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**Impact of agricultural use on selected soil properties in the buffer zone of the
Magura National Park.**

ABSTRACT

Recognition of a soil cover, its genesis and properties of taxonomic units, is particularly important during assessment of natural resources of an environment and its protection.

Magurski National Park (MNP) occupies mainly upper, spring part of Wisłoka river catchment and covers almost 20 000 ha area. In addition, MNP has a buffer zone of 22 987 ha area, the purpose of which is protection against hazardous influences of outer factors.

The paper was aimed at determining the impact of agricultural performance and fallowing the MNP buffer zone soils on their selected physicochemical and chemical properties. Agriculturally performed soils, on majority of studied area, are extensively managed. The lack of intensive agricultural treatment can lead to the change in their useful features.

Uniform spots of the soil cover were selected in 2013-2014, on which 24 soil test pits were made. The profiles were described according to the systematics developed by Polish Society of Soil Science (SGP5, 2011). Land sculpture and performance (especially agricultural) determined the selection of the site of soil profile to reveal. The soil test pits were localized within outer and inner buffer zones of MNP.

During the field work, morphological features of the soil profiles were determined after their revealing. Soil samples were also collected from every soil horizon to laboratory analyses in order to determine selected physicochemical and chemical properties. Laboratory analyses were carried out by means of methods commonly used in environmental studies.

The field works and obtained analytical results allowed for distinguishing the following soil taxonomic units within the MNP buffer zone: 3 orders (Brown Earths, Clay-Illuvial Soils and Weakly Developed Soils), 6 types and 12 sub-types (SGP5, 2011). Within the type of Brown Earths, three types were distinguished: Eutrophic Brown Soils, Dystrophic Brown Soils, Brown Alluvial Soils (according WRB: Eutric Cambisols, Dystric Cambisols and Fluvisols). Order of Clay-Illuvial Soils was represented by two types: Proper Clay-Illuvial Soils (Luvisols) and Glossic Clay-Illuvial Soils (Retisols), while Weakly Developed Soils by Rankers (Leptosols). Most of soils were utilized for meadow-pasture (extensively), whereas the remaining for ploughing or fallowing purposes.

Thickness of the profiles was about 100 cm or less. All of them were characterized by humus layer of about 25 cm thickness or more. Some soils, that were utilized as meadows or pastures, had a clear transition zone of the humus layer, indicating their previous ploughing performance. Considering the granulometric features, silty loam or silt deposits with varied clay fraction proportion (1%-62%), predominated. Soil of the studied area were characterized by usually strong acidification, proven by low pH values, relatively high values of hydrolytic acidity, exchange acidity and exchangeable aluminum content. Taking into account the soil performance, the highest values of pH were recorded for arable lands, then for fallows, and finally for meadow-pastures.

Organic carbon content in humus horizons of tested soils amounted to 24.1 g kg^{-1} and decreased with the depth. Considering the biogenic elements, analyzed soils were characterized by significant contents of total nitrogen, low – available phosphorus, mainly moderate or low – available potassium, and high or very high – available magnesium. Average content of total forms of microelements and other trace elements in studied soil was following (mg kg^{-1}):

Fe(30500)>Mn(962)>Zn(82.0)>Ni(48.4)>Cr(32.4)>Pb(25.9)>Cu(23.6)>Co(13.9)>Cd(0.49).

According to legal norms obligatory in Poland, studied soils can be assessed as not contaminated with heavy metals.

Considering the impact of the management system of the analyzed soils on their properties, considerably higher content of Ni was found in humus horizons (regardless of the soil order) of ploughing as compared to fallowed soils. There was also observed a clear tendency to higher contents of available phosphorus, potassium, and magnesium forms, as well as higher accumulation of organic carbon and total nitrogen in fallowed soils in relation to other forms of soil management. These dependencies were different in individual orders and types of soils.

There is gradual extensification of agricultural activity within MNP buffer zone, the symptoms of which are: decrease in farm animals population at increased green lands area and reduced fertilization (namely mineral and liming), which is reflected in crops yielding. It is also the consequence of low overall indicator of agricultural productive space quality for the studied area.