Interdependencies of Agricultural Land Use and Flood Risk

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- founded 1960, staff of 14 scientists
- Departments for farm management, market economy, regional research and agricultural policy, agricultural economics library
- National and international research projects

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Project Objectives

Estimation in a regional scale of

- Flood prevention on agricultural lands
- Flood sensitivity of agricultural lands
- Costs of agricultural measures for adapted land use

as subproject of FLOOD Risk II

- National project with 41 subprojects for development of integrated strategies for flood prevention (natural science, socioeconomic and juridical projects)
Schematic approach

Assessment of agricultural land

Natural properties
Agricultural land use

Low prevention in case of:
- soil, landscape and climatic conditions which favour quick water runoff
- agricultural land use with high share of arable land and risk crops (corn, sunflowers, beets…)

Frequency of floods
Agricultural land use

Recommendations for an improved flood prevention and reduced flood sensitivity

Agricultural measures and costs

Flood prevention on agric. areas
Flood sensitivity of agric. areas

High sensitivity in case of:
- frequent flooding
- soil, landscape and climatic conditions which favour quick water runoff
- agricultural land use with high share of arable land and risk crops (corn, sunflowers, beets…)
Reference Area Seitenstetten, agricultural land use

Seitenstetten
Agricultural Land Use

River
Community borderline
Water catchment area
Grassland
Arable land
Risk crops on arable land

0 0.5 1 2
Kilometers

Projekt Landwirtschaft und Hochwasser
Flood Risk II
Bundesanstalt für Agrarwirtschaft
12/2007

Danueb Area Cohesion 2009, Dunaujvaros
Flood frequency in Seitenstetten

Seitenstetten Rivers

- River
- Community borderline
- Water catchment area
- Flooding frequency 30 years
- Flooding frequency 100 years

Kilometers

Projekt Landwirtschaft und Hochwasser
Flood Risk II
Bundesanstalt für Agrarwirtschaft
12/2007

Danub Area Cohesion 2009, Dunaujvaros
Flood prevention contribution of agricultural lands
Flood sensitivity of agricultural lands

Seitenstetten Water Catchment Areas
Flood Sensitivity

- River
- Community borderline
- Water catchment area
- low
- low - middle
- middle
- middle - high
- high

Kilometers

Project Landwirtschaft und Hochwasser
Flood Risk II
Bundesanstalt für Agrarwirtschaft
05/2008

Seitenstetten Water Catchment Areas
Flood Sensitivity

- River
- Community borderline
- Water catchment area
- low
- middle
- high
- Wood or settlement area

Kilometers

Project Landwirtschaft und Hochwasser
Flood Risk II
Bundesanstalt für Agrarwirtschaft
05/2008

Danube Area Cohesion 2009, Dunaujvaros
Measures with positive effects on water retention

3 steps of intervention:

• Changing of land management, treatment (environmental friendly treatment, green cover, mulch and direct seed)

• Changing of crop rotation type (renunciation of special risk crops)

• Changing of land use type (from arable land to grassland or forest)
### Additional economic costs for land use changes

<table>
<thead>
<tr>
<th>Measures of land use change</th>
<th>Additional annual expenditure in €/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change from winter barley to grassland</td>
<td>360,-</td>
</tr>
<tr>
<td>Changes from forage cereals to grassland</td>
<td>324,-</td>
</tr>
<tr>
<td>Change from Triticale to grassland</td>
<td>309,-</td>
</tr>
<tr>
<td>Change from forage wheat to grassland</td>
<td>279,-</td>
</tr>
<tr>
<td>Change from autumn ploughing with temporary green cover</td>
<td>159,-</td>
</tr>
<tr>
<td>Change from corn to forage cereals</td>
<td>158,-</td>
</tr>
<tr>
<td>Change from autumn ploughing without green cover to direct seeding in winter cover crops</td>
<td>-22,-</td>
</tr>
</tbody>
</table>
Exemplary application of measures in Seitenstetten

Improvement of contribution to flood prevention:
• Conversion from silage corn to grassland on 88 ha
• Catch crop planting on 44 ha arable land

Improvement of flood sensitivity:
• Conversion from silage corn to grassland on 23 ha
• Conversion from grain corn to feed grain on 22 ha

Effects of measures:
• Total costs of € 44,000,- annually (€/ha 277,-)
• Decrease of flood sensitivity from high to medium level
• Increase of flood prevention from low to high level
Conclusions and recommendations

• Better understanding of multifunctionality of agricultural land

• Setting of regional priorities regarding flood protection

• Looking for suitable state-regulated and private instruments or measures (e.g. in the Agri-Environmental Programme)

• Austrian-wide analyses of current cultivation practices in water catchment and flood plain areas

• Deriving generally accepted criteria for flood-compatible land cultivation