

Environmental security as a factor of sustainable development of the territory

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Abstract. The article deals with the issues of environmental security within the concept of sustainable development. The authors analyzed various approaches to the definition of sustainable development and developed their own position on this term. Environmental security is closely related to sustainable development. The article analyzes the ecological situation in Moscow and draws conclusions based on statistical material. Also, the main factors influencing the ecological situation of the territory were identified and studied on the example of Moscow. The study, involved a correlation-regression analysis to determine the influence of the degree of environmental pollution on demographic aspects, during which a moderate relationship was established between the mortality rate of the population, life expectancy, and factor signs associated with the environmental influence. The research results proved the need to ensure its environmental security to achieve the goals of sustainable development of any territory. And the creation of conditions for a comfortable life of the current generations, the satisfaction of their ever-increasing needs without prejudice to future generations is possible only with a competent prioritization in the state policy of any country, first of all, solving environmental problems.

1 Introduction

The relevance of the considered issue increases every year, despite the fact that the term “sustainable development” itself appeared more than 30 years ago in the “Our Common Future” report at the UN International Commission [1]. Later, at many UN conferences and meetings, questions were repeatedly raised related to the fact that most of the world's natural resources have already been exhausted, the threat of overpopulation of the planet and the aggravation of the general environmental situation in the world were discussed. The issue of increasing the economic gap between technological and resource-producing countries was especially acute, which in turn leads to an increase in the property, educational and social stratification of the population. The struggle for comfortable living conditions, the problem of conflicting relationships between society and the natural environment, an irresponsible attitude to the environment threatens civilization with the prospect of the destruction of many species of flora, fauna, and humanity in general.

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Despite the fact that many countries and Russia in particular have already formulated the main problems that hinder the sustainable development of territories, and clearly outlined ways of their solution, the relevance of the problem is nevertheless growing.

Let's consider the essence of the English term "sustainable development". This concept is based on the principle of organizing the achievement of human development goals, at the same time supporting the viability of natural systems the society and the economy directly depend on [2].

Therefore, the term "sustainable development" can be interpreted as a viable, uniform, rational, balanced development. Thus, the interpretation of this concept is very different, which, in our opinion, is due to the versatility of the process, which is difficult to enclose in the framework of a single definition.

To demonstrate the versatility and depth of the concept of "sustainable development", we present various definitions of foreign and domestic scientists and international organizations of this category.

Table 1. The essence and basic concepts of "sustainable development"

Source	Concept
The UN Human Development Report	"... development that not only generates economic growth but also fairly distributes its results, restores the environment to a greater extent than destroys it, increases the possibilities of people rather than impoverishes them" [3]
Rio Declaration on Environment and Development, 1992	"Sustainability is a simple concept: to live fairly, within our environmental capabilities" [4]
S.I. Ozhegov Dictionary of the Russian Language	"Development is a steady and stable process of transition from one state to another, more perfect, from the old quantitative state to a new one, from simple to complex, from lower to higher" [5]
V.I. Danilov-Danilian, Russian scientist, corresponding member of the Russian Academy of Sciences	"Sustainable development is a kind of social development, which preserves its natural basis, its created living conditions do not entail human degradation, and socially destructive processes do not develop to a scale that threatens the security of society" [6]
A.D. Ursul, Ph.D. Philosophy, Professor, Honored Scientist of the Russian Federation	"Sustainable development is the development of mankind, when the needs of present generations are met without prejudice to future generations; controlled balanced development of society, which does not destroy its natural basis and ensures the continuous progress of civilization" [7]
T.V. Begun	"Sustainable development of the territory is a purposeful process of managing the socio-economic system of a municipality that ensures the stability of connections, elements, and structure of the system in general toward an increase in the quality of life of the population within the framework of balance with the environment" [8]

Source: compiled by the authors

Shaping our stand on this term, we concluded that its essence lies in the harmony, reliability, and duration of trends in the development of the territory, ensuring that the needs of citizens living in this territory at present and future generations are considered.

The key meaning of sustainable development of the territory, which is reflected in the Sustainable Development Concept, is associated with the balance of three components: economy, society, and ecology, the so-called "triad" of sustainable development. However, the officials of a country, city, any territory are based on one or another component, i.e. set

priorities in their own way. We should note that even effective investments in the economy, in scientific and technological development, and the social sphere without due care for the objective laws of natural evolution, natural conditions and natural resources of a particular territory will not ensure the sustainable development of the territory. In the modern context, it is the ecological component, namely competent and careful use of resources, environmental protection, ecological literacy of every citizen of the country, which is the basis for the sustainable development of the territory, state, and civilization in general.

