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Article

Environmental policy in the context of the implementation of the sustainable development goals in the countries of central Asia: Projection to the regional level

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Abstract: The article examines the modern vectors of implementation of measures to achieve results in the field of Sustainable Development Goals (SDGs), both at the level of national priorities and at the level of Central Asian countries. The purpose of this study is a multidimensional analysis of actions that make it possible to develop solutions to stabilize the environmental situation in Central Asian countries based on global international trends. The scientific novelty of the research lies in the integrated use of thematic modeling methods, as well as sociological surveys used to improve the efficiency of business processes in the field of environmental protection. The methodological basis for conducting a comparative assessment of the impact of environmental policy instruments used on regional development is the concept of sustainable development. In conclusion, conclusions are drawn about the need to develop effective mechanisms for the implementation of environmental policy in the studied countries.

Keywords: sustainable development goals (SDGs); environmental policy; national level; regional level; institutionalization, governance

1. Introduction

Current trends in the development of ecosystems show that the balanced development of all components of these complex structures is the key to the prosperity and development of all mankind. At the same time, practice clearly demonstrates that an imbalance in one of the components of a complex mechanism leads to negative consequences and problems. First of all, this applies to the ecosystems of States whose border territories are in close proximity. Long-term proximity and common historical development paths affect the existing industrial and socio-economic infrastructure, contribute to the development of progressive joint strategies for further socio-economic development. The border territories of neighboring countries can act as landfills for the implementation of effective projects, including those on environmental issues. As best practices show, State environmental policy should be based on the basic principles of the implementation of global sustainable development goals, and at the same time, ensure effective integration of global and national priorities. Modern environmental challenges require coordination at the interstate level, taking into account the interests of each country individually (Turgel et al., 2020).

The set of measures and tools of environmental policy is wide, however, the combination of these tools to achieve maximum positive effect and offset their negative effects is more difficult. Experience shows that the use of modern systems of international and national economic ratings and indices makes it possible to identify negative trends in the environmental situation in a particular country and offer innovative methods to solve the problems that have arisen. At the same time, taking into account the SDGs shows that in the modern period, the countries of Central Asia are still insufficiently using digital infrastructure, innovative resource-saving technologies with the highest possible environmental friendliness. At the same time, the use of digital mechanisms and technological innovations contributes to an increase in energy costs, which entails an additional technological burden on the environment. These circumstances require the development of new business models, the transition to a "green", low-carbon and circular economy, which will help reduce the risks from environmental factors to healthier people living in Central Asian countries. In this regard, it is necessary to ensure the development of collective methodological programs to improve environmental efficiency, modernize or reduce harmful industries, use artificial intelligence systems and neural networks to optimize a set of measures to improve the environmental situation in the Central Asian region.

- Production standards and technological standards that establish minimum criteria for consumer and manufacturing technologies, such as fuel efficiency standards for automobiles or the best available technologies for pollution control. Current research mentions that production standards can be effectively used with other tools, such as the carbon tax. Thus, setting standards for automotive engines can stimulate the production of efficient cars, and the carbon tax can reduce the use of cars with internal combustion engines in general. At the same time, as Sorrel (2007) notes, the absence of the second measure can lead to increased car operation;
- Subsidies for the introduction of green technologies that promote the introduction and dissemination of energy-efficient or low-carbon products by financially encouraging the purchase of such products. For this method, it is also recommended to use it in combination with a carbon tax. As noted in the literature, such subsidies reduce the cost of energy use through increased energy intensity and energy efficiency. Lower cost, in turn, will increase energy demand, limiting the positive effects of the instrument (Murray et al., 2014);
- Carbon tax/carbon certificates implemented to account for all direct and indirect costs associated with CO_2 emissions in the prices of fuels, resources, intermediate and consumer products and services. According to current research, this tool can be most easily introduced at the global level, as it involves one-dimensional negotiations (Weitzman, 2014), while setting CO_2 emission targets for 200 countries means solving a 200-dimensional task. Setting technical standards for individual technologies is an even more multidimensional task.;
- Support innovation aimed at increasing private investment and successful research and development in the field of energy-efficient and low-carbon technologies and products. This category includes the financing of fundamental and applied research on environmental issues, the execution of research commissioned by business entities, subject to the improvement of the legal

framework for the protection of intellectual property. As Acemoglu (2012) notes, support for innovation generally goes well with environmental policy, regardless of the tools.

The above circumstances make us think about how the existing approaches to the formation of environmental policy goals in Central Asian countries are adequate to the requirements of the current situation, in which cases systemic failures occur that prevent the stabilization of the environmental situation, as well as to develop mechanisms for "soft" coordination of environmental policy, including the transnationalization of measures.

The aim of the study is to conduct a multidimensional comparative analysis of approaches to the implementation of state environmental policy in Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan, as well as to develop the main vectors of development of this area based on advanced technological solutions taking into account global international trends (Turgel et al., 2020). The choice of the Central Asian countries for comparison is justified by common national objectives of socio-economic development, historically established trade and industrial relations, long-term experience of interaction, as well as the presence of common state borders.

The objectives of the study are:

- Conducting a comparative analysis of the strategic priorities of the environmental policy of the Central Asian countries, the structural policy measures adopted in their implementation, and current economic results;
- Implementation of the SDGs at the regional level in Central Asian countries;
- Assessment of the potential for "soft" coordination of environmental policy in the studied countries.

Environmental policy in Central Asian countries in the context of the implementation of the SDGs should be based on the joint work of the state, business and society, which are able to make a worthy contribution to achieving an environmentally friendly space for future generations.

2. Literature review

Environmental issues in the modern period are the subject of close attention of scientists around the world. At the same time, it should be noted that environmental issues have been given attention for many centuries. For example, in the legends of the Mahabharata (VI–II centuries BC), information is provided about the peculiarities of the life of 50 species of animals, ancient scientists of Babylon described various methods of cultivating the land, the works of Chinese scientists of the IV–II centuries BC are devoted to the peculiarities of growing cultivated plants. Environmental factors are considered in the works of ancient scientists. As is known, Aristotle for the first time in his "Observations on the History of animals" systematized more than 500 species of animals studied by him. In turn, Theophrastus of Eresis (372 BC–287 BC), based on observations of Ancient Mediterranean plants, also proposed for the first time their systematization into trees, shrubs, semi-shrubs and grasses. Further, for many centuries, the study of flora and fauna continued around the world, directly or indirectly affecting environmental problems. For example, the English chemist R. Boyle was the first to conduct an ecological experiment and, in his writings, proved

that low atmospheric pressure affects various species of animals. Ecology is described by the works of such scientists as Lomonosov (1763), who in his treatise "On the layers of the Earth" states, "... many people think in vain that everything, as we see, was first created by the creator...", A. G. Bolotov, J. B. Lamarck, A. Humboldt, E. A. Eversman, C. Darwin, K. F. Roulier, N.N. Moiseev and many others.

The very term "ecology" first appeared in 1866 in the work of the German biologist Ernst Haeckel. By this term, the scientist understood: "... knowledge of the economics of nature, the simultaneous study of all the relationships of living things with organic and inorganic components of the environment, including certainly non-antagonistic and antagonistic relationships of plants and animals in contact with each other" (Zigman, 2007).

As experience shows, since the middle of the 19th century, such scientists as K.F. Roulier (1814–1858), who is recognized as the founder of Russian ecology and evolutionary paleontology (Ilyichev, 2003), Vernadsky (1863–1945), the creator of the theoretical basis of modern ecology, made a great contribution to the development of environmental science. It was in his writings that the doctrine of the biosphere and the evolution of "living matter" was first presented, and such a concept as the "noosphere" was formulated (Smil, 2002).

Later,Sukachev (1880–1967), a well-known ecologist, geobotanist, paleontologist and forester, introduced a new concept of "biogeocenosis" into science, Schwartz (1919–1976), one of the founders of population and evolutionary ecology, revealed the mechanisms of the evolutionary process in nature.

