



TECHNICAL NOTES ON SUSTAINABLE ORGANIC AND LOW-INPUT DAIRYING



The SOLID Farmer Handbook

Introduction

There is increasing recognition of the ability of organic and low input systems to deliver a variety of benefits, but the same systems are faced with a number of constraints including how to develop appropriate breeding and feeding strategies and deal with health, welfare, financial and environmental challenges, all of which sit within the frame of uncertain policy support and volatile markets. Much of this relates to a lack of knowledge about such systems.

The SME partners and researchers have collaborated closely with farmers in many project activities, ranging from dairy goat producers in Greece and Spain to dairy cow producers with large and small herds, from Romania to Finland.

As an illustration of the great diversity, overall, farms included landless dairy goat farms in Spain and Flanders, goats that ranged over more than 300 ha of common land in Spain and Greece, and dairy cow farms above 200 ha in Denmark and UK. Herd sizes ranged from nine cows (Finland) to over 300 cows (Italy, Denmark, UK) and 22 goats (Spain) to 1150 goats (Flanders), with milk sales for cows both under 3000 l/year (where cheese is also made) and over 10,000 l/year, and for goats between 117 and 900 l/year.

To identify research priorities sustainability assessments were carried out on more than 100 dairy farms (organic/low-input) in nine countries across Europe, followed by workshops where the results were discussed and potential topics for research identified.

The process of the farm sustainability assessment was largely viewed positively by farmers, SME partners and researchers. The output of the tool illustrated differences between countries and between cow and goat enterprises (see box). The most valuable outcome of using such an assessment tool was to encourage discussion about sustainability in its widest sense.

Farmers suggested a range of research topics related to: Feeding, Forage production, Soil and nutrient management, Breeds and breeding, Animal health and welfare, Product differentiation and marketing and Energy use. To identify the final topics of study farmers and researchers worked together to narrow down the questions, identify other research that had been done elsewhere and look for specific farms where any trial could be carried out (see Table 1). Reports of these farmer-led trials can be found at www.solidairy.eu/index.php/participatory-on-farm-research-in-solid/

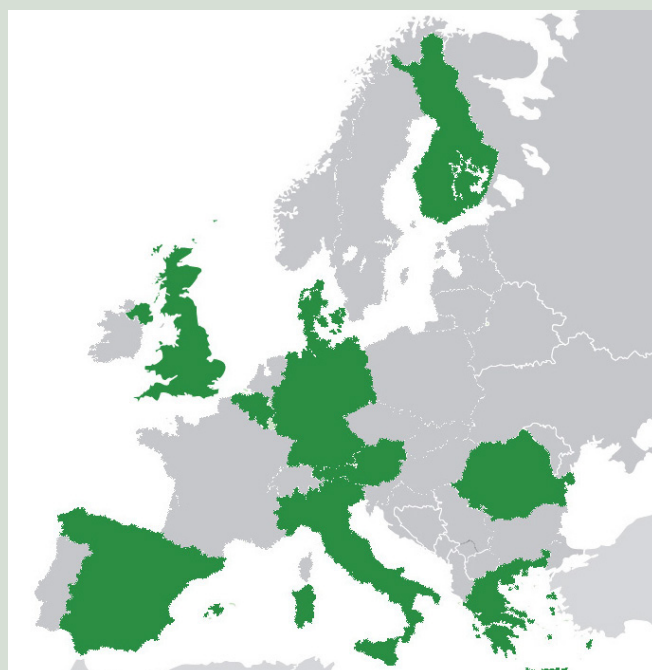
In this series of technical notes we are presenting a selection of results and recommendations of the work undertaken in SOLID aimed at those working in such industries. The results are derived from the participatory research but also from more traditional scientific experiments carried out as part of the SOLID project. The project has also produced scientific articles, reports, workshops and E-learning materials which are referenced in the notes which can be found at www.solidairy.eu/



Introduction to SOLID

SOLID was a European project on Sustainable Organic and Low Input Dairying, financed by the European Union.

For five years (2011 to 2016) agricultural scientists and farming experts from 25 institutions in ten European countries worked together in order to develop new knowledge and methods to improve the sustainability of the organic and low-input dairying systems in Europe. Nine of the project partners were SMEs working with low-input and organic dairy farmers (including co-operatives, advisory services and one organic certification body). The project was co-ordinated by the Institute of Biological, Environmental and Rural Sciences at Aberystwyth University, UK.



SOLID partners in the UK, Denmark, Austria, Italy, Belgium, Finland, Greece, Spain, Romania, Germany.

Organic/low-input farming

Organic farming is clearly defined through the EU regulations (<http://ec.europa.eu/agriculture/organic>) for organic production that all organic farmers have to follow.

The term low-input is not clearly defined for dairy farms. In the SOLID project, we used the Farm Accountancy Data Network sources to identify low-input farms. We calculated the total costs of purchased concentrated feed and fodder for grazing livestock, costs for fertilizers crop protection energy and fuel divided by grazing livestock units and considered the 25 % of farms with lowest external input use as low-input in each country (see also Technical Note 10).

