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AIR POLLUTION IN TASHKENT CITY: PROBLEMS AND SOLUTIONS

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ABSTRACT

The 21st century is a period of accelerated urbanization processes on a global scale, and along with socio-economic growth in large cities, environmental problems are also sharply increasing. Tashkent is no exception to this process.[1] Currently, the level of urban air pollution is becoming a serious threat to the health and quality of life of the population.[2]

KEYWORDS

Atmosphere, weather, Tashkent city, ecology.

Introduction

Air pollution in Tashkent is caused not only by natural but also by anthropogenic factors. Natural factors include the city's geographical location, its lowland location and the slow exchange of air due to its mountainous terrain, and the limited wind flow.[3] Anthropogenic factors include a number of factors resulting from human activity. Uncontrolled urban expansion, deforestation, increased road traffic, and industrial emissions are contributing to air pollution. [4,5]

Along with the constant growth of the population of Tashkent, the number of vehicles is also increasing. Most of these vehicles use fuels that do not meet international environmental standards, which leads to an increase in harmful emissions into the atmosphere.[6] The number of cars in the republic has increased from 3.14 million in 2021 to 4.6 million in 2023, with an average of 730 thousand cars moving in Tashkent per day, which is a serious problem for the city's ecology.[7]

The reduction of green areas is also a significant part of this problem. In Tashkent, 49 thousand trees were illegally cut down, which negatively affected the microclimate. In addition, the chaotic construction of the city, carried out in violation of environmental standards, is an additional cause of air pollution.[8]

With the increasing demand for thermal energy by the city's population, environmentally harmful materials such as fuel oil are being used as additional fuel in central heating systems. For example, in December 2023 alone, 9 boiler houses in Tashkent used 3 thousand tons of fuel oil. This type of fuel leads to the release of large amounts of carbon dioxide, sulfur dioxide and other harmful gases.

The urgency of this problem means that air pollution has not only environmental, but also economic and social consequences. Deterioration of air quality indicators negatively affects the health of the population, leading to an increase in respiratory diseases. In addition, it reduces the efficiency of production in various sectors of the economy, as well as reduces the attractiveness of the city, limiting its ability to attract investors and tourists.

It is necessary to take a number of measures to improve the ecological situation in Tashkent. The use of international experience and advanced technologies in the fight against atmospheric air pollution is of great importance. The article provides a detailed analysis of the causes of air pollution, considers measures to improve the current situation, and puts forward proposals for adapting international experience to local conditions.

The importance of addressing this issue is not only about improving the ecological situation in Tashkent, but also about the responsibility of ensuring a clean and sustainable environment for future generations.

Methodology

In preparing this article, the following sources of information were analyzed to study the environmental status of the city of Tashkent:

1. Official statistical data - on the number of vehicles, energy consumption and construction work.
2. Results of environmental monitoring - air quality indicators, including AQI (Air Quality Index) analysis.
3. Environmental documents and programs - plans and implemented measures of the Ministry of Ecology to protect atmospheric air.
4. International practices - methods used by other countries to reduce air pollution and their effectiveness. Natijalar

The results of the study on atmospheric air pollution in Tashkent allowed us to clearly and systematically classify current problems related to air quality. These problems were summarized in the following main areas:

1. Reduction of green areas

One of the main problems that harms the ecology of Tashkent is the reduction of green areas. The study found that in recent years, cases of illegal logging have increased sharply. For example, despite the moratorium on logging, more than 49,000 trees have been illegally cut down. The reduction of green areas leads to the loss of natural filtering layers that retain dust and harmful gases, which in turn increases the amount of harmful substances in the atmosphere.

2. Construction chaos

The implementation of construction work in Tashkent without the approval of urban development plans is having a negative impact on the ecological environment. Dust and waste generated during the construction process have been noted as one of the main sources of air pollution. Illegal construction and projects that violate sanitary and hygienic requirements are also contributing to a decline in the quality of the city's air.

3. Increase in the number of vehicles

The increasing number of cars in the city leads to an increase in harmful emissions into the atmosphere. In 2023, an average of 730 thousand cars were registered in Tashkent per day, and an additional 160 thousand to 300 thousand cars were registered from the regions. Most of these cars use AI-80 fuel, which does not meet environmental requirements. Harmful gases emitted by cars parked in traffic jams make up a significant part of the emissions into the atmosphere.

4. Increased consumption of energy resources

In recent years, energy consumption in Tashkent has increased significantly. In 2019, 3.9 million tons of coal were used, while in 2023 this figure reached 6.7 million tons. The emissions generated during the use of coal fuel, including carbon dioxide, sulfur dioxide, nitrogen oxides and ash, directly harm the atmospheric air. The 3 thousand tons of fuel oil used by one heating center serve as an additional factor polluting the air.

