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Article

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Development of Economic Mechanism for Ensuring Ecological Security in Kazakhstan

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ABSTRACT

This article deals with the analysis and assessment of the environmental situation in the regions of Kazakhstan, as well as issues of developing an economic mechanism for ensuring environmental safety in the country. The problem of ensuring environmental safety has acquired the status of one of the most priority and acute problems facing humanity. It is very difficult to simultaneously maintain the pace of economic growth and minimize the negative consequences of human impact on nature. Creating a reliable and effective mechanism is the main task of ensuring environmental safety in all states. It can provide a balanced solution to economic problems and problems of preserving the natural environment to meet the vital needs of the population. Based on the analysis of conceptual approaches to the formation of the economic mechanism for ensuring environmental safety, the fundamental principles of the formation of this mechanism in Kazakhstan have been determined.

Keywords: Economic Mechanism, Environmental Safety, Sustainable Development, Environmental Pollution, Greening the Economy
JEL Classifications: O18, O21, O31, Q57

1. INTRODUCTION

Ensuring environmental safety is an important and priority area in protecting the national interests of the state. Today, the issues of ensuring environmental safety are highly relevant, becoming the subject of interest and new research by economists. Protecting the environment is one of the most widely discussed problems of contemporary time. The successful development of the economy and well-being of the present and future generation largely depend on the sound solution of these problems. Scientific and technical progress as well as increased anthropogenic pressure on the environment inevitably leads to an exacerbation of the ecological situation: depletion of natural resources, environmental pollution and loss of ties between man and nature. Moreover the economic and political health is worsened; the struggle for commodity markets and living space is becoming more aggressive.

Concept of transition of the Republic of Kazakhstan to sustainable development for 2006-2024 aims at achieving balance of economic, social and environmental aspects of the development of the Republic of Kazakhstan as the basis for improving the quality of life and ensuring the country's competitiveness in the long term.

World practice demonstrates the diversity of tools to ensure environmental safety by action, operating conditions, degree of efficiency and forms of application. At the same time, the existing mechanisms of environmental management, environment and human health protection and safety in Kazakhstan are characterized by unsystematic nature, distortion of the functions of individual elements, inconsistency with modern market conditions, and as a result, they are ineffective and unpromising. The problem of ensuring environmental safety is a natural consequence of the huge changes that have been observed since the beginning of the century in the human environment by instrumental methods, and

in the second half of our century – by remote, including satellite, methods. These data show that changes have swept the entire planet and developed in the direction of worsening conditions for the existence of humans and many other organisms: changes in the composition of the atmosphere, depletion of the ozone layer, degraded land, rapidly increasing extinction of species, etc. All these changes occur at speeds that are many times higher than natural fluctuations; they affect people's health and in one way or another affect the well-being of all countries, including Kazakhstan. The global environmental crisis affects all of humanity and all aspects of people's lives, but it manifests itself differently in each country depending on its natural conditions, economic and social situation. Thus, currently, the problem of environmental safety is relevant for the entire world community and can be put on a par with the threats and challenges that the world has faced since the beginning of the new millennium. This means that without its solution, it is impossible to move towards sustainable world development or strengthen global environmental safety.

2. MATERIALS AND METHODS

A scientifically grounded theoretical basis for the establishment of an economic mechanism to ensure regional ecological safety is highly demanded. There are numerous researches by Kazakhstani and foreign economists devoted to the issues of formation and development of economic support in ensuring environmental safety. From the point of view of economics, the works by Khachaturov are worth mentioning (Khachaturov and Loiter, 1980; Khachaturov, 1982), as they consider national economic problems taking into account nature protection, in particular, problems of the integrated planning of natural resources application.

The problems of resource conservation and their relationship with the environmental factor in economic development have been studied by Papenov (1992), Golub and Strukova (1988, 1989, 1993, 1995), Hoffman (1977, 1990), Sinyakevich (1999, 2002), Danilishin and Shostak (1999), Gerasimchuk and Vakhovich (2002), Davidyuk (2008), Kesyan (2011), Kosyakova (2007), Nikitina (2012), Aidosov et al. (2018). The issues of effective environmental management of the Republic of Kazakhstan have been studied by Soltanbekova (2009), Andabaeva (2007), Iskakova (2006) etc.

The state sets as its goal the protection of the environment favorable for human life and health (The Constitution of the Republic of Kazakhstan, 2017). Highest possible greening of production processes, the introduction of environmentally friendly technologies and energy conservation are found to be the main directions of the state environmental policy. Scientist Golichenkov considers environmental safety as "achieving and maintaining such a quality of the environment, in which the impact of its factors ensures human health and fruitful activity in harmony with nature." Nurpeisov defines environmental safety as "…protection of vital interests and rights of an individual, society and the state against threats arising from anthropogenic and other environmental impacts" (Nurpeisov, 2003). Unfortunately, for many decades, Kazakhstan has developed mainly a resource management system with extremely high man-made pressures on the environment (Nikolaykin, 2004).

The development of the economy is associated with the impact on the environment, since the creation of new and expansion of existing production leads to positive economic and social results, but it also has negative aspects, in particular, the ecological situation may deteriorate. Therefore, an important scientific problem is the assessment of economic development impact on the environment is urgent.

The increase in the volume of mining and other industries, the introduction of new natural resources and the expansion of entrepreneurship, including foreign economic relations, without an economic mechanism in the field of ecology can lead to over-exploitation of mineral, land and water resources, air and water pollution. It also poses a threat to people's lives (Khachaturov and Loiter, 1980).

