EVALUATION OF THE MULTIFUNCTIONALITY OF AGRICULTURAL AREAS AS PART OF AN INTEGRATED LAND USE PLANNING APPROACH

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ABSTRACT

The report summarizes results of the INTERREG IIIB project "Integrated Land Use Planning". The basin of the river Ybbs – a tributary of the Danube - contains very different natural conditions. The agriculture in this area is confronted with these conditions in terms of production of food and raw material. Furthermore effects on resource protection, hazard conditions, diversity, recreation concerns and spatial structuring effects influence the land cultivation. In many cases the production factor is often not the most important function of agriculture; for example in some sub-regions the function of production is evaluated very low, while all the other functions are estimated as particularly valuable. In these regions agriculture or at least open space is of high importance for the society. If the agricultural land use disappears, other solutions have to be found in order to maintain the different functions, especially the "recreation near settlements" and "open space for unhindered water run-off". The evaluation of these functions provides a basis for increased awareness of the influence of agriculture and gives the possibility to adapt political measures e.g. in the rural development programs.

1 INTRODUCTION - PROJECT OVERVIEW

The INTERREG IIIB CADSES project "Integrated Land Use Planning" (ILUP, 2003 – 2006) is led by the Austrian Ministry of Agriculture, Forestry, Water Management and Environment. Additional partners are Austrian Federal and Provincial Authorities which are competent for water management and regional planning. In an international cooperation with Czech Republic (Moravia basin), Germany (basins of the Danube side tributaries Vils and Rott) and Hungary (Raab basin) an integrated river basin management should be developed and implemented. The main focuses are risk management and prevention of floods through adapted land use. The sub-project of the Federal Institute of Agricultural Economics comprises a regional economic analysis of the river Ybbs basin (side tributary of the Danube) and an evaluation of different functions besides the production of goods and raw materials in the agricultural areas in four reference communities in the river Ybbs basin.

2 RIVER YBBS BASIN

The river Ybbs runs from the Austrian limestone alps in northern direction to the river Danube (see fig. 1, compare [2]). The whole basin comprises an area of ~275,000 ha from which 140,000 ha are forest, 74,000 ha are used as grassland and 66,000 ha are used as arable land. The sea level varies from 1,800m in the alps to 300m at the Danube. Accordingly the precipitation ranges from 1,750 mm to 700 mm per year. Approximately 190,000 people live in the basin, spread over 69 communities. Only three cities in the region have more than 10,000 inhabitants, the most other communities are small villages. The alpine sub-region is threatened by migration, forestation and loss of settlement areas. In many small communities 15 to 20% of people are working in the agricultural sector. 55% of the people in the region are working in industries and 34 % in the service sector. Only in a few communities tourism is an economic pillar. The agricultural land use corresponds to the natural resources. Beside small shares of intensively used grassland in the valley grounds and extensively used grassland on the slopes and up in the mountains, forests cover most of the area in the southern alpine region. The cultural area in the extensive transition zone is used for one third each as wood, grassland and arable land. In the hilly region near the Danube the arable land use dominates with big shares of market crops and corn production especially for pig fattening. Nearly 93% of farm enterprises keep animals. The number of cattle in the mountainous sub-region decreases, while pig and poultry farming in the hilly region are stable.

3 REFERENCE COMMUNITIES AND METHOD FOR EVALUATION OF FUNCTIONS IN AGRICULTURAL AREAS

On basis of the regional analyses and in coordination with other project partners four reference communities have been chosen for a detailed evaluation. They represent the different natural conditions and land use potentials in the river basin. The community Göstling is situated in the south of the catchments area in the Limestone Mountains, Waidhofen an der Ybbs and Seitenstetten are representatives for the transition zone, while ín Strengberg arable land is dominate. To get a clear picture about the different functions of agricultural areas the communities are subdivided into functional areas due to geomorphologic conditions. As far as possible the functional units are homogenous in terms of agricultural land use. A theoretical approach for evaluating of the functions had already been developed in former projects and was adapted to the scale (~1:25,000) of the project, to the thematic focus of risk management and to the specific data availability of the regions.

