Brief information about the project

Name of the project	ИРН «Assessment of degradation processes of irrigated lands of Turkestan oblast for sustainable land use» (AP23490857)
Relevance	Salinization is one of the main degradation processes that determine the ecological state of lands. Soil salinization may not be as destructive as earthquakes or large-scale landslides, but it leads to serious environmental consequences, such as increased impacts on crop yields and agricultural production. In Central Asian countries, annual losses from land salinization alone amount to $2 billion. In recent years, due to the rapid increase in the level of salinity of the soil cover and groundwater in the irrigated lands of Central Asia, about 50% of irrigated lands have been salinized. In particular, 33% of irrigated lands in Kazakhstan, 11.5% in Kyrgyzstan, 16% in Tajikistan, 95.9% in Turkmenistan and 50.1% in Uzbekistan are subject to salinization. Secondary salinization is an important problem of land use in the Turkestan region. The reason for the widespread development of secondary salinization in the irrigated lands of Central Asia is the hydromorphic irrigation regime, against the background of high salinity of soil-forming rocks, as well as the arid climate, which promotes the evaporative concentration of salts in hydromorphic conditions. Currently, the issue of the impact of climate change on the process of salt accumulation is widely discussed in the world.
Purpose	Assessment of the processes of degradation of irrigated lands for sustainable land use in rural areas of the Turkestan region, timely prevention and elimination of the consequences of negative processes and rationalization of land use.
Objectives	- Analysis of methodological approaches for assessing the processes of degradation of irrigated lands, creation of an information and analytical database of irrigated lands of the Turkestan region. - Development of criteria for assessing the processes of degradation of irrigated lands, calculation of vegetation and salinity indices, monitoring of the reclamation status of irrigated lands using remote sensing data and development of a series of maps on the degradation of irrigated lands. - Integrated assessment of land degradation and development of recommendations for the restoration of degraded lands.
Expected and achieved results	- Previous studies on the evaluation of irrigated land degradation processes are analyzed. An information base will be formed, which will include modern and archival remote sensing data and cartographic materials, which will make it possible to assess the current state of salinity and

	its changes during the research period. Field research is carried out, in particular, hydrogeological observations, taking water samples for chemical analysis of the level of groundwater and the degree of their salinity, monitoring the salinity regime of the soil layer in irrigated areas. An information and analytical database will be created on irrigated lands of the Turkestan region. - Criteria for assessing the processes of degradation of irrigated land are developed and vegetation and salinity indices are calculated. Based on remote sensing data, monitoring of the reclamation state of irrigated land is carried out, on this basis a series of maps regarding the degradation of irrigated land is drawn up. In addition, maps are drawn up based on the results of field research on the level, mineralization and chemical composition of groundwater in irrigated lands. Based on indicators of the level of groundwater, the degree of mineralization and remote sensing data, maps of the level of salinity of soil cover in irrigated areas are developed. In addition, a final map is drawn up that assesses the intensity of the degradation processes of irrigated areas in the study area. - The dynamics of crop production in the irrigated areas of the Turkestan region is evaluated and the degree of degradation of irrigated land is determined. A comprehensive assessment of the degradation of the Earth is carried out using remote sensing data. Also, losses from the degradation of irrigated land in the research area will be assessed and proposals will be developed to restore degraded irrigated land in the Turkestan region.
Research team members with their identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and links to relevant profiles	1. Tokbergenova Aigul Abdugapparovna. - Leading Researcher, Project manager, PhD, Head of the Department of Geography, Land Management and Cadastre. h-index – 3; Scopus: 57202334262; https://orcid.org/0000-0002-1934-5063 2.Kanat Bazarbaevich Zulpykharov, Senior Researcher, PhD candidate, h-index – 2; Scopus: 58055198400; https://orcid.org/0000-0002-0275-2463 3. Omirzhan Taukebaev, Senior Researcher, PhD candidate, h-index – 3; Scopus: 57347268200; https://orcid.org/0000-0002-7959-1434 4. Zhasulan Maratovich Smanov is a junior researcher, PhD candidate in Geography. h-index – 7; Scopus: 57211743539 https://orcid.org/0000-0002-8182-3978 5. Turymtaev Zhanarys Bakytzhanovich - intern researcher, Master's degree in Geography. 6. Kalieva Damira Medetovna.- MNS, PhD doctoral student in the specialty "Land Management",
Использование	Ministry of Agriculture of the Republic of Kazakhstan, local authorities, farmers/peasant farms and scientific organizations.
Приоритет в сравнении с реальными аналогами	The fundamental difference between the project idea and existing analogues lies in the applied basis of the research.

