

Ilmurodova Lobar Ahmedovna, 1-st stage basic doctoral student on the specialty "Land formation, cadastre and land monitoring". Samarkand State University of Architecture and Civil Engineering. Samarkand. Uzbekistan.

DETERMINATION OF INDUSTRIAL ZONES, LARGE TRANSPORT INFRASTRUCTURES AND THEIR ENVIRONMENTAL PROBLEMS OF SAMARKAND REGION

Abstract. This article analyzes the industrial zones formed in the Samarkand region, large transport infrastructures and the environmental problems arising from them. During the study, evidence-based conclusions were drawn based on statistical data from open sources, regional development programs and environmental monitoring reports. The results revealed the impact of industrial and transport activities on the environment and discussed ways to reduce the problems.

Keywords: free economic zones, soil degradation, biological diversity, ecological monitoring.

Introduction. Industrial zones play an important role in the economic development of the Samarkand region. Over the past decade, the state has established small industrial zones and free economic **zones (FEZs), which are aimed** at deep processing of local raw materials, creating new jobs, and increasing export potential [1].

Main part. *Main industrial zones*

Urgut Free Economic Zone

- **Specialization:** chemical industry, pharmaceuticals, building materials, electrical engineering, food and textile products.
- **Territory:** Covers an area of more than 400 hectares.
- **Environmental impact:** Chemical waste and emissions are the main sources of risk [2].

Small industrial zone of Samarkand city

- **Specialization:** food products (flour, bread, butter, etc.), metal processing, light industry (sewing and knitting).
- **Location:** on the outskirts of the city.

- **Environmental impact:** the problem of transport waste and household waste.

Kattakurgan Industrial Zone

- **Specialization:** construction materials (cement, brick, marble), oil and grease production.
- **Territory:** Located on the banks of the Zarafshan River.
- **Environmental impact:** there is a risk of industrial effluents falling into the river [3].

Bulungur industrial zone

- **Specialization:** processing of agricultural products (vegetables, fruit juices, canning).
- **Environmental impact:** the sewage and organic waste treatment system is inadequate.

Jomboy Industrial Zone

- **Specialization:** livestock and dairy processing, oil and fat industry.
- **Environmental impact:** There is a problem of odor in organic waste and surrounding areas [4].

Environmental problems in industrial zones

1. Atmospheric air pollution (dust, gas emissions).
2. Industrial wastewater flowing into the Zarafshan River.
3. Soil degradation and improper waste storage.
4. Public health risks due to exhaust gases and chemicals.

Industrial zones in Samarkand region play a leading role in economic development, but they also require attention as a source of environmental risk.

Therefore, it is necessary to strengthen environmental monitoring, and modernize waste processing and treatment facilities.

Table 1

No.	Ecological problem	Main sources/causes	Consequences / effects	Source
1	Air pollution	transport, industrial enterprises, thermal energy facilities	Deteriorating air quality, increasing respiratory diseases	[3]
2	Pollution of water resources	Industrial wastewater, pesticides and fertilizers, household waste	Degradation of drinking water quality, reduction of water usage opportunities	[7]
3	Soil degradation and salinization	Improper watering, chemicals, construction waste	Decrease in productivity, degradation of land resources	[6]
4	Waste problem	Industrial, construction and household waste; landfills not meeting demand	Pollution of soil and underground water, deterioration of sanitary conditions	[5]
5	Noise and vibration	Road transport, railway, airport	Negative impact on quality of life, risk to mental and physical health	[3]
6	Loss of biological diversity	Urbanization, new construction, loss of natural habitat	Decline in plant and animal species, disruption of ecological balance	[4]