The following functions are taken into consideration:

- Production of food and raw materials

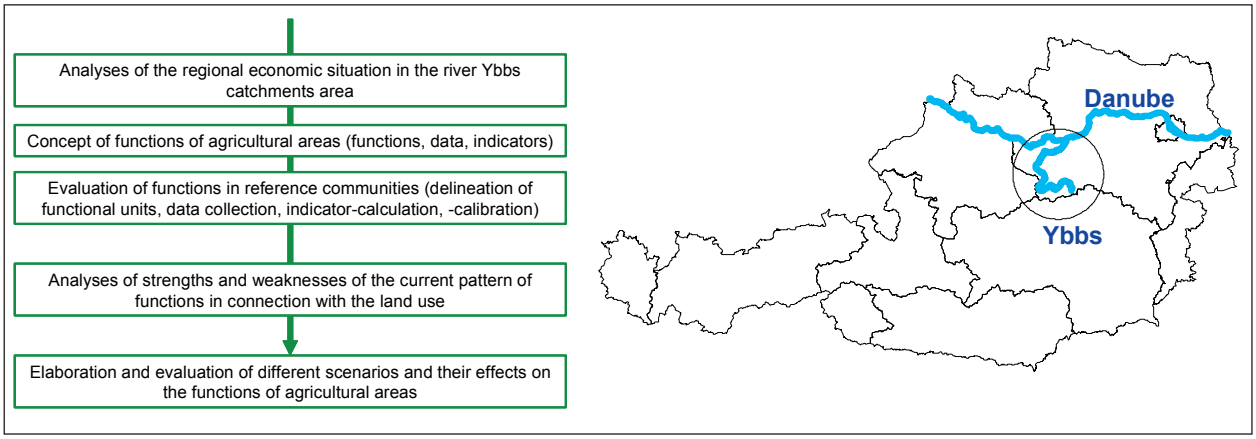

Fig. 1: Project Design of the ILUP sub-project of the Federal Institute of Agricultural Economics and location of the Austrian river Ybbs basin

- Resource protection
- Hazard protection
- Diversity
- Recreation
- Spatial Structuring

A small evaluation model has been developed for each function. The results were transformed into a common scale from 1 to 5 to facilitate a common view of the different functions. The function of production was evaluated on basis of the Austrian digital soil map which gives already information about the soil quality for arable land and grassland (share of different soil quality classes per ha agricultural area). The evaluation of the hazard protection function goes back to the Austrian hazard risk maps (share of hazard risk zones per ha agricultural area) and gives evidence of the importance of hazard risks in the specific zones. The resource protection function takes the risks for wind and water erosion into account as well as the risks for leaking pollutants into the groundwater in connection with the current land use. The data source is the digital soil map and the IACS (Integrated Administration Control System for the CAP) of the Ministry of Agriculture. In the framework of the diversity function on the one hand the diversity of the special agricultural land use (number of parcels per ha agricultural area) is taken into consideration, and on the other the structure of the influenced cultural landscape (different landscape elements per ha). Due to the approach the recreation function depends on the diversity of the landscape – as a supply of recreational area – and on the demand on recreational areas, which is expressed in number of inhabitants and overnight stays of tourists. The Spatial structuring function includes weighed interference lines of agricultural areas (streets, railroads, energy lines, border lines to built up zones etc. per ha agricultural area) and provides an insight into the burden or disturbance of the agricultural zones.

4 EVALUATION RESULTS

The evaluation results show the different patterns of functions in the specific functional units. Exemplarily three typical patterns are discussed (see fig. 2, compare [3]):

1. In some parts of the alpine limestone region (community of Göstling) the function of production was evaluated relatively low while resource protection, diversity and recreation got higher points in the system. This is a hint to the well adapted agricultural land use. It shows the importance of open space for maintaining the diversity and the potentials for recreation. The recent development shows the threat of forestation. If forest gains space the potential of further land use would be decreased as a result of further migration of inhabitants and loss of attractiveness of the landscape for tourists and inhabitants.

2. Especially in the surrounding of the city of Waidhofen, located in a narrow valley, the pattern of functions is an extreme one. The function of production is on a very low level but all the other functions show the highest values. This situation indicates the big importance of agricultural areas – or at least maintained open areas – for the community although agriculture does not really need these areas. The last open spaces in this area are needed for water run off areas in the case of floods, retention areas, recreation areas and to maintain biodiversity and the spatial structure of the city. If agriculture gives up, these areas have to be kept open by other services or technical resolutions are needed. Consequences have to be found for flood protection, and to maintain the attractiveness of the city in terms of diversity. Otherwise the recreation function would suffer.