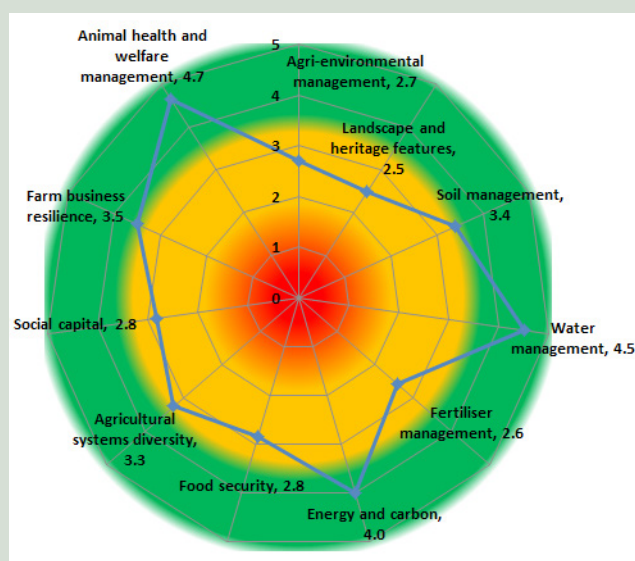
Table 1: Farmer-led research in SOLID

Topic	Approach	Country
Feeding and forage		
Home-grown proteins	On-farm trials	Finland
Use of by-products	On-farm trials	Spain, Romania
Irrigation of pasture	On-farm trials	Greece
Animal management		
Reducing antibiotic use	Moderated discussion group followed by on-farm trials	UK (with Duchy Future Farming Programme)
Herbs in pasture	Comparative case studies	Denmark
Maternal /nurse cow rearing of calves	Farm case study with monitoring of calf growth	UK and Denmark
Impact of farm practices on concentration of iodine in milk	Comparative farm case studies	UK
Natural resource use and environmental impact		
Soil management, pasture productivity and grazing	Farm case study with monitoring of forage production	UK
Responding to climate change	Moderated discussion group and farm case studies	Denmark
Impact of different protein sources on carbon footprint	Case study using LCA (Life Cycle Analysis) method	Italy
Impact of intensification on biodiversity	Comparative farm case studies with assessments and modelling	Austria

Outcome of the sustainability assessment

The sustainability assessments carried out in the SOLID project indicated that the organic/low-input dairy systems studied have their greatest and most consistent strengths in terms of farm business resilience; contributing factors to this strength are diversification (which is not always possible for a dairy farm), and a specialist market for the product. On-farm processing and marketing are beneficial to both organic and low-input dairying, but need more support in most countries. Organic producers have a specifically defined product that requires better marketing and outlets. Low-input producers can use a variety of aspects of their products to market them, but need to be proactive and creative in this respect. Profitability can also be improved by cutting costs and examples of farmers seeking to do this in innovative ways were reported. This includes extending lactations (mainly on goat farms) and moving to once a day milking. Improving energy self-sufficiency was also mentioned. Many farmers clearly have concerns about the economic survival of their businesses. Animal health and welfare appeared from the assessments to be a strength, yet farmers still aspire to greater improvements, being aware of the importance for productivity, consumer image, and the animals themselves.

The weaknesses relevant to sustainability as identified by the tool varied between countries. Water management appeared as a weakness of some systems, both in regions where water is plentiful, and also in some areas dependent on irrigation (e.g. parts of Italy and Romania). This is clearly important in view of the likely increase in extreme weather patterns with climate change. Breeding plant varieties and developing crop management systems for extremely high or low amounts of rainfall were suggested as research topics by farmers. The 'classical' indicators of environmental sustainability, i.e. management of soil, water and nutrients, and energy and carbon resources, all show considerable variation in the majority of countries, indicating that there is the potential for poorer performing farms to improve.



Example farm results: cobweb (0 is poor performance, 5 is good). See <http://www.solidairy.eu/index.php/case-farms/>

The technical notes

The technical notes cover three thematic areas which we believe are particularly important for organic and low-input farming: feeding of ruminants with forage-based diets and home-grown feeds; animal management for health and welfare; and wider issues of the environment and economics.

Feeding of ruminants with forage-based diets

The principal challenge that organic and low-input farmers face is how to increase milk from forage; this is closely correlated with profitability and yet many producers are not achieving satisfactory performance. Specifically this means increasing forage yields, improving the grassland management and correct ration formulation in order to maximise milk from forage. Given the range of conditions across Europe different solutions will be required to suit individual circumstances including the selection of suitable breeds of animals.

Animal management for health and welfare

There is an expectation that there are some breeds better adapted to organic/low-input conditions, but there is also considerable variability between different organic and low-input systems. There is a need to set specific breeding goals for a specific farm. Many improvements in cow health can be achieved by removing the causes of stress for cows and people. SOLID looked into practices such as suckled calf rearing systems as well as the use of trees to provide shelter.

Wider issues of environment and economics

Dairy farmers are faced with challenges related to the carbon footprint of ruminants, wider issues of sustainability of farming and the supply chain as well as a global collapse of conventional milk prices and the uncertainty of support payments. One advantage of low-input and organic production can be lower inputs costs, but farmers also need to reflect on how the market (including a growing market for organic dairy products in Europe and around the world) and other factors will impact on their economic sustainability.



Technical note	Topic
	Feeding of ruminants with forage-based diets
1	Energy requirements and ration planning for low-input dairy cows
2	Feeding home-grown protein and novel feeds to dairy cows
3	Use of diverse swards and 'mob grazing' for forage production
4	Trace element management in organic dairy cows
5	Vegetable by-products for feeding dairy goats
	Animal management for health and welfare
6	Breeding cows suitable for low- input and organic dairy systems
7	Low-input antibiotic strategies: improving animal health & welfare
8	Rearing calves on milking cows: key points to consider
	Wider issues of the environment and economics
9	Carbon footprint and biodiversity assessment in dairy production
10	Profit on low-input and organic dairy farms
11	Strategies to increase sustainability for the supply chain & consumers
12	Agroforestry for livestock systems

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Sustainable Organic and Low-Input Dairying

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