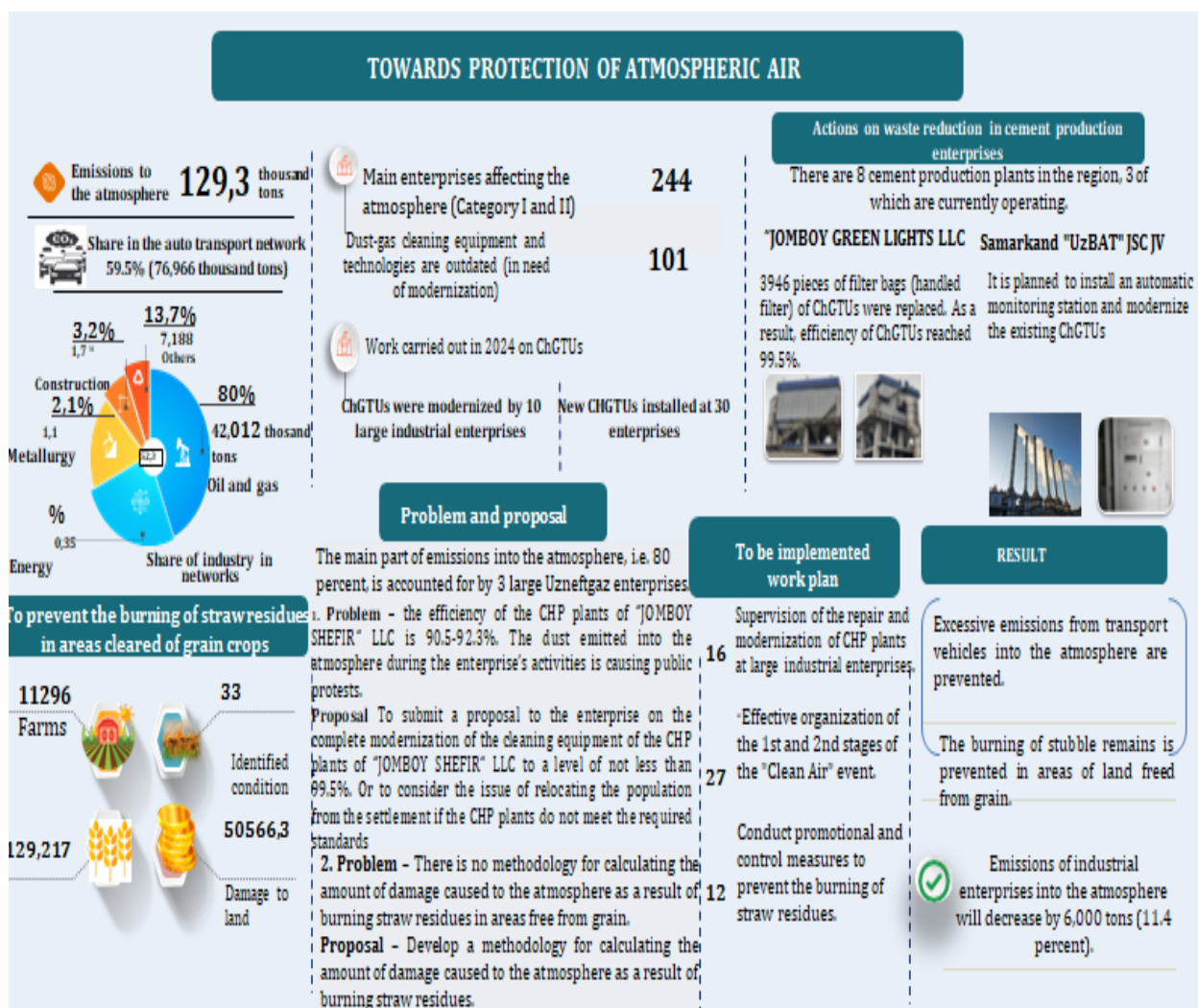
Environmental problems in Samarkand reg

60,000 saplings were planted around 36 large industrial enterprises and a "green belt" was established.



16,000 saplings were planted around 10 household waste landfills and a "green belt" was established.

Information from the Department of Ecology, Environmental Protection and Climate Change of Samarkand Region



Major transport infrastructure in the Samarkand region

Samarkand region is located in the central part of Uzbekistan, making it a convenient region in terms of transport and communication infrastructure. Highways of international and republican importance, railway networks and air transport system pass through the region. This infrastructure plays an important role in economic development, tourism and foreign trade relations [1].

Motorways

- **The M37 highway**, passing through Samarkand, is of international importance in the direction of Tashkent - Bukhara - Turkmenistan - Iran.
- **Highways A377 and A378** connect the interior of the region with other regions of the Republic.
- **The Tashkent-Samarkand-Termez road is the** most important transport artery in the region, and is of great importance for freight and passenger transportation.
- **Environmental problems:** traffic emissions from roads emit harmful gases into the air, noise levels are high, and dust from asphalt pavement is observed [8].

Railway infrastructure

- **The Tashkent - Samarkand - Karshi railway line is the** largest highway served by high-speed trains (the "Afrosiab" electric train).
- **The Samarkand-Bukhara-Khiva line** connects the region with Western Uzbekistan.
- **Freight transportation** - mainly construction materials, fuel, and agricultural products.
- **Environmental problems:** noise, vibration, and oil-based fuels from rail transport emit additional pollutants into the air [9].