A special place in this series is occupied by such scientists as the Russian physicochemist, academician of the Russian Academy of Sciences Petryanov-Sokolov (2023), who is the author of 13 inventions in the field of filtration and purification of gases and liquids, a Russian biologist, ecologist, public and political figure, corresponding member of the Russian Academy of Sciences A.V. Yablokov, Russian scientist, economist, ecologist, hydrologist, corresponding member of the Russian Academy of Sciences, specialist in the field of environmental economics, economic and mathematical modeling, theory of sustainable development V.I. Danilov-Danilyan. It was under his editorship that the encyclopedic editions "Ecological Encyclopedia" in 6 volumes (2008–2013) were published for the first time in the world, which contains more than 15 thousand articles defining basic terms and concepts on ecology and environmental safety and the encyclopedia "Rivers and Lakes of the World" (2012), which includes more than 900 There are more than 300 articles describing rivers, lakes and about 550 reservoirs.

Berni (Turgel et al., 2020), who in his "Large Illustrated Encyclopedia of Wildlife" presented scientific justifications on the need for careful treatment of wildlife in order to prevent an environmental disaster, should be included among the scientists whose pen belongs to encyclopedic publications on environmental problems. In turn, the scientist A. Bunea, in the publication entitled "Forward to the cessation of growth! The Ecological and Philosophical treatise" develops the idea that illusions about the infinity of resource development are utopian. In his work, the scientist calls for the optimization of excessive production and consumption, which are the root cause of environmental pollution (Daly, 1990).

Many modern scientists in their research show that environmental problems

cannot be considered only from the point of view of nature and the possibilities of its restoration. Environmental education is of great importance in modern realities. Such works include the work of Avilova (2019) "Formation of ecological culture of children in a rehabilitation center", in which the author substantiates the idea that environmental education, begun from early childhood, even in difficult living conditions for a child, is the key to ecological culture and serves to preserve the environment. The team of authors consisting of Rosenberg (2017) in the article "Two axioms of survival in the modern world: sustainable development and environmental education" suggests new trends in environmental education by developing a textbook and for the first-time offering bachelor's degree training in the profile "Sustainable ecosystem development". Works in this area include the works of such scientists as Sitak et al. (2016).

In the modern scientific literature, an urgent area of research is the issue of the use of alternative types of energy. Such works include the study by Duffy and Beckman (2013) "Fundamentals of solar thermal power engineering".

Another important issue of our time is the impact of engineering structures on the ecology of the regions. A number of works by entire groups of authors are devoted to this topic. For example, scientists such as Poddaeva et al. (2013) in their article "The influence of the spatial organization of reconstructed residential buildings on the wind energy potential of the environment" explore how wind potential can be integrated with engineering structures during the reconstruction of residential buildings in Moscow. In the work of Lifshits et al. (2013) "Aeronautical regime of the slope landscape and their engineering preparation", the authors conducted a comprehensive analysis of the patterns of flow around the slope areas by air flows affecting the bioclimatic comfort and wind erosion of the landscape (Lifshits et al., 2018).

As noted above, research on solving environmental problems is being conducted all over the world, including in the Republics of Central Asia.

In this regard, I would like to note the works of zoologist, ecologist, one of the founders of the national school of ecologists, researcher of Central Asian fauna, Doctor of Biological Sciences—Kashkarov. Kashkarov (2024a) is one of the first scientists who studied the fauna of Central Asia and a pioneer in the foundation of reserves in this region. In his recently republished work "Fundamentals of Animal Ecology" (in two parts), the issues of biocenosis and the relationship of evolution with ecology are considered (Kashkarov, 2024a). And in the work "Environment and community. Fundamentals of synecology", the scientists concluded about the seriousness of environmental problems and ways to prevent an environmental disaster (Kashkarov, 2024b). Despite the fact that the author's research was conducted quite a long time ago, they have not lost their relevance in the modern period. This is indicated by the republication of his works at the present time.

Very interesting and informative in environmental terms are the works of the Uzbek physicist-geographer, professor of Samarkand State University Abdulkasimov, who in his works presented regional problems of the ecological state of agricultural landscapes of Central Asia (Abdulkasimov, 1997).

Another scientist of Uzbekistan, whose pen includes works related to the study of vertebrate fauna in the Karakum desert, is Zakhidov Tesha Zahidovich. As experience shows, the results of his research were used for zoogeographic zoning of

deserts in Uzbekistan. And today they are used to solve the issues of dust storms that occur in the Karakum, Kyzylkum deserts and in the territory of the dried-up part of the Aral Sea.

The scientific works of the scientist geographer and ecologist, Doctor of Geographical Sciences, Professor Askar Nigmatullayevich Nigmatov, who in his writings considered the possibilities of overcoming environmental problems in the Central Asian region, are also well known.

As practice shows, modern researchers turn to the works of Central Asian scientists and on their basis form and prove scientific hypotheses. An example is the work of Seitova (2021). "Ecological Worldviews of Central Asia", where the author reveals the views of Eastern encyclopedic scientists on environmental problems (Seitova, 2021), as well as an article by Jabbarova and Kenzhaeva (2018). "Ecological worldviews of Ibn Sina", in which the authors show the relationship between human behavior and philosophical categories, as well as their impact on the human bioenergetic field (Zhabbborova and Kenzhaeva, 2018) and the study of Dzharmukhanbetova (2012). "Environmental problems of Central Asia", where the author examines the problems of the Aral Sea and suggests ways their solutions, as well as the problems of man-made disasters. (Dzharmukhanbetova, 2012).

Many modern scientists are researching legal issues of ecology. For example, in the article by Azizov (2014). "The legal concept of "environmental emergencies" under the legislation of the Russian Federation and the Republic of Uzbekistan", the definition of an environmental emergency is presented, an analysis of the interpretation of this concept in the legislative acts of Uzbekistan is carried out, it is revealed that in the event of environmental emergencies, water, land, animals are adversely affected, which may subsequently also have a negative impact on human health (Azizov, 2014). Similar problems were raised earlier in the work of Goltsov (2007).

The works of such scientists as Belozerova et al. (2023) show that the state of environmental elements (water, air, atmosphere and etc.), noise, radiation, climate change has an impact on human health. In addition, it follows from the analysis of literary sources that currently in the republics of Central Asia, optimization of household waste management is being carried out, innovative methods of disposal of chemical and medical harmful substances are being developed, efforts to eliminate water losses in agriculture, the use of alternative types of energy, etc. All these measures are aimed at improving the state of the environment and solving environmental problems as soon as possible.

A separate pool of scientific papers related to the implementation and localization of the SDGs can be noted. For example, the publications Daly (1990), Redclift (2002), and Elliott (2012) reflect the issues of implementation of the environmental SDGs at the national level. Blewitt (2014), Korhonen (2014), Wu (2020) prefer to study the issues of SDG implementation at the regional level. Pishchulov (2016) Smirnov V.V. (Smirnov and Mulendeeva, 2019) study the attitude of the population of post-Soviet countries to the environmental agenda adopted at the national and regional levels. In the works of Turgel et al. (2020); Grebeneva et al. (2018); Adilbekovaand Sultanova (2018); Baykenova et al. (2017) the ecological aspects of the strategic directions of regional development are reflected. The emphasis on the specifics of environmental

issues in industrial regions is made in the works of Turgel et al. (2019) and Artykbaeva (2015). The works of Dolfsma and Seo, Weitzman, Sorrell and Sijm are devoted to the study of various tools in the field of environmental policy implementation. Acemoglu, in its research, comes to the conclusion that support for innovation, in general, is well combined with environmental policy, regardless of the tools used.

Another separate group of sources is the work devoted to the comparative analysis of the implementation of the SDGs in Central Asian countries. But in this case, the scientific community is still only forming approaches to understanding this issue.

3. Research questions

The conducted literature review allowed us to formulate a group of questions for the study:

How effective is the implementation of an integrated policy for the institutionalization of the SDGs on horizontal links at three levels (national, regional, local) in Central Asian countries?

