Brief information about the project

Name of the project	BR18574227 «Scientific and applied justification management of NAS to prevent desertification processes in southern Kazakhstan, to ensure the SD rural areas» (0123PK00024)
Relevance	Desertification is a global issue that has a significant impact on the sustainable development of regions, the biodiversity and ecological security of their ecosystems, and has a negative effect on regional development. These occurrences generate intricate socioeconomic stability issues, including poverty-related issues.
	Numerous, complicated, and country-specific, the causes of land degradation are often related with the misuse and overexploitation of natural resources, such as incorrect and unsustainable farming methods, overgrazing of pastures, deforestation, forest degradation, and natural disasters.
	In Central Asian nations, as in the rest of the world, desertification, land degradation, and drought (DLDD) are not only significant environmental but also socioeconomic issues.
	Unfortunately, the lack of scientifically-based regulations, recommendations, and steps to avoid the development of desertification processes exacerbates the process of land degradation in the natural and agricultural systems of the republic's southern region.
	The examination of the issue revealed the necessity to strengthen the land management system in order to alleviate poverty and create sustainable national development. In places afflicted by desertification, the reduction of rural poverty is the first concern. (Strategic measures to prevent desertification through 2025 in the Republic of Kazakhstan. Astana, 2015 - 336 p.).
	Overloaded pastures are a severe problem in most rural settlements in the south due to a growth in individual farming and agricultural cattle. This degrades the environment and pastures around settlements.
	The region's landscapes are predisposed to desertification, which has accelerated in recent years due to climate change and increasing human pressure. For a substantial portion of Kazakhstan's population, natural pastures of arid ecosystems serve as the foundation for animal husbandry, biodiversity, and the natural environment.
	The solution to these difficulties is to build a scientific and applied justification for sustainable management of natural and agricultural systems to prevent desertification in the south of Kazakhstan, providing economic growth, food security, and a high standard of living for the population.
Purpose	To develop a scientific and applied justification for sustainable management of natural and agricultural systems (NAS) to prevent the development of

	desertification processes in the southern regions of Kazakhstan, which allows ensuring economic development, food security and a high standard of living of the population.
Objectives	–To develop scientific and methodological foundations of management, assessment and thematic multi-scale mapping of natural and agricultural systems subject to desertification; –Create informational-analytical database; –To determine the main parameters for assessing the risk of desertification in natural and agricultural systems; –To develop criteria, indicators, evaluation of degradation of agricultural and rangeland use; –To conduct field studies of the state of natural and agricultural systems of agricultural and pasture use; –To perform monitoring observations of the desertification processes development in natural and agricultural systems; –To develop and create an information-analytical database on blocks: natural, agricultural, environmental; –To develop and create a modern landscapes map for the development of a series of applied assessment maps of special content to combat desertification. –To conduct inventory and evaluation mapping of the development of desertification processes in natural and agricultural systems based on RS and monitoring observations; –To conduct field studies of natural and agricultural systems, monitoring observations on key areas of NAS for the development of desertification processes; –Develop and create multi-scale assessment and application maps: 1)agricultural development of natural complexes; 2)manifestations of desertification processes in natural and agricultural systems of pasture and agricultural use; 3)resistance of natural complexes to agricultural impact; 4)degree of degradation of natural and agricultural systems; 5)functional zoning of NAS subject to desertification; –Conduct an assessment: 1)productivity of natural and agricultural systems of agricultural and pasture use; 2)dynamics of desertification processes in natural and agricultural systems; 3)landscape and ecological state of natural and agricultural systems. –To develop a sustainable management system of natural and agricultural systems for preventing the development of desertification processes; –Conduct a survey of farms on the use of soil-water-saving technologies;

	–To develop and create a database on technologies that prevent the development of desertification in natural and agricultural systems; –To develop scientifically-based requirements, recommendations and measures to prevent the development of desertification processes in natural and agricultural systems; –To evaluate the effectiveness of the developed recommendations and measures to prevent the development of desertification processes in natural and agricultural systems; –Create a schema of the organization of agricultural environmental management; –To develop environmental protection measures maps to prevent the development of desertification processes in natural and agricultural systems; –To develop and create a Web-application for sustainable management of agricultural and pasture use; –To conduct seminars, training in agricultural formations on measures to prevent desertification, popularize soil-water-saving technologies and introduction of scientific results of the Program.
Expected and achieved results	Expected results - for 2023: development of scientific and methodological foundations for management, assessment and thematic multi-scale mapping of NAS susceptible to desertification; creation of an information database; determination of parameters for assessing the risk of desertification; development of criteria, indicators, and assessment indicators of PSS degradation; development of an information database on natural, agricultural and environmental blocks; development of a map of modern landscapes; carrying out inventory and assessment mapping of the development of desertification processes based on remote sensing and monitoring observations; conducting field research and monitoring observations; development of multi-scale thematic maps. - for 2024: assessment of productivity, dynamics of development of desertification processes, landscape and ecological state of the NAS; development of a sustainable management system for NAS; conducting a survey of farms on the use of soil and water conservation technologies; development of a database on technologies that prevent the development of desertification in the NAS; development of a set of scientifically based requirements, recommendations, measures and assessment of their effectiveness; creation of a flowchart for organizing agricultural environmental management; development of maps of environmental measures to prevent the development of desertification processes and creation of a Web application for the sustainable management of NAS;

