	0,27	-0,23↓
Note: compiled by authors			

The ecological situation is most stable in Atyrau, Turkestan, Kyzylorda and Zhambyl regions, which are leading in 2022 in this indicator. In other areas of the data, the indicator is at a low level of 0.15-0.36, compared with economic and social indices.

The most difficult ecological situation is observed in the North Kazakhstan and Almaty regions. As a result of the decline in the environmental sustainability index, these two areas are at the bottom of the list of regions. The low values of the environmental sustainability index are primarily due to high emissions of air pollutants from stationary sources per capita, as well as an increase in the number of sources of pollutant emissions.

When ranking the regions according to the integral indicator value of sustainable development of the region, it was found that the top three in terms of this indicator include the same regions, but in a different order. So, in 2012, the three leading regions looked like this: Almaty, Atyrau region, Astana. Ten years later, the picture has changed a little: Atyrau region, Astana, Almaty.

At the final stage, it is necessary to form an integral indicator of the ongoing development policy effectiveness of Kazakhstan regions from the standpoint of compliance with the principles of

"green" growth according to formula 3 (see Table 6).

TABLE 6. Integral indicator of the ongoing policy effectiveness of Kazakhstan regions development from the standpoint of compliance with the principles of "green" growth

Region	2012	Grade	2022	Grade	Increase ↑/ Decrease ↓
Akmola	0,30	13	0,38	9	+0,08↑
Aktobe	0,47	5	0,46	5	-0,01↓
Almaty	0,44	7	0,37	10	-0,07↓
Atyrau	0,56	2	0,64	1	+0,08↑
West Kazakhstan	0,42	8	0,41	8	-0,01↓
Zhambyl	0,40	9	0,45	6	+0,05↑
Karaganda	0,46	6	0,46	5	0,00
Kostanay	0,40	9	0,44	7	+0,04↑
Kyzylorda	0,39	10	0,47	4	+0,08↑
Mangystau	0,37	12	0,38	9	+0,01↑
Pavlodar	0,51	4	0,44	7	-0,07↓
North Kazakhstan	0,29	14	0,34	11	+0,05↑
Turkestan	0,38	11	0,47	4	+0,09↑
East Kazakhstan	0,39	10	0,38	9	-0,01↓
Astana city	0,52	3	0,61	2	+0,09↑
Almaty city	0,63	1	0,48	3	-0,15↓
Note: compiled by authors					

The region-outsider in both 2012 and 2022 remains the North Kazakhstan region, which occupies the last place in the ranking. In nine regions of the country, an increase in the integral indicator is observed. At the same time, the largest growth was noted in Astana and the Turkestan region (+0.09). To obtain comparative generalizing characteristics of the sustainable development of Kazakhstan regions, a regions grouping was compiled according to the level of the integral indicator of the ongoing regional development policy effectiveness from the standpoint of compliance with the principles of "green" growth in 2012 and 2022, the results of which are presented in Table 7.

Table 7 shows that 12 regions of Kazakhstan in 2012 had a threshold value of the integral indicator in the range of 0.1-0.5 and belonged to regions with weakly sustainable development, and 4 regions belonged to regions with medium sustainable development (Atyrau and Pavlodar regions, Astana and Almaty city).

The dynamics of the effectiveness integral index of the ongoing regional development policy from the standpoint of compliance with the principles of "green" growth allows us to draw a number of conclusions:

(1) firstly, not a single region fell into the zone of sustainable and highly sustainable development both in 2012 and 2022. There is also not a single region in the zone of unsustainable development.

(2) secondly, most regions of Kazakhstan are in the zone of weakly sustainable development.

(3) thirdly, in 2022, two regions (Almaty city, Pavlodar region) moved from the group with medium sustainable development to the group with low sustainable development.

Summing up, we can conclude that the methodology used in the course of the study allows us to obtain a relative assessment of the ongoing regional development policy effectiveness from the compliance standpoint with the principles of "green" growth. With a small amount of information

TABLE 7. Grouping Kazakhstan regions according to the level of the integral indicator of the ongoing regional development policy effectiveness in terms of compliance with the principles of "green" growth in 2012 and 2022

Thresholds	Interpretation of the sustainable development indicator	Region	
		2012	2022
From 0 to 0,1	Unsustainable	-	-
From 0,1 to 0,5	Weakly sustainable	Akmola, Aktobe, Almaty, West Kazakhstan, Zhambyl, Karaganda, Kostanay, Kyzylorda, Mangystau, North Kazakhstan, South Kazakhstan, East Kazakhstan	Akmola, Aktobe, Almaty, West Kazakhstan, Zhambyl, Karaganda, Kostanay, Kyzylorda, Mangystau, Pavlodar,North Kazakhstan, Turkestan, East Kazakhstan, Almaty city
From 0,5 to 0,7	Medium sustainable	Atyrau, Pavlodar, Astana, Almaty city	Atyrau, Astana
From 0,7 to 0,9	Sustainable	-	-
From 0,9 to 1	Highly	-	-
Note: compiled by authors			

required for the calculation, the integral indicator has a certain sensitivity and information content. Thus, it is possible to:

(1) conduct a comparative assessment of various territories stability;

(2) measure the actual value of the economic, social and environmental sustainability of the region;

(3) more reasonably assess the prospects for the socio-economic development of the region;

(4) determine the efficiency of using the resources of the territory;

(5) identify areas of economic, social and environmental activities that are most consistent with the goals of the region's development;

(6) objectively assess the work effectiveness of state authorities in the region.

The list of socio-economic indicators used in the calculation of the integral index makes it possible to determine with a sufficient degree of certainty the effectiveness of the ongoing regional development policy from the standpoint of observing the principles of "green" growth. It is also important that the information base of the study is the official data of state statistics agencies, which ensures their availability and comparability.

5. CONCLUSIONS

Based on the definition of the integral indicator of sustainability, the article assesses the effectiveness of the "green" growth policy pursued at the regional level. The typology of Kazakhstan regions has been carried out according to the level of their environmental and economic development for the purposes of creating an effective environmental and innovation policy. The dependence of the ecological state and the development trend of the region on the economic, environmental and social policy implemented by the state are revealed.

The empirical conclusions of the work can find practical application in the process of developing an effective environmental and economic regional policy. Thus, according to the results of the analysis, it can be recommended not to implement destructive projects with a strong

environmental impact in the regions of Kazakhstan that have high index values, and in regions with low index values, it can be recommended to diversify production in order to reduce the environmental burden.

The results of the study showed that the current model of socio-economic development of the country and its regions requires further efforts to develop adequate indicators of "green" development that take into account economic, social and environmental components in a balanced way.

The dynamics analysis of the integral indicator of the ongoing regional development policy effectiveness from the compliance standpoint with the principles of "green" growth showed that most regions of Kazakhstan are in the zone of weakly sustainable development, not a single region fell into the zone of sustainable and highly sustainable development both in 2012 and 2022. Consequently, the decrease in the stability of regional economies requires adjustment of the economic, social and environmental policy pursued by the regions, the development of measures aimed at reducing the negative impact of external and internal environmental factors, as well as the search for mechanisms to increase the stability of regional systems.

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