Is there consistency in the implementation of environmental policy in Central Asian countries and what is the potential for developing mechanisms for "soft" coordination of this area?

Do the Central Asian countries demonstrate common approaches to the implementation of the SDGs at the regional level?

4. Research hypotheses

Based on the research objectives, the following hypotheses were identified:

The Central Asian countries partially demonstrate common approaches in terms of policy formation aimed at the implementation of the SDGs at the national level.

With regard to environmental issues, the concept of sustainable development is considered in the studied countries not only as a tool for improving management efficiency, but also as a tool for "embedding" the achievement of the SDGs into the international agenda, which allows for the introduction of mechanisms for "soft" coordination of environmental policy, taking into account the commonality of issues and the presence of common borders.

In Central Asian countries, there are no mechanisms for the implementation of environmental SDGs at the regional level, which does not allow the development of interregional cooperation programs on this topic.

5. Methods

The methodological basis of the research was the concept of sustainable development, designed to ensure high, scientifically sound results in all spheres of life in countries based on the application of international best practices and optimization of management decisions.

The scientific novelty of the research lies in the complex use of methods of thematic modelling, quantitative analysis, as well as the results of conducted sociological surveys used to improve the effectiveness of management in the field of

environmental protection.

The study conducted a comparative analysis of a large amount of textual information (normative legal acts, texts of scientific publications, descriptions of country mechanisms, etc.). The method of thematic modelling based on textual data (TopicModelling) was also used, which allows analysing textual data and identifying hidden thematic structures in a collection of documents. This method made it possible to automatically determine which topics are present in a set of texts, and which words characterize each topic, which is important for the effective description and interpretation of large amounts of textual information. Thematic modelling provides a powerful data analysis tool that allows you to study trends in the development of social environmental policy in different countries and understand how they are interconnected.

The following methods have been analysed to form basic models of regions: descriptive analysis, correlation analysis, cluster analysis, factor analysis, time series analysis, regression analysis, etc. Regression analysis is a powerful tool for analysing SDG-related data because of its ability to identify causal relationships, which allows us to establish not only the relationship between various factors and SDG achievements, but also to assess how strongly one variable can influence another, while taking into account all other factors.

The article also presents the results of a sociological study aimed at determining the level of awareness of residents of the regions of the Republic of Kazakhstan about the implementation of national projects within the framework of the SDGs, as well as an assessment of the level of satisfaction of respondents with the environmental situation in the regions.

The sample was compiled on the basis of a stratified random selection of respondents by place of residence, gender and age in proportion to the number of administrative-territorial units of the first level and the gender and age structure of the population of the Republic of Kazakhstan, based on current national statistics data as of 1 January2024. The general population consisted of citizens of Kazakhstan over the age of 18, registered and permanently residing in the country. The sample size was 2000 respondents, which allowed us to obtain data with a statistical error of 2.8% (with a confidence probability of 97%).

The main method of collecting sociological information is an online survey based on an interactive standardized questionnaire posted on the website and filled out form a computer or mobile device online, based on the use of Internet technology in a remote form. To ensure the reliability of the data, control was carried out at all stages of data collection and processing—compliance with the quota assignment, completeness of filling out questionnaires, fixing IP addresses, correctness and consistency of answers, logical and arithmetic control.

Information processing was carried out by forming a database in a specialized computer program SPSS. The analysis of the obtained data was carried out using modern methods adequate to the goals and objectives of the study, as well as using the calculation of indices and rating scales.

The information base of the study

Five types of sources served as the information base for this study.

Firstly, the authors of this study studied the normative legal documents of the socio-economic development of the studied countries, including environmental safety issues. The article analyses more than 50 regulatory documents of the studied countries for the period from 1991 to the present, posted on official websites using the VOSviewer software product. The selection criteria were related to the aspects of sustainable development and environmental policy of the studied countries.

Secondly, this study is based on statistical data obtained from the web portals of the statistical services of the countries studied.

Thirdly, the authors studied the strategic plans and programs of regional and local governments for the period from 1991 to the present.

Fourthly, the works devoted to the implementation of the Sustainable Development Goals are considered.

Fifth, the results of the sociological research conducted by the authors were used.

6. Results and discussion

In this section, an attempt is made to answer the questions posed by the study and to propose mechanisms for the "soft" coordination of environmental policy in the countries studied. The group of principles for the selection of indicators reflecting the environmental situation in individual Central Asian countries, as well as relevant regulatory instruments, include:

- Basic and forecast indicators for assessing the sustainability of development in accordance with international standards and taking into account the achievement of the SDGs;
- Adaptation of national SDG indicators for regional assessment;
- Ensuring comparability and comparability of indicators, the values of which can be evaluated in dynamics and data on which are published/updated on a regular basis.

6.1. Institutionalization of the SDGs in the national and regional policies of individual Central Asian countries

The implementation of the SDGs in Central Asian countries is considered as an element of more global goals related to ensuring the sustainable development of national economies. A criteria-based approach based on the allocation of such components as the level of governance at which key policy decisions are made; the scale of national goals that sustainable development contributes to; prioritization of development directions; decision-making centres allows us to characterize a model of government participation in the implementation of the SDGs at the national level. (**Table 1**).

Table 1. Institutionalization of the SDGs in the national policy of the analyzed countries.

Criteria	Republic of Kazakhstan	Kyrgyz Republic	Republic of Uzbekistan	Republic of Tajikistan
Main national strategic document	"Kazakhstan-2050" Strategy (Government of the Republic of Kazakhstan, 2012).	National Development Strategy of the Kyrgyz Republic for 2018–2040 (Kyrgyz Republic, 2018).	"Uzbekistan-2030" Strategy (Republic of Uzbekistan, 2022).	National Development Strategy of the Republic of Tajikistan until 2030 (Republic of Tajikistan, 2021).
Priority areas outlined in the main strategic document	Comprehensive support for entrepreneurship; establishing new principles of social policy; comprehensive economic pragmatism based on profitability, return on investment, and competitiveness; knowledge and professional skills (training and retraining of personnel); further strengthening of statehood and development of democracy; consistent and predictable foreign policy; support and development of Kazakh patriotism as the foundation for the success of a multi-ethnic and multi-confessional society (Government of the Republic of Kazakhstan, 2012).	Ensuring employment and stable incomes for the population; creation of productive jobs and competitiveness in the digital economy; formation of attractive conditions for entrepreneurs; application of innovative and nature-conserving technologies; development of infrastructure, industry, and the agro-industrial complex; digital transformation of the country (Kyrgyz Republic, 2018).	Achieving upper-middle-income status through sustainable economic development; creation of an education, healthcare, and social protection system fully meeting the needs of the people and international standards; creation of favorable environmental conditions for the population; building a fair and modern state serving the people; guaranteed sovereignty and security of the country.	Ensuring energy security and efficient use of electricity; breaking out of the communication deadlock and turning the country into a transit state; ensuring food security and access to quality nutrition for the population; expanding productive employment.
Legal and regulatory framework for SDGs at the national level	1) Kazakhstan Development Strategy until 2050; 2) "National Priorities" Strategy; 3) National Development Plan of the Republic of Kazakhstan, National Security Strategy of the Republic of Kazakhstan; 4) Sectoral/field development concepts, national projects; 5) Regional development programs; 6) Development plans of government bodies, regional, republican cities, capital development plans, and plans for national holdings and companies (Government of the Republic of Kazakhstan, 2012).	1) National Development Strategy of the Kyrgyz Republic for 2018–2040; 2) National Development Program of the Kyrgyz Republic until 2026 (Kyrgyz Republic, 2018).	1) "Uzbekistan-2030" Strategy (President of the Republic of Uzbekistan, 2020); 2) Additional measures for the accelerated implementation of national goals and objectives in the field of sustainable development until 2030 (President of the Republic of Uzbekistan, 2020); 3) Action Plan for the effective achievement of national goals and objectives in the field of sustainable development for 2022–2026 (President of the Republic of Uzbekistan, 2020); 4) New Uzbekistan Development Strategies for 2022–2026 (Government of the Republic of Uzbekistan, 2022).	1) National Development Strategy of the Republic of Tajikistan until 2030 (Government of the Republic of Tajikistan, 2021); 2) Medium-term Development Program of the Republic of Tajikistan for 2021–2025 (Government of the Republic of Tajikistan, 2021).

