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The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов и молодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

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кажет», - дейді ғалым. Түркиядағы Ыстамбұл университетінде әл-Фараби атындағы ҚазҰУ ректоры Ғалымқайыр Мұтанұлының бастамасымен «Әл-Фараби» зерттеу орталығы ашылды. Орталықтың басты мақсаты – түркітану саласына ірі-ірі ғалымдарды дайындау. Ораз Сапашев 2017 жылдан бері Ыстамбұлдағы «Әл-Фараби» зерттеу орталығында да сабақ береді. Бұдан бұрын 2010-2012 жылдары АҚШ-та, 2015-2016жыладры Анкарада қазақ тілін үйреткен. Түрколог ғалымның айтуынша, Түркияда қазақ тілін көбіне түркітанушы мамандар оқиды. Тек қазақ тілін үйретуде аздап қиындықтар кездеседі екен. Мәселен, біз кириллицамен жазамыз, ал онда латынша. Сонымен қатар, қыпшақ грамматикасы мен фонологиясы біршама өзгеше. Сөздік қорымыз бен терминдік кешеніміз де ерекшеленіп тұрады.

2025 жылы Қазақстан Республикасы толық латын әліпбиіне көшетінін ескерсек, бұл олқылықтарды да жеңудің бірден бір жолы табылар еді. Алайда қазақ тілін үйретуде тиімді тұстары да бар. Біріншіден, түріктер үшін қазақ тілі шетел тілі емес. Екі тілге де сөз және сөздік жүйе ортақ, тілдік таным бірдей. Сол себепті шетел тіліне қарағанда түріктер қазақ тілін жылдам үйренеді екен. Қазақ тілі Қазақстанда және Орталық Азияның басқа елдерінде адамдардың өмірінде үлкен рөл атқарады. Ол Қазақстанның ресми тілі болып табылады, бұл оны Үкіметпен қарым-қатынас жасау, азаматтық алу және жұмыс істеу үшін қажет етеді. Сонымен қатар, қазақ тілін үйрену қазақ халқының мәдени мұрасы мен дәстүрлерін сақтауға көмектеседі.

Қазақ тілін білу халықаралық қатынастарды, әсіресе дипломатия мен экономикалық ынтымақтастықты жақсарту үшін де пайдалы болуы мүмкін. Қазақ тілінде білім беру ресурстары мен ғылыми ақпаратқа қолжетімділікті ашады. Бизнес және туризм саласында қазақ тілін білу жергілікті мәдениетті жақсы түсінуге және іскерлік қатынастарды нығайтуға көмектеседі.

Сонымен, қазақ тілін үйренудің Қазақстанда және Орталық Азияның басқа елдерінде өмір сүру мен жұмыс істеу үшін көптеген артықшылықтары бар, бұл мәдени мұраны сақтауға және қызметтің әртүрлі салаларында коммуникацияны жақсартуға көмектеседі.

Қолданылған әдебиеттер тізімі

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ENVIRONMENTAL SAFETY IN KAZAKHSTAN: ANALYSIS OF STATISTICS AND WAYS OF IMPROVEMENT

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Kazakhstan, the ninth largest country in the world, can be proud of a rich tapestry of land-landscape,

from the snow-capped reams of Tian Shan to the vast steppes and the shimmering Caspian Sea. Ensuring environmental safety in this vast territory is an important problem. This article examines the current state of environmental security in Kazakhstan. The primary sources of information are data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan and the National Report on the State of the Environment and Use of Natural Resources for 2022.

The study analyzes key environmental protection issues and provides recommendations for improving environmental security in the Republic of Kazakhstan.

Air and Ozone Layer Pollution

Air pollution persists as a significant concern in Kazakhstan, with major industrial centers like Atyrau, Pavlodar, and Karaganda exceeding established emission standards. Statistics from the AGENCY FOR STRATEGIC PLANNING AND REFORMS OF THE REPUBLIC OF KAZAKHSTAN reveal alarming trends in the emission of harmful substances such as sulfur dioxide, nitrogen oxides, and fine particulate matter (Figure 1) [1]. [These pollutants contribute to respiratory and cardiovascular diseases, as well as trigger adverse environmental phenomena like global warming, acid rain, and others.](#)

