Executive Summary

Introduction

The objective of this report is to present information on research needs to support improvement of sustainability of organic and low input dairy farms in the EU which could be addressed with on-farm projects. The report describes the execution and findings of two tasks in Work Package (WP) 1 of the SOLID project: 1) Case studies using a rapid sustainability assessment on a total of 70 organic and 32 low input dairy farms in nine countries across Europe and 2) a series of workshops held in these countries, designed to discover farmers' views of research needs relating to aspects of sustainability. A total of 72 dairy cow farms from Austria, Belgium, Denmark, Finland, Italy, Romania and UK, and 30 dairy goat farms from Flanders, the Netherlands, Greece, Spain and Italy were involved in the case studies. The farms were associated with the SME (Small and Medium Enterprise) partners in the project, which included co-operatives, advisory services and an organic certification body.

The case studies were intended to "set the scene" for organic or low input farms (depending on the SME involved) within each country, and encourage farmers to consider sustainability in its broadest sense, by discussing relative scores, rather than to obtain an "absolute value" for sustainability, or fully representative information for a country. The results were used to help to instigate focussed discussions in farmer workshops. Research needs identified through both steps will form the basis of plans for Participatory Research projects relevant to improving the sustainability of Low Input and Organic dairy farms in the next phase of the SOLID project in seven countries.

Methods for sustainability assessment

Sustainability was assessed using the PG (public goods) tool developed at the Organic Research Centre, after some modifications to make it more suitable for use in this task. The PG tool assesses each individual farm across 11 "spurs": Soil Management, Biodiversity, Landscape and Heritage, Water Management, Nutrient Management, Energy and Carbon, Food Security, Agricultural Systems Diversity, Social Capital, Farm Business Resilience, and Animal Health and Welfare. The tool is constructed as an excel workbook with a worksheet for each spur. It makes use of information which the farmer will already have available (e.g. farm accounts, cropping records, animal health plan) resulting in a radar diagram giving a visual impression of the stronger and weaker activities contributing to the sustainability of a farm and can be completed in approximately four hours.

National partner representatives carried out the assessments in each country.

Approximately ten farms were chosen in each country, to illustrate the range of farms connected

with the SME involved in the project, in terms of:

- Size
- Intensity/level of input use
- Commonly used breeds
- Marketing channels/type of product (e.g. milk, cheese)
- Geographical areas where these systems are found

Partners were encouraged to include up to three novel or innovative systems.

Results of Case Studies of Sustainability Assessment

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 10000 l/year, and for goats between 117 and 900 l/year.

The assessment exercise was largely viewed positively by the farmers and researchers but some questions and concerns about certain parts of it, and specific data that the tool requires, were also expressed. The output of the tool was able to illustrate differences between countries, and between cow and goat enterprises. Strengths revealed were more consistent between countries than weaknesses. The most variable spur across countries was “Water Management”. Low scores occurred both in regions where precipitation is high (e.g. Austrian mountains) and where irrigation is needed (Italy).

The highest scoring spur was consistently “Animal Health and Welfare”. This finding should be treated with some reservation because the nature of the assessment relied to a large extent upon the existence of herd health plans and farmers’ subjective opinions of their animals’ facilities and freedoms. Scores for goat farms were lower than for cow farms on this spur. The next highest scoring spurs overall (for both cows and goats) were “Farm Business Resilience” and “Soil Management”. Both were quite varied between countries. “Farm Business Resilience” was on average lowest in Italy and highest in Finland, but the country averages conceal considerable differences between farms, particularly in Romania (with a wide range of flexibility and risk management) and Finland (where financial viability, vision and strategy were quite variable).The lowest scoring spur for cow farms overall was “Biodiversity”. This may be influenced partly by the design of the tool which focuses on agri-environmental management rather than directly measuring biodiversity indicators, and partly by the fact that farmers do not have the opportunity, finance or perception of importance, to invest much time and money in supporting biodiversity. For goat farms the lowest scoring spur was “Agricultural Systems Diversity”, indicating that these were generally very specialised farms. The “classical” indicators of environmental sustainability: 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

capability for poorer performing farms to improve. In particular, farmers' attitudes to water management may need to be altered: even in dry areas there was need for a greater understanding of the importance of water management. In some countries it appeared that national legislation directed, but perhaps also restricted, farmers' concepts of sustainable practices, particularly with regard to nutrient use. Efficient energy use or reduction of fossil fuels received varying degrees of interest – e.g. very little in Greece where goat farms without electricity exist, and more in the UK where farmers have been made aware of "carbon footprint" or Greenhouse Gas emissions by government and industry activity.