Undoubtedly, the features of the established models of public administration have the greatest impact on the localization of the SDGs. The different level of economic development of the studied countries determines an individual list of priority areas. But all countries increasingly give priority to issues of socio-economic development. In the Republic of Kazakhstan, priority is given to long-term goals related to building new principles of social policy, supporting self-realization and talent development, etc., as well as further strengthening statehood and developing democracy, while in other countries the focus is on solving priority tasks (creating new jobs, ensuring food security, increasing investment attractiveness, the development of traditional sectors of the economy, etc.).

Currently, a legal framework has been formed in all Central Asian countries to

integrate the SDGs into the country's strategic planning, and a list of national SDG indicators has been approved. At the same time, the study revealed different time ranges of the regulatory framework of the SDGs at the national level, which indicates the lack of unified approaches to this issue. Different planning horizons demonstrate the lack of a coordinated policy to achieve the SDGs.

In addition, there is a different level of consistency of program documents with the targets of sustainable development. For example, in Kyrgyzstan, the highest level of consistency (over 80%) is characteristic of SDGs 7, 9 and 13; in Tajikistan, these are SDGs 7, 8, 9 and 12; in the Republic of Kazakhstan, SDGs 3, 4, 8,9 and 16.

There are no unified approaches to environmental issues either. The issues of creating a favourable environmental environment for the population are reflected only in the development strategy of the Republic of Uzbekistan. The development strategy of the Kyrgyz Republic focuses on the introduction of nature-saving technologies. Environmental issues are not included in the strategic documents of Kazakhstan and Tajikistan, which indicates the transfer of consideration of this issue to the level of tactical planning.

Thus, despite the fact that all Central Asian countries have a regulatory framework for the SDGs at the national level, they differ significantly from each other in terms of the scale of national goals that sustainable development contributes to achieving. The different level of socio-economic development of the studied countries leaves a certain imprint on the prioritization of the directions set out in the main strategic documents. The lack of identity in the time horizons of planning and the levels of consistency of policy documents with the SDGs indicates a low potential for an integrated policy to institutionalize the SDGs at the national level.

6.2. Environmental policy targets in selected Central Asian countries and their financial support

In the modern period, the UN presents the most fundamental goals of global environmental policy. Implementing the concept of "Green Economy", key attention is paid to monitoring and reducing risks in the field of environmental health, human life and safety.

Due to the current situation and geographical location, the environmental agenda is of great relevance for the countries of Central Asia. It has recently become particularly important due to the aggravation of environmental problems such as climate change, the drying up of the Aral Sea, the reduction of water resources, melting glaciers, land degradation and the intensification of desertification processes. The set of measures and tools of environmental policy is wide, however, the combination of these tools to achieve maximum positive effect and offset their negative effects is more difficult. The analysis of the program documents regulating the implementation of environmental policy makes it possible to assess the degree of consistency of environmental policy pursued in the studied countries (**Table 2**).

Table 2. Policy documents regulating the implementation of environmental policy in the studied countries.

Criteria	The Republic of Kazakhstan	Kyrgyz Republic	The Republic of Uzbekistan	The Republic of Tajikistan
Regulatory document	The concept of the transition of the Republic of Kazakhstan to a "green economy" (Prezident Respubliki Kazakhstan., 2013).	The Concept of environmental safety of the Kyrgyz Republic (President Kyrgyz Republic, 2007).	The concept of environmental protection of the Republic of Uzbekistan until 2030 (Prezident Respubliki Uzbekistan, 2019b).	The concept of Environmental Protection in the Republic of Tajikistan (2023), the State Environmental Program of the Republic of Tajikistan for 2023–2028 (Pravitel'stvoRespubliki Tadzhikistan, 2008), Strategies for the development of a "green" economy in the Republic of Tajikistan for 2023–2037 (Pravitel'stvoRespubliki Tadzhikistan, 2023).
Status	The concept	The concept	The concept	Concept; The State program; Strategy
The basis for the development	By Decree of the President of the Republic of Kazakhstan dated 30 May2013, No. 577.	Decree of the President of the Kyrgyz Republic dated 23 November2007, No. 506.	Decree of the President of the Republic of Uzbekistan dated 30 October2019, No. UP-5863.	Resolution of the Government of the Republic of Tajikistan dated 31 December2008, No.645, Resolution of the Government of the Republic of Tajikistan dated 1 March2023, No.53, (Pravitel'stvoRespubliki Tajikistan, 2022), Resolution of the Government of the Republic of Tajikistan dated 30 September2022, No. 482.

A horizontal analysis of the program documents showed that in the countries studied, the main regulatory document is the concept. The conceptual approach to this issue is typical for all the countries studied and lays the foundations for deep systemic transformations in the long term in order to transition to a "green economy", ensure environmental safety, environmental protection, and rational use of natural resources.

In Kazakhstan, the transition to a "green economy" is the main way to achieve the SDGs, fulfilling Kazakhstan's promised contribution to reducing greenhouse gas emissions under the Paris Agreement of 12 December 2015, ensuring economic and environmental sustainability, a just and prosperous society, and a clean and healthy environment. Uzbekistan is also actively involved in achieving the goals set under this agreement (Agency of Statistics under the President of the Republic of Uzbekistan, 2024).

Special attention should also be paid to the fact that in 2021 a new Environmental Codec was developed in the Republic of Kazakhstan. Work on this document has been carried out for several years, which resulted in the consolidation of a package of strategic norms based on the best foreign experience in the document.

In Kyrgyzstan, the fundamental document in the field of environmental safety is the Concept of Environmental Safety, which ensures the protection of the country's citizens and natural systems from threats arising from anthropogenic and natural impacts on the environment.

In the Republic of Uzbekistan, by Decree of the President of the Republic of Uzbekistan, dated 30 October 2019, No. UP-5863, the Concept of Environmental Protection until 2030 was approved. This document provides for the introduction of effective mechanisms at all levels of government for the qualitative improvement of the environmental situation in the country. An important step in solving environmental

problems in the Republic was the Decree of the President of the Republic of Uzbekistan dated 31 May 2023.No. UP-81 "On measures to transform the sphere of ecology and environmental protection and the organization of the activities of the authorized State body", which provides for the creation of not only forest protection plantations, the creation of innovative water intake wells and irrigation systems, but also continuous multi-level environmental monitoring in the country based on the use of advanced technological solutions.

The concept of environmental protection in the Republic of Tajikistan defines the implementation of state policy in the field of environmental protection and rational use of natural resources (Prezident Respubliki Uzbekistan, 2019a). In addition, in the Republic of Tajikistan in 2023. The Strategy for the development of the "green" economy was approved, which focuses on institutional reforms, ensuring the effective use of natural capital, attracting investments, introducing modern and innovative technologies and strengthening international cooperation in the direction of the "green" economy (Agency of Statistics under the President of the Republic of Uzbekistan, 2024).

In accordance with the Law of the Republic of Tajikistan "On Strategic Planning and State Forecasting", the "State Environmental Program of the Republic of Tajikistan for 2023–2028" was approved. The State environmental program is designed for 5 years and is based on the main directions of the National Development Strategy of the Republic of Tajikistan for the period up to 2030. This program defines "the main directions of sustainable development of society for the organization of targeted activities for quality environmental protection, sustainable management and environmental safety." (Turgel et al., 2020). The program contains a more detailed specification of the list of activities, responsible performers, deadlines and sources of financing.

Analyzing the time horizons of the program documents regulating the implementation of environmental policy in the studied countries, it should be noted that the Republic of Kazakhstan in 2013 was one of the first to declare the transition to a "green economy", while Kyrgyzstan relied on ensuring environmental safety in 2007. An important area of the Concept of Environmental Protection in the Republic of Tajikistan, approved in 2008, was the integration of environmental policy with economic and social programs and strategies developed in the country.