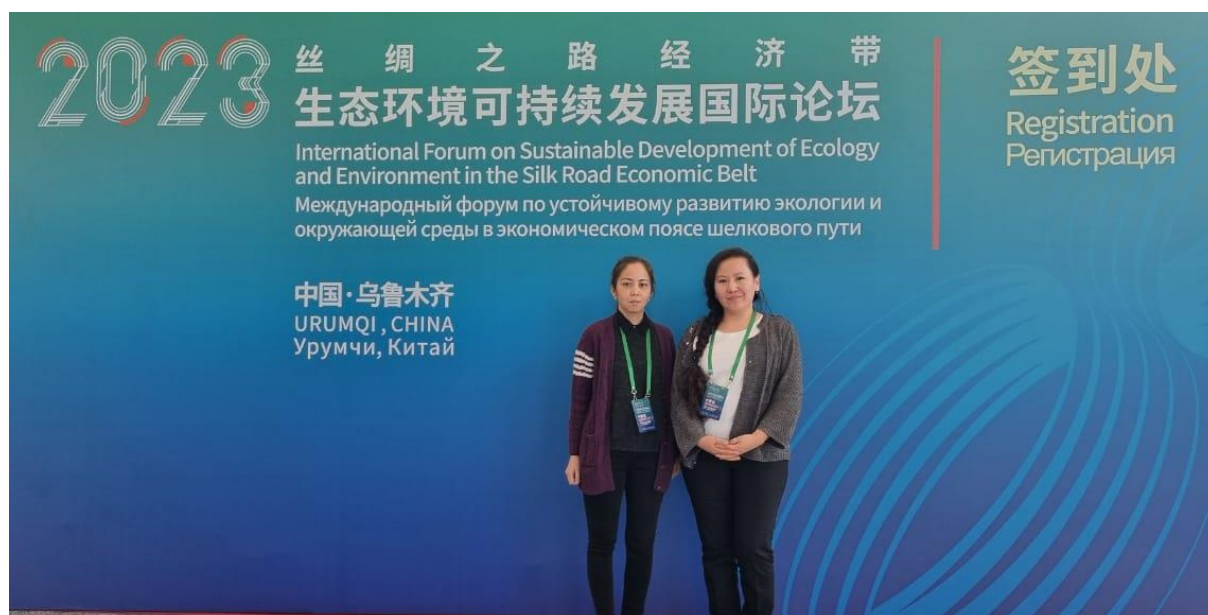|	
	conducting seminars in agricultural enterprises on the scientific results of the Program.
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List of publications with links to them	**Articles in journals preferred byCQAFSHE RK:** 1. А.А. Токбергенова, Д.М. Калиев, Қ.Б. Зулпыхаров, С.Б. Бисенбаева, О.Ж. Таукебаев. Оценка плодородия почв сельскохозяйственных угодий в Алматинской области с использованием ГИС технологий // Вестник КазНУ, Серия Географическая. - 2023. - №2 (69). – С.34-48. https://doi.org/10.26577/JGEM.2023.v69.i2.04 2. Токбергенова А. А., Зулпыхаров К.Б., Таукебаев О.Ж., Эсанбеков М. Ю., Қалиева Д. М., Әлшериева Д.Е., Дуанбекова А.Е., Анализ проблем засоления

	почвы на орошаемых землях Туркестанской области (на примере Мырзашольского орошаемого массива) // Вестник науки Казахского агротехнического исследовательского университета им. С. Сейфуллина (междисциплинарный). – 2023. - №1 (116). – Б.120 – 137. https://doi.org/10.51452/kazatu.2023.1(116).1314
	3. Zh.A. Zhanabaeva, K.T. Narbaeva, A.K. Musina, A.E. Aldiyarova, O.Zh. Taukebayev Assessment of changes and use of water resources in the Syrdarya river. The scientific journal «Ізденістер, нәтижелер - Research, results» of the Kazakh National Agrarian Research University. №4, December, 2023 https://doi.org/10.37884/4-2023/21
Patents	-

КАРТА ТЕМПОВ ОПУСТЫНИВАНИЯ ПРИРОДНО-СЕЛЬСКО ХОЗЯЙСТВЕННЫХ СИСТЕМ ЮЖНОГО РЕГИОНА

Темпы опустынивания:
Очень высокий Средний Очень низкий
Высокий Низкий

Certificate of authorship

Forums and conferences

Bisenbaeva S. At the forum "First Announcement of International Forum on Sustainable Development of Ecology and Environment in the Silk Road Economic Belt", Urumqi, China

Meeting with Professor Nodir Dzhanibekov and colleagues of the Institute of Agrarian Development in Countries with Transition Economies. Leibniz Department of General Conditions for the Development of the Agricultural Sector and Agricultural Policy Analysis (IAMO) in Halle (Saale), Germany
Tokbergenova A., Asylbekova A., Zulpykharov K., Ryskeldieva A., Kudaibergenov M.

Taukebaev O. with Professor Eugene Levin and Todd Gary - Director of the Center for External Research Development Partnership, Meharry School of Applied Computational Sciences, USA

Meeting with Professor Gerd Schmidt from the Leibniz Institute for Agricultural Development in Transition Economies (IAMO) in Halle (Saale), Germany
Tokbergenova A., Ryskeldieva A., Taukebaev O.

Field Work