Unsolved environmental problems significantly affect the health and lives of the population. In this regard, development of the economic mechanism for ensuring environmental safety in the Republic of Kazakhstan is one of the key elements to increase effectiveness of the state in identifying ways for its sustainable development.

Goal of research is to justify the development of the main functional components of an integrated economic mechanism for ensuring the environmental safety of Kazakhstan.

3. RESULTS AND DISCUSSION

Identification of the main environmental risks affecting the economy of Kazakhstan makes it possible to develop and conduct more effective government policies in the field of greening the economy, production, and the development of environmentally friendly technologies, especially in leading industries.

It also turned out to be urgent as Kazakhstan, implementing "Strategy-2050" (Strategy "Kazakhstan-2050", 2012) and concept of transition to sustainable development for 2006-2024 (The concept of the transition of the Republic of Kazakhstan to sustainable development for 2006-2024, 2006) is aimed at a long-term environmental strategy, harmonizing the interaction between society and the environment.

Strategic goals of the concept will provide Kazakhstan with an opportunity to be among the most competitive and developed countries in the world by the level of living standards.

Rapid economic growth based on the development of productive forces also ensures their further development, improvement of social wealth, the rise of cultural and material wealth and the increase in life expectancy. But at the same time, the consequence of accelerated economic growth is the degradation of nature, i.e. ecological imbalance.

Degradation of one component sooner or later leads to degradation of another. Finally, the violation of the ecological balance in nature

(pollution of the atmosphere, soil, water, seas, accumulation of solid waste and toxic substances in food, noise, radioactive elements) is the result of nature development and production, the primary goal of which is gaining as much profit as possible (Nikolaykin, 2004).

The impact of natural resources exploitation on production and human life is being studied by representatives of various sciences, mainly representatives of the natural sciences. It is multidimensional and therefore is the subject of a relatively new trend in science called environmental economics.

Environmental pollution by industrial emissions of enterprises leads to the emergence of various types of material damage (an increase in morbidity rate, an accelerated deterioration of buildings and structures, a decrease in agricultural productivity, etc.). The monetary assessment of the material damage caused by emissions of pollutants by enterprises represents an economic loss.

Environmental problems identified in the Register of environmental problems of Kazakhstan are divided into global (include the negative effects of global climate change, the destruction of the ozone layer and the preservation of biodiversity, desertification and land degradation), national (include the reduction of the Aral Sea, the presence of the former Semipalatinsk test site, the impact of intensive development of the Caspian Sea shelf resources on marine and coastal ecosystems, depletion and pollution of water resources, historical pollution, military-space and testing complexes' activities) and local (air and water resources contamination, radioactive or chemical pollution, as well as industrial and household waste).

The Environmental Code of the Republic of Kazakhstan implies the stabilization and reduction of the environmental impact of human activities (Environmental Code of the Republic of Kazakhstan, 2018). Hence, the growth of production is accompanied by an annual increase in air pollution (Table 1).

As can be seen from the table there is an annual increase in air pollution both in the Republic of Kazakhstan as a whole and in the Aktyubinsk, Atyrau, Karaganda and Kostanay regions from 2010 to 2017.

Gradual increase in pollution from 2010 to 2017 occurs in Akmola, Kyzylorda, South Kazakhstan and Mangystau regions. According to the statistics, the largest amount of emissions of pollutants into the atmosphere in the Republic in 2017 was 598.7 thousand tons stated in the Karaganda region (Statistical compilation "Environmental indicators of monitoring and environmental assessment," 2016).

According to meteorologists, the monitoring was conducted during the year in 46 settlements, of which 27 were classified as low polluted, 10 as elevated and 9 with high rate of air pollution.

Cities with high volumes of wastes are to be Almaty, Astana, Aktobe, Balkhash, Zhezkazgan, Temirtau, Karaganda, Shymkent and Akai village.

Cities with elevated levels of pollution are Zhanatas, Ust-Kamenogorsk, Ridder, Kyzylorda, Taraz, Semey, Shu, Petropavlovsk and the settlements of Glubokoe and Beyneu.

The following cities were determined as with low levels of pollution: Turkestan, Taldykorgan, Stepnogorsk, Aksai, Kokshetau, Kulsary, Saran, Kentau, Aksu, Zhanaozen, Zyryanovsk, Rudny, Ekibastuz, Kostanay, Pavlodar, Uralsk, Aktau, Atyrau, Karatau, Kostanay, Pavlodar, Uralsk, Aktau, Atyrau, Karatau, and the villages of Bereg Korday, Toretam, Karabalyk and Shchuchinsk-Borovskaya resort area.

Compared to 2015, the level of air pollution has a positive trend (decreased) in the cities of Aksai, Ekibastuz, Stepnogorsk, Ridder and Ust-Kamenogorsk.

In seven cities of Aktobe, Astana, Balkhash, Petropavlovsk, Shu, Kyzylorda, Zhanatas and Akai village, the level of air pollution has increased compared to 2015 (Statistical compendium "Official statistical information (by industry)," 2016).

