Global problems of biodiversity and food security

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Abstract. The article substantiates the ongoing processes in modern society and their impact on the growth of threats to food security of the countries of the world. The disturbance of the biological diversity of the planet indirectly affects the state of biocenoses and their resistance to destruction and degradation. The anthropogenic influence of mankind and its geometric growth in numbers do not allow the biosphere to restore equilibrium after the intervention and consumption of its resources. The work assesses the role of humans in reducing biodiversity. The conclusion is made about the importance of biodiversity conservation for maintaining the life support of the growing human population and the role of biodiversity in providing the necessary level and availability of food for balanced and sustainable economic development.

1. Introduction

The biodiversity of our planet today is declining due to the anthropogenic impact expanding agricultural areas, invades wildlife disrupting its ecosystem. The problem of imbalance in nature and in the relationship between man and nature has been studied for many years by various scientists. The global problems associated with the deterioration of the environment and imbalance between the wild and techno sphere are reflected in the general epidemiological situation in the world.

Over the past 100 years, humanity has been under constant attack by a number of infectious diseases inherent in the wild animal world. Viral infections AIDS, EVD, SARS, bird flu, swine flu are transmitted to humans and are caused by human intervention in the wildlife. Today, a new COVID-2019 pandemic is raging in the world, unprecedented in its scale and mortality rate.

The explosive growth in the incidence of coronavirus infection in the Wuhan province of the PRC in December 2019 - January 2020 forced states to reconsider their native policies and introduce paternalistic measures to protect their own epidemiological, economic and food security [1].

Initially, quarantine measures introduced by many countries limited the movement of tourists and foreign citizens across state borders.

Gradually, as the threat of a pandemic grew, quarantine measures were tightened and turned into economic bans on the export of food raw materials. So, since April 2020, a number of countries have
introduced quotas for the export of a number of grain crops to international markets: Russia has limited the export of corn and wheat and Vietnam has limited the export of rice.

To support national economies, the leaderships of the countries introduced additional economic support measures for citizens and businesses. The ban on the work of many enterprises and organizations that are not related to life-supporting spheres and industries has greatly affected the economic well-being of these enterprises and their employees. Industries related to tourism, transportation, entertainment and industries producing non-essential goods have been hit hard [2].

In response to the spread of the COVID-19 pandemic in the world, the Government of the Russian Federation has consistently closed the border for residents of Iran, South Korea, Italy, until, finally, by Order No. 635-r of March 16, 2020, the Government of the Russian Federation prohibited the entry of all foreign citizens and stateless persons, including through the territory of the Republic of Belarus. Together with the ban on citizens, the bans were introduced on the transportation of transit cargo with food products, which significantly violated the schedules and volumes of supplies.

The pandemic is affecting the environment in two ways. On the one hand, the shutdown of many factories, mines and other polluting industries has a positive effect. The air near industrial facilities becomes cleaner, the water and surrounding areas are recovered. On the other hand, the lack of regular and legal earnings from the population makes it literally predatory to exploit the biological resources. The cases of poaching and illegal resource trading and deforestation have increased. Thus, there is a depletion of natural resources, the balance in nature is upset and the biosphere itself changes. These changes are delayed by the Government, they will be really noticeable after a certain period of time, so this problem does not escalate in society.

2. Russian agro-industrial complex key parameters assessment

The world's population is growing at an increasing rate. The technological progress has provided the population with advanced vaccines to infections and made it possible to reduce child mortality and produce more food for the needs of all social strata [3, 4].

Due to the latest medical advances in many developed countries, the average life expectancy of people has increased. Population growth is mainly in the third world countries, in which there is a serious problem with food, medical care and the provision of minimum social guarantees.

Today, the world is home to about 7,713 million people, and by 2100, the forecast is 10.875 million people. The most intensive population growth occurs in the sub-Saharan region, Central and South Asia, East and South-East Asia, as well as in the least developed countries, which leads to an increase in the problems of global world hunger. There is a population explosion in this country that cannot be kept. The exceeding the permissible level of the population creates a high burden on the weak economies of developing countries, which are not able to provide minimal social guarantees for citizens. The growing population will not have the opportunity to study, to receive health care, and have quality and sufficient food [5, 6].

In fact, by 2100, the world's population will increase by 29%, that is, the need for life-supporting resources will also increase by 29%. Unfortunately, not all countries are able to provide their citizens with resources. So, many countries in Africa and Asia are not even able to feed the population due to the arid climate, the military conflicts and the lack of resources to maintain the local agroecosystems. The existing world hunger belt passes precisely through these regions, figure 1.
The population is most undernourished in Africa in the south of the equator -- up to 100% (figure 1). In addition, the hunger is experienced in India, in the island countries of the Pacific basin, in Asia, and in Latin America. Without solving these problems, these regions will not be able to develop steadily manner, so it is necessary not only to supply them with food, but to help create conditions for the production of food raw materials [7].

The efforts of the UN World Food Organization do not give the desired effect in reducing the number of hungry people. Moreover, hunger has continued to grow in recent years, which creates high social pressure in these regions and gives rise to new military conflicts. In the context of the COVID-2019 pandemic, the civil unrest has possessed even developed countries. For example, in June 2020 many cities in the United States and a number of European countries were under the massive civilian protests against racism under quarantine. Thus, one should not count on humanitarian support from developed countries, since they are busy solving internal problems and combating coronavirus infection, which, according to a number of scientists, is the biosphere's response to the invasion to environment [8, 9, 10].