3. A third typical pattern occurs in the hilly landscape of Strengberg, where the production function is evaluated as an important factor, but all the other functions got only a few points. One threat in this productive zone is the further intensification

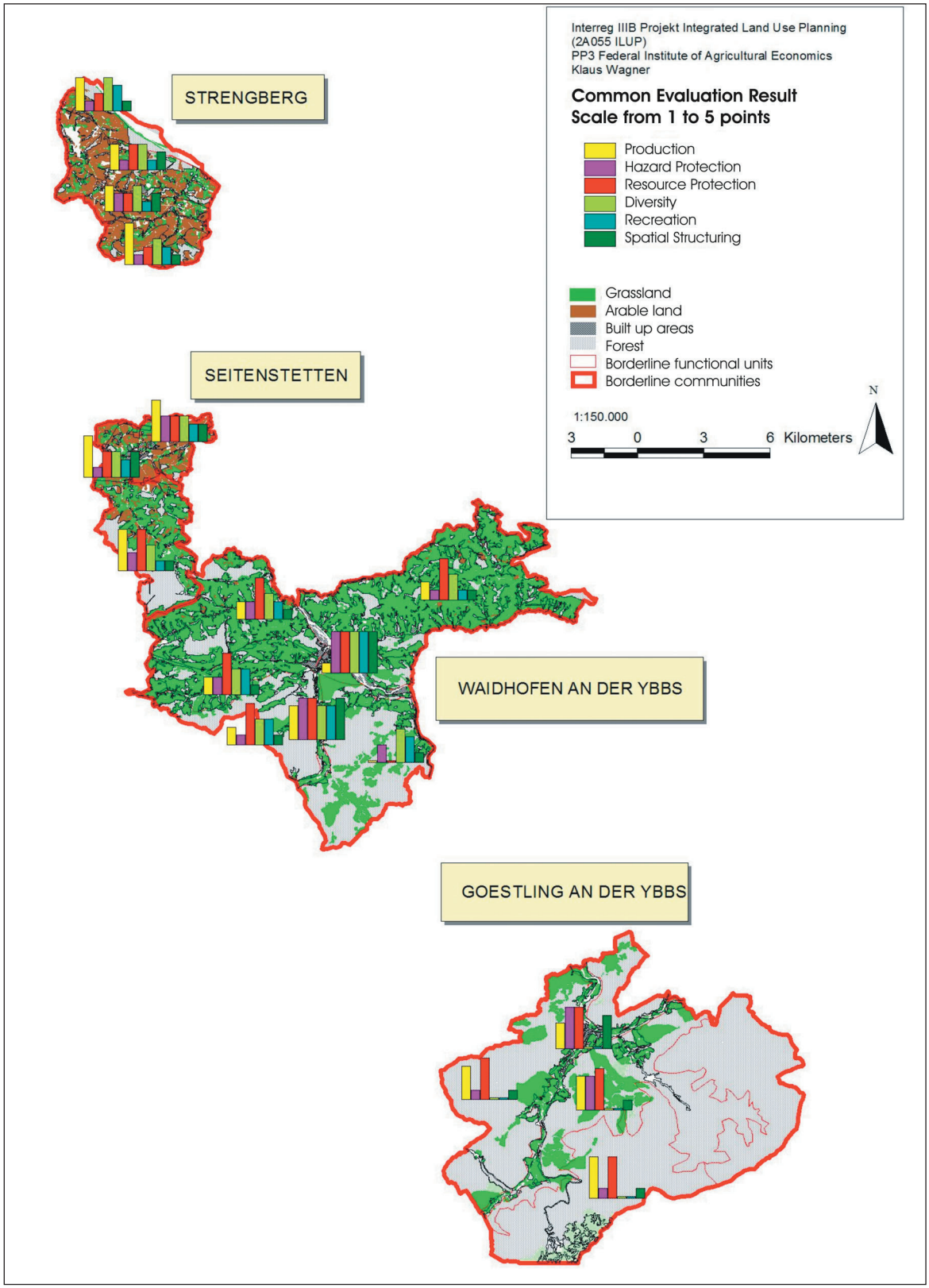

Fig. 2: Evaluation result for reference communities in the river Ybbs basin

of agriculture. The consequence would be erosion and groundwater pollution. Thus the decrease in potential of diversity and recreation would continue. As a result there would be diminished chances to develop other pillars in the regional economy and to increase stability in the region.