An analysis of the development of the Republic of Uzbekistan in recent years (Begalov et al., 2024) shows that the country is effectively implementing a set of measures provided for by the Decree of the President of the Republic of Uzbekistan "On measures to improve the effectiveness of reforms aimed at the transition of the Republic of Uzbekistan to a "green economy until 2030, by Decree of the head of state "On additional measures for the introduction of energy-saving technologies and the development of low-power renewable energy sources", By the Decree of the President of the Republic of Uzbekistan "On urgent measures to improve the efficiency of water resources use".

It should be noted that in Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan, work has been carried out to adapt the environmental SDGs to reflect environmental issues in direct-action documents (Presidential Decrees and Government Resolutions), which reflects the high status of the adopted documents. Environmental policy refers

to administrative methods of direct impact.

The countries of Central Asia, due to the existing environmental issues, demonstrate identical approaches to the formation of environmental policy targets (**Table 3**).

Table 3. The main objectives of environmental policy in the countries studied.

Republic of Kazakhstan	Kyrgyz Republic	Republic of Uzbekistan	Republic of Tajikistan
The formation of favorable living conditions by creating a safe, environmentally clean environment, balanced use of natural resources, and the preservation of biodiversity of wildlife and plant species. Ensuring the transition of the Republic of Kazakhstan to low-carbon development and a "green economy" to meet the needs of current and future generations. Protection, reproduction, and rational use of flora and fauna, water resources, and specially protected natural areas (Prezident Respubliki Kazakhstan, 2013).	Sustainable development, which involves equal attention to its economic, social, and environmental components, and recognition of the impossibility of societal development with nature's degradation; minimizing environmental impacts during economic growth; preventing negative environmental consequences from economic activities for public health, considering possible environmental impacts; rejecting economic and other projects affecting natural systems if their consequences are unpredictable for the environment; nature use on a paid basis and compensation for environmental damage caused by violating environmental protection laws; access to environmental information; active participation of civil society, local self-government bodies, and businesses in preparing, discussing, adopting, and implementing decisions in the field of environmental protection and sustainable resource management (Pravitel'stvoKyrgyzskoiRespubliki, 1999).	Ensuring a favorable environmental state as a necessary condition for improving the quality of life and health of the population of the Republic of Uzbekistan; sustainable economic development through the introduction of innovative technologies that reduce negative environmental impacts and protect public health; ensuring rational use of environmental objects and reproduction of biological resources (Prezident Respubliki Uzbekistan, 2019b).	Reducing greenhouse gas emissions, transitioning to a "green" economy, promoting the "Green Country" initiative, and maintaining the natural system by expanding the area of forests, gardens, vineyards, green spaces, and specially protected natural areas, ensuring sustainable development and environmental security for the population (Pravitel'stvoRespubliki Tadzhikistan, 2022).

Kazakhstan, Uzbekistan and Tajikistan are characterized by the transition to a "green economy". Kazakhstan's priority target is to ensure the transition to low-carbon development, while Uzbekistan strives to introduce technologies that minimize negative effects on the environment. In the Kyrgyz Republic, environmental safety is considered as a component of the national security of the country.

The targets of all countries include elements of public participation, the development of environmental education and the balanced use of natural resources, but at the same time, emphasis is placed on solving problematic issues in their country.

The thematic analysis of the regulatory framework of the studied countries in recent years (**Figure 1**) has shown that the legislation of the Republic of Kazakhstan focuses on solving problems related to the protection of flora and ecosystems; ensuring nuclear safety (which is of particular importance in the context of the legacy of the Semipalatinsk test site), as well as strengthening control over compliance with environmental legislation.

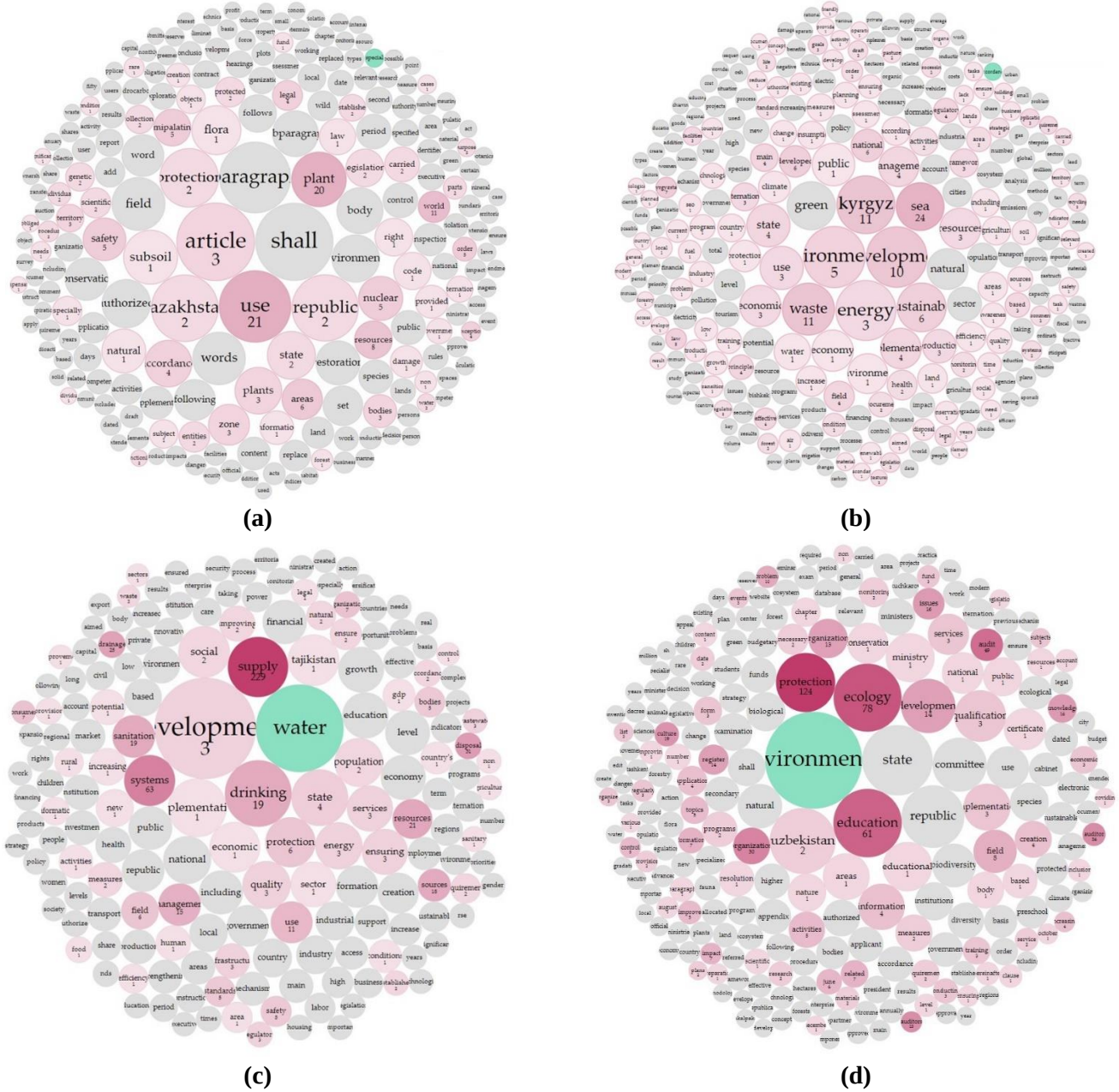

Figure 1. Part of the thematic analysis of the regulatory framework of the studied countries. **(a)**Kazakhstan; **(b)** Kyrgyzstan; **(c)** Tajikistan; **(d)** Uzbekistan.

In the Kyrgyz Republic, the most urgent issues are the transition to a "green" economy and the development of renewable energy sources; the fight against climate change and adaptation to new climatic conditions; economic development with an emphasis on environmental management and resource management.

