Brief information about the project

Name of the project	AP09259457 «The study of microorganisms producing biosurfactants and their applicability for enhanced oil recovery»
Relevance	The project is aimed at studying the anatomical and morphological features of perennial wheat plants, characteristics of growth and development, formation of yield and quality in various agro-ecological conditions in South and South-East of Kazakhstan. Fundamentally new approaches increase productivity and conserve the fertility of arable land will be implemented introducing perennial wheat into farming practice in South and South-East of Kazakhstan within the project. The main elements of agricultural technology for cultivation of perennial wheat for grain and fodder, features of growth and development, formation of the yield and the quality of perennial wheat for commercial and cover sowing will be studied based on the establishment and carrying out of field experiments in three agro-ecological zones of South-East of Kazakhstan. An agroecological assessment of the effectiveness of farming of perennial wheat in the management of the phytosanitary state of crops, conservation of soil fertility and environmental protection are given. Research on the biology of growth and development of perennial wheat, the development of effective methods of its cultivation in relation to various agroecological zones is an actual and promising direction of agriculture in the South and South-East of Kazakhstan.
Purpose	The goal of the project is to develop an agrobiological basis for the introduction of perennial wheat to farming practice in South and South-East of Kazakhstan in order to increase on productivity of arable land, reduce the level of greenhouse gas emissions, conserve soil fertility and protect the environment.
Objectives	1.To study the features of the growth and development of perennial wheat in various agroecological zones of the south and southeast of Kazakhstan 2. To investigate the anatomical and morphological features of perennial wheat plants 3. To develop the optimal terms, methods and norms for sowing perennial wheat 4. To reveal changes in agrophysical, agrochemical properties of soils and study the sequestration of carbon in the soil under crops of perennial wheat 5. To study the carbon sequestration in soil and determine the level of greenhouse gas emissions from crops of perennial wheat 6. To analyze the microbiological activity of soil under crops of perennial wheat 7. To study the features of the formation of the crop and the quality of grain of perennial wheat.
Expected and achieved results	The developed basic elements of agricultural technology for the cultivation of perennial wheat will be used by small and medium-sized farmers in the South and South-East of Kazakhstan to increase the productivity of arable land, preserve soil fertility and create a feed base; The use of perennial wheat as a cover crop under irrigation conditions will be used by farmers for efficient use of

	irrigation water, obtaining two harvests per unit area; The effectiveness of perennial wheat in accumulating organic matter, preserving the agrophysical and agrochemical properties of the soil, reducing the level of greenhouse gas emissions will be used in the field of ecology to preserve soil fertility and protect the environment. The results obtained can be the basis for the development of the scientific direction: - biology of perennial wheat culture in Kazakhstan - development of the nature protection system of agriculture in the South and South-East of Kazakhstan - selection and seed production of perennial grain crops in Kazakhstan 3) applicability and (or) the possibility of commercializing the obtained scientific results; Based on the results obtained, a method for cultivating perennial wheat suitable for commercialization will be developed 4) social, economic, environmental, scientific and technical, multiplicative and (or) other effect of the project results with justification; Introduction of perennial wheat in the farms of Almaty, Zhambyl and Turkestan regions to ensure the achievement of the following indicators of socio-economic and environmental efficiency: - increase in the yield of feed units from 1 ha of crops by 1.7-2 times; - reduction of crop contamination by 40-50%; - reduction of irrigation water consumption by 30-40%; - elimination of irrigation soil erosion; - reduction of water consumption per unit area by 1.5-2 times; - reducing the seeding rate tenfold; - maintaining the agrophysical properties of the soil at the initial level; - reduction of greenhouse gas emissions per unit area by 30-40%; - reducing the cost of cultivation by five times; The development of degraded land withdrawn from agricultural circulation on an area of 100 thousand hectares through the cultivation of perennial wheat should be provided additionally: - production of 100 thousand tons of grain; - production of 300 thousand tons of hay;
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List of publications with links to them	1.Kurmanbayeva, M., Kusmangazinov, A., Makhatov, Z., Karabalayeva, D., Yerezhepova, N., & Murzabayev, B. Positive Effects of Perennial Wheat on Soil Fertility, Carbon Stocks and Microbial Biomass in South-Eastern Kazakhstan. Polish Journal of Environmental Studies, 2024, 33(2), 1791–1799. https://www.scopus.com/authid/detail.uri?authorId=58614703300 2. Kurmanbayeva, M., Rašeta, M., Sarsenbek, B., Kusmangazinov, A., Zhumagul, M., Karabalayeva, D., ... & Toishimanov, M. (2024). Comparison of fatty acids and amino acids profiles of the selected perennial and annual wheat varieties from Kazakhstan. Natural Product Research, 1-6. https://www.scopus.com/authid/detail.uri?authorId=58614703300 3. Kurmanbayeva, M., Sarsenbek, B., Kusmangazinov, A., Karabalayeva, D., Yerezhepova, N. Evaluating Perennial Wheat as a Strategy for Biodiversity Conservation and Soil Fertility Improvement in Kazakhstan, International Journal of Design and Nature and Ecodynamics, 2023, 18(6), 1363–1369, https://www.scopus.com/authid/detail.uri?authorId=58614703300 4. Kurmanbayeva, M., Makhatov, Z., Kusmangazinov, A., Karabalayeva, D., & Yerezhepova, N. (2023). Protein, Amino Acid and Carbohydrate Content of Fungal Treated Annual and Perennial Wheat Straw. Journal of Ecological Engineering, 24(12). https://www.scopus.com/authid/detail.uri?authorId=58614703300
Patents	Patents for utility model № 7364, A method for creating herbal agroecocenoses in a changing climate, Kurmanbayeva Meruert Sakenovna, Ospanbaev Zhumagali Ospanbaevich, Inelova Zarina Arkenzhanovna, Kusmangaziev Adil Bolatuly, Sarkytbayeva Aisulu Karimkazhievna, Sarsenbek Bekbolat Nurlanuly