

SOIL MORPHOLOGY AND PLANT LIFE AROUND THE SHURTAN OIL AND GAS

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Abstract. This article studies the morphology of soils around the Shurtan oil and gas plant (Kashkadarya region), their changes under the influence of anthropogenic factors, and the state of vegetation cover. As a result of the analysis of soil sections, the main horizons, color, density, structure, and salinity levels of the soils were determined. The predominance of steppe and meadow species in the composition of the flora, the appearance of some anthropophytes and alien species introduced as a result of oil and gas activities were noted. The results of the study serve as an important scientific and practical basis for conducting environmental monitoring around industrial enterprises and developing bioremediation measures.

Keywords: soil morphology, Shurtan oil and gas plant, salinity, vegetation cover, environmental monitoring.

Introduction. In recent decades, the impact of large industrial enterprises on the environment has become one of the global environmental problems. In particular, the processes of oil and gas extraction and processing have resulted in the release of harmful substances into the atmosphere, soil and water. The Shurtan oil and gas plant in the Kashkadarya region is one of the largest industrial complexes in Uzbekistan, and its activities have a significant impact on the ecological systems of the region. The relevance of the study is that the morphological characteristics of soils around industrial enterprises change, the composition of plant cover is disrupted, and these processes pose a threat to the biodiversity of the region. Therefore, environmental monitoring of soil and plants around the plant is of great importance.

Methods. The study was conducted in 2024–2025 at 5 observation points around the Shurtan oil and gas plant:

Point 1 – the closest (500 m) part to the plant area;

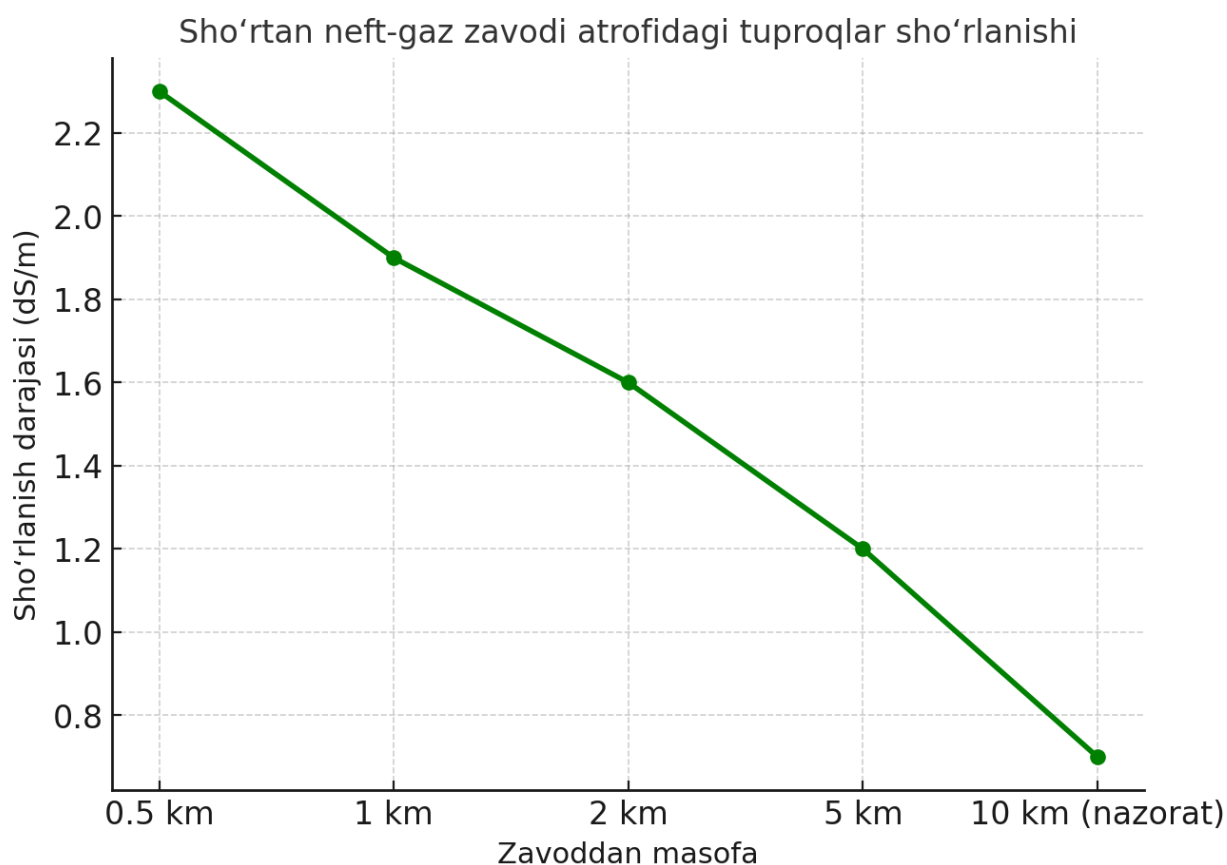
Point 2 – 1 km away;

Point 3 – 2 km away;

Point 4 – 5 km away;

Point 5 (control) – 10 km away, an area relatively free from industrial impact.

Soil analysis: Morphological description of horizons (color, moisture, density, structure). pH, salinity (EC), humus content. Concentration of heavy metals (Pb, Cd, Ni, Cu). Plant study: Geobotanical transect method (the number of plants and species composition were calculated in 1x1 m plots). Classification of plants into ecological groups (steppe-meadow, xerophyte, anthropophyte). Soil



morphology A darkening of the soil color and deterioration of structural separation were observed at points near the plant. Compaction and an increase in mechanical particles were noted in the 0–30 cm layer. The salinity level increased to 1.8–2.3

dS/m near the plant, and 0.7 dS/m at the control point. The concentration of heavy metals was as follows:

Pb – 18.6 mg/kg (1.5 times higher than the norm),

Cd – 1.2 mg/kg (close to the norm),

Ni – 32.1 mg/kg,

Cu – 20.5 mg/kg.

Flora

The total vegetation cover around the plant was 40–45%, and in the control area it was 60–65%.

Main species: *Artemisia diffusa* (sorrel grass), *Salsola arbuscula* (saxaul), *Poa bulbosa* (rhizome grass).

Under anthropogenic pressure, the emergence of weeds such as *Amaranthus retroflexus* and *Chenopodium album* has been noted in some areas.

A decrease in the species *Calligonum* and *Haloxylon*, which are typical of steppe ecosystems, has been observed.

Discussion. The results show that the soils around the Shurtan oil and gas plant show morphological changes and signs of chemical pollution. Soil salinization and high levels of heavy metals reduce soil fertility and cause degradation of plant cover. Although steppe and meadow species dominate the vegetation cover, the number of anthropophytes and weeds is increasing in areas with increased industrial impact. This has a negative impact on ecosystem stability. Compared with studies conducted in other areas (for example, around the Mubarak gas processing plant), similar environmental problems are observed in the Shurtan plant area.

Conclusion. Soils around the Shurtan oil and gas plant have undergone morphological and chemical changes, including compaction, salinization, and accumulation of heavy metals. Vegetation cover has become sparse under the influence of industry, and alien anthropogenic species have appeared. It is necessary to conduct regular environmental monitoring and introduce

bioremediation measures in the plant area. The creation of green areas and the restoration of local steppe and grassland species will ensure ecological stability.

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