The legislative framework of the Republic of Uzbekistan focuses on environmental protection, digitalization in solving environmental problems and the development of environmental education.

The following areas are priorities for Tajikistan: development of water supply and improvement of drinking water quality; development of infrastructure projects, which is of particular relevance due to the geographical location of the country and

dependence on water sources.

Regarding the costs of environmental measures, the countries under study show different trends. An analysis of this indicator in dynamics showed that the Republic of Kazakhstan pays the greatest attention to environmental protection issues (**Figure 2**). To a lesser extent, environmental measures are funded in Tajikistan, Kyrgyzstan and Uzbekistan. But the general trend of all analysed countries (with the exception of Tajikistan) is an increase in government spending on environmental protection.

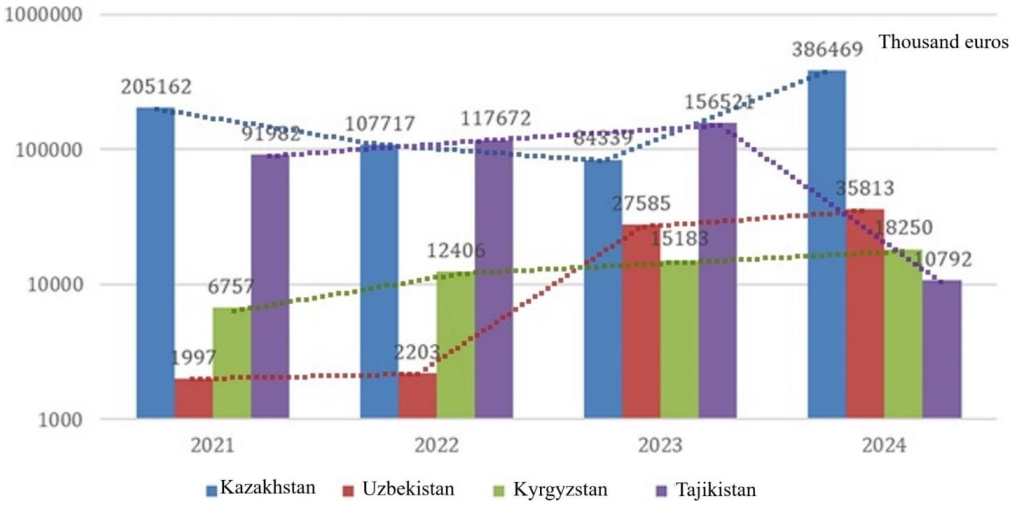

Figure 2. Dynamics of changes in environmental protection costs.

For example, in the Republic of Kazakhstan, according to the generalized labeling results for all functional groups, the coverage of SDG objectives by budget programs is 46% (77 out of 167 national SDG objectives). In the context of environmental issues, the analysis showed a high level of compliance of budget programs with SDG 13. “Combating climate change” (67%), and the low level is SDG 15. “Conservation of the terrestrial ecosystem” (33%). Experience shows that the number of budget programs in the field of solving environmental problems increases annually. If in 2021–2023 there were only 9 such programs, then in 2024 there is an expansion in both the number of administrators of budget programs and their number. At the same time, it should be noted that in Kazakhstan, priority is given to public financing in comparison with the business sector (Klastery et al., 2020).

The shortage of water resources contributes to the adoption of comprehensive programs in this area. In 2024, in Kazakhstan, due to the threat of floods and floods, a Concept for the development of a water resources management system for 2024–2030 was adopted. It is no coincidence that significant financing from the republican budget is provided for this budget program “Effective management of water resources” (102,085.086 million tenge, which is 52.62%). The next place in the republic in the field of ecology is occupied by the budget program “Management, conservation and development of forest resources and wildlife”, which is financed by 56,996.277 million tenge (29.38%). Next, it is necessary to note the budget program “Development of hydrometeorological and environmental monitoring”, aimed at monitoring the state of the environment and the implementation of hydrometeorological monitoring (6.31% of the allocated funds). Insignificant financing of 0.28%–5.29% is provided for the remaining budget programs.

In the Kyrgyz Republic, expenditures under the section "Environmental protection" account for 0.4% of the total expenditures of the republican budget (including financial assets) and 0.1% of GDP. The main strategic goal of the Environmental Protection sector is to ensure the preservation of the unique ecological system of the Kyrgyz Republic and environmental protection for present and future generations. By region, funds are allocated for the construction, reconstruction, expansion and technical re-equipment of environmental and resource-saving capacities, structures, installations, aggregates, etc. In 2016. A strategy for the development of drinking water supply and sanitation systems in settlements of the Kyrgyz Republic until 2026 was adopted, providing for the number of required investments in the construction/rehabilitation of drinking water supply systems in villages until 2026, based on an average of 20.9 million soms per village (by region).

In the State Budget of the Republic of Uzbekistan for 2024, 38.7% of all allocated funds for development programs in the field of ecology, including 0.85% are the costs of maintaining state inventories of wildlife, protected natural areas and waste disposal sites, 4.5% are the costs of creating protective plantations to prevent desertification of desert, mountain and foothill areas and the movement of sand, wind and water erosion of the soil, as well as environmental improvements, 11.32%—expenses within the framework of the nationwide Yashilmakon project. This project was launched in November 2021 and has already had positive results to date. As part of the implementation of this project, it is planned to plant 1 billion green spaces, which will mitigate the impact of the hot climate and man-made stress on the country's population. It is very gratifying to note that all residents of the districts of cities, regions, mahallas are already actively involved in the implementation of this project, all residents of the country—from schoolchildren to wise elders—are trying to make their contribution and turn their native land into a blooming garden, with a safe ecological environment for future generations and the prosperity of the country in the global economic market.

The problem of drinking water economics, which is typical for the countries of Central Asia, is most effectively solved in Uzbekistan. Scientists and practitioners of the republic are constantly working to improve methods and tools based on technologies of drip irrigation, discrete irrigation, sprinkling, as well as the method of laser water planning.

As follows from the Concept of development of the water sector of the Republic of Uzbekistan for 2020–2030, modern technologies for saving water resources must be implemented on 50% of the 4.3 million hectares of irrigated land in the Republic of Uzbekistan.

Uzbekistanis are doing a lot of work to combat the consequences of an environmental disaster in the Aral Sea basin. For several years, scientists and activists of the country have planted saxaul forest and other desert plants at the bottom of the dried-up Aral Sea. These plantings reduce the appearance of dust storms, contribute to the restoration of flora and fauna, which has a positive effect on the lives of people living in the Republics of Uzbekistan, Tajikistan and Kazakhstan.

The Law of the Republic of Tajikistan "On the State Budget of the Republic of Tajikistan for 2024" contains a combined cost item "Housing and communal services, environmental protection and forestry", which provides financing in the amount of

130,817 thousand somoni. In 2019, the law of the Republic of Tajikistan on drinking water supply and sanitation was adopted, providing not only state regulation, but also financing of drinking water supply and sanitation.

Based on the above, we can state the identity of approaches to environmental policy in the countries under study, which creates certain prerequisites for joining efforts to jointly solve problematic issues and introduce mechanisms for "soft" coordination of work to achieve the environmental SDGs.

6.3. Assessment of the quality of environmental management

The study proposes a set of quantitative and qualitative indicators to assess the quality of environmental management at the regional level:

- The level of reflection of the sustainable development agenda in the program documents of regional development;
- The level of development of public-private partnership in the field of environmental protection;
- The level of social well-being of the population;
- The quality of monitoring the achievement of the environmental SDGs.

There are many contradictions regarding the level of reflection of the sustainable development agenda in the program documents of the regions.

The Central Asian countries are striving to actively develop sustainable development institutions in their regional policies. Local executive authorities and local self-government bodies play an important role. In the Republic of Kazakhstan—these are regional and city akimats; in the Kyrgyz Republic—authorized representatives of the President of the Kyrgyz Republic in the regions, municipalities of Bishkek and Osh; in the Republic of Uzbekistan— the Council of Ministers of the Republic of Karakalpakstan, regional and Tashkent city administrations; In the Republic of Tajikistan—local self-government bodies in 369 rural districts, local government bodies in 4 inner-city districts of Dushanbe.