During 2016, 2828 cases of high pollution (HP) and 550 cases of extremely HP (EHP) of air were recorded in: Aktobe - 235 cases of HP and 67 cases of EHP on hydrogen sulfide; Balkhash - 4 cases of EHP for hydrogen sulfide and suspended solids and 5 cases of EHL for hydrogen sulfide; Karaganda - 14 cases of HP in

Table 1: Key indicators for pollutant emissions

Regions	2010	2011	2012	2013	2014	2015	2016	2017
			In thousands, ton					
Akmola reg.	72.9	77.8	105.7	83.8	84.6	85.6	94.5	86.9
Aktyubinsk	125.3	119.8	123.9	125.4	121.8	134.3	155.6	169.5
Almaty	74.7	73.4	64.3	68.4	51.6	55.0	50.3	43.4
Atyrau	97.8	107.4	133.1	138.4	109.1	110.7	167.1	177.0
West Kazakhstan	58.1	55.9	62.0	60.4	44.7	42.4	42.5	41.5
Jambyl	19.3	24.9	40.7	33.6	38.2	41.9	52.4	51.9
Karaganda	661.2	691.3	641.4	572.6	603.6	596.4	593.0	598.7
Kostanay	114.5	109.4	100.6	115.4	103.8	91.6	98.7	114.8
Kyzylorda	29.0	31.9	31.1	31.2	30.8	30.1	30.1	27.5
Mangystau	68.6	75.8	64.2	77.5	88.3	72.5	65.8	62.6
South Kazakhstan	40.7	47.1	48.6	56.3	59.9	69.0	72.1	68.2
The Republic of Kazakhstan	2226.6	2346.3	2384.3	2282.7	2256.7	2180.0	2271.6	2357.8

Source: Compiled by the authors according to the source: (Statistical compilation "Environmental indicators of monitoring and environmental assessment," 2016)

suspended particles particulate matter (PM) 2.5, PM-10, carbon monoxide and 1 case of EHP in suspended particles PM 2.5; Petropavlovsk - 2563 cases of HP and 477 cases of EHR on hydrogen sulfide; Temirtau - 12 HP cases for nitrogen dioxide and hydrogen sulfide (Statistical compendium "Official statistical information (by industry)," 2016) (Figure 1).

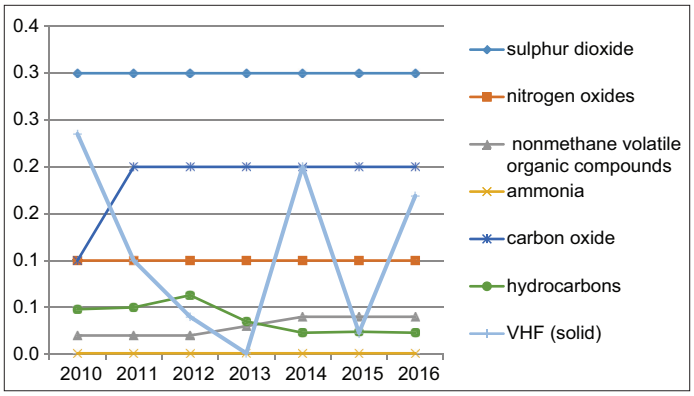
In the period from 2010 to 2016, the main share of emissions of pollutants into the air in the Republic is sulfur dioxide and VHF (solid). In 2010, emissions of pollutants (sulfur dioxide, nitrogen oxides, NMVOC, ammonia, carbon monoxide, hydrocarbon and VHF [solid]) from stationary sources to atmospheric air amounted to 4649.9 thousand tons per year. In 2016, the emissions from stationary sources into the air amounted to 2271.6 thousand tons per year. The cumulative emissions of 2016 accounted for 44% of the cumulative emissions of 2010.

According to the published monitoring of the environment in the Republic of Kazakhstan, issued by a group of Kazakh and Russian scientists and UNDP experts in Kazakhstan, Kazakhstan can be declared a zone of ecological disaster.

It is estimated that 75% of the country's territory is at increased risk of ecological destabilization. About 5 million people in Kazakhstan live in polluted atmospheric air, and 2 million in conditions of extremely high levels of pollution, and all these two million live in the southern capital of the republic. The annual amount of atmospheric pollution in Kazakhstan ranges from 3 million tons. Greenhouse gas emissions and carbon dioxide are particularly polluting the air.

According to the specific indicator of greenhouse gas emissions per unit of gross domestic product (3.38 kg/USD) carbon dioxide ranks first in the state. Energy is the largest contributor to CO_2 emissions, and coal is among energy sources. At a more intensive pace, the share of coal increased in 2012 by 63% (70% of electricity is generated by burning coal), and according to forecast data, it will increase to 66 % of the gross emissions resulting from fuel combustion by 2020.

Figure 1: Emissions of main pollutants per unit area (area of the country − 1000 km³) t/m³



Source: Compiled by the authors based on data of (Statistical compilation "Environmental indicators of monitoring and environmental assessment," 2016)

Air pollution major causes is associated with emissions of highly toxic gaseous and solid substances from non-ferrous metallurgy, heat and power, ferrous metallurgy, oil and gas complex and transport; 50% is shared by heat and power sources, 33% of emissions are caused by mining and non-ferrous metallurgy enterprises. The largest amount of emissions of various pollutants occurs in Western Kazakhstan, accounting for more than 43% of the total amount of emissions throughout Kazakhstan.

Central Kazakhstan takes the second place by the number of emissions, constituting 36%, North (over 7%) and South Kazakhstan (more than 8%) are on the third place. The most mobile, with an extensive radius of action, are oxides of nitrogen and sulfur have a strong impact on public health and harvest failure.

For example, the growth of oil and gas production and the irrational approach to the processing of raw materials have led to excessive accumulation of industrial waste, since the volume of sulfur in the dumps of the Tengiz field has already exceeded 8 million tons. Sulfur belongs to the 4th class of danger. Under the influence of hydro meteorological and temporal factors, the soil is eroded, cracked, destroyed, begins to crumble, and further destruction processes only accelerate.

