Spatial analysis of maize cropping systems to relieve crop pest pressure in Austria

University of Natural Resources and Life Sciences, Vienna
Department of Economics and Social Sciences

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Background on maize production in Austria

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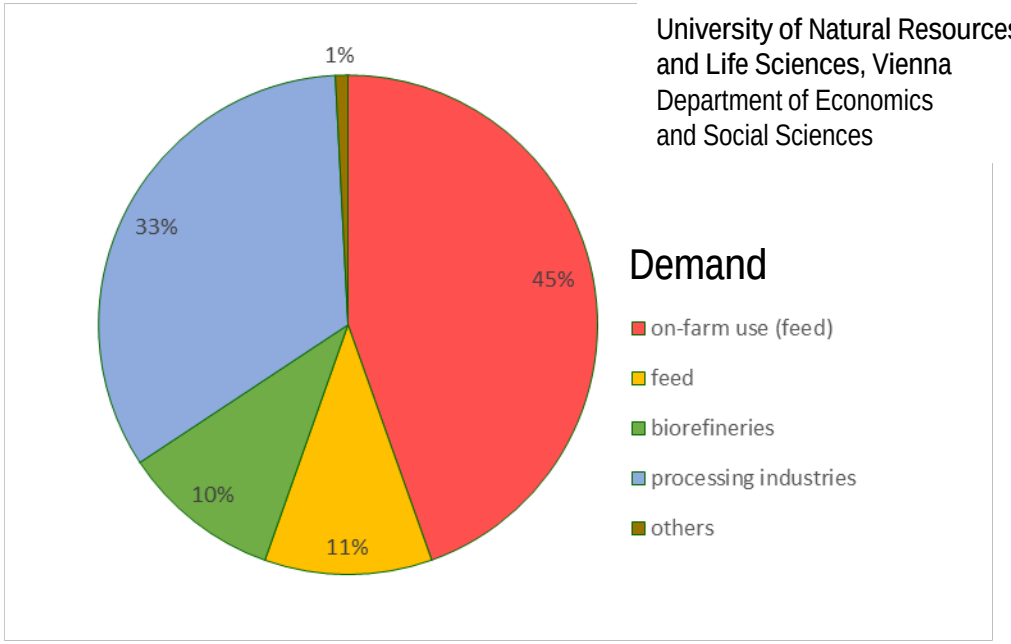
Maize production

216 000 ha grain maize and CCM

2.3 million tons

(+ 83 000 ha silage maize)

Source: AMA preliminary grain balance 2014/2015



Pest pressure: weeds >> animal pests > fungi, bacteria > viruses (Oerke and Dehne, 2004)

Invasive pest: Western Corn Rootworm (*Diabrotica virgifera virgifera*)

→ pest pressure, (obligatory) monitoring, stresses role of crop rotations

Research questions and methods

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Hypothesis

Link from production to pressure (to production)

Benefits from field to landscape scale management

Research questions

Are crop rotations related to pest occurrence?

What are the economic impacts of alternative crop rotations?

Methodology and data

Integrated Administration and Control System (IACS) 2000-2014

Monitoring results 2004-2014

Standard gross margins (AWI, LfL)

