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Evaluating traditional and modernized landscapes for sustainable agriculture

GIS and field methods to evaluate high productive landscapes from an ecological perspective

Land consolidation, modernization, and industrialization of agricultural production has significantly changed the ecology of cultural landscapes in many parts of Europe. This change causes severe problems such as soil degradation, the destruction of important habitats, and as a consequence the loss of soil fertility and biodiversity.

This research evaluates crucial aspects of the ecological status quo of two highly productive agricultural landscapes. Pedological, botanical, and geomorphological analyses are used to evaluate and compare the ecological sustainability of both areas.

One research area, the Middle Saxonian Loess Landscape is situated in the eastern part of Germany. A modernized, high input, large-scale agriculture created a landscape that is poor in structural elements and therefore in geo- and biodiversity.

Under almost similar natural conditions in the south of Poland, a traditional landscape still exists at the Proszowice Plateau. It is rich in landscape elements and characterized by integrated family farms, small-scale agriculture, and low input farming methods. This form of traditional landscape is often referred as role model for sustainable land use systems.

Both research areas show different but significant degradation marks. Soil erosion, soil depletion, and the loss of valuable habitats can be observed.

In Poland, agricultural development is currently aiming for modernisation, intensification, and land consolidation. In contrast, the consolidated research area in Germany has been designated for the reintegration of lost landscape structures. This is a basic requirement for its ability to fulfill multiple landscape functions. Both areas can be expected to become more and more similar. This trend is governed by the Common Agricultural Policy (CAP) of the European Union.

Therefore the main hypotheses are:

- To a great extent, the existing traditional landscape in Poland can serve as a role model for ecologically integrated (sustainable) landscapes in Europe
- Landscape development that aims for relative ecological stability and resilience can help to avoid further degradation at the consolidated Middle Saxonian Loess Landscape in Germany and the traditional loess landscape at the Proszowice Plateau in Poland

The presentation focuses on GIS methods to identify reasonable sites for field investigations of soils and vegetation. Furthermore, preliminary results of pedological and botanical analysis will be presented.

The project aims for a comparative landscape evaluation which supports knowledge transfer for sustainable development of agricultural landscapes in Poland and Germany. The critical analysis of traditional landscape structures, soils, and vegetation in Poland provides important knowledge to rediversify German landscapes. At the same time, the negative results of agricultural modernization and land consolidation provide important knowledge required to support modernization and intensification processes in Poland.