The total economic loss in Kazakhstan arising from the direct and indirect effects of land degradation is KZT 93 billion. This, in turn, requires from our subsoil consumers the careful and rational attitude to land and mineral resources, the implementation of cleaning measures. In addition, most of Kazakhstan is located in the arid zone and about 66% of its territory is subject to desertification processes in different degrees (reasons: scarcity, uneven distribution of water resources causing widespread sands − up to 30 million hectares and saline lands − 127 million ha, drought impact) (Figure 2).

According to the requirements of the environmental safety concept, since 2010 Tengizchevroil JV has planned to invest $250 million to install sulfur granulation facilities and diversify the transportation methods of this product for sale (since 2008 to 28 countries, which has reduced sulfur reserves in Tengiz by 2012 at 600 thousand tons per year).

However, not all refineries in Kazakhstan comply with environmental standards, investing inadequately the processing and disposal of hazardous waste. In addition, in the process of oil and gas production, chemical analyzes of soils has established the adverse impact of oil and oil products on them, that leads to erosion, deflation, soil contamination, their transformation into technologically saline soils and salt marshes.

Atyrau region has experienced technogenic pollution in the form of oil spills of tens of thousands of tons on the area of more than 1.3 million hectares; soil contamination in some areas reaches a thickness of more than 10 meters, vegetation has been destroyed.

The low level of utilization of associated petroleum gas is typical with the introduction of new fields into operation (30%). When burning associated gas, greenhouse gases, nitrogen oxides, sulfur

dioxide and soot are emitted into the atmosphere, an increased thermal background is formed around the fields.

Despite the fact that the oil and gas industry ranks first among the industries in terms of investment, in the main areas of oil and gas production and oil refining as Atyrau and Mangystau, production is carried out using outdated technology and equipment, which leads to accidents and oil leaks. As a result, the total area of oil pollution in Western Kazakhstan is 194 thousand hectares, and the volume of spilled oil is more than 5 million tons. The specific amount of damage from individual substances exposure is presented by the chart (Figure 3).

Analytical review of the current state of ecology in Kazakhstan has revealed a number of problems presented in Table 2.

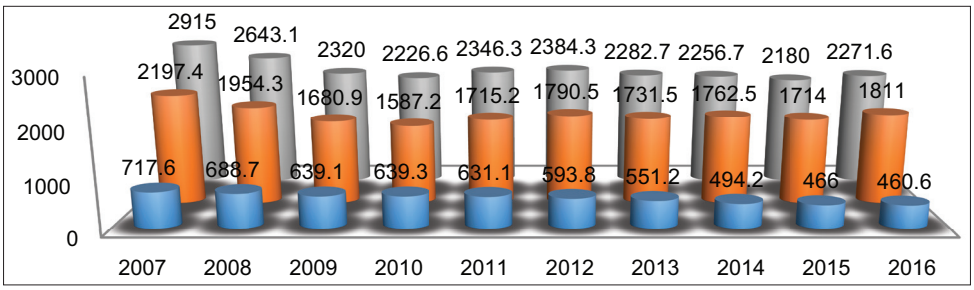
Air pollution surveys were conducted in 19 cities of the country. The highest level of pollution has been noted in 10 cities (8 of which with a high level of air pollution), for example, Almaty, Ridder, Shymkent, Ust-Kame-nogorsk, Karaganda, etc. Sometimes the maximum concentrations of pollutants exceed MPC by 10-20 times (for example, in Balkhash and Ust-Kamenogorsk for sulfur dioxide) (Statistical compilation "Environmental indicators of monitoring and environmental assessment," 2016).

The limited water resources, precisely, the problem of providing ecologically clean drinking water is also among the most important environmental risks of Kazakhstan. The average annual river flow in the Republic of Kazakhstan is relatively small and is only 101.9 km. Of this amount, about half of the river flow 57% or 58.4 km. is formed on the territory of the republic. The remaining water resources are 43.5 km and come from neighboring countries (China, Uzbekistan and Kyrgyzstan).

The resources of surface water available for use are estimated at a volume of only 46 km. With in Kazakhstan there are over 85 thousand rivers and temporary watercourses, 3447 lakes, 4500 ponds, also the Aral Sea and the Lake Balkhash. The Aral Sea disaster still remaining could be solved by reducing the amount of water allocated for irrigation of land.

Industrial and domestic wastewater significantly deteriorates water quality and makes it toxic (2.5 million tons annually). In cities and industrial centers, wastewater accounts for approximately 15–20% of the total load of the reservoir with polluting ingredients. The West and South of the republic are experiencing the most acute shortage of water. In 39 cities and towns, there are no wastewater treatment plants at all, respectively; there is a discharge of untreated sewage.

Figure 2: Emissions of pollutants from stationary sources of air pollution (thousand tons)



Source: Compiled by the authors according to the Statistical compilation "Environmental indicators of monitoring and environmental assessment," 2016

