AgMIP Coordinated Global and Regional Assessment of Climate Change Impacts on Food Security and Agriculture

Building Blocks and Challenges

Regional Panel: Europe

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Aspen, 15 Sept. 2015
MACSUR participants and case studies

18 countries
- Austria
- Belgium
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Hungary
- Israel
- Italy
- Netherlands
- Norway
- Poland
- Romania
- Spain
- Sweden
- UK

➔ 71 organizations, 300 scientists

www.macsur.eu/index.php/regional-case-studies/
MACSUR’s aims & mission

• to improve and integrate *models* crop and livestock production, farms, and national & international agri-food markets

• to analyze the effects of climate change for *farming* in European regions

• to identify risks for farmers and effective mitigation and adaptation options

• to analyze consequences of mitigation and adaptation for farming *competitiveness*, the *environment* and *rural development*
MACSUR’s structure / themes

Financed by national authorities and coordinated in the EU level initiative of JPI-FACCE

- **CROPm**: crop modelling and improvement
  - many partners are strongly integrated in the AgMIP research community
- **LIVEM**: livestock (system) modelling
  - Main focus so far: establishing a strong network
- **TRADEm**: global/national/farm economic models
  - partners with global models are strongly integrated in the AgMIP research community
Climate change is different...

- A multidimensional global change phenomenon that impacts (global) markets, (national) policies and (local) natural production conditions
- Impacts on livestock, plant production and natural resources
- Regional heterogeneity creates winners and losers
- Changes are outside the ranges observed in the past
- Changes are not always continuous and difficult to detect for farmers (-> noise of weather variability)
- Impacts are uncertain

-> Business as usual decision making may no longer be viable
Focus of selected econ models

- farm level dynamics
- environmental concerns
- landscapes
- inter-annual stochasticity
### selected econ models: characteristics

<table>
<thead>
<tr>
<th>Bio-economic farm model</th>
<th>Origin</th>
<th>Type</th>
<th>Optimization</th>
<th>Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODAM</td>
<td>DE</td>
<td>LP</td>
<td>multi-objective (e.g. gross margin)</td>
<td>typical farms</td>
</tr>
<tr>
<td>FAMOS[space]</td>
<td>AT</td>
<td>MIP</td>
<td>max. gross margin</td>
<td>all farms in landscape</td>
</tr>
<tr>
<td>Demcrop</td>
<td>FI</td>
<td>NLP</td>
<td>max. profits (dynamic), risk considered</td>
<td>representative farms</td>
</tr>
<tr>
<td>Hybrid TRF</td>
<td>IT</td>
<td>NLP</td>
<td>max. gross margin (inter-annual dynamic), PMP</td>
<td>territorial with representative farms (TRF)</td>
</tr>
</tbody>
</table>
### Adaptation options in economic models

<table>
<thead>
<tr>
<th>Option</th>
<th>MODAM</th>
<th>FAMOS</th>
<th>Demcrop</th>
<th>Hybrid TRF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop rotation choices</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Cultivar/crop variety choice</td>
<td>n</td>
<td>n</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Cover crops</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>New crops and cultivars</td>
<td>y</td>
<td>n</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>Tillage options</td>
<td>y</td>
<td>y</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>Fertilization options</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>y</td>
</tr>
<tr>
<td>Liming</td>
<td>n</td>
<td>n</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>Weed &amp; pest management</td>
<td>n</td>
<td>n</td>
<td>y</td>
<td>n</td>
</tr>
<tr>
<td>Irrigation</td>
<td>y</td>
<td>y</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>Landscape elements</td>
<td>n</td>
<td>y</td>
<td>y</td>
<td></td>
</tr>
<tr>
<td>Buffer strips and catch crops</td>
<td>y</td>
<td>n</td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Afforestation/Deforestation</td>
<td>n/n</td>
<td>y/n</td>
<td>n/n</td>
<td>n/n</td>
</tr>
<tr>
<td>Grassland conversion</td>
<td>n</td>
<td>y</td>
<td>n</td>
<td>y</td>
</tr>
<tr>
<td>Livestock herd size, feed choices</td>
<td>y</td>
<td>y</td>
<td>n</td>
<td>y</td>
</tr>
</tbody>
</table>
MACSUR: the way ahead

- **New phase:** mid 2015 to mid 2017
- **Modified structure:** governance and partners
- **New work agenda:**
  - explicit co-operation with AgMIP
  - cross-cutting activities (selection):
    - regional case studies based on integrated modelling approaches / impact assessments
    - development of RAPs for Europe / overall scenario development
    - variability and extreme events / farm scale risk assessment
    - consumer behaviour