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The Eco-problems and Green Economy Development in Kazakhstan: An Analytical Survey

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ABSTRACT

Nowadays the environmental issues are very urgent in both political and economic contexts as it is all about human ability to live in appropriate quality conditions, growth and develop sustainably. The ecological problems of Kazakhstan and ways of their solution are interrelated within this global task. The result of the expected third industrial revolution in the world could be the development of the green economy in Kazakhstan. Among these principles is the transition to renewable sources of natural resources, the introduction of energy efficiency and others. Based on existing scientific and research background of the green economy it has been concluded the analysis of the current ecological situation in the Republic of Kazakhstan, where particularly all regions have been taken into consideration. It has been analyzed the contemporary state of the air, water and land pollution of the country. It has been defined main ecological problems having a great impact on the country's eco-economic development. It has been also identified main issues of green economy concerning some difficulties that need emergent solving as well as future development prospects. The findings of the survey have proved that the political conception of green economy accepted by Kazakhstan will improve the eco-economic state of Kazakhstan and be able to lead the country on the high ranking economic positions.

Keywords: Green Economy, Eco-economy, Development, Kazakhstan

JEL Classifications: Q01, Q4, Q5, O1

1. INTRODUCTION

Generally, air, water and land are a primarily natural environment for each human being. Nowadays, their condition it is estimated as catastrophic, where the planet is in the state of an ecological crisis as a whole. In this research, it has been taken into consideration the case of Republic of Kazakhstan and its region as one of the most significant representatives of Central Asia to make an analytical survey defining key ecological problems of the country and thinking about possible solutions in the context of green economy conception.

An integral part of the global system is the concept of sustainable development, which includes the problems of the relationship between sustainable development and the problems of stability and sustainability of national economies. The main goal of sustainable development is to ensure economic growth, social

and economic stability and ecological balance in the long term. Harmonious coordination between these components is provided by the concept of a green economy, which has recently received increased attention in Kazakhstan and around the world.

The research objective is the study of contemporary ecological problems and their influence on country's development with a further designing of measures and solutions how to improve the current situation in context of the green economic development. The research is aimed to characterize and analyze the state and peculiarities of the formation of the green economy and to justify it as one of the mechanisms of sustainable development that can solve a number of urgent eco-economic problems of the contemporary socio-economic development of the particular country. Methods of research are comparative and systematic analyses, causes and consequences analysis, methods of statistic grouping and expert assessment.

2. LITERATURE REVIEW

The term “green economy” is defined as a type of economy that aims at reducing environmental risks and ecological scarcities for sustainable development of a state or a country. It is closely related to ecological economics but has a more politically applied focus. In 2011 the Green Economy Report claimed “that to be green, an economy must not only be efficient but also fair. Fairness implies recognizing global and country level equity dimensions, particularly in assuring a just transition to an economy that is low-carbon, resource efficient, and socially inclusive” (The Green Economy Report, 2011).

A feature distinguishing it from prior economic regimes is the direct valuation of natural capital as having economic value (The Economics of Ecosystems and Biodiversity; Bank of Natural Capital, 2014). Green economics is defined as any theory of economics by which an economy is considered to be a component of the ecosystem in which it resides (Margulis, 2013).

The use of the term is further ambiguated by the political distinction of Green parties which are formally organized and claim the “G-capital”. “Green” term as a unique and distinguishing mark. It is thus preferable to refer to a loose school of “green economists” who generally advocate shifts towards a green economy, biomimicry and a fuller accounting for biodiversity (The Economics of Ecosystems and Biodiversity; Bank of Natural Capital, 2014).

One of the significant scientists in this field is Karl Burkart who defines a green economy as based on six main sectors. They are renewable energy, green buildings, sustainable transport, water management, waste management, land management (Burkart, 2012).

Another significant researcher who united these two directions - ecology and economy - into interdisciplinary one was L. Brown. According to Brown, eco-economy is an environmentally sustainable economy. That is a system of production and consumption within environmental balance (Brown, 2012). As he stated, our main interest is to preserve conditions for the existence of mankind. Consequences of environmental issues are unnoticeable and can be compared with the unnoticeable breakout of the third world war.

As Kazakhstani eco-ecologists Sadanov et al. (1999), Suleyev et al. (2004), Upushev (2015), Diyar and Toktabayev (2013), Kalenova et al. (2017) have noted that “the most effective protection of flora and fauna is economic protection. Without this protection, according to world experience, no legal mechanisms work, no matter how perfect they are.” Among Russian authors, it should be marked out the works of Khabirov and Bragina (2008), Kryavkina (2012), Porfiryev (2013), Ushakov and Kharchenko (2017) and etc.