Environmental security, which is to ensure the state of protection of nature and man, is closely related to the sustainable development of the territory.

In terms of territorial management, environmental safety means the adoption and implementation of government decisions, as a result of which the negative impact on the environment and society will be minimized. Therefore, the activities of the officials for the management of any territory should be comprehensive, systematic, aimed at creating conditions for a comfortable living of citizens, the development of the ecological sphere, which is the main aspect of the triad of sustainable development (ecology-society-economy).

Today, every person feels that the ecological situation is worsening not only in his country, but throughout the world, which causes significant damage to the health, life and property of people, has a negative impact on his economic state, changes the social status of a person, forces him to search more comfortable and safer living conditions. Therefore, it can be argued that at present the interconnection of all three components of sustainable development (economy-society-ecology) is clearly manifested, and the ecological component comes to the fore in this triad.

The issues of effective urban management, competent management of natural resources, control over the activities of industrial enterprises and transport that pollute the environment and negatively affect the state of both flora and fauna, and society in general, are of paramount importance now. This is what determines the relevance of ensuring environmental safety of any country and territory.

Thus, the achievement of sustainable development of territories in the context of one of its components - environmental, is relevant as never before. A revision of current values and a transition to a new path of development is necessary, based on the creation of comfortable living conditions for citizens of the country and subsequent generations without prejudice to their health and life.

2 Materials and Methods

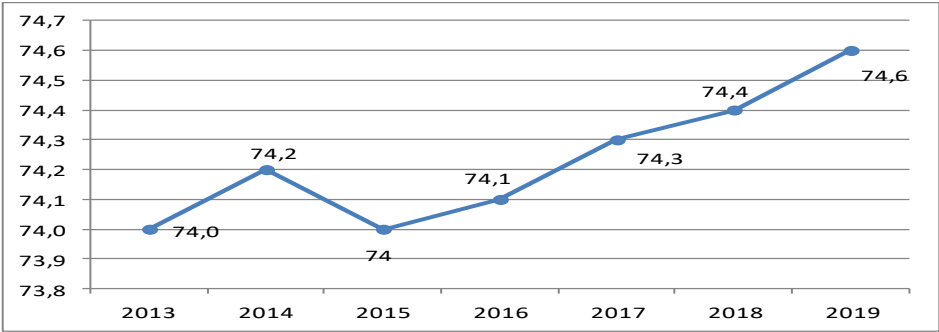
As noted above, natural conditions and natural resources, availability of production, and population size are, on the one hand, sources for sustainable development of the territory, and on the other hand, potentially constraining factors of development, as humanity cannot thoughtlessly use the natural resource potential of the territory with no regard for the negative impact on the environment of production, transport, the growing needs of mankind. That is, all actions of officials in managing the territory should not cast doubt on the well-being of their citizens.

Thus, the Russian Federation, which is the world's largest country (more than 17 million km²), and the most populated countries – China and India – play one of the key roles in the world and are the main driving factors towards sustainable development. However, the situation in the world depends on the policy pursued by these countries and their decisions related to their future.

The global COVID-19 pandemic caused in all countries of the world a suspension of mass production, a restriction in the movement of people not only within one country, but

also between countries, as a consequence of a decrease in the use of transport. As a result, the ecological situation in cities, towns, and countries has improved.

According to statistics, today there is a sharp improvement in the environmental situation in some parameters, for example, nitrogen dioxide NO₂ emissions in China decreased by 36% compared to the same period in 2019, and during this period, China emitted 100 million tons less CO₂ into the atmosphere, which corresponds to 6% of global emissions [9]. The data clearly demonstrates to the world community what impact the active human activity has on the environment, and what qualitative changes we can achieve if switch to sustainable development through the implementation of measures related to the environmental safety of the territory. It should be noted that the solution to the problems of sustainable development, in terms of environmental safety, is most acute for cities due to the intensifying urbanization (Fig. 1).



Source: Federal Service of State Statistics [10]

Fig. 1. The share of urban population in the total population, %

For most citizens of our country, the advantage of urban life is obvious, and is associated with economic and social components: job opportunities, higher wages, accessible education, medical care, cultural development, etc. But the disadvantages of urban life should also be noted: noise, daily rush, remoteness from the natural environment, stress due to the inability to abstract from a large crowd of people, low-quality living conditions, etc. All these and other disadvantages of urbanization lead to a negative impact on the environment and on the psychological state of citizens, and in general on the quality of life of the population. Urbanization has an impact on climate change, and with a further number of city residents, it negatively affects all subsystems of human life support: water supply, material infrastructure, transport, ecosystem goods and services, energy supply, and industrial production.