Results:
Maize shares on cropland 2000 - 2014

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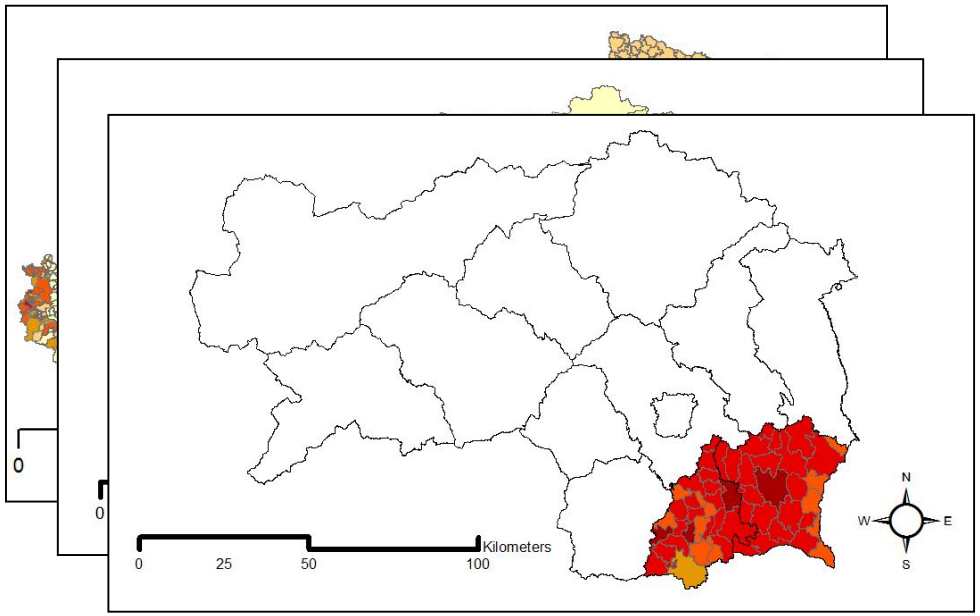
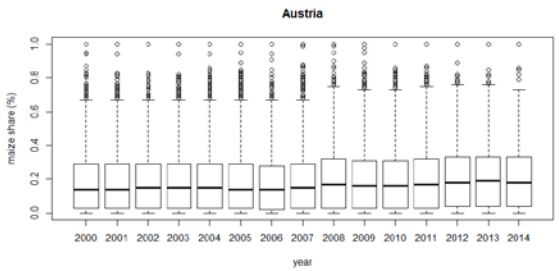
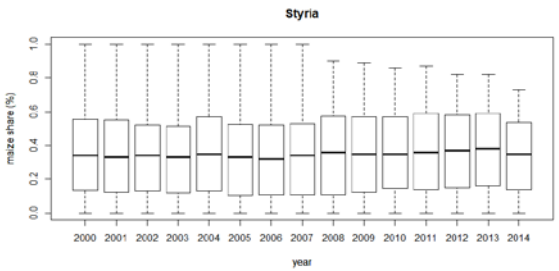
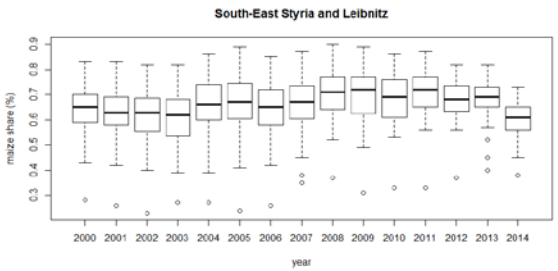