Given the current epidemiological situation, the social and economic climate in many countries is not in favorable way. There is a massive dismissal of employees of enterprises and organizations in the non-production and service sectors, funding for a number of programs that have been recognized as irrelevant are being cut [11].

The lack of reserves prompts people to invade wildlife again, depleting its biological resources, exploiting and destroying the formed biological system. It turns out a certain chain of destructive tendencies: a person destroys nature to provide for his own needs, thereby destroying the environment and planet's biosphere in whole. The correction of the existing destructive trends in the socio-economic sphere is impossible without cardinal intervention in the processes of anthropogenic impact on the biosphere. This implies the joint efforts of all countries of the world aimed at reducing destructive technologies and at stopping the processes of destruction of agrocenoses. Protection and restoration of biodiversity is a priority. The decline in biodiversity and the increased rate of its extinction undermine the foundations of sustainable development and global ecological balance [12, 13].

It is known that about 100-200 species disappear every day. By the end of the 21st century, the planet will have lost about 50-80% of all species of living beings that form the basis of the modern biosphere. For the environment, these are irreplaceable losses that will negatively affect the human form of life.

The biodiversity pyramid of the terrestrial biosphere (figure 2) shows how important it is to preserve the existing sets of biocenoses from the simplest to the most complex ones.

![Figure 1. World belt of hunger.](image-url)
Figure 2. Pyramid of biodiversity.

The simplest forms, when organized, create the most complex forms, and so on. At the top of the pyramid, an ecosystem is formed, which makes it possible for living forms, including humans, to exist. The ecosystem not only creates an environment for normal human habitation, but also gives him the necessary resources to create comfortable living conditions, so it must be preserved in this state [14].

Unfortunately, modern civilization does not take into account the fact that the ecosystem can be destroyed under the influence of anthropogenic existence. Thus, overgrazing of livestock leads to soil destruction and desertification of many steppe and semi-steppe territories. Unreasonable consumption of water for irrigation leads to the loss of water bodies (the Aral Sea), an increase in the volume of industrial logging leads to the destruction of forests and their inhabitants. Drainage of wetlands for agricultural land leads to the loss of the unique flora and fauna of the wetlands [14, 15].

There are a lot of similar examples of thoughtless use of natural resources and potentials. Mankind, in an effort to create comfortable conditions for existence and maximize commercial benefits, does not take into account the losses incurred by the environment. All of these interventions in the natural ecosystem are cumulative and gradually lead to global disasters.

Today, many states come to the conclusion that it is necessary to consolidate efforts to conserve biodiversity. The role of biodiversity in the conservation of ecosystems as a basis for evolution has been proven in the 20th century. The need to protect and sustain existing biodiversity is enshrined in the 1992 UN Convention on the Conservation of Biodiversity. Nevertheless the lack of tools and regulations to implement the acts of the Convention has led to the fact that it is still not being implemented by countries.

In this area, insufficient international legal documents have been developed that define the boundaries of anthropogenic impact. Global climate change is associated with a decline in biodiversity. Thus, the reduction of natural ecosystems (water bodies, forests, swamps) reduces the ability of the earth's surface to absorb the generated carbon dioxide and reflect the rays of sunlight, which ultimately leads to a warming of the climate and an increase in the level of the World Ocean.

Since the threat of warming is more tangible and affects human life, it focuses the attention of developed countries. The study of the causes of such climate change has led to a greater understanding of the importance and role of conserving existing biodiversity. The observations of climatologists have proved the great role of the anthropogenic factor in the emerging climate trends (figure 3).
The fluctuations in temperature in 1914-2014 indicate an emerging trend towards an increase in the average annual temperature, which will persist under existing conditions and environmental factors. The increasing rate of global warming is an alarming factor in the change in the planet's biosphere, since it affects the level of the World Ocean and the reduction of the land area for human habitation. Small island states are gradually sinking, which causes an influx of migrants and refugees from these territories, which must be supported and provided with the necessary resources for living being [16].

3. Conclusion
The depletion of biodiversity dictates the need to search for new approaches to cooperation with nature and the use of its resources. The growing threat of destruction of existing ecosystems that form the habitat of living organisms on the planet is forcing the countries of the world to revise their industrial technologies and applied mechanisms to ensure sustainable economic growth and ensure food security. The population growth does not make to reduce the rate of civilization development, but requires the intensified efforts of the world leadership to reduce the rate of growth of global biological threats.

The biodiversity creates an opportunity for ecosystem restoration and development. It is important to preserve exactly the species diversity that exists at the moment, because the more diverse life forms on the planet, the more stable ecosystem. In such sustainable ecosystem humanity could survive and develop fully and productively.

The growing threat of imbalance in biodiversity and its reduction under the influence of human activity requires the search for new approaches to solving food security problems, which is important for countries where hunger is a real threat to the life and health of citizens.

Such processes are taking place all over the world. They are larger in developed countries and smaller in developing countries. Anthropogenic impact has a cumulative effect and leads to a gradual change and depletion of the environment. The hidden character of such changes does not help to attract attention currently, but after a generation this is reflected in the impoverishment of territories, the change in the usual landscape, the disappearance of many species of flora and fauna with a deterioration in the environment of human existence.

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