SOLID | Sustainable Organic and Low Input Dairying

Sustainable dairy production with large amounts of home-grown feeds A case study within SOLID (EU-project)

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SEVENTH FRAMEWORK PROGRAMME

SOLID - Sustainable Organic and Low Input in Dairying

- **EU FP7 project** www.solidairy.eu
- 25 partners from 10 different countries
  - Coordinator Prof. Nigel Scollan University of Aberystwyth, Wales, UK
  - Universities, Research Institutes, Knowledge Centres and 10 SME's
- Total budget 2011-2016
  - 7.75 M€,
  - whereof EU contribution 5.96 M€

SOLID | Sustainable Organic and Low Input Dairying

SOLID – Sustainable Organic and Low-Input Dairying

- Use the latest scientific techniques to help **cows and goats to adapt to organic and low-input systems**, with few or no chemicals and artificial feedstuffs.
- Develop new and sustainable **foodstuffs** and improve the quality, yield and management of **forage crops**.
- Assess and improve **grassland dairy systems**, including home-grown forage supplies.
- Develop new methods and strategies and improve **collaboration along the supply chain**, from farm to fork.
- Share the **knowledge** with groups of farmers and the dairy industry in order to make the most of the project's successes at all levels.

SOLID | Sustainable Organic and Low Input Dairying

Definition of Low Input

Includes total farm expenditure of

- Purchased feed (for grazing livestock)
- Fertiliser
- Crop protection
- Energy

-> expressed as € per Grazing Livestock Unit (€/GLU)

Classes were defined:

- Low Input (LI) (419 € /GLU)
- Medium Input (MI)
- High Input (HI)

Data for conventional, Low Input and Organic dairy farms (EU 27 data)

	Conventional	Low Input	Organic
Forage area, ha	28	20	41
Dairy cows / farm	30	17	26
Own land, %	66	75	70
Total Labour, AWU	1.97	1.62	1.87
Family Labour, %	93	96	92
Milk yield, kg/cow/year	5 400	3 950	5 120
Milk Production, tons/farm	205	85	160

8 work packages make up the project

1. Innovation through stakeholder engagement and participatory research
2. Adapted breeds
3. Novel feeds and decision support models
4. Develop a knowledge platform to assess environmental sustainability
5. Supply chain and consumer analysis
6. Socio-economic evaluation
7. Knowledge exchange, training and innovation
8. Management

WP2: Performance of different breeds and cross-breeds in low input systems.

Genetic and metabolic measures

- **Northern Ireland**

  Crossbred Jersey – HF - Swedish Red

- **Austria** - Holstein (bred for lifetime performance not high lactation yield) v Brown Swiss
- **Finland** - Finnish Ayrshire selected for index including fertility and health traits vs Holstein
  - Productivity, animal health, milk quality

WP3: Forages for productivity, quality, animal health and welfare in organic and low input dairy systems

Exploring novel forages including by-products:

- Eg Agroforestry by-products (willow)
- By-products of olive oil and tomato production
- Full-fat or locally extracted rapeseed cakes
  - Two publications

- Analysis to identify potential feeds
- Feeding experiments in Romania

Feeds included in the Literature review

Camelina, Crambe and Safflower meals

Lupin by-products

Olive leaves, Olive cake, Tomato pomace

On-farm produced rapeseeds

Buckwheat, mustard and Canary seed

Wood by-products, Agro-forestry

Reduced fat and high protein distillers grains, pea, bean, chickpea and lentils

WP4: Environmental assessment For improvements and communication in organic and low input dairy systems

Objectives:

- To develop and apply Life Cycle Assessment (**LCA) based tools** for producing indicators for environmental sustainability assessment of diverse **multi-functional** dairy systems (process approach)
- To identify the **sustainability hot spots** in important low input and organic dairy chains (system approach)
- To **integrate the LCA** approach to other sustainability indicators used in chain approaches
- To analyse the **eco-efficiency and sustainability gains** from innovations at the farm and chain level (policy approach).

WP5: Competitiveness of organic and low input dairy sector: Supply chain and consumer analyses

Objectives:

- To identify **expectations for innovation** in management practices and adapted breeds along the whole supply chain (fork to farm)
- To assess the **acceptability of novel strategies** (developed in WP1, 2 and 3) along the whole supply chain, with special consideration to consumer acceptance and preferences, and the sustainability of supply chain management practices
- To identify **optimal strategies** to enhance collaborative behaviours in supply chains in order to introduce acceptable innovations enhancing competitiveness and sustainability along the whole supply chain.