Table 2: Main threats to ecology of Kazakhstan

Reasons	Threats
Emissions from industrial enterprises	Atmospheric air pollution remains one of the leading environmental factors that have a negative impact on the environment Main share of industrial emissions into the atmosphere is accounted for by enterprises in the oil and gas sector. Burning of associated petroleum gas is the main factor of air pollution Atmospheric air pollution is intensified due to the use of outdated production technologies, inefficient purification facilities, poor quality of the used fuel, poor use of renewable and non-conventional energy sources
Air pollution from road transport	Share of emissions from mobile sources in cities tends to increase due to a rapid increase in the number of motor vehicles. The impact of the used transport of the old sample is particularly negative (today there are prohibitions on their import into the Republic of Kazakhstan), in which the specific emissions of pollutants from the exhaust gases significantly exceed the specific emissions of new models of vehicles, especially carbon oxides
Transboundary transfer	Transboundary environmental issues include issues of water distribution, pollution of transboundary water bodies, atmospheric air and soil, movement of hazardous technologies, substances, waste, development of border mineral deposits, preservation of unique natural complexes
Anthropogenic contamination	Toxic chemicals and debris are released into the soil in high quantities that prevent the normal circulation of the soil systems. The main sources of soil pollution are residential buildings, industrial enterprises, transport, agriculture and nuclear power
Low level of ecological culture	Economically predatory use of natural resources, pollution of the environment by unauthorized landfills

Source: Compiled by authors

Speaking of environmental safety, we mean the state of environment, which guarantees the prevention of environmental degradation and a danger to human health. Environmental safety is achieved through the establishment of mandatory standards and requirements for the protection of environment, the use of natural resources through legislatively defined environmental standards and regulations, as well as bringing those responsible to legal responsibility for environmental violations.

The danger of the current environmental crisis is that it threatens the possibility of sustainable development of human civilization. Further degradation of natural systems leads to a loss of its integrity and ability to maintain the environmental quality necessary for life. Sustainable development requires an expanded reproduction of renewable natural resources to preserve the equality of conditions and raw materials development by present and future generations.

Overcoming the crisis is possible only with a help of a new type of relationship between man and nature, precluding the destruction of environment.

To prevent, remedy and control the situation there is an economic mechanism for ensuring environmental safety. It is necessary to increase its efficiency, i.e. improving the mechanism for application of environmental law.

The concept of an economic mechanism for ensuring environmental safety implies a legal institution that includes a set of legal norms regulating the conditions and procedure for accumulating funds coming in as payment for environmental pollution and other harmful effects on it, financing environmental protection measures and economic incentives for economic entities by application of tax and other benefits.

The economic mechanism for ensuring environmental safety is intended to create conditions for the development of respect for nature among both producers and citizens. Legal entities should develop an attitude in which damage to the environment is tantamount to harming oneself. A set of measures for the economic stimulation to environmental protection, rationing of economic impact on the environment, environmental impact assessment, environmental requirements for the placement, design, operation of production and economic facilities, environmental control, liability and compensation for losses.

Developing of the economic mechanism for the country's environmental safety during the transition to market relations has become an organic integral system of economy management and regulation.

A special role is imposed on the system of economic standards and legal norms of enforcement actions on natural resources consumers, forming the basis of the economic mechanism in ensuring environmental safety. The essence of this mechanism is realized through the basic principle of rational nature management when the polluter and the user of natural resources bear the main costs of restoring disturbed natural integrity, as well as the introduction of environmentally friendly technologies and materials.

Mechanism of nature management in Kazakhstan is planned to be implemented in two stages. Now the first stage is being implemented. It involves the introduction of payments for emissions (discharges) of pollutants and disposal of production wastes; payment for the consumption of natural resources; provision of measures for economic incentives for environmental activities of enterprises; the abolition of taxation on the part of profits sent for environmental purposes; creation of a multi-level system of budgetary and extra-budgetary funds for environmental protection.

Economic reforms under the relevant laws and regulations provided for significant rights to manage social, economic and environmental processes in the subordinate territories.

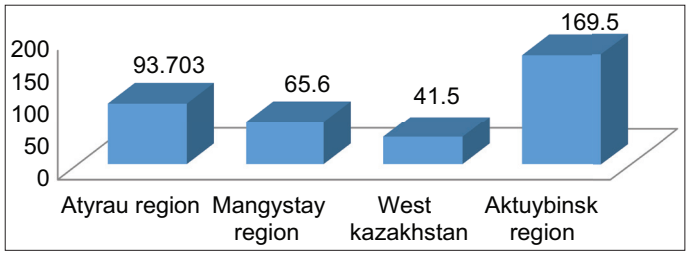
Charges for environmental pollution were introduced by decisions of the heads of regional administrations. Cases of exceeding the standards for emissions (discharges) of pollutants and disposing of industrial wastes are indisputably charged by local bodies of the Ministry of Finance of the Republic of Kazakhstan. This creates ideal conditions for non-abuse on both sides.

Payments go to the state budget and are counted there as a separate line. Annual standards for emissions (discharges) are established on the basis of these standards for maximum permissible emissions and limited admissible pollutions and waste disposal, which should be developed for all enterprises that pollute the environment. Limits and quotas for the use of renewable natural resources are determined by the results of the analysis of the volume and structure of this natural resource and the calculation of its quantity, which can be withdrawn without harming the ecological situation.

Environmental pollution charges are transferred by nature users to the income of the republican budget in the amount of 15% and 85% of the amounts due to the income of the regional budget. To transfer funds to the nature conservation fund, users of natural resources issue two payment orders: one to transfer the amount due to the republican budget and the other to the regional budget. When transferring these amounts collective payment orders can be used. The column "for what" of the payment order indicates the purpose of the payment and the payment period.

In the republic, the economic mechanism of environmental management is just beginning to operate.

Figure 3: The volume of air pollutant emissions in Western Region, 2017 (thousand tons)



Source: Compiled by the authors based on data of (statistical compendium)

This economic mechanism of limit and over-limit charges is intended to regulate environmental management, which is carried out on a regular basis without violating environmental legislation. Excess pollution charges are levied at multiple times, but do not apply to penalties, but are economic incentives for the implementation of measures to reduce environmental pollution and the economical use of natural resources.

