A learning tool for sustainability at a mixed ecological farm

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Sustainable Farm Systems

Operations Control

Business Control

continue

translate

feedback

values
	norms

VISION

LOCAL-SPECIFIC ENVIRONMENT
Mixed ecological farming

- Management characteristics:
  - NO quick-acting instruments
  - Prevention
  - Recycling
  ➔ Chain Management
Management Control

- Negotiation (values/norms)
- Heuristic Problem Solving (learning)
  - Unstructured ➔ Structured
- Operational Control (habituation)
MC model structure and system development

Sustainability Goal Hierarchy

Sustainability Function Deployment

Product Flow Model

Sustainability Management Handbook
Product Flow Model (example)

- *milking cows*
- *milk market*
- *milk*
- *grass/clover*
- *ensilaging*
- *soil nutrients*
- *animal welfare*
- *potato growing*
- *grass/clover seed*
- *seed supplier*
- *silage grain*
- *silage feed*
- *nutrients*
- *manure*
- *surface water*
- *nitrate leaching*
- *nature-value*
- *nature-effect*
- *LEGEND*
- *production unit*
- *external resource*
- *internal resource*
- *soft by-product*
- *product flow*
- *internal resource flow*
- *emission flow*
- *by-product flow*
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### Sustainability Function Deployment

#### property goals-operations relation matrix

**Flow:**
- mown grass/clover
  - from
  - ley growing
  - to
  - grass/clover ensilaging

#### Relations:
- 1 = weak
- 3 = medium
- 9 = strong

#### Property Goals
- Sand content
- Grass/clover ratio
- Dry matter content
- Structure value

#### Operations
- Seed purchase
- Soil tillage
- Sowing
- Growing
- Mowing
- Loading

#### Importance Factor (1-5)

<table>
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<tr>
<th>Property Goals</th>
<th>Seed Purchase</th>
<th>Soil Tillage</th>
<th>Sowing</th>
<th>Growing</th>
<th>Mowing</th>
<th>Loading</th>
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<td>3</td>
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<td></td>
<td></td>
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<td>3</td>
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</tbody>
</table>

#### Determination of Critical Operations
- 1
- 2
- 3
- 4
- 5
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Flow details

**flow:** mown grass/clover  
**unit:** ley growing  

**Evaluation**

**sub goal:** sand content  
**OK**  
**main goal:** butyric acid bacteria spores  
**not OK**  

**diagnose**

**Monitoring**

1. Take 2 samples of 100g of each 5th self loading forage wagon (instr. SAM.323)
2. Determine sand content (instr. DET.316)
3. Write down the results on form SND.325

**preventive measures**

**instructions**

**procedures**

**experiments**

**Soil tillage**
- after tillaging, the land must be as smooth as possible (ST.001)

**Growing**
- regularly check for mole hills and remove them (MH.007)

**Mowing**
- check mower adjustment; re-adjust if necessary (MOW.850)

**Loading**
- use a clean wagon; clean if necessary (WAG.520)
Conclusions

- **Learning tool**
  - Continuous redesign process
  - Translation: sustainability ➔ daily management
  - handbook
    - updated
    - tailored

- **Sustainability emerges with the grip a farmer can get on product properties by monitoring and assurance throughout the complete production process**