WP6: Socio-economic evaluation of novel strategies in organic and low-input dairy farming

Objectives:

- To develop a methodology for **classifying low input dairy farms** and to provide baseline data to identify **factors** that have led to the **profitability** of high performing dairy farms
- Assess the effect of novel strategies on EU dairy typical farm types through farm scale and sector scale **modelling** of proposed novel strategies
- To **determine the policy implications** of more widespread adoption of novel strategies developed within the SOLID project in contrast to further intensification of milk production within the EU.

WP7: Knowledge exchange, training and dissemination

Task:

- Analyse the outputs from WP1 to 6 in order to
  - identify the stakeholders for each deliverable
  - use innovative and participatory methods in dissemination

Stakeholder groups:

- dairy farmers
- milk processing/animal industry
- consumers
- NGOs
- scientist
- policy makers

WP1: Innovation through stakeholder engagement and participatory research

Aims:

- to actively **involve farming stakeholders** (dairy farmers, farmer groups, farm advisors) and stakeholder partners in a co-ordinated participatory approach
- to identify **research needs**
- to engage **producer innovation** in the development and implementation of research projects
- to assess stakeholder-led **novel strategies** at the farm level

How are farmers involved?

10 per country have undertaken whole farm sustainability assessments (Rapid Assessment Tool - RAT)

- Helping to identify research needs
- Suggesting novel ideas to test or monitor
- Providing data for analysis
- Hosting on-farm research

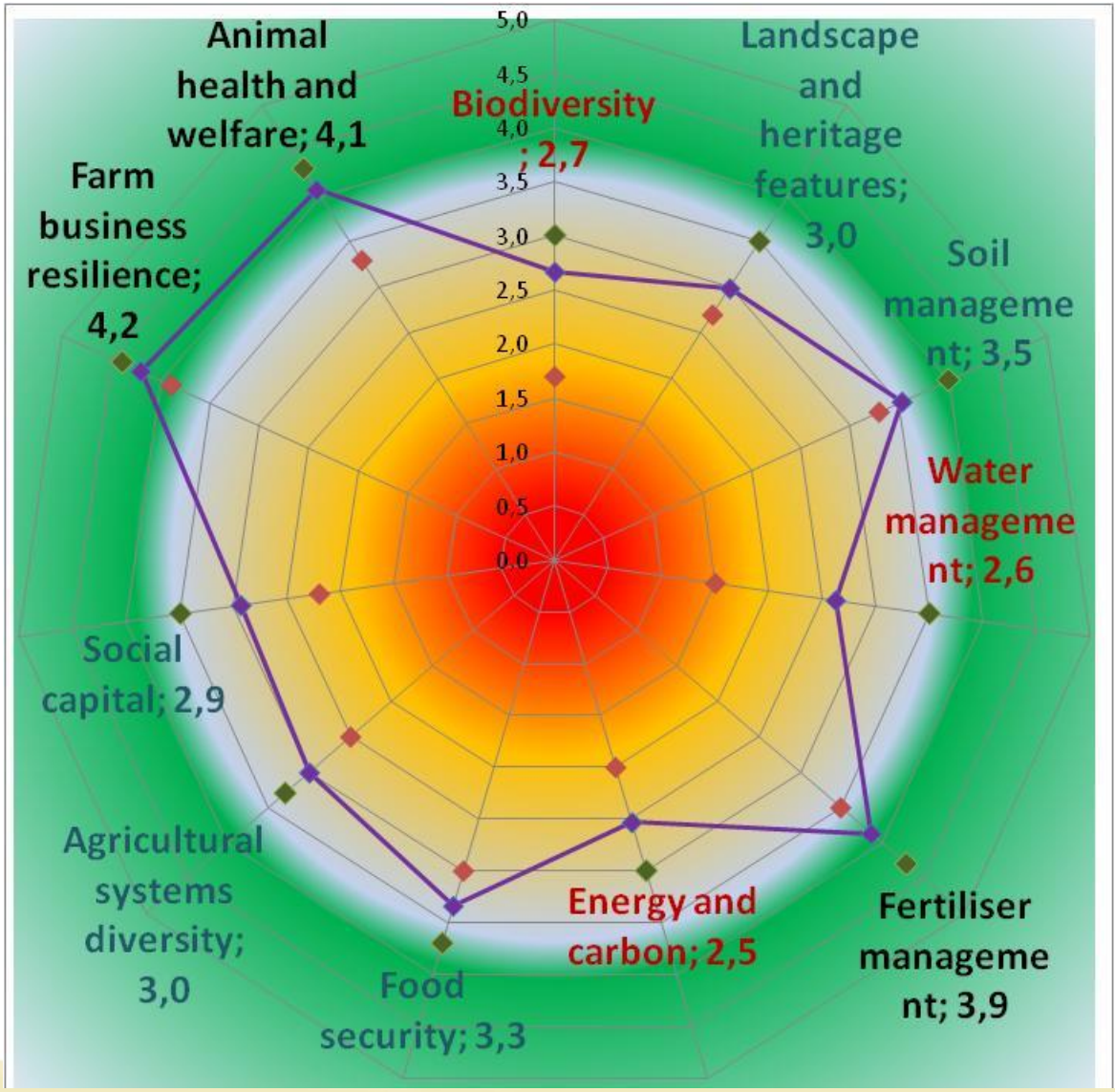
Rapid Assessment Tool Exercise for Sustainability