The current mechanism is fully based on fines and compensations imposed on violators of environmental legislation. In our opinion, such an administrative mechanism cannot bring the expected result in the field of environmental protection, since it leads business entities to coercion. The desired result is achieved in the case when environmental protection is beneficial to the economic entity. Therefore, developing of effective mechanism for the interaction of industries with environment is an important task to improve environmental protection measures. It is important to note that the formation of economic management methods in the environmental sector is a completely separate task that deserves special study (Sikhimbaev and Khanov, 2014).

A new element of the economic mechanism of environmental management is legislative binding agreement and licensing of environmental management (Sikhimbaev and Khanov, 2014).

The nature user and the executive body of a region or a city conclude a contract or a license is issued for the integrated use of a particular type of natural resources on the base of environmental impact assessment for the proposed economic or other activities. At the same time, the contract provides the conditions and procedure for the use of natural resources, the obligations and rights of the nature user, the size of charges for the right to use natural resources and responsibility of the parties.

As is known, an important component of the economic mechanism of environmental management is charges for the right to use subsurface and other natural resources. The government, on the basis of the Law of the Republic of Kazakhstan "On Subsoil and Subsoil Use," has introduced temporary minimum rates of charges for the right to mine (use) mineral resources (Law of the Republic of Kazakhstan "On Subsoil Use and Subsoil Use," 2017).

Providing broader benefits to enterprises, organizations and individuals when they carry out activities to protect the environment is an important step in solving environmental problems. In our opinion, the issue of exemption from value added tax on environmental protection works and services performed at the expense of environmental funds is appropriate. This step would be an additional source for solving environmental problems. Providing exemption from value added tax and profit for reserves, national and dendrological parks and botanical gardens also seems to be reasonable. This measure would significantly improve the financial situation of reserves. When calculating the tax on income of legal entities, it should be also reasonable to reduce the taxable base of enterprises by the amount of their own funds, aimed at investments on reducing emissions and pollutants discharge. Under the current tight financial and tax policy, enterprises would have gained substantial practical opportunity to finance environmental protection measures at their own expense. The state allocates considerable amount of funds for environmental protection programs, but they often do not reach the destination. (Statistical compendium "Official statistical information (by industry)", 2016) (Figure 4). Science is also looking for ways to overcome environmental risks, for example, domestic scientists are now conducting research to clean up soils contaminated with oil, and they offer very simple and economical ways, using microbes and vegetation of the same soil. The scientists are planning to try out oil refinery of the Aktobe region in the nearest future.

Environmental safety of Kazakhstan has employed KZT 33 billion of funds. The largest volume is concentrated in gas and oil regions: West Kazakhstan – KZT 8.1 billion, immediately + 46.8% per year, East Kazakhstan – KZT 6.6 billion, immediately + 56.4% per year, Atyrau – KZT 4.3 billion + 58.3% less than a year earlier.

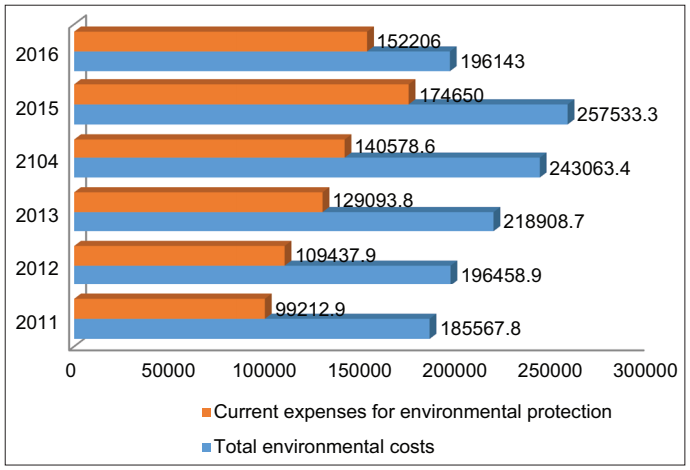
The largest volume is concentrated in gas and oil regions: West Kazakhstan – KZT 8.1 billion, immediately + 46.8% per year, East Kazakhstan – KZT 6.6 billion, immediately + 56.4% per year, Atyrau – KZT 4.3 billion, 58.3% less than a year earlier (a decrease is expected, taking into account the massive investments into ecology during the active work on the successful launch of Kashagan in 2016).

Generally, the largest amount of investment in environmental safety is provided by the industrial sector (mainly mining and manufacturing and electricity/heat supply), that is 76% by the end of 2015 and more than 80% in previous years.

It is noteworthy that in the crisis years of 2015-2016, the volume of capital investments in the environment fell sharply: after the peak of 2014 (KZT103.5 billion) in 2015 the reduction of the investment portfolio was 19.9% per year, and in 2016 the volume of investment decreased by half.

At the end of last year, the largest volume of investments fell on air protection and climate change issues, which is KZT18.2 billion, minus 27.3% per year (this is 41.3% from the Republic of

Figure 4: Environmental protection expenses for 2011-2016



Source: Compiled by the authors based on data of (Statistical compendium "Official statistical information (by industry)," 2016)

Kazakhstan, against 30.1% in 2015). Another 23.1% was directed to wastewater treatment (KZT 10.1 billion, minus 33.3% per year), and 19.3% to waste management (KZT 8.5 billion, minus 40.1% for year). The current expenses went into a minus as well as capital investments. So, by the end of 2016, the volume of current expenditures on environmental protection amounted to KZT 152.2 billion, which is 12.9% less than in 2015 (Statistical compendium "Official statistical information (by industry)," 2016).