Farmer Workshops

To maintain consistency between countries the workshops held to discuss research priorities followed a set protocol which included presentation and discussion of the results of the sustainability assessment. The ultimate aim of the workshop was to identify suitable topics for on-farm participatory research. Inevitably, discussions included topics that could not be solved with this type of work, and some cases where information is already available, but these contributed to understanding farmers' needs.

Research Themes Proposed

Overall, farmers felt that research specifically designed to provide answers for organic /extensive / low input production was lacking and they welcomed the opportunity to be involved.

Across all countries, topics suggested can be summarised under the headings of: Feeding (including protein sources, forage production, feeding of forage and concentrate), Soil and Nutrient Management, Breeds and Breeding, Animal Health and Welfare, Product Differentiation and Marketing, and Environmental Issues. Although there was some variation between countries, there were many common themes.

Feeding

This topic was mentioned in all countries, particularly regarding improving the productivity, reliability and utilisation of forage, and producing as much feed as possible on the farm. Increasing the capacity for production of homegrown protein was always featured, with suggestions of learning more about the cultivation and feed value of protein rich feeds and forages such as lupins, beans, and lucerne. Despite existing information many dairy farmers are not confident about growing these crops themselves. Other aspects included investigating equipment and energy for drying forage (Austria), plants as sources of minerals (Belgium and Romania), and drought resistant plants (Italy, Romania, Spain and even parts of the UK). There was also an interest in the nutritional value of diverse pasture and analyses of the plants that are eaten in the pasture or when goats are browsing (Italy, Greece, UK, Austria).

Interest in diverse pasture was also linked to market opportunities, through implications for product composition, particularly in Austria and Italy, and animal health, through the medicinal

properties of herbs and concentration of minerals in deep-rooting plants.

Soil and Nutrient Management

In some countries, farmers considered that a better understanding of the soil was needed to support better feed and forage production, and suggested research into topics of increasing soil carbon and organic matter, addressing the depletion of available P, and rapid soil analyses (UK). Austrian farmers discussed the nutrient value and optimal use of manure, but it is considered that there is a considerable body of information available on this.

Breeds and Breeding

Despite considerable ongoing research, breeding for animals best suited to low input and/or organic systems was raised in Denmark and Austria. There was an interest in cross-breeding in Italy, and in the UK, in investigating whether specific breeds/cross breeds have greater longevity. Goat breeding was also mentioned with Greek farmers suggesting making the genetic improvement of goat breeds more efficient and investigating the link between milk quantity and quality and goat breed.

Animal Health and Welfare

Despite high scores for the animal health and welfare spur, many workshops identified at least one health or welfare issue where farmers felt a need for further research. The areas, however, differed between countries, including, for cows, mastitis control using fewer antibiotics (UK), improving health and longevity (Finland), and parasite control (Flanders/Netherlands). For goats, topics included optimal vaccination programmes and housing to allow natural behaviour, with an interest in the consequences for productivity (Flanders/Netherlands), assessing the parasitological status of extensive herds, and determining risk factors for neonatal losses and sub-clinical mastitis (Greece). In many of these subjects, information is available and knowledge transfer within and between countries is clearly needed.

Environmental Issues

Denmark and Finland showed the greatest concern about issues related to energy, the physical environment and aspects of climate change, perhaps as a result of awareness raised by national policies and legislation. Suggestions made were demonstrations of energy saving practices, and ways of re-using water (Belgium and Denmark).