If the regulatory framework of the SDGs at the national level is represented by a wide range of documents, including strategies, national programs and development concepts, then the depth of penetration of the SDGs at the regional level is significant only in the Republic of Kazakhstan. The SDGs are reflected in the concepts of industry development; national projects; territorial development programs; development plans of government agencies; development plans for regions, cities of republican significance, the capital; development plans for national holdings and national companies. For example, an analysis of the plans and programs for the development of the regions of the Republic of Kazakhstan for 2021–2025 showed that they mostly reflected such SDGs as 1,2,3,4,8,9 and 11. This fact is confirmed by the results of a sociological survey of residents of Kazakhstan:

- 31.2% of the respondents believe that local and regional authorities should actively contribute to the achievement of the SDGs;
- 27.3% of respondents noted that this is the prerogative of the republican authorities;
- 14.4% of the surveyed residents of Kazakhstan preferred special NGOs, environmental associations and human rights defenders.

A good example is the reflection of the SDGs in the program documents of the regions of the Republic of Kazakhstan (**Table 4**).

Table 4. Reflection of the SDGs in the program documents of the regions of the Republic of Kazakhstan.

Areas	SDG 6: Clean water and sanitation	SDG 7: Low–cost and clean energy	SDG 13: Combating climate change	SDG 14: Conservation of marine ecosystems	SDG 15: Conservation of terrestrial ecosystems
Abai region	+	+	+	–	+
Aktobe region	+	+	+	–	–
Akmola region	+	–	+	–	+
Almaty region	–	–	–	–	+
East Kazakhstan region	+	+	+	–	+
Zhambyl region	+	+	+	–	+
Zhetysu region	+	–	+	–	+
West Kazakhstan region	+	+	+	–	+
Karaganda region	–	–	+	–	+
Kostanay region	+	–	+	–	+
Kyzylorda region	–	–	–	–	–
Mangystau region	+	+	+	+	+
Pavlodar region	+	–	+	–	+
North Kazakhstan region	+	–	+	–	+
Ulytau region	+	+	+	+	+

As can be seen from the table, SDGs 6, 13 and 15 are reflected in the practical development programs of all regions of Kazakhstan. Due to the geographical location, SDG 14 is allocated in the development program only for the Mangystau region. Also, in the regional development programs, special attention is paid to the problem of waste recycling, landscaping and the sanitary condition of cities. Measures aimed at improving the ecological condition and preserving ecosystems of water bodies and fish resources are identified in the development plans of Ulytau and Zhetysu regions. However, in most areas this aspect is reflected only by the generalized formulation "Improvement of the ecological situation of the region".

In Kyrgyzstan, Uzbekistan and Tajikistan, the SDGs are not present as such in regional strategic documents. There are isolated examples of the inclusion in regional strategies of provisions directly aimed at the implementation of the Sustainable Development Agenda.

One of the directions for the implementation of the principles of sustainable development at the regional level is the involvement of business and other stakeholders in the sustainable development agenda. In order to identify priority areas for expanding cooperation with business structures, the study attempts to determine the relationship between the volume of investments directed by regions to environmental protection and rational use of natural resources per capita and indicators characterizing the environmental situation in the regions (emissions of pollutants into the atmosphere from stationary sources and vehicles (per capita); volume of solid household waste exported per capita; volume of disposed pollutants; access to clean water (the proportion of the population provided with drinking water from decentralized water supply sources).

Table 5.A fragment of the results of a regression analysis characterizing the causal relationships between the volume of investments directed to environmental protection measures and indicators reflecting the environmental situation.

Areas	**The regression equation**	**Explanation**
Kostanay region	$Y = 1507780421{,}35 - 7670508{,}11X_1 - 2738663{,}61X_2 + 1428741{,}19X_3$.	y: the volume of investments in environmental protection and rational use of natural resources per capita (thousand tenge); x_1: the number of pollutants released into the atmosphere without purification per capita (kg); x_2: volume of solid household waste exported per capita (tons); x_3: volume of disposed pollutants (tons); x_4: access to clean water (percentage of the population provided with drinking water from decentralized water sources) (%).
East Kazakhstan region	$Y = -49969923{,}6595 + 81406{,}3582X_1 + 37884{,}9474X_2 + 32997{,}7145X_3$.	
Almaty region	$Y = 354764{,}4821 + 1935{,}6305X_1 - 735{,}1717X_2 + 2531{,}2187X_3$.	
West Kazakhstan region	$Y = 6811772{,}5379 - 209792{,}5564X_1 - 1362{,}4044X_2 + 27896{,}4135X_4$.	

In all regions, there is the strongest correlation between the volume of investments directed to environmental protection measures and the volume of disposed pollutants per 1 ton. An increase in the volume of pollutants released into the atmosphere without purification per capita by 1 kg will lead to the search for additional sources of financing mainly in the industrial regions of the Republic of Kazakhstan. The West Kazakhstan region stands out from the general list of studied regions, where an increase in access to clean water (the proportion of the population provided with drinking water from decentralized water sources) by 1% leads to an increase in investment by an average of 4%.To a lesser extent, there is a relationship between the volume of investments and the volume of solid household waste exported per capita per 1 ton, since the problem of solid household waste has been solved in all regions of the country (**Table 5**). Undoubtedly, not only regional budgets, but also banking structures and development institutions should be considered among the sources of financing. The use of public-private partnership mechanisms in the field of environmental protection will make it possible to comprehensively solve priority environmental problems of the regions.

But, unfortunately, currently in all Central Asian countries, environmental issues have not become a priority in the implementation of projects by business structures. Solving this problem on a residual basis leads to an aggravation of the situation, for example, during floods, which necessitated the introduction of an emergency regime. In order to expand public-private partnership, it is necessary to develop mechanisms for involving representatives of the business community in the SDG implementation processes.

But, at the same time, environmental issues have become the object of close attention of local communities. Thus, the results of a sociological survey of residents of the Republic of Kazakhstan showed that only 5.6% of respondents are satisfied with the measures taken to improve the environmental situation in the regions. 34.8% of respondents believe that akimats have been paying less attention to environmental protection and waste management over the past year, but have given priority to landscaping and landscaping (36.6% of respondents).51.2% of residents of the regions noted that nothing has changed on the issue of access to clean drinking water.

According to the respondents, the most serious damage to the environment in the regions is caused by: the activities of industrial companies, emissions, accidents (44.6%); transport exhausts (freight, public and personal transport) (39.2%); dense buildings/violation of residential construction standards (33.8%); pollution of reservoirs, coastal areas and poor purification of tap water (22.9% and 17.5%, respectively). 52.5% of respondents believe that large industrial enterprises cause the greatest harm to the environment. Residents of Karaganda, Pavlodar, and East Kazakhstan regions, which are considered the industrial centres of the country, are more dissatisfied with the activities of industrial companies.

A fairly large percentage −58.7% of respondents noted that large industrial enterprises should, first of all, pay attention to improving production technologies and introducing innovations, as well as pay more attention to such issues as constant monitoring of the environmental situation in the region of the enterprise (964.1% of respondents); transparent reporting on environmental impact by enterprises for public control (52.2%); the transition to “green production”—the introduction of more environmentally friendly, resource-saving technologies (29.1%); support for environmental organizations, activists, dialogue with environmental organizations (20.4%). Respondents believe that tax incentives and subsidies can work more effectively if they are simultaneously combined with informing the public and companies about more environmentally friendly production technologies (VCIOM, 2024).

