Indicators in time, space and multiple domains: lessons from applying an integrated assessment tool for agricultural systems

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Outline

- Integrated Assessment and Modelling
- SEAMLESS project
- Sample application
- Indicators and indicator framework
- Integrated database and spatial framework
- Discussion
Integrated Assessment and Modelling

- Integrated assessment
  - Interdisciplinary
  - Stakeholder-involvement
  - Future oriented
- Modelling
  - Several quantitative models
  - Scales
- Scenario analysis
Integrated Assessment and Modelling and indicator based approaches

- Biophysical
- Economic
- Hydrological

Statistical data sources covering different domains

Agri. Environmental Indicators
Aims of SEAMLESS project

- Overcoming fragmentation in research models and data in Europe for integrated assessment of agricultural systems

- Better informed impact assessment of new agricultural and environmental *policies*

**To advance:**
- Consistent micro-macro analysis
- Consistent economic, environmental, social and institutional analysis
- Re-use of research tools for a range of issues
Trade liberalization - WTO proposal

Price decline: EU vs World
Decrease in average farm income by farm type (%)
WTO – change in nitrate leaching (%)

Farm types in Midi Pyrenees

<table>
<thead>
<tr>
<th></th>
<th>Arable-cereal</th>
<th>Arable-other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate leaching</td>
<td>-2 %</td>
<td>+6%</td>
</tr>
<tr>
<td>Maize area</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Peas area</td>
<td>↓</td>
<td>↓</td>
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<tr>
<td>Rape area</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Soya area</td>
<td>↑</td>
<td>↑</td>
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<tr>
<td>Sunflower area</td>
<td>0</td>
<td>↓</td>
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Hatem Belhouchette and Kamel Louhichi
Indicators

- 230 indicators, divided over 75 indicator groups
- Mostly economic and environmental dimensions
  - Weak on social dimension
- Model variables as additional outputs
Goal Oriented Indicator framework

<table>
<thead>
<tr>
<th>Dimensions</th>
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<tr>
<td>Biophysical, economic, social, institutional</td>
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<thead>
<tr>
<th>Level of organisation (spatial scales)</th>
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<tbody>
<tr>
<td>Field, farm, region, country, EU, globe</td>
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<th>Domains</th>
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<td>Sustainability, Sustainable development</td>
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<th>Themes (goal based approach)</th>
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<td>Ultimate goal, processes of achievement, means</td>
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<tr>
<th>Sub-themes/issues</th>
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<tr>
<td>Viability, performance, capital, maintenance, …</td>
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Integrated database

Data:
- Climate and soils
- Farmtype data (FADN)
- Agricultural management(!)
- Policy
- Trade
- Regional typologies
- Indicators (model output)

Two important features:
- Common spatial framework
- Common farm typology
The hierarchical framework combines:

- **Administrative regio**
  - Farm resources
  - Policies
  - Trade

- **Climatezones**
  - Climate

- **Agri-environmental zones**
  - Soil data
  - Farm type allocation
  - Survey data on farm management
An example of mapping farm types to AEnZs

Density of low-intensity farms in agri-environmental zones
Discussion

- SEAMLESS-IF is available as an operational, usable tool.
- Strong dependence between the indicators and the models which are calculating these indicators.
- Priorities for improvement:
  - Agricultural management data.
  - Indicators for biodiversity, qualitative aspects and social dimension.
Discussion (2)

- Important achievements:
  - Integrated database
  - Comprehensive list of indicators across scales

- Vision: Central Toolbox with
  - Indicator calculations
  - Integrated database
  - Models for ex-ante assessment
  - Allowing rapid and standardized assessment of current and future states across scales.
Current organisation

- **SEAMLESS Association**
  - Overcoming fragmentation
  - Maintenance, extension and dissemination
  - Continue the network role
  - Open source

- Network of EU research institutes and universities,

- see

  www.seamlessassociation.org
Thank you for your attention

References: