

Summary of the doctoral dissertation

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The use of erosive indicators of soil degradation to shape the optimal structure of agricultural land on the example of the Bystrzyca Dusznicka catchment area

The aim of the study was to assess environmental-climatic factors in the context of surface water erosion of soils in the studied catchment area of the Bystrzyca Dusznicka, and on this basis to develop universal principles of sustainable soil use in mountain areas. The subject of the study was an agriculturally used mountain catchment with an area of 200 km² located in the Eastern Sudety Mountains and drained by the left tributary of the Nysa Klodzka River - the Bystrzyca Dusznicka.

The study applied the Universal Soil Loss Equation (RUSLE), modified for Polish conditions. This equation was implemented in the form of an algorithm into the GIS (Geographic Information System) software, using natural-climatic data obtained from the database cartographic resources and meteorological data of the IMGW.

In addition, 6 soil interception installations were made on 2 selected arable land slopes and 1 installation on a grassland slope. The captured soil material and leachate were subjected to chemical analysis.

The work also included calculations of fertilizer nutrient cycling on the surface of all arable land in the catchment with the Macrobil model using National Census data and mapping data.

The results of the intercepted mass of eroded soil were statistically analyzed using Pearman's linear correlation method, taking into account slope, soil grain size and rainfall. In addition, the results of the soil losses calculated in the model were averaged for each parcel of arable land of the catchment area and then statistical analysis of the erosive factors that are components of the RUSLE equation was carried out using Pearman's linear correlation method.

As a result of model calculations, the most endangered plots of arable land were indicated, in cartographic form, and on the basis of statistical analysis of soil samples measured in the field, the most appropriate method of anti-erosion reclamation measures on the arable land of the study catchment was determined.

keywords: *soil erosion, RUSLE model, GIS, anti-erosion land reclamation.*