

## Cooperative action for pest relief – An Austrian case study

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### Abstract

Emerging from the south-eastern border of Austria, farmers are increasingly affected by the spread of the invasive western corn rootworm (*Diabrotica virgifera*). The primary habitat of *Diabrotica v.* is maize and intensive maize production facilitates a fast propagation of the pest. Maize is a main feeding crop in livestock production in Austria. High mobility of the pest and limitations in chemical and other pest control procedures have increased the ecological and economic vulnerability of maize-dominant cropping systems in the last years. Diversity in cropping patterns and landscape composition are suggested to effectively control pest pressure, limit yield losses, and maintain an economically viable production. We suggest that single-farm actions restrict the transformation ability of the current practices. Additionally, collective action is one of the new components in agri-environmental programs. According to the concept of resilient farming, we analyze a reduction of pesticide use by modelling alternative crop management systems. The latter are based on recommendations from experts and literature complemented by reports on cooperative action. We select a case study region in South-East Styria to model coordinated management of arable farming to contribute to a pest relief. A multi-farm optimization model is applied to quantify the benefits of cooperative action. Examples of cooperative action include the implementation of crop rotations at the regional scale to account for the mobility of the surveyed pest and the spatio-temporal coordination of chemical and biological crop protection measures. The benefits of restructured crop management systems are quantified by the difference of regional farm gross margins between a single-farm and regional implementation of the most defensive measures. Individual farm benefits are derived from the comparison and indicate the potential of compensation payments among the farms. Additionally, the model gives evidence on potential feed gaps resulting from crop substitution in the case study region. It is concluded that cooperative farmland management has the potential to tackle invasive pest pressures effectively. The management of pest pressure is of crucial importance in avoiding economic damage at farm and regional scales.

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