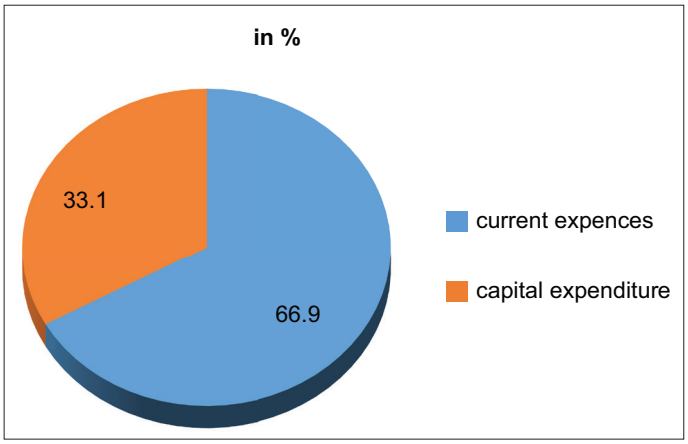
As a result, the total volume of costs for environmental safety (current + capital) in 2016 was KZT196.1 billion, against KZT 257.5 billion in 2015 (minus 23.8%). The current year sets a course for increasing attention to environmental issues. For example, at EXPO 2017 meetings, the Ministry of Agriculture of Kazakhstan and the World Wildlife Fund signed a memorandum on the implementation of the program for the return of tigers to the historic habitat in Kazakhstan. The Ministry of Agriculture of the Republic of Kazakhstan decided to create the state natural reserve "Ili-Balkhash" from January 2018.

The costs of economic entities in 2017 aimed at environmental protection increased compared to 2016 by 24.9% and amounted to KZT 262.4 billion. (Statistical compendium "Official statistical information (by industry)", 2016) (Figure 5). A significant proportion of environmental expenditures (84.3%) is carried out by industrial enterprises, mainly at the expense of enterprises of Atyrau, Karaganda, East Kazakhstan and Mangystau regions.

Of the total current expenditures, material costs comprised KZT 52.8 billion, of which 43.5% were directed to air protection, 29.5% to the protection of water sources from sewage pollution and 27.0% to other environmental protection activities (Statistical compendium "Official statistical information (by industry)," 2016) (Figure 6).

Over 27 years of Independence, the Republic of Kazakhstan has taken significant measures to protect the environment, soil and water, to eliminate historical pollution and consequences of nuclear testing site, etc., but although, for example, the amount of emissions of industrial harmful substances has decreased environmental risks are not completely eradicated.

Figure 5: Structure of environmental protection costs in 2017



Source: Compiled by the authors according to the Statistical compendium "Official statistical information (by industry)" 2016

As can be assumed from the analysis, Kazakhstan is systematically strengthening environmental safety. This activity finds a well-deserved assessment of the world community. As a result of state initiatives, Kazakhstan was the first of the countries of the Central Asian sector to be elected a non-permanent member of the UN Security Council.

Ecology problems all over the world are not local, no single country can solve them. And the solution of the most pressing issues of the state of ecology in Kazakhstan does not depend only on its efforts. Ecological safety acts as a basic value of modern society, and in this respect, the dominant influence of policies expressing social values and implementing measures aimed at shaping and protecting these values is manifested.

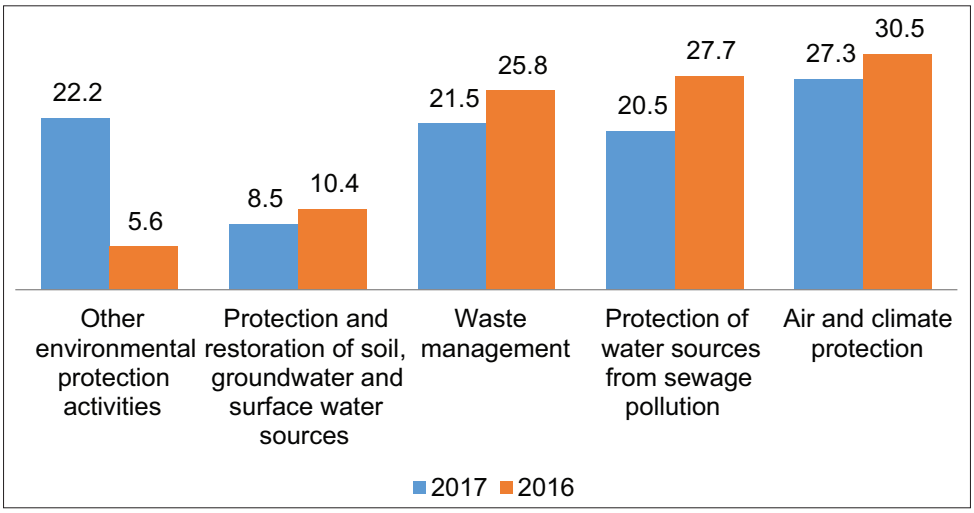
In order to effectively solve environmental problems, Kazakhstan is focused on convergence with the legislation of developed countries and the implementation of international standards. Kazakhstan has signed 19 international conventions and has developed national action plans for their implementation.In order to effectively address environmental problems in Kazakhstan, a course has been taken towards convergence with the legislation of developed countries and the introduction of international standards. The Republic of Kazakhstan has signed 19 international conventions and developed national action plans for their implementation.

