MERIT - Merit based income from sustainable land management in mountain farming

Work Package 3: Impact on Regional Level
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Methoden – statistische Auswertung
Overview – Work package 3

• Objective of WP3 is upscaling the impact of innovative outcome orientated measures from farm level => regional/international level

• Method: Using Sensitivity Analysis (F. Vester) to develop a network system model
  – based on expert knowledge
  – based on semiquantitative data

• Evaluating model results with expert interviews
Frequently asked questions

• How will effects on species and Biodiversity be?
• How much will it cost?
• How will farmers react on result based schemes?
• How much training for farmers do we need?
• How much efforts do we need for administration and control?
• …
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Upscaling

Mountain Regions

Case Study Region

Pilot farm

Pilot farm

Case Study Region

Pilot farm

Case Study Region

Pilot farm

Pilot farm

Pilot farm

Pilot farm
Working steps

1. 20-25 parameters for system model defined
2. semiquanitative relations between parameters described
3. driving forces within parameters identified
4. szenarios based on driving forces elaborated
5. szenario results with expert survey evaluated
1. Defining 20-25 parameters for system model
2. Describing semiquantitative relations between parameters
3. Identifying driving forces within parameters
4. Elaborating scenarios based on driving forces
5. Evaluating scenario results with expert survey
# 1a. Defining Parameters

<table>
<thead>
<tr>
<th>Name of parameter</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label Marketing/Supply Chains with environmental specifications</td>
<td>Economy</td>
</tr>
<tr>
<td>Input prices for farms</td>
<td>Economy</td>
</tr>
<tr>
<td>Prices for Biodiversity products</td>
<td>Economy</td>
</tr>
<tr>
<td>Percentage of farm income from public</td>
<td>Economy</td>
</tr>
<tr>
<td>Farm income</td>
<td>Economy</td>
</tr>
<tr>
<td>Income possibilities from tourism in the region</td>
<td>Economy</td>
</tr>
<tr>
<td>Diversity of landuse types</td>
<td>Environment</td>
</tr>
<tr>
<td>Grassland use intensity</td>
<td>Environment</td>
</tr>
<tr>
<td>Livestock density</td>
<td>Environment</td>
</tr>
<tr>
<td>Diversity of Livestock</td>
<td>Environment</td>
</tr>
</tbody>
</table>
### 1b. Defining Parameters

<table>
<thead>
<tr>
<th>Name of parameter</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Image of Farmers</td>
<td>Society</td>
</tr>
<tr>
<td>Willingness to pay for biodiversity products</td>
<td>Society</td>
</tr>
<tr>
<td>Farmer willingness/acceptance/motivation for biodiversity</td>
<td>Society</td>
</tr>
<tr>
<td>Attractiveness of Landscape</td>
<td>Society</td>
</tr>
<tr>
<td>Workload for farmers</td>
<td>Society</td>
</tr>
<tr>
<td>Farm land abandonment</td>
<td>Society</td>
</tr>
<tr>
<td>Cooperation between local actors</td>
<td>Society</td>
</tr>
<tr>
<td>Agri-Environmental Schemes</td>
<td>Administration</td>
</tr>
<tr>
<td>Research/Innovation/Evaluation</td>
<td>Administration</td>
</tr>
<tr>
<td>Mandatory environmental regulations</td>
<td>Administration</td>
</tr>
<tr>
<td>Administration/Control of AEM</td>
<td>Administration</td>
</tr>
<tr>
<td>Training and Education on Biodiversity</td>
<td>Administration</td>
</tr>
<tr>
<td>Result based agro-environment schemes (RBAES)</td>
<td>Administration</td>
</tr>
</tbody>
</table>
2. Relations between Parameters

• Scale
  -3 overproportional contradictory / negative
  -2
  -1 / 0 / 1 2 3
2. Relations between Parameters

• Examples
  – *If administration and control (Param.44) of AEM will increase then participation of farmers (Param.41) in AEM will decrease*
  – *If prices for products linked to Biodiversity standards (Param. 13) will increase then livestock density will slightly decrease (Param.24 )*
  – *If training of farmers for biodiversity (Param.45) will be fostered then farmer motivation to take part in AEM and RBAES (Param. 46) will increase*
# Sensitivity Matrix (F. Vester)

<table>
<thead>
<tr>
<th>Param.1</th>
<th>Param.2</th>
<th>...</th>
<th>P.n</th>
<th>Activ-sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Param.1</td>
<td>x</td>
<td>1</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Param.2</td>
<td>2</td>
<td>x</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td>...</td>
</tr>
<tr>
<td>Param.n</td>
<td>-3</td>
<td>1</td>
<td>x</td>
<td>18</td>
</tr>
<tr>
<td>Passiv-sum</td>
<td>15</td>
<td>11</td>
<td>...</td>
<td>5</td>
</tr>
</tbody>
</table>
3. Driving forces in the system

- **Param. 41**: Agro-Environmental schemes (AEM)
- **Param. 45**: Training of farmers for Biodiversity
- **Param. 46**: Result based agro-env. schemes
- **Param. 23**: Grassland use intensity
- **Param. 11**: Label marketing/Direct marketing of products with Biodiversity Standards
4. Szenarios using simulation model

• 5 parameters identified as driving forces
• Modelling effects of increasing / decreasing with simulation model
• Select main effects from modelling
Scenario „Increasing Label Marketing of products with Biodiversity standards“
5. Expert survey

- Questionnaire with results from szenario modelling
- 52 experts from CH, IT, D, FR, AT
- Example: *In case farmers take more part in trainings on „Farmland Biodiversity“, then ...*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Fully true</th>
<th>Rather true</th>
<th>Rather false</th>
<th>Fully false</th>
<th>No opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>... farmers will be increasingly motivated to implement measures for improving biodiversity on their farm</td>
<td>22</td>
<td>27</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>... more agricultural products with clear link to biodiversity standards will be marketed</td>
<td>4</td>
<td>27</td>
<td>15</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>... farm income will increase</td>
<td>1</td>
<td>16</td>
<td>23</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>... biodiversity in alpine cultural landscape will increase.</td>
<td>10</td>
<td>39</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
If RBAES are more promoted, ...

- the intensity of landuse in mountain farming will decrease
- the amount of work for farmers will not change
- farmers need more training on „farmland biodiversity“
- more administration and controlling will be necessary

No opinion or no link with the question
Is fully false
Is rather false
Is rather true
Is fully true
Major advantages of result oriented measures

- More flexibility
- More site-specific and traditional farming
- Higher acceptance by the public
- Additional marketing potential
- More self-responsibility for farmers
- Gaining of know-how on Biodiversity
- Increasing awareness about biodiversity
- Higher motivation and acceptance of nature protection by farmers
- Effectiveness in achieving goals & transparency

Number of mentions

0  5  10  15  20  25
Major disadvantages of result-oriented measures

- Difficult to define the goals and measure the results
- Lack of acceptance by farmers
- More risk in achieving the goal(s)
- More training and education support needed
- Higher costs for administration and control
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Methoden – statistische Auswertung

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