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GEOINFORMATION MODEL OF TERRITORIAL ORGANIZATION OF LANDS OF EROSION AGRICULTURAL LANDSCAPE (ON THE EXAMPLE OF THE AGROINDUSTRIAL COMPLEX "ZHDANOVICHI")

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ABSTRACT

Keywords: RUSLE MODEL, GEOGRAPHIC INFORMATION SYSTEM (GIS), SOIL EROSION, ZHDANOVICHI AGRO-INDUSTRIAL COMPLEX, AGRICULTURAL LANDSCAPE, EROSION FACTOR EXTRACTION, SPATIAL MODELING.

Soil erosion is a major environmental problem affecting agricultural productivity and land sustainability and is prevalent in several regions, including Belarus. This research selected the "Zhdanovichi" agro-industrial complex in Belarus as a typical region to study the spatial characteristics of erosion-prone land. The goal of this research is to construct a geoinformation model that can describe and analyze the spatial structure of erosion-affected agricultural landscapes.

This study proposes an improved application of the RUSLE model by incorporating region-specific data from Belarus, including detailed information on soil types, topography, rainfall, and land use, to enhance its suitability for local agricultural landscapes. A customized RUSLE model was built and applied to the "Zhdanovichi" agro-industrial complex using ArcGIS Pro. Five key factors—cover management (C), soil erodibility (K), rainfall erosivity (R), topography (LS), and support practices (P)—were extracted based on local conditions. Specifically, the C factor was assigned from land use data; the K factor was derived from soil type and literature values; the R factor was calculated using rainfall records; the LS factor was based on slope and flow accumulation obtained from a digital elevation model created with scattered elevation points; and the P factor was adjusted according to slope classes and land use. All factors were standardized and rasterized to ensure consistency in spatial modeling.

These factors were multiplied pixel by pixel using raster calculation to produce a soil loss distribution map of the study area. The results show clear spatial differences in erosion intensity. Based on standard classification criteria, soil erosion levels were defined, and key risk areas were identified. These outcomes provide a data basis and method reference for land use planning and ecological protection.

The GIS-RUSLE analysis process constructed in this study proves to be applicable and general for small and medium-scale agricultural areas. It demonstrates practical value in soil erosion simulation and risk assessment within agricultural landscapes.