	The assessment of land degradation processes will be consistent with the strategy of adaptive land use for the organization of sustainable agricultural development in the Turkestan region. As a result of the study, a comprehensive solution will be obtained for the assessment and monitoring of irrigated lands in the context of climate change and anthropogenic activities based on field research and remote sensing data.;
List of publications with links to them	Publications are currently being prepared.
Patents	It is planned to obtain a patent from the Kazakhstan Patent Office in 2026.
!!! Along with the completed form, please attach to email relevant photographs and video materials that can be used to visualize and present the project on the web page.	

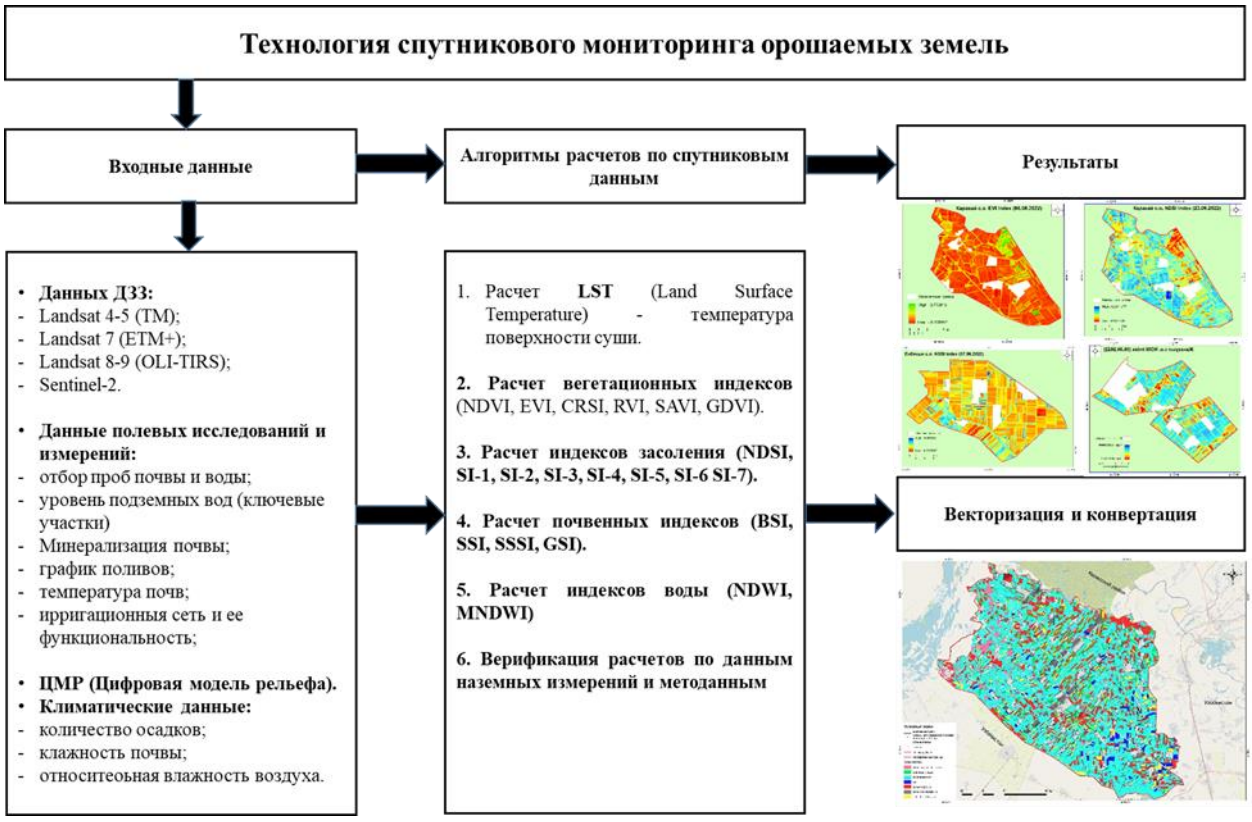

Figure 1. Methodology for assessing and mapping degradation processes in irrigated lands based on remote sensing technology