5. Natural factors

The geographical location of Tashkent also affects the level of air pollution. The city's mountainous and low-lying location limits wind circulation, which causes harmful particles in the air to remain suspended for a long time, rather than disperse. Temperature inversions (where a layer of warm air overlaps cold air) have also been identified as a factor that keeps pollutants in the atmosphere.

6. Socio-economic impacts

Air pollution negatively affects public health, leading to an increase in respiratory diseases. This leads to increased healthcare costs and reduced work capacity. In addition, increased pollution levels reduce the ecological attractiveness of cities, negatively affecting tourism and investment opportunities.

7. Effectiveness of environmental measures

A number of measures have been implemented by the Ministry of Ecology. In particular:

• Automated monitoring stations have been installed to monitor the atmosphere. As of 2023, 2 stations in Tashkent and 8 stations across the country have been integrated into the international monitoring system.

• Dust and gas purification equipment has been installed, and work is underway to reduce emissions at industrial enterprises.

However, these measures are limited in relation to the scale of the problem, and no significant improvement in atmospheric air quality has been observed.

Discussion

Air pollution in Tashkent city is causing serious environmental, economic and social problems. Based on the results of the study, it is possible to identify the causes of this problem and discuss proposals for solving them.

1. The relevance of restoring and preserving green areas

Green areas play a crucial role in ensuring the ecological balance of the city. Trees filter harmful gases and dust particles from the air, moderating the urban microclimate. However, in recent years, illegal logging in Tashkent has led to a significant reduction in green areas. To eliminate this situation, the following measures must be taken:

• Strict control: Introduce technological tools (drones and satellite imagery) and special inspections to detect and prevent illegal logging.

• "Green Belt" project: Implement a large-scale tree planting initiative around the city, which will help intercept dust flows and reduce the environmental damage of wind.

• Public participation: Inform the population about the preservation and expansion of green areas and organize tree planting campaigns with their participation.

2. The need to modernize the transport system

Harmful emissions from vehicles are one of the main air pollutants in Tashkent. To ensure the environmental safety of the transport system, the following are proposed:

• Ban the use of AI-80 gasoline: Since this fuel does not meet international standards and increases the amount of harmful emissions, it should be completely banned.

• Encourage electric vehicles: Provide subsidies to car owners for the purchase of electric vehicles and introduce tax breaks for this type of vehicle.

• Develop public transport: Reduce the number of private cars by introducing environmentally friendly vehicles powered by electricity or gas and expanding the public transport network.

3. Regulation of construction activities

Construction work in Tashkent remains one of the factors disrupting the ecological balance. Dust and industrial emissions are causing air quality to deteriorate. The following measures can be taken in this area:

• Ecological expertise: Assess each new construction project for environmental safety and allow work to begin only after approval.

• Construction dust reduction: Introduce special equipment and filter systems that trap dust at construction sites.

4. Efficient use of energy

In Tashkent, the increasing demand for energy, especially the expansion of the use of harmful fuels such as coal and fuel oil, has been identified as one of the main factors contributing to air pollution. To solve this problem, the following should be done:

• Use of alternative energy sources: Development of solar and wind energy, as well as the abandonment of harmful fuels by modernizing existing central heating systems.

• Ban on fuel oil: Complete restriction of the use of fuel oil as a backup fuel in heating centers and the introduction of environmentally friendly alternatives instead.

5. Use of international experience

International experience in reducing atmospheric air pollution is important for Tashkent. For example, in Beijing, the following measures were implemented within the framework of the “Clean Air” program:

• Relocation of industrial enterprises outside the city;

• Provision of public transport with electric and gas-powered vehicles;

• Expansion of green areas and implementation of tree planting programs.

These experiences can also be applied in Tashkent and will help to significantly improve the environmental situation.

6. Public awareness and engagement

Public participation is crucial in addressing environmental issues. Regularly providing information about air pollution levels and encouraging people to take action will strengthen social engagement. It is necessary to install public displays displaying air quality indicators and expand environmental awareness programs.

Conclusion

According to the results of the discussion, an integrated approach is needed to eliminate the main factors causing air pollution in Tashkent. Modernization of urban infrastructure, expansion of green areas, replacement of vehicles with environmentally friendly types, and adaptation of international experience to local conditions play a decisive role in improving the ecology of Tashkent. Active participation of the population and a firm state policy are important factors in achieving this goal.

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