3. RESULTS

3.1. Identifying Eco-problems: Analysis of Current State

If to group all environmental problems, it would be better to group them into three big categories. They are air, water and land

pollution issues. As analysis shows, air pollution in Kazakhstan occurs for the following reasons:

- The growth of extraction and processing of minerals (lead, zinc, phosphoric, chrome production). 20 billion tons of their wastes have accumulated, a third of them poison the air every day with toxins (Ecological Indicators of Environmental Monitoring and Assessment, 2017). The enterprises use old inefficient cleaning systems. As a result, the amount of harmful substances is released into the atmosphere.
- Combustion of associated gas in flares during oil and gas production. This is accompanied by soot emissions into the atmosphere.
- Increasing the number of cars emitting carbon monoxide and lead into the atmosphere. When they are used, low-quality fuel is used, filters for exhaust gas purification are often not applied.

As a result of these factors, the permissible level of air pollution has been exceeded in 15 major cities of the country. The most polluted atmosphere in the East Kazakhstan, Karaganda and Pavlodar regions (Kazakhstan, 2016; Statistical Yearbook, Astana, 2017).

The second group concerns pollution of water resources. Kazakhstan is the largest country in Central Asia. And in terms of water availability, it was in the most difficult situation. There are some factors those have a great impact on the ecological state of the country.

Firstly, it is the barbaric use of rivers for irrigation of cotton fields during the Soviet Union period. And not only in the country itself but also in the neighboring republics, where the rivers flow. Most of the water from the rivers generally left in the sand, because the channels of the irrigation canals were not strengthened.

The ecological problem of the Aral Sea has many consequences. The concentration of salt in water increased 14 times (Ecological Indicators of Environmental Monitoring and Assessment, 2016). The former bottom of the sea is huge salt marshes, with salt from their surface being blown by the wind for hundreds of kilometers and causing erosion of lands far away.

The concentration in the water not only of salt but also of poisonous substances that flowed from the fertilized agricultural land to the rivers increased. This killed commercial fishing in the lake. Since 1980 it has been stopped. Previously, there were 32 fish species of really nice quality in untold quantities. There are striking facts about the history. In the years of the Civil War in some fishery regions, dried fish was heated by steam locomotives when there was not enough coal (Diyar and Toktabayev, 2013). However, after some time, shipping stopped, fisheries and fish canneries closed. The social consequences of this are job cuts. The lake has left. The water table has fallen. Lands suitable for cultivation turn into deserts. Green oases perish without water, and birds and animals disappear. So, everything is interdependent in natural ecosystems.

Earlier in the lake there was fishing for rare species of fish-carp and pikeperch, and the carp was extracted almost half of all that in the USSR (Sadanov et al., 1999). The reason for shallowing

is that rivers bring less water. They built dams for hydroelectric power stations that cover the riverbed. In one of the reservoirs water was even diverted from the lake itself.

The Balkhash lake is slowly killing industrial emissions and sewage from cities on its shores. The Balkhash copper smelter has placed hundreds of thousands of tons of waste near the lake. Of these, sulfur dioxide and about ten hazardous heavy metals enter the water. Thousands of tons of poisonous dust from production also annually settle in the waters of the lake.

The Aral Sea has been disappearing. It was the fourth largest lake in the world. From him remained the fourth part by area and the tenth in volume. Now it is almost two shallow waters. The reason is the diversion of water from the Syrdarya and the Amudarya rivers, which replenished it, for irrigation.

The Balkhash lake raises fear: It can repeat the fate of the Aral Sea. This is a unique pond, in different parts of it is filled with fresh and salt water. Since the 1960s, the ecological problems of Lake Balkhash have begun: It has become chalkier, the water level has decreased by more than two meters (Suleyev et al., 2004). The area was reduced by two thousand square kilometers. Saline has been also formed here.

Then, environmental problems of the Caspian Sea also concern Kazakhstani eco-economy. In the waters of the sea there is a dangerous tendency. It loses the ability to self-purification, which can turn once a clean pond into a sediment bowl. The reason is the same called human activity. Its feature here is oil production on the coast and underwater on platforms far to the sea.

The third group of environmental problems is land pollution. The heaviest legacy is radioactive contamination. During 40 years, nuclear weapons have been tested at the Semipalatinsk nuclear test site. 300 square kilometers of land for a long time remain dangerous for all living things. The consequences of this have not yet been finally determined. Officially, the polygon was closed in 1991 (Upushev, 2015).

All these facts are real proof of urgency and significance to consider and analyze these ecological issues in detail in the context of the green economy conception.