Air transport

- **Samarkand International Airport** is one of the largest airports of the republic and regularly operates international (Russia, Turkey, UAE, Korea, Kazakhstan) and domestic routes.
- **Freight transportation** - although limited, serves mainly for export-import products.
- **Environmental problems:** during aircraft flights, CO₂ and NO_x emissions are observed, as well as high noise levels around the airport [10].

In Samarkand region, large transport infrastructure plays a major role in economic and tourism development. However, their environmental impact is also significant, and it is necessary to reduce transport emissions, introduce electric transport, and strengthen environmental monitoring.

Generalization of environmental problems in Samarkand region

1. Air pollution

- **Sources:** road transport, industrial enterprises (Urgut SEZ, Kattakurgan cement plant), thermal energy production facilities.
- **The main problem: the release of** CO₂, CO₂, NO_x, dust, and other harmful substances into the air.
- **Result:** deterioration of air quality in the center of Samarkand city, increase in respiratory diseases [3].

2. Pollution of water resources

- **Sources:** industrial wastewater, excessive use of pesticides and fertilizers in agriculture, and household waste.
- **Area:** The Zarafshan River and its tributaries are at risk of pollution.
- **The result:** a decline in the quality of drinking water and a decrease in the availability of water resources [7].

3. Soil degradation and salinization

- **Sources:** improper irrigation system, excessive use of mineral fertilizers and chemicals, construction waste.

- **Area:** Bulungur, Jambay, Pastdargam districts have high salinity.
- **The result:** reduction of agricultural productivity, deterioration of land resources [6].

4. Waste problem

- **Sources:** industrial waste, construction waste, household waste.
- **The problem:** there are not enough waste processing plants, and landfills do not fully meet environmental requirements.
- **The result:** pollution of soil and groundwater, deterioration of sanitary conditions [5].

5. Noise and vibration problem

- **Sources:** road transport, railway, airport.
- **Area:** Samarkand city center and areas along transport routes.
- **Result:** negative impact on the quality of life of the population, threat to mental and physical health.

6. Reduction of biological diversity

- **Sources:** urbanization, new construction, reduction of natural habitats.
- **Area:** Zarafshan valley, mountain slopes.
- **The result:** the decline of some plant and animal species, disturbance of the ecological balance [4].

Conclusion. The main environmental problems in Samarkand region are atmospheric pollution, degradation of water and soil resources, waste problem, noise and biological diversity. To solve these problems:

- strengthening environmental monitoring,
- development of the waste recycling system,

- introduction of environmentally friendly technologies in transport,
- efficient use of water resources will be necessary.

ECOLOGICAL PROBLEMS AND SOLUTIONS IN SAMARKAND REGION

INDUSTRY PROJECTS



PROBLEMS



↑ 2

5

FACTORIES

EMITS TONS OF
HARMFUL WASTE



SORT OUT



80

INSTALLED
FILTERS
RECOMMENDED

WASTEWATER PROBLEM



PROBLEMS



WATER IN BOYNAZAR
IN THE CLEANING PLANT

1192

IN PROGRESS



SORT OUT



NEW WATER

PLANNED
STRUCTURE

THE ZARAFSHAN RIVER PROBLEM



PROBLEMS

1

KM STRENGTHENING
THE RIVER COAST



SORT OUT

STRENGTHENING
CREATING A GREEN

TRANSPORT AND WASTE



540.0

THOUSAND
TRANSPORT



300

"Экономика и социум" №11(138) 2025

TON CO₂ IS

www.wiupr.ru



4



References:



1. National Encyclopedia of Uzbekistan. Samarkand region. – Tashkent: OME, 2019.



2. Reports of the Ministry of Investments, Industry and Trade of the Republic of Uzbekistan. – Tashkent, 2022.



3. Ecology and Environmental Protection of the Republic of Uzbekistan . – Tashkent, 2021.
4. R. Ismailov, D. Karimova. “Environmental problems of Samarkand region and ways to solve them”. – Scientific journal of Tashkent State Technical University, 2021.
5. Ecology of the Samarkand Regional Government. - Samarkand, 2022.
6. K. Niyazov. *Problems of land resource use in the Samarkand region* . – Tashkent, 2020.
7. Reports of Uzgidromet Samarkand region department. - Samarkand, 2021.
8. Reports of the Roads Committee of the Republic of Uzbekistan. – Tashkent, 2022.
9. Statistical data of JSC "Uzbekistan Railways". - Tashkent, 2021.
10. Official website of Samarkand International Airport and reports of the Ministry of Transport of the Republic of Uzbekistan. – Tashkent, 2022.
11. Information from the Department of Ecology, Environmental Protection and Climate Change of Samarkand Region. - Samarkand, 2024