Therefore, the sustainable development of the territory should be characterized by such a development, which gives priority to the ecological component and rational use of natural resources; the production of goods is carried out on the basis of the principles of lean production; the introduction and application of technologies is carried out taking into account natural and climatic factors; territory management is based on the principle of minimizing the risks of negative impact of economic or other human activities on the environment.

Environmental security of the territory is one of the priority tasks in today's realities. Federal Law “On Environmental Protection” defines environmental security as a “state of protection of natural environment and vital interests of a person from the possible negative impact of economic and other activities, emergency situations of natural and man-made nature, their consequences” [12].

For example, man’s waste is one of the sources of greenhouse gas emissions that contribute to climate change. According to statistical data, the Moscow region accumulates 27.53 million m³ of waste per year (on average 3.63 m³ per person), while Moscow accumulates 24.1 million m³ of waste per year (1.91 m³ per year) and in aggregate, these territories account for more than 15% of all waste in Russia. In general, Russians accumulate up to 337.2 million m³ of waste per year [13].

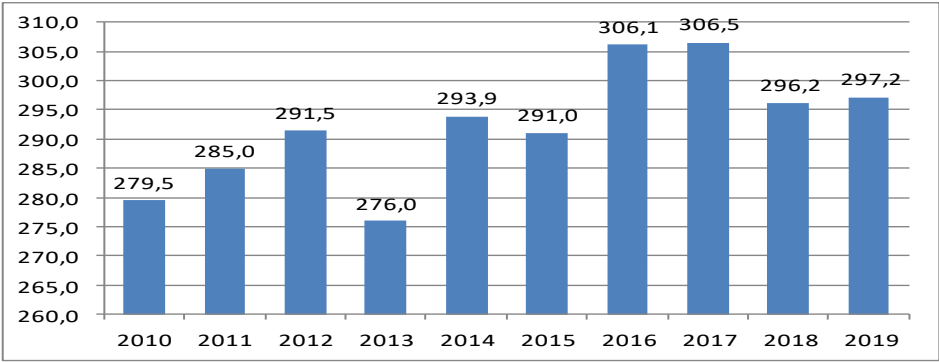
The number of solid waste landfills in the Moscow region as of 2018 reached 11 objects [14]. Thus, over the past 10 years, greenhouse gas (CO₂) emissions have increased by more than 35 million tons annually, and the total number of hydrometeorological hazards has increased by more than 70 units during the same period [10].

As a result, local economies can be devastated, and people can lose their assets and livelihoods. Today, the concept of ecological migration is already known, that is, a situation which forces the population to move as a result of natural, often anthropogenic disasters. Currently, the number of environmental migrants is 25 million [15].

Therefore, the program of the sustainable development of the territory needs adaptation to the existing national strategies and plans, where environmental security should take a central place.

3 Results and Discussion

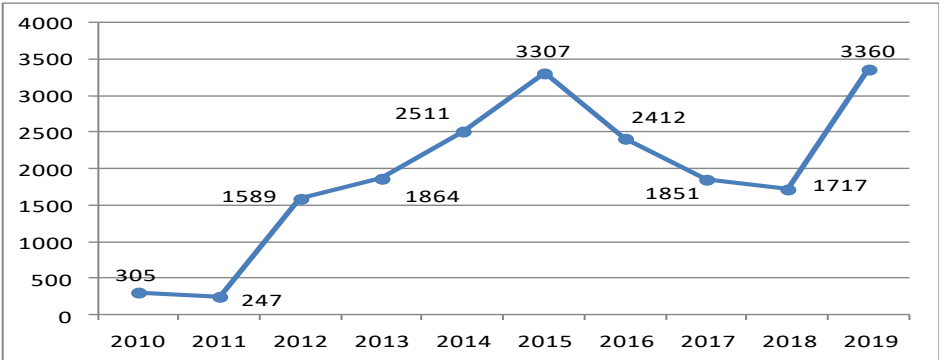
Factors, such as the number of transport enterprises, the forest-park zone of the territory, large-scale development, the number of industrial enterprises, influence the ecological situation of any territory. In the course of the study, the statistical data of these indicators for the city of Moscow for 2010-2020 were analyzed. The research results are presented in Figures 2 and 3.



