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STATE OF WASTEWATER AT TEXTILE ENTERPRISES IN UZBEKISTAN

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Аннотация: *Статья посвящена анализу состояния сточных вод на текстильных предприятиях Узбекистана. Несмотря на быстрое развитие отрасли и увеличение числа производств, очистка сточных вод остаётся одним из наиболее проблемных экологических вопросов. Представлены данные о низком уровне безопасной очистки сточных вод в стране (около 32 %), примеры зафиксированных случаев загрязнения каналов красителями и химическими веществами, а также факторы, затрудняющие эффективное управление промышленными стоками.*

Abstract: *This article analyzes the state of wastewater in textile factories in Uzbekistan. Despite the industry's rapid development and the increasing number of production facilities, wastewater treatment remains one of the most challenging environmental issues. The article presents data on the low level of safe wastewater treatment in the country (approximately 32%), examples of documented cases of sewer contamination with dyes and chemicals, and factors hindering the effective management of industrial wastewater.*

The textile industry plays a key role in Uzbekistan's economy, providing hundreds of thousands of jobs, significant investment, and exports.

However, fabric production, dyeing, finishing, and other processes require intensive water consumption and inevitably generate significant volumes of wastewater—containing dyes, chemical reagents, surfactants, and other pollutants. If these waters are not properly treated, the consequences could be catastrophic for the environment, human health and the quality of water in rivers and canals.

The state of wastewater in textile enterprises in Uzbekistan: facts and figures.

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The scale of the textile industry.

- According to official statistics, the number of textile enterprises in Uzbekistan has grown significantly by 2025. A recent report states that 396 large enterprises worth approximately $3.5 billion have been commissioned over the past five years..
- According to estimates, the industry accounts for about 3% of the country's economy and 14% of industrial production.
- Employment: The industry provides jobs for hundreds of thousands of people (official statements say “over 500,000”).

These figures demonstrate that textiles are a large-scale industry producing large volumes of products, which logically means a significant volume of potential wastewater.

Real-World Pollution Cases: Problems in Practice

- In July 2025, foam was detected on the surface of the water in one of the canals of the Andijan region, the South Fergana Canal. Analysis showed that the wastewater from a textile factory contained nitrites, nitrates, alkalis, and dyes.
- The investigation established that SAMO (OOO Nil-Granite) was the culprit, whose local treatment system was either not working or was working partially. As a result, the company discharged untreated or partially treated wastewater directly into the canal.
- The environmental agency’s report noted that such discharges lead to the death of fish and the disappearance of aquatic fauna – “downstream from the discharge point there are no living creatures left, even the frogs have died.”
- In the capital, Bozsu Canal (Tashkent), colored wastewater has been repeatedly observed, coming, according to official data, from textile enterprises.
- Representatives of the water utility state that the existing municipal treatment facilities are designed only for domestic wastewater (houses, kitchens, baths), but not for industrial wastewater containing dyes and chemicals.

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These examples are far from isolated. They illustrate systemic problems: inadequate oversight, dysfunctional wastewater treatment systems at enterprises, economizing on environmental costs, and, as a result, water pollution..

How well is Uzbekistan treating wastewater:

- According to international assessments (including UNECE), only ~32% of household wastewater in Uzbekistan is safely treated.
- That is, the majority (≈ 68%) of household wastewater remains either untreated or insufficiently treated before discharge.
- It is important to note that municipal wastewater treatment plants in the capital and other cities are designed only for domestic wastewater (baths, kitchens, houses), and not for industrial wastewater containing dyes, chemicals, alkalis, etc.
- In the case of industry, according to the laws of Uzbekistan, each enterprise that discharges wastewater is required to have its own local treatment facilities.
- However, the implementation of these standards is incomplete: some enterprises either have not built such stations or do not operate them, often for cost reasons.

Technical and institutional problems

- As shown in a study by Tashkent State Technical University, the efficiency of wastewater treatment using modern technologies (for example, ion exchange units) for textile industry enterprises remains problematic.
- In some cases, enterprises either do not have on-site treatment facilities or refuse to operate them due to high costs. Under such conditions, industrial wastewater is discharged either directly into nature or into the city sewer system - which is unacceptable, especially in the presence of dyes and chemicals.
- In the current situation, the services responsible for municipal wastewater treatment systems cannot cope with the load without the help of industry treatment facilities: the biological treatment built into municipal stations is not designed for industrial wastewater.

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- Insufficient coverage of centralized sewerage and treatment systems - only a small percentage of businesses and settlements are connected to reliable systems: according to official data, in some areas there is no centralized network at all.

Facts of violations - examples from 2025

- In 2025, foam was detected on the surface of the South Fergana Canal (Anjana region), and laboratory analysis showed elevated levels of nitrites, nitrates, alkali, and dyes - all of which indicated the discharge of wastewater from a textile plant.
- Also in 2025, in the capital's Bozsu Canal (Tashkent/Tashkent region), textile factories were observed discharging dyed (colored) wastewater.
- Following this, a criminal case was opened against the water utility operator for pollution, which indicates official recognition of the seriousness of the problem.
- In connection with such cases, the authorities announced plans to move about 35 polluting textile enterprises from Tashkent to a specially built industrial complex - a measure aimed at reducing the load on the city's wastewater treatment systems.