Product Differentiation and Marketing

Farmers were also interested in developing the market for their products. Among Dutch goat farmers there was interest in how best to communicate with consumers regarding the premium on their products whereas in Finland there was concern about the lack of an organic beef market. Greek goat farmers in common with Romanian cow farmers expressed an interest in adding value

to the market product and in novel approaches to the supply chain. Some good examples existed in most countries.

Conclusions

These case study farms illustrate the enormous diversity in organic and low input dairy systems in the EU. Farmers' considerations of sustainability generally begin with economic sustainability. The most valuable outcome of using the sustainability assessment tool was that it encouraged farmers to think about wider aspects.

The sustainability assessment indicated that the organic and low input dairy systems studied have one of their greatest and most consistent strengths in terms of farm business resilience. This is helped by diversification, and a specialist market for the product (either as an organic product or with another specialist feature, e.g. traditional, locally produced). On farm processing and marketing are beneficial to both organic and low input dairying, but need more support in most countries. Profitability can be improved by cutting costs and examples of farmers seeking to do this in innovative ways were reported. These included extending lactations (mainly on goat farms) and moving to once a day milking. Examples of improving self-sufficiency in terms of both feed and energy production were seen.

The weaknesses in sustainability as identified by the tool vary more between countries than the strengths. Water management appeared as a weakness of some systems, both in regions where water is plentiful, and also in some areas dependent on irrigation. Low scores in the biodiversity spur can partly be explained by the way the tool assesses grassland systems, and improvements in the assessment could be made. The "classical" indicators of environmental sustainability: 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 capability for poorer performing farms to improve.

The research topics arising across all countries can be summarised under the headings of: Feeding (including protein sources, forage production, feeding forage and concentrate), Soil and nutrient management, Breeds and breeding, Animal health and welfare, Product differentiation and marketing, Energy use and Water management. In many of the areas mentioned by farmers there is considerable existing knowledge and/or ongoing research, but knowledge transfer is clearly needed.

More specific topics mentioned in more than one country include:

- Self-sufficiency in protein – growing protein-rich crops
- Grass and clover varieties for grazing and organic systems
- Increasing persistency of clover
- Home-grown feeds and forages for drought conditions and supplementing grazing during drought
- Feeding by-products

- Rapid evaluation of feed value
- Milk production from diverse, herb-rich swards – including productivity, animal health, soil health and product quality
- Maintaining soil fertility in organic systems
- Breeding animals for low input systems and longevity
- Reducing (subclinical) mastitis and neonate losses
- Controlling parasites
- Developing new products and markets
- Alternative energy sources

Farmers' discussions and research suggestions show that forage remains the basis and centre of organic and low-input milk production systems. Farmers know that good use of forage is of vital importance for low-input and organic dairy farms; however, there is lack of confidence in the reliability of forage production systems, both in quantity and quality. There is a need for a greater understanding of soil processes, and how to maintain soil fertility, particularly in organic systems. Although the animal health and welfare spur of the tool scored highly, the farmers indicated knowledge gaps and research needs in this area, which is important for productivity and consumer image, as well as for the animals themselves. It should be noted that some of these gaps in each topic can be filled by knowledge transfer. The overlap of interests between countries means that there is great opportunity for exchange of information and ideas. This applies not only to new knowledge to be generated by SOLID but also to transfer of existing knowledge. Greece and Romania in particular need more information in their native language.

Potential Stakeholder impact(s)

- Guidance for members of the supply chain, researchers and policy makers on aspects of dairy farming where research can make a difference and improve sustainability of dairy farms.
- Information on novel and best practices that can be shared between countries.

Interactions with other WPs Deliverables / joint outputs

WP no.	Relevant tasks	Partner(s) involved	Context of interaction
6	6.1.1	ABER, ILVO	Comparing selected farms with the "Low-input " threshold developed in Task 6.1.1
3	3.1	MTT, CSISC, INCDBNA	Information on current use of novel forages and farmers' interests in experimenting with these
6	6.2.2	EV-ILVO	Information from Case Studies to build into the model
6	6.2.3	EV-ILVO	Farmers' opinions on design of the participative model, what should be included, how it should be designed
2	2.3	DAPVET	Initial contacts with goat farms made in WP1.