Aim:

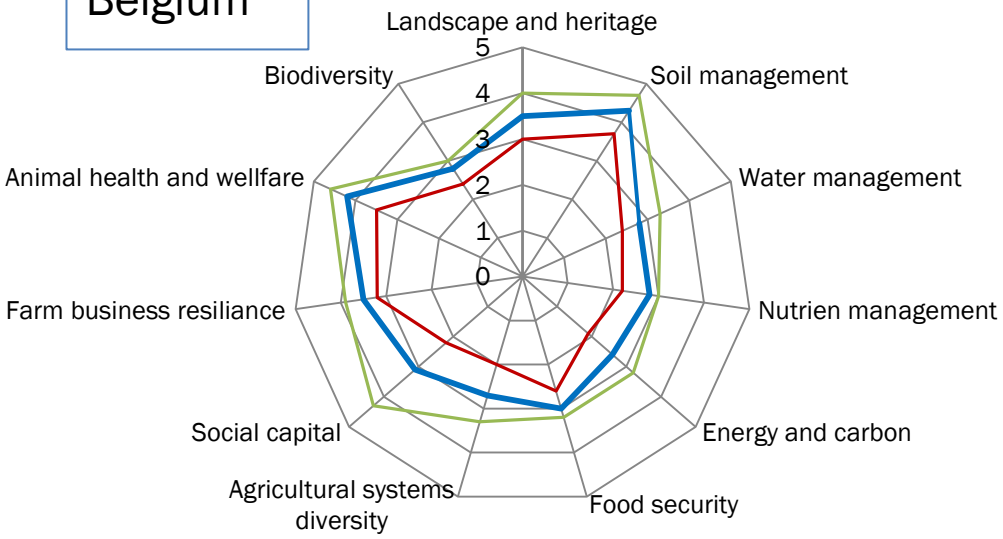
- to describe innovative production systems with strengths and weaknesses (productivity & sustainability)
- inform research needs
- Half a day on a farm

RAT results, Finland

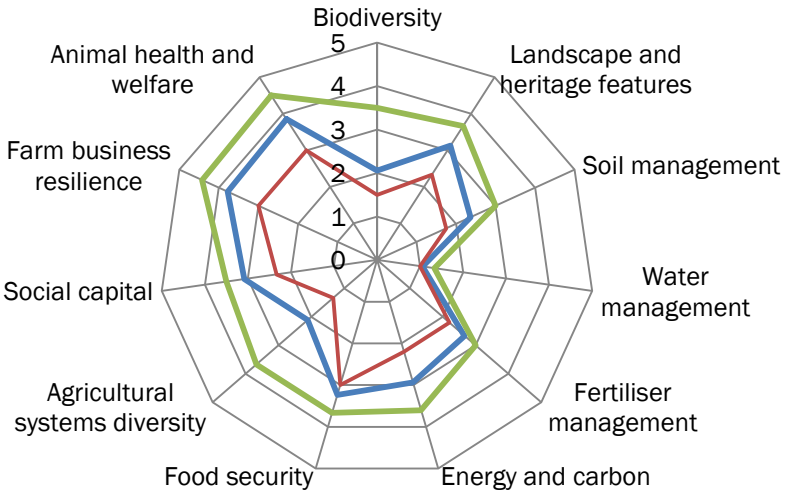
- 7 organic dairy farms
- 19 years in organic production (15-24)
- Mean size 139 ha (18-414)
- 20-170 ay/farm



