

Limiting Factors for Agricultural Production and Differentiation of Soil Management in Romania

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Romania's land area is 23,839,100 ha; 0.16% of the world's surface. Worldwide, Romania is ranked #83 for areal extent, and it constitutes 4.81% of the Europe's surface (ranked #12).

Romania has 14,856,800 ha of agricultural land which represents 62.3% of the total surface; 0.65 ha per capita. At the national level, 72.5% and 27.5% of soils in Romania can be broadly classed as very poor and good/very good, respectively, based on intrinsic soil characteristics, climate, topography, and ground water.

Romania has a specific geographical situation, namely: i) Romanian territory is located in the southeast portion of Central Europe at the cross roads of several high and low pressure centers that form regularly at the borders. The influence of these air masses is altered by the presence in the central regions of the Carpathian mountain chain resulting in a diverse climate with average annual rain fall amounts between 350 to 1,400 mm and average annual temperatures between 2 and 11.5°C. ii) At the national level, almost all soils in the international classification system are present in Romania; each soil type having specific properties and characteristics. iii) On approximately 12.5 million ha (7.5 million ha arable), soil fertility is adversely affected by erosion, acidity, low humus content, extreme texture (clay, sand), excessive moisture, chemical pollution etc.

These natural and anthropogenic factors dramatically influence agricultural production. Furthermore, soil, climate, topography, etc. vary widely not only across the country, but also on smaller scales, even across fields within the same farm.

In Steppe zone limitative climatic factors, which require differentiation towards soil management use, include: long periods of drought, high temperatures, high frequency winds (wind erosion in area of sands), low relative air humidity, and harsh frosts during winter. Negative phenomena most commonly encountered in this area are salinization, excess water, temporary deficit of rainfall, and poor to very poor supply of humus, phosphorus, and potassium.

In Forest-Steppe zone limiting factors of the area include: drought, erosion, temporary excessive moisture, soil compaction, slope, exposition, groundwater depth, occurrence of white frost period, and early/late frosts; climate is also highly variable from one sub-area to another. Irrigation and water conservation measures in the soil have a very important role in the forest steppe. Most lands in the forest steppe are situated on slopes so the tillage system must include anti-erosion agrotechnics. Furthermore, finding the optimal timing of tillage is very important for avoiding secondary compaction of the soil.

In Forest area limiting factors of the area include mixed relief, reduced field surface, excess surface moisture, lower soil fertility compared to previously studied areas, soil erosion, landslides, primary and secondary soil compaction, soil acidity, pronounced diverse spectrum of weeds and vegetative development opportunities compared to previous areas.

Harnessing the sustainable arable lands on slopes and their conservation implies that the organization of the territory and differentiated soil management will achieve the following: i) cultivation of an assortment of plants suitable for the purposes and conditions offered by the slopes and design of crop rotations with an anti-erosion role; ii) use of anti-erosion culture systems on slopes, level curve direction in strips, grassed strips and arable terraces; iii) application of differentiated soil management elements, respecting regional planning projects; iv) execution of soil tillage on the general direction of level curves; v) adaptation of agro-components such as: fertilization, integrated control of weeds (especially herbicide application), and the maintenance, mechanization, and harvesting of the specific land.

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