Brief information about the project

Name of the project	AP19579270 «Cartographic modeling and forecasting of pasture productivity in Central Kazakhstan based on remote sensing data for sustainable livestock development»
Relevance	The loss of balance between livestock and pasture resources has a negative impact on the condition and productivity of pastures, the yield of livestock products and their quality. Pasture lands transferred to a long-term lease are used irrationally. The main reason for this is the lack of a scientifically sound organization of pasture landscapes, which should consider the typology of pastures, the possibility of their rational use, taking into account the optimal load on pasture lands. To solve the problems of pasture shortage, experts propose to put pasture lands from the reserve land of the republic into circulation, expand the area under forage crops in compliance with crop rotation, restore work on the creation of cultural pastures, etc. In this direction, it would be effective to rely on scientific research on cartographic modeling of pasture productivity to determine the direction of trends and the values of proportionality coefficients, which make it possible to identify areas where the productivity of natural zonal vegetation has increased or decreased over the past 30 years using remote sensing data. The application of the research results in practice will make it possible to predict the productivity of pastures in various administrative districts and landscapes of the region, which will make it possible to correctly regulate the loads on pastures.
Purpose	Cartographic modeling of the productivity of pasture landscapes of Central Kazakhstan based on remote sensing data for the sustainable development of livestock in the region, development of recommendations for improving the quality of pasture lands, determination of the dynamics of changes in pasture productivity over the past 30 years and forecasting their use.
Objectives	- analysis of existing theoretical and methodological approaches and methods of cartographic modeling of pasture productivity; - to determine the main agro-climatic features of the studied region and to characterize the dynamics of changes in the area of pasture lands over the past 30 years on the basis of long-term climatic indicators and remote monitoring data; - grouping of pasture lands by administrative districts with different average annual values of the vegetation index using

	NDVI over the past 30 years and determining the productivity of pastures in dynamics; - to study the spatial heterogeneity of pasture lands, to make an inventory of pastures with the definition of pasture boundaries based on satellite imagery materials with verification of ground-based research and to create a database on pasture productivity using GIS technologies; - geobotanical mapping of pastures, studying the degree of degradation of pastures and determining the patterns of changes in productivity of pasture landscapes of Central Kazakhstan, taking into account long-term climatic indicators based on remote sensing data; - to develop large-scale forecast and recommendation maps on productivity and forecasting the use of pasture landscapes of Central Kazakhstan by administrative districts and landscape units using GIS technologies and remote sensing data; - development of an algorithm for cartographic modeling and forecasting of pasture lands based on remote sensing data; - forecasting and cartographic modeling of the productivity of pasture lands in Central Kazakhstan; -development of a set of recommended measures to restore pasture productivity and improve the quality of pasture lands in order to conduct sustainable livestock farming in the face of climate change based on remote sensing data and ground-based monitoring systems; - based on the obtained 3-year results, to develop a Geoportal "Pastures of Central Kazakhstan" with interactive thematic maps on forecasting productivity and sustainable use of pasture landscapes of the region
Expected and achieved results	The impact of the results on the level of scientific research lies in the fact that the results of this project will contribute to solving applied problems in the field of obtaining scientific knowledge on cartographic modeling and forecasting the productivity of pasture landscapes in conditions of climate change using remote sensing data. The expected social effect is to develop a set of recommended measures to restore pasture productivity and improve the quality of pasture lands in order to conduct sustainable livestock farming, which enable local farmers and rural populations to effectively use the pasture lands of the region. These measures contribute to overcoming poverty in

	rural areas and improving conditions for the development of animal husbandry in Central Kazakhstan. The expected economic effect after the implementation of the project activities leads to the rational use of the pasture landscapes of the region and makes it possible to increase livestock production. The developed Geoportal "Pastures of Central Kazakhstan" makes it possible to provide information to agricultural formations, local executive bodies; simplify the exchange of scientific information on the productivity of pasture landshafts between government agencies and other interested organizations.
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