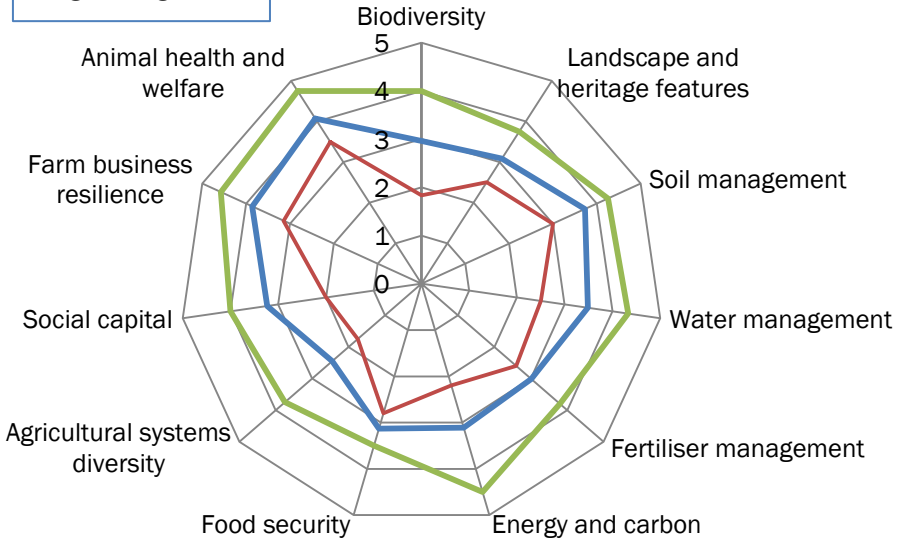
Belgium



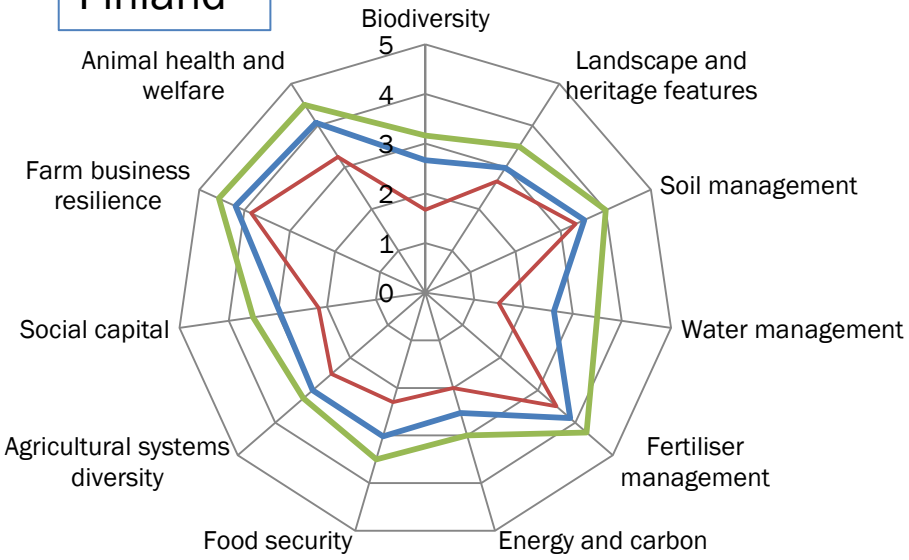
Austria



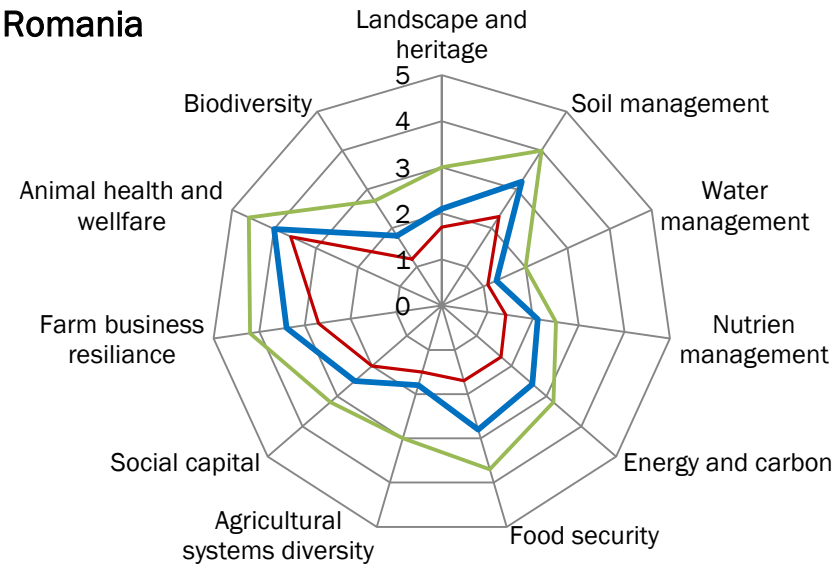
Denmark



Finland



Romania



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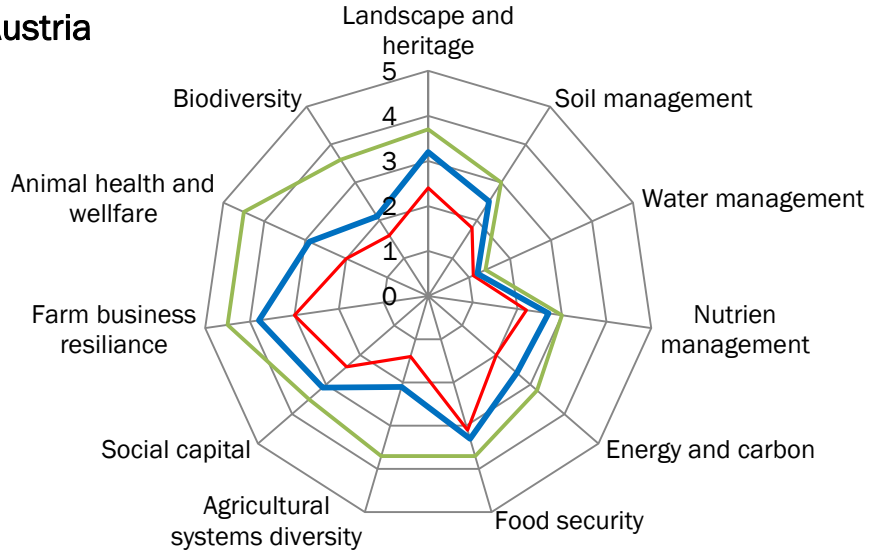
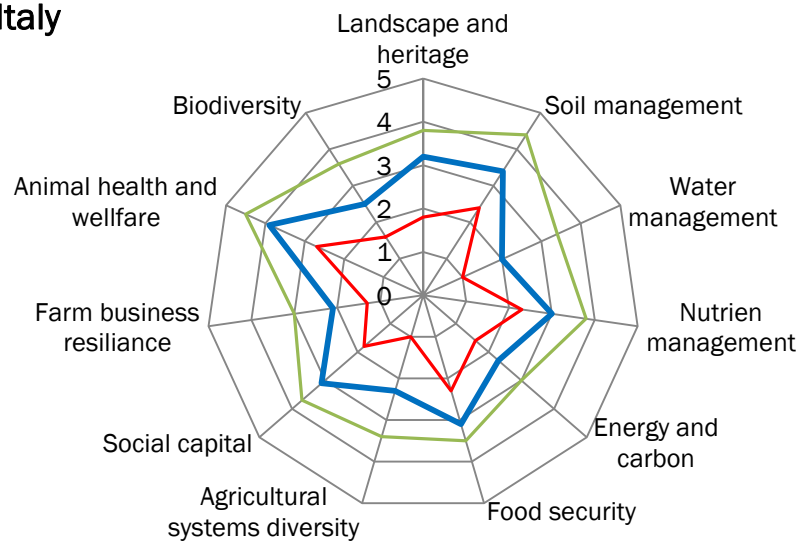


Italy



Topics for on-farm research in Finland

Aim: Increase home-grown protein production (forage and concentrate) in organic dairy farming

- How to increase the **clover content of the first cut** of red clover grass silage by increasing the clover content of the yield -> pinch cut in May
- How to increase the **protein content of the grass** in the first cut of clover/grass silage –> slurry in the autumn
- What are the best techniques to **establish a winter turnip rape** crop
- How does the protein produced by faba bean and **blue lupin** compare to **peas?**

Pinch cut of red clover-grass ley in May to increase the protein content of the ley in the first cut in June

Winter turnip rape

Blue lupin + spring wheat

Blue lupin

- 5% of the total yield
- Analyses of lupin:
  protein 336 g/kg,
  raw fiber 144 g/kg,
  raw fat 88 g/kg

Faba bean + spring oats

Faba bean

- 28% of the total yield
- Analyses of faba bean:
  protein 318 g/kg,
  raw fiber 88 g/kg,
  raw fat 21 g/kg

Pea-oats-wheat vs. Faba bean-oats-wheat for whole-crop silage

Florida-pea

Tangenta-faba bean

	DM	Protein	D-value	NDF
Pea	185	165	639	413
Faba bean	136	175	672	496