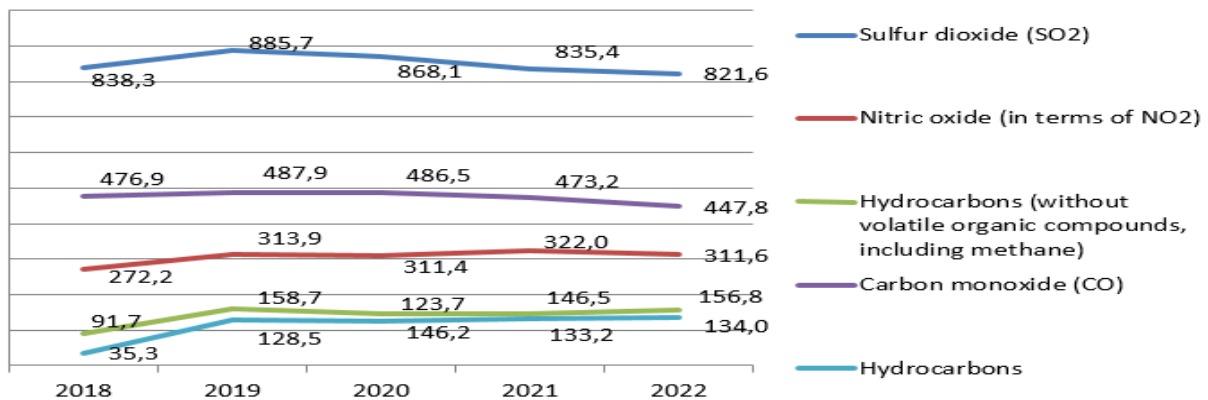


Figure 1-Emissions of specific pollutants into the atmosphere in the years 2018-2022 (in thousands of tons) [1]

The presented diagram provides insights into the emission trends of specific air pollutants from 2018 to 2022. A notable observation is the 40% increase in hydrocarbon compounds during this period. In contrast, carbon monoxide, sulfur dioxide, and nitrogen oxide emissions exhibited a 15% decrease. These trends highlight the dynamic nature of air pollutant emissions in the region.

Strategies for Cleaner Air

The global shift towards cleaner energy sources, such as natural gas and renewables, has demonstrated a remarkable reduction in air pollutants. Investing in greener industrial processes and enforcing stringent emission standards are crucial steps towards overall environmental improvement. Furthermore, fostering a green technology ecosystem, nurturing startups, and promoting innovative eco-friendly products are essential strategies.

Climate Change

Kazakhstan's geographical location renders it particularly susceptible to the impacts of climate change. This manifests in the form of extreme weather events, including heavy snowfall in winter, glacial melt in spring, prolonged drought in summer, and torrential rains in autumn. These events pose significant threats to the well-being of the population, agricultural productivity, industrial development, and biodiversity conservation.

Combating Climate Change

Kazakhstan is firmly committed to upholding international environmental agreements. In January 2021, the country adopted the Environmental Code, which incorporates 19 out of the 24 international conventions ratified by Kazakhstan. Climate change, a global challenge of immense significance, is a

central focus of this document. The transition to renewable energy sources, such as wind and solar power, is identified as a key solution. Additionally, the code advocates for implementing sustainable environmental management practices to mitigate the impacts of climate change.

Water Resources

Water scarcity is a growing concern in Kazakhstan, particularly in its arid regions. Statistics from the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan indicate a rising demand for water across various sectors, putting pressure on limited freshwater resources [2]. Due to geographical factors, seven of Kazakhstan's eight water basins are transboundary, making the country highly dependent on the water policies of neighboring nations. In this regard, the Aral-Syrdarya, Zhayik-Caspian, Shu-Talas, and Balkhash-Alakol water basins are most vulnerable, while the Tobyl-Turgai and Irtysh basins are least vulnerable. According to the Institute of Geography and Water Security, average annual river runoff in Kazakhstan has decreased by 12.5 cubic kilometers compared to 1960. Of this, 9 cubic kilometers, or 72% of the total reduction, is attributed to local rivers, while 3.5 cubic kilometers, or 28%, is attributed to transboundary rivers. Inefficient water use and deteriorating infrastructure further exacerbate the water management challenge.

To address water issues in the country, a competent state body – the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan – was established in September 2023. This specialized agency is tasked with systematizing approaches and improving state policy in this area.

Water scarcity is a critical challenge facing Kazakhstan, demanding concerted efforts to conserve and manage water resources effectively. By implementing comprehensive strategies, including infrastructure modernization, water-saving practices, and exploration of alternative water sources, Kazakhstan can ensure water security for its citizens and support sustainable development.

Biodiversity and Land Resources

Kazakhstan boasts a wealth of biodiversity and unique ecosystems. However, statistics from UNDP indicate the degradation of pastures, landscape, and biological diversity [3]. According to Global Forest Watch, two leading regions in Kazakhstan accounted for 51% of all forest cover loss between 2001 and 2022. The most significant forest cover loss occurred in East Kazakhstan, with 19.9 thousand hectares lost compared to the average of 4.61 thousand hectares, as illustrated in Figure 2. This poses a threat to ecosystem balance and reduces land productivity [4]. In conclusion, it is proposed to develop satellite monitoring tools for forests and biodiversity, implementing preventive measures to avoid potential large-scale consequences.