After the historical United Nations Conference on Sustainable Development, also known as Rio+20 or Earth Summit held in 2012 in Brazil, the world community decided on the direction of its economic development. Further, there was one more historically important milestone-EXPO 2017-devoted to ecological issues particularly future energy alternatives and their development, hosted in Astana, Kazakhstan. So it is a proof that in the post-Soviet space one of the first began to realize the green economy in Kazakhstan. In 2013, by his May decree, the president approved the government concept on the implementation of the green economy principles.

As a result of this significant project, it is expected:

- Improving the well-being of Kazakhstani citizens;

- Substantial saving of natural resources through the introduction of technological innovations;
- Strengthening environmental protection.

This Green economy conception is implemented within the framework of the strategic development plan of the Republic until 2050. During implementation, all sectoral and regional development programs are adjusted.

On the way to realizing this global concept, it has Arisen Kazakhstan's eco-economic problems that need to be solved. There are:

1. Neighborhood with countries in the stage of rapid economic development along the water border, as well as global warming, do not allow to fully provide the entire population of Kazakhstan with drinking water. If nothing is done, by 2050 the water deficit will be 70%.
2. Lack of sufficient financing for the agricultural sector reduces access to new technologies. There is no possibility to update agricultural equipment (obsolete 80%), there is no access to higher-yielding varieties of seeds, effective fertilizers, and plant protection products.
3. By 2030 the oil and gas fields under development will reach their peak, after which the production volumes will begin to fall. Therefore, it is necessary to introduce energy-saving technologies, reduce consumption of energy-intensive industries and increase the share of energy generated from alternative sources. To do this, it will be necessary to update the park of obsolete equipment and introduce energy-efficient technologies. This will reduce the burden on the energy sector of Kazakhstan's economy.
4. Large heat losses have been found out in the housing stock of Kazakhstan. This is due to the fact that the houses of the 1950-80s are built (1/3 of all housing stock) are needed to be repaired. It is required to conduct an energy-efficient audit and take measures to reduce heat losses. Now, the housing stock is losing more than 30% of the thermal energy (Ecological Indicators of Environmental Monitoring and Assessment, Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, 2017).

Moreover, the volume of pollutant emissions in 2016 in Kazakhstan has been increased. Emissions in the volume of 2.3 million tons of harmful substances were recorded in 2016 in Kazakhstan. The indicator of environmental pollution increased by 4%, while the state increased the maximum permissible standards by almost 14%. As Figure 1 shows, in the previous year, the volume of emissions decreased by 8.6%. However, there was a jump again in 2016 (Kazakhstan, 2016; Statistical Yearbook, Astana, 2017).

Compiled on the base of data by the Committee on Statistics of the Ministry of National Economy of the RK

In Figure 2, it is represented the data concerning maximum allowable pollutant emissions in Kazakhstan for 2013-2016. This increase in the volume of emissions of pollutants last year was observed with simultaneous increase in the maximum permissible pollution standards. In 2016 in Kazakhstan, a limit of pollutant

emissions was established at 4.7 million tons. The maximum pollution standards increased by 13.6% compared to the level for 2015 (Kazakhstan, 2016; Statistical Yearbook, Astana, 2017).

Compiled on the base of data by the Committee on Statistics of the Ministry of National Economy of the RK

If taking into consideration the volume of pollutant emissions into the atmosphere in context to regions of the Republic of Kazakhstan for 2016-2017, it is presented in Figure 3. The total amount of pollutant emissions into the atmosphere in Kazakhstan for 2016 is 2 271,6 thousand tons. The rate of atmospheric pollution in the Atyrau region has increased mostly. In 2016 the volume of emissions increased by 56.4 thousand tons (50.9%). In total, the region accounts for 7.4% of all harmful emissions in Kazakhstan (Kazakhstan, 2016; Statistical Yearbook, Astana, 2017).

Compiled on the base of data by the Committee on Statistics of the Ministry of National Economy of the RK

Meanwhile, the greatest progress in reducing the volume of emissions for the past year is observed in the Pavlodar region - minus 10.1 thousand tons (1.8%). The region also accounts for 23.9% of all harmful emissions in the RK, in contrast to 25.4% in 2015. Despite a small decrease in volumes (by 0.6%), the real negative trend is the situation in the Karaganda region in 2016, where 593 thousand tons of harmful substances were thrown into the atmosphere. That is 26.1% of the total volume in Kazakhstan (Kazakhstan, 2016; Statistical Yearbook, Astana, 2017).