5 LONG TERM AND SHORT TERM DEVELOPMENT OF THE FUNCTIONS

Other sub-projects of ILUP, see [1], give information about the land cover development in the region (comparison of satellite images 1987 – 2003) and land use development (comparison of land use cadastre 1872 – 2000). As far as the data situation permits, the information is used to express the changes in land use and in the functions of agricultural areas (see fig. 3). The development in land use since the beginning of the 19th century shows a clear segregation. Arable land is shifting to favoured regions outside the mountains. Grassland and wood are the substitutes. Furthermore a lot of settlement areas are founded on former arable land in the valley grounds. Thus the function of resource protection is not a one way development. In the zones of vanishing arable land the resource protection function is increasing, while in the zones of increasing arable land the resource protection function is decreasing to a great extent. Besides the increasing share of arable land, a bigger field size, modern field treating methods and the big share of risk crops for erosion are contributing to this situation. The short term development from 1987 to 2003 shows similar processes: extensively used grassland changes to wood, arable land shifts to favoured regions and on arable land you can see a clear trend from cereals to corn production, which increases the risks for erosion as well as for ground- and surface water pollution. Again here is a positive development in the resource protection function in some regions and a negative development in other functions.

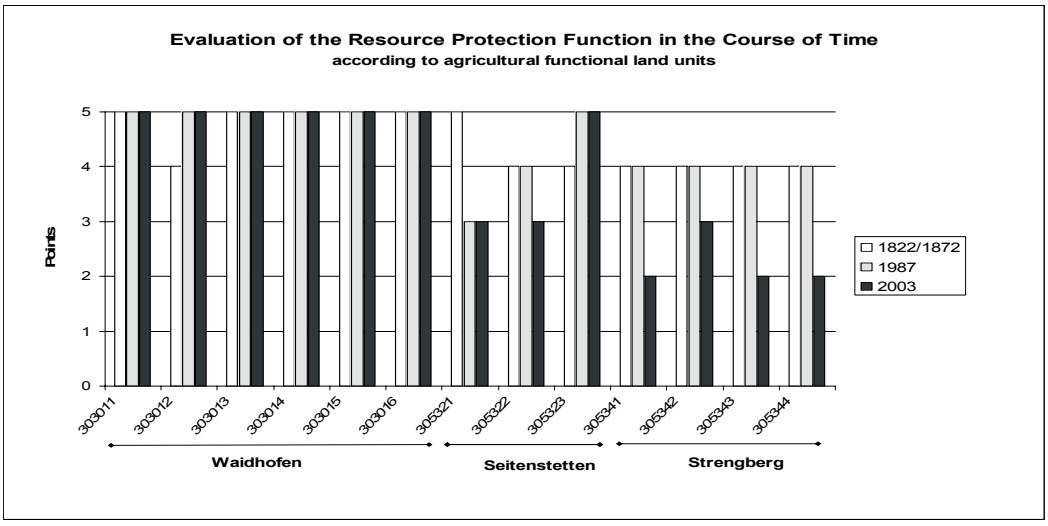

Fig. 3: Resource protection function of agricultural areas in the course of time

6 RESUME

The results of the evaluations in the river Ybbs basin show the different preconditions for a well adapted and risk minimizing land use. The alpine sub-region with the difficult natural conditions allows just a few land use alternatives. Agriculture requires a minimum amount of settlement and infrastructure to maintain the open landscape as an amenity potential for tourism. Moreover it supports the biodiversity and preserves water run-off areas in the valley grounds. In the transition zone and the hilly landscape out of the mountains agriculture is restructuring as a consequence of the Common Agricultural Policy. In an integrated river basin management the positive and negative side effects (intensification of agriculture) have to be taken in consideration. The evaluation of the functions of agricultural areas should raise awareness of people for the different values of agricultural areas. It also should be a basis for an adaptation of regional objectives and policy measures in forestry, water management, regional planning and agriculture through an integrated river basin management. A lot of different policy measures in the Austrian Rural Development Program are declared to the above mentioned problems. In the program for the period 2007 to 2013 measures like erosion protection measures on arable land, adapted crop rotation measures, installation of landscape elements, maintenance and development of areas concerning nature protection or water management, also technical and infrastructural measures for water retention and soil stabilisation are included. All these measures may contribute to local needs which were shown in the results of the ILUP project.

7 REFERENCES

[1] ILUP Project-homepage: http://www.ilup.org

[2] Wagner, Klaus, 2005, Die regionalwirtschaftliche Situation im Einzugsgebiet der Ybbs, in: Ländlicher Raum, Internet

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[3] Wagner, Klaus, 2006, Die Bewertung der Multifunktionalität landwirtschaftlicher Flächen im Einzugsgebiet der Ybbs, in: Ländlicher Raum, Internet journal of the Austrian Ministry of Agriculture, http://archiv.laendlicher-raum.at/ , Sept. 2006