**Resource use efficiency and management optimization in dairy farming**

R. Loges, T. Biegemann, S. Chen, P. Schönbach, M. Kämper, M. Schmeer, A. Herrmann, K. Søegaard, I. Sillebak-Kristensen, F. Taube

**Objectives**
- Comparison of farming systems:
  - low input (extensive) vs. high input (intensive)
- Site specifications
- Analysis of typical dairy farming system in Schleswig-Holstein (GER):
  - environmental life-cycle-assessment (LCA)
  - field level sampling (forage production) and farm level investigations

Grassland (leys) at different sward ages (1, 2, and >5 years)
- Pastures
- Meadows
- Maize grown for silage and other forage crops

**Analysis of high- and low-input dairy farms in Schleswig-Holstein (Germany)**

<table>
<thead>
<tr>
<th>Typical: intensive dairy farming system</th>
<th>Alternative: extensive dairy farming system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Input (“Felm”)</strong></td>
<td><strong>Low Input (“Sterup”)</strong></td>
</tr>
<tr>
<td>Keeping of animals</td>
<td>Indoor (12 month)</td>
</tr>
<tr>
<td>Forages</td>
<td>Pasture grazing (&lt;9 month)</td>
</tr>
<tr>
<td>Concentrates</td>
<td>Silage (maize and grass)</td>
</tr>
<tr>
<td>Milk production (kg year⁻¹ cow⁻¹)</td>
<td>Grass-clover silage (wintertime only)</td>
</tr>
<tr>
<td>Stocking rate (LU/ha forage area)</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Farm level investigations** (data collection “from-cradle-to-farm-gate”)
- Emissions from processing and transport of external inputs
- Emissions from the use of external inputs

**Field level measurements** (directly measured at different forage production/pasture sites)
- N₂O-fluxes
- Nitrate leaching
- Soil C-seq
- Productivity

**Comparative ecological assessment**
- e.g. CARBON FOOTPRINT MILK

---

**Fig. 1: Location of experimental sites / cooperation farms** funded by the Interreg4A-programme