

Brief information about the project BR22886730 "Formation of the agricultural spatial data infrastructure of the Republic of Kazakhstan on technologies and principles 2.0".

Head - Alipbeki O.A.

Title	"Formation of the agricultural spatial data infrastructure of the Republic of Kazakhstan on technologies and principles 2.0.". IRN: BR22886730
Relevance	The relevance of the tasks solved as a result of the research for socio-economic development on the scale of the Republic of Kazakhstan (RK), specified in state strategic and program documents, is dictated by the interdisciplinary nature of the research conducted. The results of scientific and technological programs fully correspond to the strategic goals of socio-economic development of the country's agro-industrial complex (AIC) and the world, as specified in state and interstate program documents. The research vector is aimed at the sustainable development of the entire agro-food sector, as an integral part of sustainable land use in Kazakhstan and globally.
Goal	Formation of an agricultural spatial data infrastructure based (AgroSDI) on the principles and technologies of 2.0 as a branch component of the National SDI of RK for a comprehensive assessment of the activities of the AIC and the development of rural areas (RA).
Tasks	1. Formation of the basic AgroSDI of RK based on the principles and technologies of 2.0. 2. Development of methods for land use classification using modern algorithms and cloud computing as a function of the AgroSDI 2.0 of RK. 3. Development of methodological approaches for the integrated assessment of the economic, social and environmental policies of the state for the development of the AIC and RA as a function of the AgroSDI 2.0.
Expected and Achieved Results	Formation of the basic AgroSDI of RK on the principles and technologies 2.0; Development of methods for land use classification using modern algorithms and cloud computing as a function of AgroSDI 2.0 of RK; Development of methodological approaches for the integrated assessment of the state's economic, social and environmental policies for the development of the AIC and RA as a function of the AgroSDI 2.0 of RK. That is, the expected results of the Scientific technical Program are focused on the maximum use of the achievements of IT, Data Science and Geo and Science. As part of the program, spatial data were collected and the SDI 2.0 was formed for the pilot Kegen district of the Zhetysu oblast. Archived Earth remote sensing data for the period 1999–2023, obtained from five different space platforms, were compiled. A comprehensive study of Land use and Land cover (LULC) classification algorithms is conducted: six Parametric, seven Machine learning (ML) and nine Deep learning (DL) methods.

	Empirical, ML, and DL approaches to the integrated assessment of the economic, social and environmental policies of the state in the development of the AIC and RA based on spatio-temporal and Big Data within the framework of AgroSDI 2.0 of RK have been studied.		
Names and Surnames of Research Group Members with Their Identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and Links to Corresponding Profiles	Name/Surname	Scopus ID	ORCID
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Publications list with links to them	In 2024–2025, four scientific articles were published in peer-reviewed international scientific journals indexed in the Web of Science and Scopus databases, confirming the high degree of reliability and scientific novelty of the results obtained. 1. Alipbeki, O.; Alipbekova, C.;Mussaif, G.; Grossul, P.; Zhenshan, D.;Muzyka, O.; Turekeldiyeva, R.; Yelubayev, D.; Rakhimov, D.; Kupidura, P.; et al. Analysis and Prediction of Land Use/Land Cover Changes in Korgalzhyn District, Kazakhstan/Agronomy 2024, 14, 268. https://doi.org/10.3390/agronomy14020268 (Q1). 2. Alipbeki O., Grossul P., Rakhimov D., Aliken E., Augambayev K., Alipbekova C., Begaliyeva M., Ravshanov A. Spatiotemporal analysis and identifying the driving forces of land use change in the Abay district (Karagandy Region, Kazakhstan) (Conference Paper). 6th Annual International Scientific Conference on Geoinformatics, GI 2024; Virtual, Tashkent; Uzbekistan; 19-20 November 2024; Code 204951. E3S Web of Conferences Volume 590, Article number 04007. GI 2024. https://doi.org/10.1051/e3sconf/202459004007 (Q3). 3. Alipbeki O., Grossul P., Rakhimov D., Kupidura P., Alipbekova C., Musaif G., Turekeldiyeva R., Augambaev K., Begaliyeva M. Ecosystem Health Assessment of the Zerendy District, Kazakhstan. Sustainability, 2025, 17, 277. https://doi.org/10.3390/su17010277 (Q1). 4. Darima Zhenskhan, Onggarbek Alipbeki, Song Soo Lim, Jumi Song, Aida Balkibayeva, Anar Nukesheva, Raushan Mussina, Gauhar Mussaif. Exploring latent dimensions of in situ urbanization in northern rural Kazakhstan through structural equation modeling. Asia-Pacific Journal of Regional Science, 2025 https://doi.org/10.1007/s41685-025-00376-8 (Q2).		
Patent information	An application for a patent of the Republic of Kazakhstan has been filed: “Bidai onimderinin “sabaq taty” auruy emdeu”, the authors are Alipbeki Onggarbek Alipbekuly, Oryngozhin Ernaz Sovetuly, Alipbekova Chaimgul Abusagatovna. The application is under consideration by the National Institute of Intellectual Property under the Ministry of Justice of the Republic of Kazakhstan.		