System of environmental assessment, licensing and inspection work has been successfully implemented. Environmental safety contributes to the realization of the constitutional rights of citizens to a favorable environment; addressing current socio-economic challenges and taking adequate measures to protect the environment; ensuring the realization of rights of future generations to use the natural resource potential in order to maintain sustainable development. State policy in the field of environmental safety aims at ensuring the protection of natural systems, the vital interests of society and the rights of an individual against threats arising from anthropogenic and natural impacts on the environment.

To achieve this goal it is necessary to solve the following tasks:

- Feasibility study of directions and measures of reforming, defining cost-effective and anti-monopoly mechanisms for its functioning, as well as including a forecast of changes in industry indicators and their impact on the development of both the country's economy as a whole and related complexes
- Reduction of anthropogenic impact leading to climate change and the destruction of the ozone layer of the Earth
- Biodiversity conservation and prevention of desertification and land degradation
- Preventing depletion and pollution of water resources
- Elimination and prevention of various kinds of pollution such as historical, air radioactive, bacteriological and chemical, including transboundary
- Reducing the accumulation of industrial and household waste
- Establishment of tax and other benefits for Kazakhstani oil

Figure 6: Structure of environmental protection costs in the Republic of Kazakhstan by type of environmental activities for 2016-2017



Source: Compiled by the authors based on data of (Statistical compendium "Official statistical information (by industry)," 2016)

refineries when introducing low-waste, energy-saving and resource-saving technologies, special equipment that reduces the harmful impact on the environment

- Strengthening legal liability for environmental damage and failure to fulfill obligations to protect and preserve the environment in the republic.

In our country, it is necessary to pay special attention to the innovation system, as well as to ensure the priority development of scientific research on the most important problems of environmental safety and sustainable environmental management, the introduction of a unified system for monitoring the state of the quality of the human environment.

In Kazakhstan, the solution of environmental problems is associated with the introduction of environmentally friendly technologies, the formation of ecological culture of people.

In order to effectively solve environmental problems, it is proposed to separate environmental protection from the economic mechanism of environmental management for improving the environmental management of industrial enterprises.

Development of the economic mechanism for ensuring environmental safety in practice in Kazakhstan defines its main areas:

1. Greening of the economy means ensuring sustainable ecologically safe environmental management and preserving the resource-ecological balance through reducing the environmental capacity of production and reducing the impact of the economy on the bio spheric and energy metabolism
2. New economic mechanisms for environmental management imply the inclusion of environmental characteristics in the pricing system, the improvement of the system of payment for environmental management and compulsory environmental insurance
3. Improving the effectiveness of state control in the field of environmental protection and nature management implies the strengthening of state control bodies by eliminating duplication in the implementation of control and law enforcement functions and the creation of a mechanism to protect the rights of citizens and organizations in the course of such activities
4. At the same time, a scientific substantiation of the allowed volumes of polluting substances emission is provided taking into account the ecological situation in regions, the background state of environment, and the establishment of special environmental management conditions. Rationing of environmental pollution is carried out with maximum consideration of the consequences of a harmful effect on the health of population and the state of environment; the socio-economic consequences of the planned activity are also taken into account
5. Immediate measures are required to create a unified state system of environmental monitoring of the environment and natural resources based on geographic information systems, including all enterprises and institutions of departmental monitoring, as well as production monitoring systems
6. In this regard, further reform of the legislation of the Republic of Kazakhstan should be directed not at increasing environmental legislation, but at its systematization and efficiency. This problem can be solved by codification of the environmental legislation of the Republic of Kazakhstan, i.e. specification of standards for the conservation of the environment and natural resources
7. Greening of society is the process of forming a system of society's views aimed at achieving harmony between man and nature. Its implementation is carried out through the development of environmental education and training, scientific support, environmental awareness and public participation
8. Establishment of a system of lifelong environmental education through the introduction of environmental issues and sustainable development as well state support for environmental education
9. Scientific justification of environmental safety provides formation of the theoretical and technological basis for the transition to sustainable development and includes the following complex of fundamental and applied scientific research

10. As a full member of the UN, Kazakhstan should use international cooperation as the key to the effective implementation of state environmental policy based on a global partnership.

4. CONCLUSIONS

Environmental safety is the basic value of modern society, and in this regard, the dominant influence of policies that express social values and implement measures aimed at the formation and protection of these values is manifested.

The analysis of the environmental situation in the Republic of Kazakhstan showed that with the intensive extraction of fuel and energy minerals, the anthropogenic load on the natural environment has increased. Negative changes in the natural environment directly affect the health indicators of the population. The aggravation of the social and environmental situation in the regions makes it imperative for the relevant state authorities to take a set of measures aimed at improving the political, legal and institutional framework for regulating environmental relations. Huge changes have taken place in the development of Kazakhstan's society since the adoption of the environmental code. State development documents have been elaborated, a framework for environmental legislation has been created, a number of international documents on the protection of the human environment have been signed, and environmental management has been organized. In our country, it is necessary to pay special attention to the innovation system, as well as to ensure the advanced development of scientific research on the most important problems of environmental safety and sustainable environmental management, and to introduce a unified system for monitoring the quality of the human environment. In Kazakhstan, the solution of environmental problems is associated with the introduction of environmentally friendly technologies and the formation of environmental civilization in humans.

The development of economic mechanism for ensuring the environmental safety of Kazakhstan involves a set of economic instruments, as well as organizational, technological, regulatory and socio-cultural components of the mechanism, each of which contains a specific set of tools and needs to be studied separately. The key direction of research in the given area is the analysis of the principles and sequence of stages of the integrated economic mechanism for ensuring the country's environmental safety, which is important for choosing the most priority methods and tools for managing the environmental situation in Kazakhstan.

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