Figure 2-Location of tree cover loss in Kazakhstan [2]

The Role of Industry and Agriculture

Industry and agriculture, vital sectors of Kazakhstan's economy, contribute to environmental pollution. Kazakhstan is a major producer of agricultural products, generating a significant amount of agro-industrial waste. A substantial portion of this waste stems from crop straw, which is utilized for soil fertilization and animal feed. Figure 3 illustrates the distribution of waste across the country's primary grain-growing regions: Akmola, Kostanay, and North Kazakhstan oblasts [5]. [As evident from the graph, North Kazakhstan Oblast generates the least amount of waste.](#)

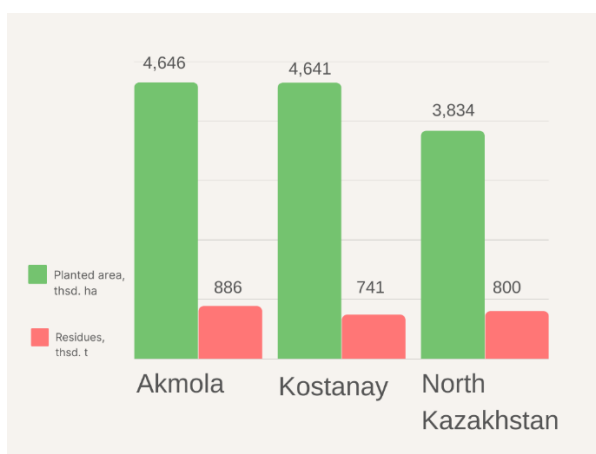


Figure 3-Akmola and Kostanay regions –

prime spawners of straw waste [3]

A sustainable future depends on cleaner industrial practices and eco-friendly technology. Industries must minimize waste and pollution, while agriculture can reduce its footprint with crop rotation, less reliance on chemicals, and targeted water use. This collaborative effort between industry, government, and consumers is essential for safeguarding our planet.

Public Participation and Environmental Governance

Environmental protection requires active public participation and strong environmental governance. Transparency in environmental data and public access to information are essential. Encouraging public engagement in decision-making processes related to environmental issues can foster a sense of ownership and responsibility.

From an evaluation of the above arguments, despite its vast natural resources, Kazakhstan faces a critical challenge in ensuring environmental safety. The good news is that a clear path towards a more sustainable future exists. This path hinges on leveraging data and translating it into actionable solutions. A multifaceted approach is key, focusing on three pillars:

- a decisive shift towards cleaner energy sources to reduce pollution.
- implementing responsible resource management practices that prioritize long-term environmental health.
- Finally, fostering public participation is crucial to raise awareness and encourage a culture of environmental stewardship.

By working together – government, industries, and citizens alike – Kazakhstan can not only

1	East Kazakhstan	19.9 kha
2	Qostanay	12.8 kha
3	North Kazakhstan	8.76 kha
4	Aqmola	7.55 kha
5	Pavlodar	5.51 kha

secure a healthy environment for the present generation but also leave a lasting legacy for generations to come. This collaborative effort will require open communication, transparent data sharing, and a shared vision for a sustainable future. Success will depend on fostering a sense of collective responsibility and empowering citizens to be active participants in environmental protection initiatives. The way to a sustainable Kazakhstan may not be easy, but with dedicated efforts and a collaborative spirit, the rewards for the environment and public health will be immense.

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AI: THREATS AND OPPORTUNITIES

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In our time, Artificial Intelligence (AI) has become the subject not only of fascination but also of intense debate. In the light of rapid technological progress, it represents both a potentially world-changing force and a source of concern and anxiety. Discussions revolve around its unlimited potential to improve the quality of human life as well as dark perspectives, including threats associated with its opacity, potential abuse, and ethical questions facing society.

The view on AI cannot be restricted to unequivocally positive or negative assessments. Instead, it is necessary to consider it as a dual phenomenon, which opens up grand opportunities as well as serious challenges

AI is beneficial in many areas of life. For example:

- **Medicine and Healthcare:** AI can significantly improve the diagnosis and treatment of various diseases, as well as optimize the management processes of medical institutions and resource distribution.
- **Education:** Implementing AI in education allows for the creation of personalized educational programs tailored to individual students' needs, as well as improving assessment processes and feedback.
- **Ecology and Sustainable Development:** The use of AI in analyzing climate and environmental data helps identify environmental crisis threats and develop effective strategies for sustainable development.
- **Transportation:** AI-driven autonomous transportation systems can enhance safety and efficiency of movement, reduce accidents, and traffic congestion.

On the other hand, threats associated with its development require careful study and regulation. Nick Bostrom argues that if intelligent computer algorithms learn to autonomously create even smarter algorithms, and those in turn create even smarter ones, there will be an explosive growth of artificial intelligence, making humans appear akin to ants in intellectual capacity. A new, albeit artificial, superintelligent species will emerge, with the ability to pursue goals beyond human comprehension. Whether it decides to make everyone happy or halt anthropogenic pollution of the world's oceans by eliminating humanity altogether, resistance from humans would be futile. There would be no chance of a Terminator-style showdown or shootouts with metallic cyborgs. It would be checkmate for us.

Over the past century or so, scientific advancements have instilled hope in some for solving all of humanity's problems while evoking profound fear in others. Both viewpoints seem justified. Thanks to science, dreadful diseases have been conquered, the world can feed more people than ever before, and one can travel from one side of the globe to the other in less than a day. However, thanks to the same science, people are using cutting-edge military technologies to annihilate one another with terrifying speed and efficiency.