Geography´s Contribution to the Austrian MAB Mountain Grassland Project: GIS-Databank, Imaging Landscapes and Change Detection

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1. Introduction

This paper deals with a special contribution to the recent Austrian MAB-project: "Changing Agriculture and Landscape. Secondary Grassland in the Mountaineous Areas of Austria". It is the Geographer's segment within the entire project, carried out by the Department of Geography and Regional Studies at Klagenfurt University in Carinthia, Southern Austria. Among the participiants of the MAB-project this research unit is the only one which is located in the interior oif the alpine area, and the subject of interest (grassland dominated land use) is surrounding the department's location. The geographical contribution is organized, in part done, and in part technologically supervised by the author of this paper. Substantial investigations are carried out by undergraduate and graduate students. Up to this point it was useful and necessary to apply landscape data of previous projects to the MAB-Grassland-studies. Especiall, in the GIS-part of our investigations we could use existing data sets.

2. Grassland GIS

Detailed and interdisciplinary research at rather few locations characterizes the general idea of the present MAB-Grassland project. For the contribition of geography to that local studies point 4 of this paper. In contrast to the local studies Geography is preparing a nationwide "Grassland GIS". A detailed set of land use classes and land cover types are cartographically recorded. Especiall, the ratio between grassland and arable land is identified using satellite images as well as local statistics. The result, digitally produced maps of the alpine grassland areas, had been presented at the symposium. Another cartographic presentation did deal with the combination of data sets: a digital elevation model was used to produce maps of different attributes related to the alpine grassland areas (altitude, exposition, and slope gradient).

3. Visualisation: imaging and imagination of grassland landscapes

This aspect focusses on the non-agrarian value of the grassland areas: the alpine cultural landscape ("Kulturlandschaft) characterized by pastures and meadows. On the other hand, patterns and size of grassland areas depend on local relief conditions. Typically for the Austrian Alps, rather small-scale farmsteads produce and maintain the cultural landscap of the alpine valleys. Valleys and mountains, meadows and pastures, farmers and livestock, flowers and colors: these typical landscape elements are percieved visually. Therefore, these elements are documented by images. A rather large number of images is structuralized in four themes:

- Grassland as a subject of perception;
- Grassland intensities and land use change;
- Phenomenology, biodiversity, and flowering meadows;
- Alpine landscape typology: relief, grassland, cultural landscape.

The exposition of the images is shown at the BAL-Gumpenstein. Imaging is a useful alternative to quantitative aspects of science. Visualisation should be seen as a qualitative-postmodern approach for decision making elites.

4. Land use change: Upper Enns Valley in Styria

At least, one should mention the Geographer's contribution to the interdisciplinary local study which had taken place in the Upper Enns Valley. The study area is located in the surroundings of the Federal Research Institute for Agriculture in Alpine Regions (BAL-Gumpenstein). A profile intersecting the research area from the Northern Calcereous Alps across the flat and moist Enns Valley bottom southwards into the cristallinic range of the "Niedere Tauern" represented different ecological conditions. The geographical sub-project did first prepare a topographical-structural land use map, using aerial orthophotos. This map shows the status quo of land use patterns, especially the differentiation between grassland and forest area. To detect land use changes, a comparison with aerial photos of 1954 was done. As a result, one may observe the losses of grassland and the degree of reforestation on several ecologically suboptimal places within the test area. This process is continuing.

Land use change in Central Europe's alpine areas in general shows three stages of development:

❶ *Traditional alpine grassland economy*: type of self-sufficient peasants; low in intensity, high in demand for space (meadows, pastures); additional arable land for self-provisioning (weat, rye, potatoes); more or less prevalent up to the 1950s in Austria.

❷ *Structural change*: marks the postwar decades; reduction of the primary sector, market orientation; grassland losses due to overgrowing by forest, but new grassland areas converted from previously arable land; alpine cultural landscape ("Kulturlandschaft") "gets green"; highest ratio of grassland-land use.

❸ *Alpine grassland and the international economy* (European Community): intensive production, concentration; fallow areas or afforestation in other parts;

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reduction of grassland by and by; transfer payments by government in order to maintain cultural landscape ("Kulturlandschaft") - one aspect of sustainability; concentration process still continuing.

Related to the instructive goals of this paper, to the explorative character of the analytical field studies and to the exhibition of maps and images during the symposium we will not add any literature to this informations.