All scales
Maize shares at municipality level

- 0
- >0 - 20%
- >20 - 40%
- >40 - 60%
- >60 - 80%
- >80%







Results:
Diabrotica monitoring Styria

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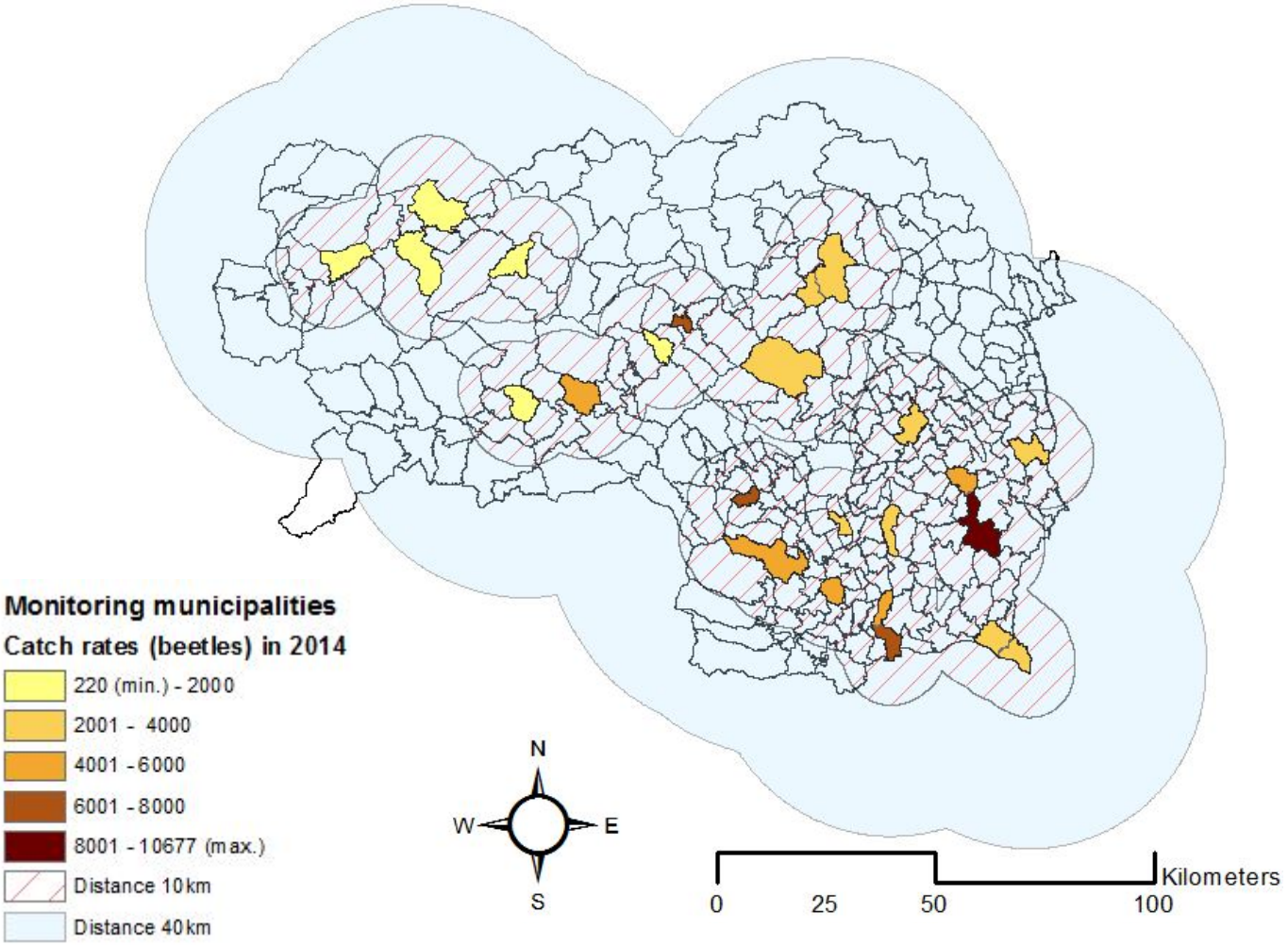