Source: Federal Service of State Statistics [10]

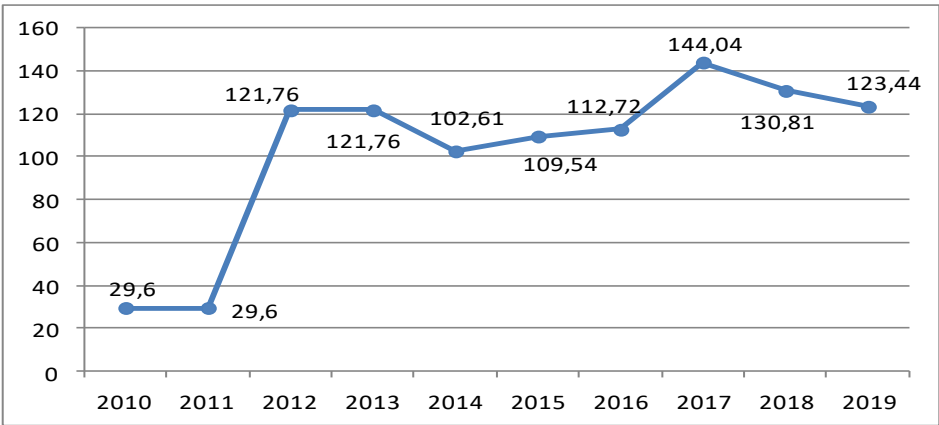
Fig. 2. The number of passenger cars per 1000 people in Moscow, 2010-2020, units.

The diagram shows that the number of vehicles ranges from 280 to 310 cars per 100 people. Therefore, Moscow traffic jams have already become a common part of the life of the capital's population. This results in emissions of heavy metals and other chemical elements into the atmosphere. In addition, Moscow is also a major transport hub. Large-sized cars, producing cubic meters of harmful exhaust, daily move along the city roads.



Source: Federal Service of State Statistics [10]

Fig. 3. The number of buildings commenced in Moscow, 2010-2020, units.



Source: Federal Service of State Statistics [10]

Fig. 4. The total area of green spaces within Moscow, 2010-2020, thousand hectares

The last two studied indicators are interrelated with each other. As the data in Figure 3 show, in 2019, the number of buildings constructed in Moscow almost doubled compared to the previous year. As a rule, during construction, green spaces are cut down to free place for houses, roads, temples, and shopping centers. In 2019, the total area of green spaces decreased by about 6%.

The study involved a correlation-regression analysis to determine the influence of the degree of environmental pollution on demographic aspects, namely, on mortality and life expectancy of the population at birth. A moderate relationship was established between population mortality and life expectancy, and factor signs associated with the influence of the environment. The level of water pollution has the greatest impact on mortality. Also, a significant factor of the mortality of the population is the number of cases of cardiovascular and infectious diseases, and the least significant – respiratory diseases and the number of vehicles. The life expectancy of the population is most influenced by the number of vehicles and enterprises located within the residential areas.

The multiple correlation coefficient is $R^2=0.976$, the determination coefficient is 0.952576. Thus, the study identified strong links between factorial and performance characteristics, which once again confirms that environmental pollution, untimely solutions

to issues related to the environmental safety of citizens of a particular territory are the main reasons for a sharp deterioration in public health, an increase in morbidity and mortality in Moscow and thereby negatively affect the components of sustainable development of the territory, i.e. society and the economy.

4 Conclusion

The components of sustainable development, namely economy, society, and ecology, are equally integral and interconnected. However, the economic and social components reflect the development, while the environmental component, in our opinion, should be the priority for the country to achieve the goals of a prosperous future.

In turn, environmental security as a factor of the sustainable development of any territory is determined by a set of conditions (social, economic, technological, natural), which, with proper management, will ensure the state of protection of the environment and citizens living in this territory.

The development and implementation of a sustainable development strategy for any territory, subject to the shift in target priorities from economic and social components to environmental, systematic work to ensure environmental safety will help meet the needs of the population in material and spiritual well-being and a favorable state of the environment.

The state must take the lead in the implementation of sustainable development goals, as it has the ability, through its authorities, to control and regulate all actions of economic entities that have a negative impact on the environment and thereby implement a policy to ensure environmental safety and protection of every citizen of the country, as indicated in the Constitution of the Russian Federation.

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