Residents of Karaganda, North Kazakhstan, Pavlodar, Atyrau, Akmola and Kostanay regions are more puzzled by the issues of improving production technologies and increasing the innovative component in the activities of enterprises. It should be noted that major breakthrough industrial projects aimed at developing the country’s mining and metallurgical complex, mechanical engineering and the oil and gas industry are being implemented in these regions. In addition, it is planned to open new production facilities. For example, in Kostanay region, it is planned to build a new plant for the production of hot-briquetted iron with a degree of metallization of at least 93%–94%. The planned schedule of the project is designed for 4 years. This project will make it possible to enter the next stage by restoring the volume of production of iron-containing pellets at JSC SSGPO, as well as ensure the production of finished goods with higher added value and global market competitiveness.

In terms of the quality of monitoring the achievement of the environmental SDGs, Uzbekistan has achieved the greatest success. A separate web page of the National Sustainable Development Goals has been created on the portal of the Statistics Agency under the President of the Republic of Uzbekistan (https://nsdg.stat.uz). This information resource on the Internet is a reliable source of data for national and

international users who analyse and track progress towards achieving the SDGs.

The site has a user-friendly interface that allows you to download new indicators with any level of detail, as well as methodological information on them, without using any programming tools. The coordination of data flows for downloading and administration of the platform is carried out by the Statistics Agency under the President of the Republic of Uzbekistan. The site is supported in Uzbek, Russian and English. The calculation methodology and other background information are provided for each available indicator.

Given the importance of the SDGs implementation, the Agency of Statistics under the President of the Republic of Uzbekistan publishes annually in three languages (Russian, Uzbek and English). “Collections of statistical indicators on the achievement of National SDGs in the Republic of Uzbekistan”.

To optimize the work on monitoring the implementation of SDG tasks by the Statistics Agency. Under the President of the Republic of Uzbekistan, a new ESCAP—SDG “Tracker” tool was introduced, designed to assess national progress in achieving the Sustainable Development Goals and inform about progress in a politically relevant way so that the country can use its national data and indicators and create a user-friendly dashboard.

Currently, the portal of the Main Statistical Agency of the Republic of Uzbekistan contains information on 128 National SDG Indicators, and the SDG “Tracker” information panel contains 60 indicators (Begalov et al., 2024).

The Interdepartmental and Expert Group on SDG Indicators and the Statistical Division of the UN Department of Economic and Social Affairs We conducted a survey among countries on best practices of achievements in the field of sustainable development. According to the results of the survey for 2022, Uzbekistan was among 87 countries with the most advanced experience.

Information on Uzbekistan’s best practices was published on the website of the UN Statistics Division “Best Practices in achieving the SDGs”, which is a good example and result of successful cooperation with the United Nations system (**Figure 3**).

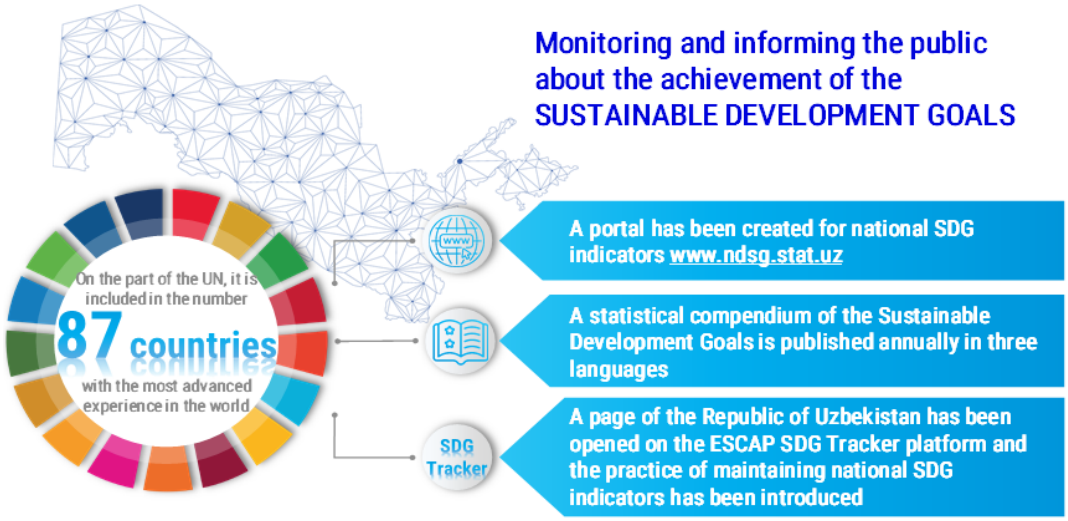

Figure 3. A web page on the portal of the agency of statistics of the Republic of Uzbekistan dedicated to monitoring the achievement of the sustainable development goals (United Nations Statistics Division).

The task of monitoring is to show the progress of sustainable development achieved in the country, compare it with other countries, and also understand where we are, what we have achieved and where additional efforts need to be made.

All the above-mentioned events serve as important components in solving modern environmental problems and require active integrated efforts by representatives of Uzbekistan, Kazakhstan, Kyrgyzstan and Tajikistan.

7. Conclusion

Based on the results of the study, the following conclusions can be drawn.

The analysis conducted using criteria such as the level of governance at which key policy decisions are made; the scale of national goals that sustainable development contributes to; prioritization of development directions; decision-making centers showed that the Central Asian countries partially demonstrate common approaches in terms of policy formation aimed at the implementation of the SDGs. This complicates the implementation of an integrated policy on the institutionalization of the SDGs at the national level and reduces the potential for joint projects aimed at accelerating the achievement of the SDGs.

National goals in the field of environmental policy are based on the fundamental principles and special recommendations of the United Nations, and are fixed by relevant decisions of heads of State and Government. On their basis, concepts and programs have been developed in each country to improve the environmental situation. At the same time, despite the historical socio-economic ties and the similarity of environmental problems present in Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan, comprehensive joint initiatives in the field of environmental policy have not yet been formed. National environmental policy priorities, on the one hand, strive to follow the spirit and letter of the global priorities formulated by the United Nations, but, on the other hand, take into account the specifics of the environmental situation in their country to a greater extent. But at the same time, environmental issues can become the foundation for the development of mechanisms for “soft” coordination in this area.

The assessment of the quality of environmental management at the regional level showed that the countries of Central Asia demonstrate a different level of reflection of the sustainable development agenda in the program documents of regional development. Environmental SDGs are fragmentary in the program documents of the regions and, as a rule, are not supported by financial resources. There are no developed approaches to solving environmental problems in the regional policy of the studied countries; there is a shortage of funds to finance activities in the field of environmental policy. Carrying out a set of works on the implementation of the environmental SDGs remains the prerogative of national governments, not regional authorities. Also, all countries demonstrate a low level of development of public-private partnerships in the field of environmental protection. In order to strengthen the innovation component and the development of entrepreneurship, attention should be paid to the preparation of country-specific regulatory documents providing for a business-friendly regime

At the same time, environmental issues have a high degree of sensitivity on the part of the population. The conducted research showed that 44.9% of those

participating in the survey believe that the culprits of many problems in the field of environmental protection are the citizens themselves. The assessment of a set of measures aimed at improving the environmental situation in the regions clearly proved the fact that it is currently necessary to increase environmental literacy and responsibility of people (73.2%), the use of innovative technologies in the garbage collection and recycling system, including industrial waste (59.6%), stricter supervision of compliance with environmental standards (59.14%); stricter environmental standards for enterprises (36.5%); introduction of an additional tax for companies that harm the environment (25.7%).

The population of the regions is quite critical of the measures taken in the field of environmental policy and to a greater extent places responsibility for the activities carried out on regional authorities. In order to obtain a synergistic effect, it is advisable to use work with the population in conjunction with the use of an existing set of tools in the field of environmental policies. Although at the moment the countries of Central Asia lag behind the most developed countries in terms of environmental policy, in the long term it is possible to develop priority areas of cooperation on issues of resource conservation and improving environmental literacy and responsibility of residents of the regions. It is necessary to ensure the development of collective methodological programs to improve environmental efficiency, modernize or reduce harmful industries, use artificial intelligence systems and neural networks to optimize a set of measures to improve the environmental situation in the region under consideration

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