Results:
Economic impact crop rotations

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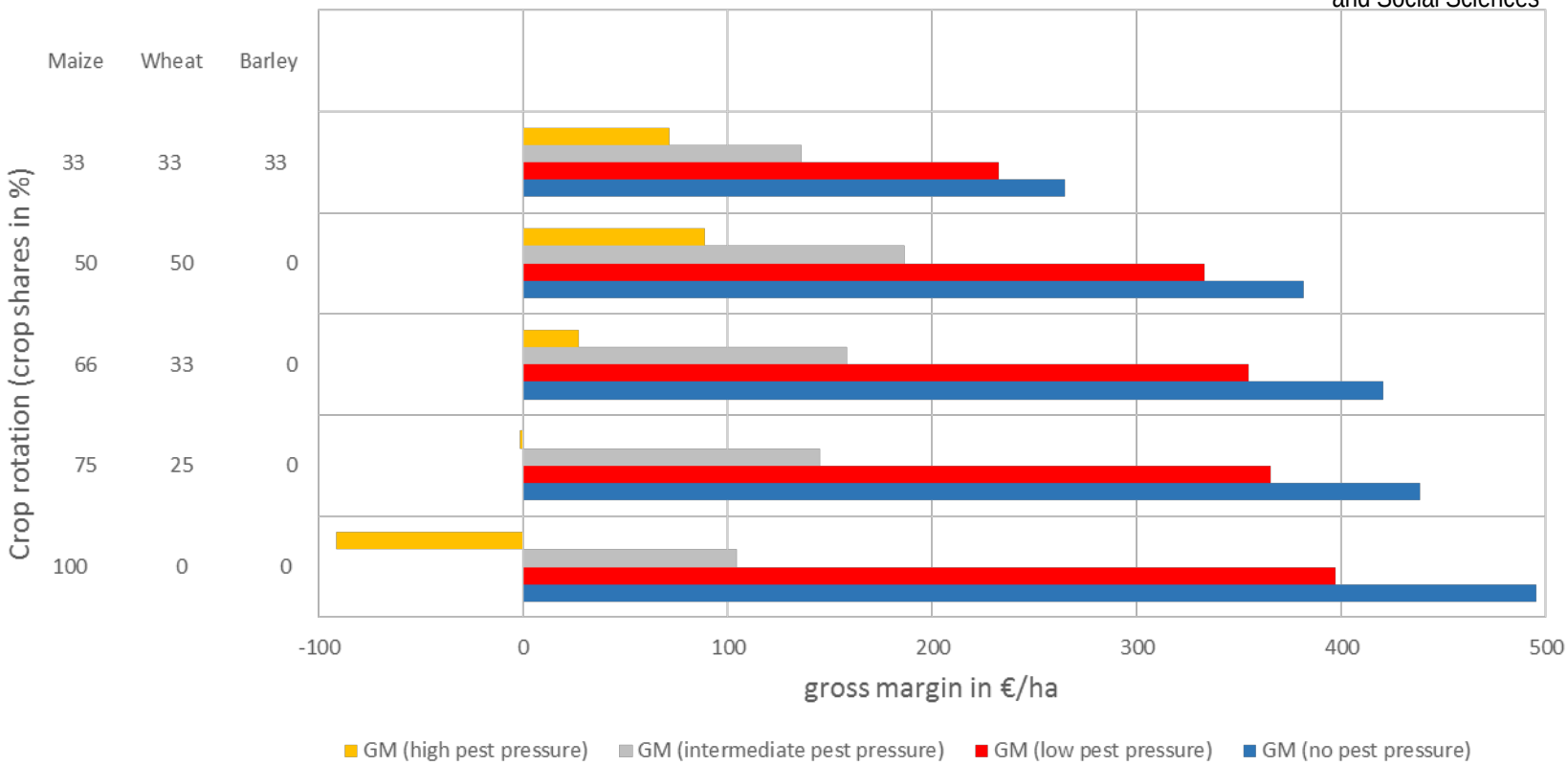

Conclusion

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- Regional specialisation provides **favorable conditions for pests** like Diabrotica
- Policy constraints on maize shares result in **reduced gross margins** per crop rotation
- **Diversification** of crop rotations reduces vulnerability in case of pest oubreaks
- **Measure mix**:
  - Keep down pest pressure level by monitoring and Integrated Pest Mangement (IPM)
  - Spatial and temporal coordination may reduce adverse farm level impacts of adaptation

Outlook

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Economic optimization embedded in an Integrated modelling framework

Crop protection strategies and management options

- Integration of monitoring data, modelling of IPM
- Spatial and temporal implementation of pest control

Involvement of farmers (stakeholders)

- Identification of barriers – qualitative analysis, quantitative impact
- Contribution of knowledge – case study

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Thank you!

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Results:
Diabrotica monitoring

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