New initiatives and plans to improve the situation

- In 2025, projects began for the construction of new treatment complexes in the areas of Tashkent and Andijan regions - with the participation of foreign companies and according to the public-private partnership model.
- One of the planned facilities: a complex designed to process 75,000 cubic meters of wastewater (including industrial waste).
- It is expected that modern facilities will allow water to be purified to standards acceptable for discharge or even reuse, and will also reduce the load on natural water bodies.
- At the same time, the question remains open: how quickly and completely will such volumes of cleaning cover all problem areas, especially near large textile clusters?.

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However, there are critical gaps and a lack of system statistics

- Despite the scale of the textile industry (thousands of enterprises), there are no publicly available official data showing the total volume of wastewater discharged by textile enterprises and the proportion of this water treated.
- The estimate "32% of household wastewater is well treated" provides only a general idea; industrial wastewater—especially critical—is often not highlighted in statistics.
- This significantly complicates the analysis: even with local treatment facilities, without regular monitoring, public reporting and control, there is no guarantee that the treatment is truly effective.
- Environmental monitoring, inspections and sanctions occur in individual cases, but there are no signs that the scope of these measures is systemic and covers all problematic enterprises.

What needs to be improved: recommendations for strengthening eco-control

To move the situation closer to a sustainable and environmentally friendly option, it is important:

1. Maintain regular public statistics: volume of wastewater discharge (by enterprise, region), percentage of purification, characteristics of wastewater (nitrates, alkalis, dyes, etc.).
2. Ensure full coverage of all enterprises, especially textile ones, with local treatment facilities and monitor their operation, with mandatory laboratory testing.
3. Develop and implement modern technologies for water purification and recycling (filtration, ion exchange, chemical/biological treatment, closed cycles).
4. Strengthen the system of penalties for the discharge of untreated wastewater, and also stimulate enterprises that invest in environmentally friendly technologies (benefits, subsidies).

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5. Integrate wastewater treatment into national sustainable development programmes, including international standards and cooperation (such as with UNECE).

Impact on the environment and society

- One of the recent serious effects is the mass death of living organisms in the canals: fish, frogs, aquatic invertebrates. The population living nearby reports that previously they could drink water from the canals and give water to animals; now this has become impossible.
- Pollution affects not only the ecosystem but also water resources used for irrigation, domestic purposes, and even as a source of drinking water in rural areas. After discharge, no fish or other aquatic organisms remain—this is a sign of serious toxicity of the effluent.
- Discharge of chemically contaminated water into the city's sewer system disrupts the operation of treatment facilities, threatening water quality, circulation, and, consequently, public health..

Government measures and prospects

- In 2023, new regulations were approved in Uzbekistan: enterprises are required to build and reconstruct local treatment facilities if they discharge wastewater.
- At the international cooperation level, UNECE (UNECE), with the support of Switzerland, launched a project aimed at improving the management of water and sanitation resources, including the safe handling of industrial waste.
- However, the implementation of these standards and projects faces challenges: the high cost of treatment facilities, weak oversight, irregular inspections, and inadequate monitoring. Scientific publications discuss the urgency of introducing more efficient treatment technologies, including ion exchange.
- In the long term, with reliable monitoring and investment, there is potential not only to minimize environmental damage, but also to introduce closed production cycles: purification, water recycling, and reduction of discharges.

Conclusions and recommendations

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The wastewater situation at textile factories in Uzbekistan is a systemic problem, combining technological, economic, and institutional complexities. Without proper treatment and monitoring, the environmental consequences become significant: water pollution, loss of flora and fauna, and threats to public health.

It is important that:

1. All textile industry enterprises strictly comply with wastewater treatment standards and have operational on-site treatment plants.

2. State and municipal authorities ensure regular monitoring, inspections, and transparent penalties for violations.

3. Modern treatment technologies are used—including ion exchange, sorption, and water reuse.

4. Legislation and regulatory bodies must be developed, taking into account international standards, recommendations, and partnerships with international organizations.

Otherwise, Uzbekistan risks facing deteriorating water quality, environmental degradation, and social problems.

Conclusion

Uzbekistan's textile industry is large and important, but its growth places significant strain on water resources and ecosystems: inadequate wastewater treatment makes pollution common.

Existing estimates (for example, that only ~32% of household wastewater is reliably treated) provide an indication of the overall level, but do not reflect the scale of industrial pollution—especially from textile factories. Actual cases of pollution (dyed runoff, chemical impurities, discharges into canals) have already been recorded in 2025, along with criminal cases and plans to relocate plants.

New projects to build treatment facilities are an important step forward. But without systematic public statistics, strict monitoring, and modern technologies, it is difficult to talk about the industry's environmentally friendly growth.

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