3.2. Finding Solutions through the Green Economy Concept Development

In the framework of this survey, it needs to mention the ecological problems around the world are not local, and they cannot be solved by any single country. And the solution of the most urgent issues of the ecology in Kazakhstan does not depend only on its efforts. So, it should be developed a common conception between Kazakhstan and neighborhood countries.

Many researchers have studied and tried to suggest ways how to solve the arisen problems. But there are some reasons that prevent them from fully implementing them. One of the reason is financial one. For example, modern good ecologically air cleaning systems are rather expensive, accounting for up to 20% of the cost of the entire production in Kazakhstan (Porfiryev, 2013). During construction, it is tried to reduce the cost in every possible way, and it affects the quality of cleaning emissions. Replacing the same filters in old factories stumbles upon other obstacles is the inability to bear such costs and the reluctance to look for reserves. Improvement of the urban atmosphere can be facilitated by the reduction or purification of motor vehicle exhaust gases, the replacement of its obsolete species with more ecological ones. It is possible to improve the atmosphere by reducing the emissions of industrial production. There are powerful systems for cleaning gaseous waste. New all-new production enterprises in the RK are designed such way.

For our opinion, to improve water resource situation, all Caspian littoral states should adopt uniform regulatory and legal documents.

Figure 1: Pollutant emissions into the atmosphere in Kazakhstan, 2011-2016, million tons

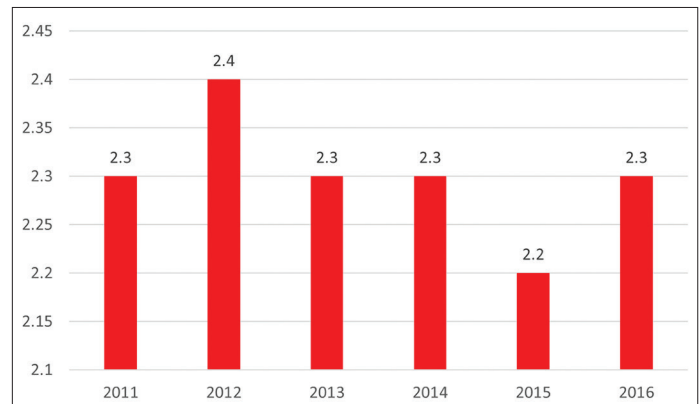


Figure 2: Maximum allowable pollutant emissions in Kazakhstan, 2013-2016, million tons

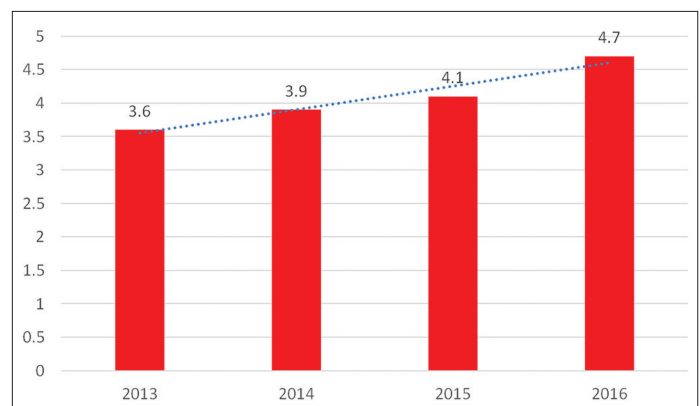
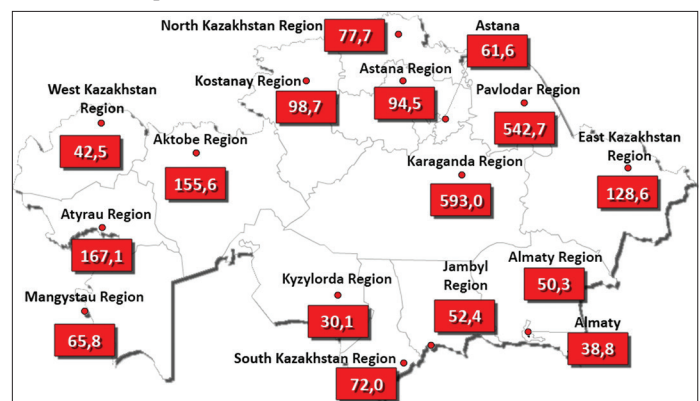


Figure 3: Pollutant emissions into the atmosphere within regions of the Republic of Kazakhstan, 2016-2017, thousand tons



Only their implementation will reduce the technogenic impact on the ecosystem of the unique lake.

Reducing water use from rivers for irrigation. The replacement of crops that require irrigation would have a positive effect on less demanding ones. For example, instead of cotton, it is necessary to grow winter wheat.

