

Revised and Improved Academic English Version

Work Performed under Task 2

Development of Technologies for Reducing Resource Consumption, Reusing Materials and Biomaterials, and Implementing Technologies that Improve Environmental Conditions to Achieve the Sustainable Development Goals (SDGs)

Research Aim and Objectives

The aim of the study is to develop and implement new biomaterials and resource-efficient technologies that reduce the consumption of natural resources and minimize the negative environmental impact of industrial and agricultural processes.

The specific objectives are:

- Collection and cataloguing of natural sorbents, including the determination of their physical and chemical properties.
- Investigation of the filtration and adsorption characteristics of these sorbents for the purification of water and air.
- Analysis of the primary sources of pollution of atmospheric air and water bodies.

Research Objects

Natural sorbents (in particular, diatomites, opokas, and other natural materials) from three different regions of Kazakhstan, as well as water and soil samples from the Atyrau Region.

Research Methods

- Monitoring of atmospheric air, water bodies, and soil contamination using modern analytical methods.
- Collection and cataloguing of 40 samples of natural sorbents from three regions of Kazakhstan.

Key Scientific Results Obtained in 2025

1. Collection and cataloguing of 40 samples of natural sorbents from three regions of Kazakhstan were completed.
2. Geological sites with promising reserves of diatomites and opokas were identified.
3. Work commenced on the establishment of an Ecology and Resource Conservation Laboratory at the Department of Ecology.
4. A monograph was prepared, and materials were collected for scientific publications and conference presentations.

Significance of the Research

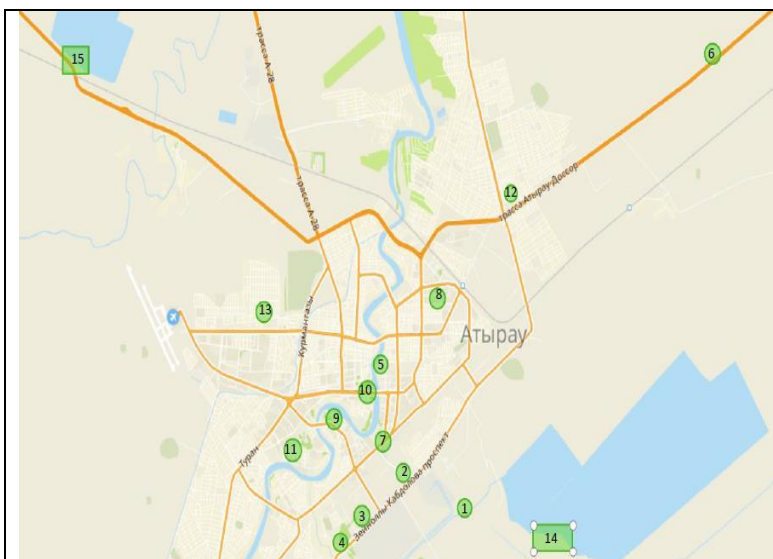
The results of the study hold considerable scientific and practical value for sustainable development and environmental protection in the Atyrau Region and beyond. The development and implementation of new biomaterials and resource-efficient technologies will enable a significant reduction in natural resource consumption and a decrease in the ecological footprint of industrial and agricultural activities.

Human Resources

One PhD doctoral student was involved in the project.

Scope of Application

Industrial enterprises and agricultural organizations.



Map of air and soil sampling points for hydrogen sulfide content



Collection of natural sorbent - opochka in Aktau village, West Kazakhstan region, on September 17, 2025.



Collection of natural sorbents - inderite and inyoite, Lake Inder, Inder District, Atyrau Region., September 18, 2025



Collection of natural sorbent - diatomite in the Mugadzhar district of the Aktobe region, Zhalpak hill, on October 25, 2025.