Digital mapping of soil related common European biophysical criteria used for the identification of Less Favoured Areas in Hungary

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One of the main objectives of the EU's Common Agricultural Policy is to encourage maintaining agricultural production in less favoured areas (LFA) in order to sustain agricultural production and use natural resources, in such a way to secure both stable production and income to farmers and to protect the environment. LFA assignment has both ecological and severe economical aspects. Recently the delimitation of LFAs is suggested to be carried out by using common biophysical diagnostic criteria on low soil productivity and poor climate conditions all over Europe. The criterion system was elaborated by JRC and its operational implementation comes under member state competence. This process requires the existence of an adequate national spatial soil information system with appropriate data structure and spatial resolution as well as a proper methodology for its analysis.

Hungary possesses an appropriate nationwide, 1:25,000 scale legacy data set originating from the national soil mapping project, which was initiated and led by Kreybig. This national survey was based on field and laboratory soil analyses and at the same time serving practical purposes. Its objective was the preparation of a map series which gives an insight to the geographical site and extent of soil conditions and soil properties for the production directing authorities, agricultural policy-makers, farmers, and the research institutes related to production problems. The similarity between the objectives of the old national mapping and those of the present European activities is remarkable. In the fifties, when the survey was completed, Hungary was the first in the world to have 1:25,000 scale soil information for the whole country.

Overall chemical and physical soil properties of the soil root zone featuring soil patches were identified for croplands. Three characteristics were attributed to soil mapping units and displayed on the maps; further soil properties were determined and measured in soil profiles. The unique feature of the Kreybig method was the usage of representative and further, non-representative soil profiles occurring within soil patches. These profiles jointly provide information on the heterogeneity of the area. The Kreybig legacy represents a valuable treasure of soil information, which is digitally processed and developed in the Digital Kreybig Soil Information System (DKSIS). In our paper we present how DKSIS was applied for the identification and delineation of areas with low soil productivity in Hungary according to JRC biophysical criteria related to soil (drainage, texture and stoniness, rooting depth, chemical properties and soil moisture balance). Information related soil profiles and SMUs was integrated and, in certain cases, supplemented using further environmental spatial auxiliary data for the compilation of nationwide digital maps displaying spatial distribution of specific, soil related limiting factors.