Suspend the disappearance of the Aral Sea by a number of joint steps with neighboring countries, since the rivers feeding this lake

also flow there. Kazakhstan is taking measures that it can do by itself. Thus, at the beginning of a new century, the 17-kilometer dam was built, which fenced off the Small and Big Aral lakes.

The Balkhash lake feed rivers from neighboring countries, therefore it is possible to solve its problems only at the international level. Scientific research sees a fundamental decision in rationally allocating water resources. First of all, it should to direct them to restore the disturbed ecosystem and only the remainder part - to consumption. But not everyone is ready for this.

It is possible to restore the Caspian Sea waters only by joint efforts of the countries located on its shores. Since the end of the 20th century, the Caspian Environmental Program has been operating. Within its framework, environmental protection measures have been developed for oil production.

Concerning improvement of land resources in Kazakhstan, it is primarily due to the reclamation of the huge territory of the Semipalatinsk nuclear test site. The United Nations, at the initiative of Kazakhstan, adopted a rehabilitation program for the Semipalatinsk region, which includes tasks from studying the consequences of testing weapons to humanitarian assistance to the affected population.

The characteristic features of the green economy are an effective to use of natural resources, preservation and increase of natural capital, reduction of environmental pollution, low carbon emissions, prevention of loss of ecosystem services and biodiversity, income and employment growth.

The green economy concept is based on the following principles (The Concept on Transition of the Republic of Kazakhstan to the Green Economy, 2013):

- The principle of eco-efficiency, which involves maximizing the useful properties of goods and services while minimizing the environmental impact throughout the product's life cycle;
- The principle of resource saving assumes the adoption of managerial decisions taking into account the need to conserve natural resources;
- The principle of unity implies the coherence of actions of all the subjects of the national economy participating in the development process;
- The principle of "inter-sectorality" i.e., the involvement of representatives of various sectors of society in the decision-making process.

According to this conception, the transition to a green economy in Kazakhstan will be carried out in three steps. The Step 1 is during 2013-2020. It will have been optimizing the use of natural resources, the creation of energy-efficient infrastructure.

The Step 2 is during 2020-2030. It will have been the transformation of the national economy, focused on the careful use of water, the promotion and promotion of development and the widespread introduction of renewable energy technologies, as well as the construction of facilities based on the created infrastructure and high standards of energy efficiency.

The Step 3 is during 2030-2050. It will have been the transition of the national economy to the principles of the "third industrial revolution" that requires the use of natural resources, provided they are renewable and stable. For this reason, it should be building the national economic model in accordance with the principles of global industrialization processes (The Concept on Transition of the Republic of Kazakhstan to the Green Economy, 2013).

The main measures of the Green Economy Concept accepted are aimed at: Elimination of water supply problems in the country; reducing the energy intensity of gross domestic product by 50%; increasing the share of alternative energy sources to 50%; transfer of thermal power plants to gas in major cities-up to 30% of the total number of heat power stations; reduction of carbon dioxide emissions by 40%; increase in the share of waste processing to 50% (About the Plan Confirmation on Realization of the Concept on Transition of the Republic of Kazakhstan to the Green Economy, 2013).

In addition to the green economy concept, to overcome all the problems mentioned above, the law on energy saving and supporting of use renewable energy sources was adopted, which established the obligation to strengthen the accounting of energy and natural resources; differentiated tariffs for consumed energy in order to stimulate saving of resources; a ban on the sale of electric appliances that are not marked for energy consumption class and for ordinary incandescent lamps.

4. CONCLUSION

Ecological problems of Kazakhstan as a highly developed industrial country accumulated for decades. To improve its resources, Kazakhstan participates in many regional and international organizations engaged in environmental issues. Whether this is enough, time will tell.

In contemporary conditions, sustainable development is the only acceptable concept of development. The transition to it implies a phased restoration of natural ecosystems to a level that ensures economic efficiency, social justice, and environmental sustainability. The main tool for sustainable development of the country is the green economy. The concept of green economy as a prerequisite for sustainable development is revealed through the prism of institutional transformations in the modern Kazakhstan economy.

As part of the creation of a unified energy register, an energy audit of all large energy-intensive industries will be carried out. The results of the research will help to find ways to reduce the dependence of industry on energy resources

The implementation of the Green Economy Conception by Kazakhstan will raise the level and quality of life of the population, make the products more competitive by reducing energy costs and using secondary processing. The implemented measures will improve the ecology in the region, eliminate the scarcity of water resources. The republic will learn how to use alternative sources of energy instead of dwindling natural ones.

As a result, in the future, Kazakhstan will have the opportunity to strengthen its competitive positions and take a worthy place among the leading countries that have introduced green technological innovations into their economy.

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