Transborder farming in small-scale land use systems

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Abstract
In many regions of the world farming can be characterised as small-scale land use systems. Huge time consumption, relatively high production costs and large portions of headland reduce agricultural productivity. Virtual land consolidation may be an effective alternative with the possibility to start rapidly. By the application of information technology both economic and ecological management targets can be implemented. The first results analysed in a model calculation are encouraging. They were already realised in some pilot projects in Germany.

1. Aims of the investigations

In many regions of the world farming can be characterised as small-scale land use systems. Large portions of headlands are causing huge working time input and severe soil compaction during operation. Furthermore application of fertiliser and of plant protection products is different to the main field. The use of efficient machinery is very difficult or even impossible. New technologies cannot be used at all or only delayed. And last but not least high production costs per unit can not be balanced out through high yields.

A consolidation of farmland can lead to first improvements under these circumstances. The construction of roads for an improved infrastructure is therefore very important. Usually the field sizes can be tripled and will grow up from about 0.3 ha to somewhere around 1 ha. However relatively high costs result and the procedures are long-lasting. In addition many procedures fail because of the resistance of a minority of farmers, who fear disadvantages after the possession rearrangement or see no benefit while going out of farming and leasing their land to other farmers.

A new possibility is opened by the application of information technology. With the aid of the Global Positioning System GPS a "virtual consolidation of farmland" is implemented where ownership structures remain unchanged. Only the settlement of a common crop rotation is required. Tillage, cultivation and harvesting are organised in larger units disregarding existing boundaries (Fig. 1).

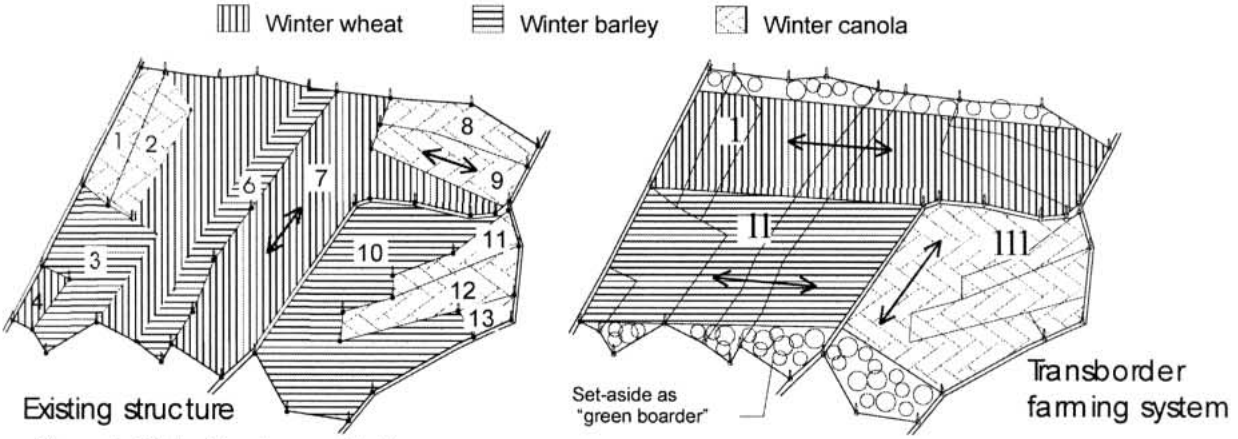

Figure 1: Virtual land consolidation

2. Methods

The realisation of transborder farming follows several successive steps:

1. *Definition of joint areas:* In a first step the farmers must agree on the common farming of an area consisting of different plots. In an ideal case all farmers from a village are integrated, in the most unfavourable case only portions of their farmland can be integrated.