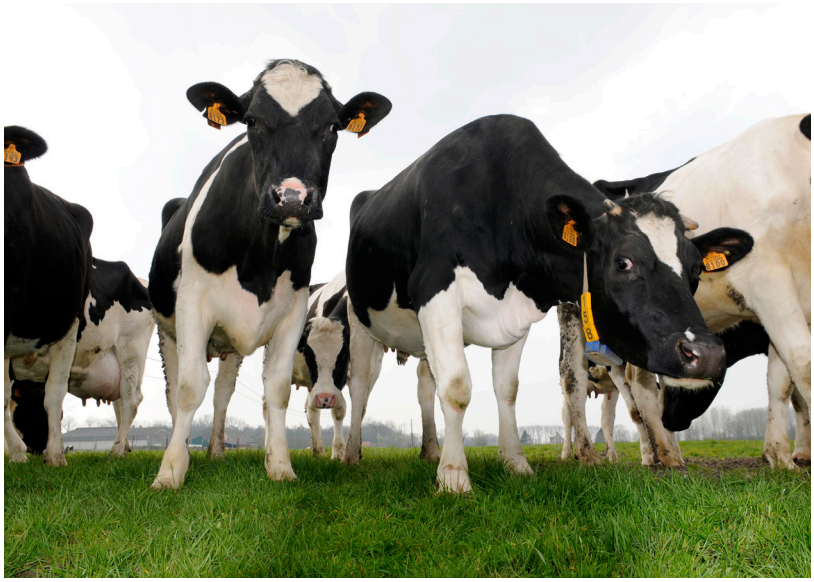
SOLID | Sustainable Organic and Low Input Dairying

Profit on low-input and organic dairy farms



Introduction

Conventional dairy farms increasingly use so-called external inputs like concentrates, fertiliser or crop protection products. Higher productivity resulting in better economic performance is the main incentive for applying this high input (HI) production method. However, abundant input use also results in environmental problems like nutrient imbalances, water and air pollution and biodiversity losses. Farming systems with a lower external input (LI) use and organic farming (ORG) can cope with these problems. It is, however, not always clear whether they are sufficiently profitable to compete with the HI production method.

This leaflet aims at examining the main drivers for competitiveness of HI, LI and ORG dairy farming. Organic farming is clearly defined through the EU regulation 834/2007 and the various implementing rules that all organic farmers have to follow, whereas no clear definition exists for LI farming. Therefore, this leaflet first describes how we defined LI dairy systems throughout Europe. We will then illustrate what these farms look like, what they produce and how they use their production factors based on the information we can extract from the European Farm Accountancy Network. Profit evaluation of these types of dairy farms is illustrated for three countries.

What is low-input dairy farming?

Contrary to organic farming, LI dairy farms are not defined by a legal definition in the European legislation, and in official farm business monitoring carried out throughout Europe such farms remain hidden in the group of conventional dairy farms. Different approaches exist as to how to look into LI dairy farming, by looking at low levels of external input use, at farms adopting production strategies with a high nature value (e.g. based on permanent grasslands) or at farms that use their inputs in such an efficient way trying to maximize the produced outputs.

In the SOLID project, we analysed the profitability of dairy farms throughout Europe. The European Farm Accountancy Data Network makes this evaluation possible. A disadvantage of FADN however is that there is a delay before the data can be used and the dataset consists of whole farm economic data. As such, the data set contains very few enterprise specific data and technical data. Based on an exploratory analysis and a literature review, we decided to define LI farms based on an indicator that relates external inputs used, relative to the grazing livestock units on the farm (see Table 1). At the country level, we considered the 25% of farms with lowest input use as LI farms and the 25% of farms with the highest input use as HI farms. Organic (ORG) farms were examined as a separate group.

In this leaflet we have focused on the results of an analysis in three countries and compared them with a European wide analysis (27 countries) of which the results are not presented here. These three countries are: Finland, Spain (except organic) and United Kingdom.

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Farm structure information

In Table 1, some farm structure variables for Spain, Finland and UK are discussed for the accounting year 2011. The accounting year 2011 was chosen because it was considered to be best most representative year considering the accounting years 2004 to 2012; later data were not available EU wide when the analysis was done. The country results are discussed in more detail and compared with some general conclusions from the European level analysis (not presented here, see Hamerlink *et al.*, 2014). All differences discussed in this technical note are statistically proven.

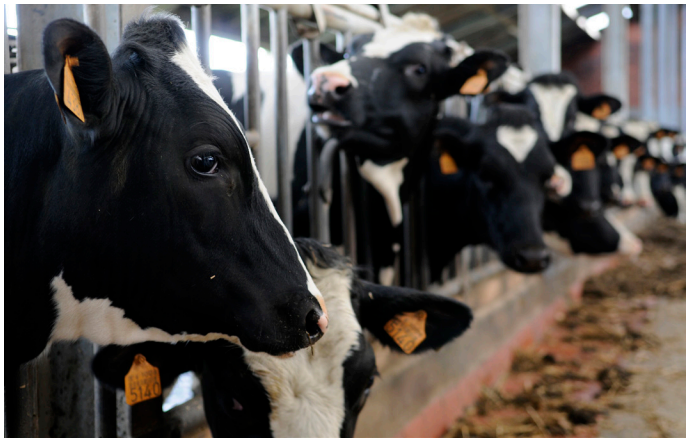

Table 1: Whole farm structural data from 2011 for Spain, Finland and United Kingdom (EU-FADN – DG AGRI)

		Spain		Finland			United Kingdom		
Variable	Unit	LI	HI	LI	HI	ORG	LI	HI	ORG
SOLID indicator [1]	€/GLU	481	1,339	680	1,369	839	413	922	579
Number of dairy cows		62	72	34	32	39	71	160	144
Utilisable agricultural area (UAA)	ha	27	36	64	65	83	86	130	173
Stocking rates	GLU/ha	4.82	3.15	1.33	0.94	0.98	1.83	2.32	1.58
Milk production per cow	kg/cow	5,274	8,772	8,237	9,479	8,056	5,806	8,671	6,661
Milk price	€/tonne	297	324	416	411	433	303	309	354
% milk output in total output	%	78	90	80	84	80	67	78	75
% meat output in total output	%	12	5	7	6	9	15	10	11
% forage on total UAA	%	99%	98%	67%	81%	78%	99%	88%	94%
% fodder maize on total ha forage	%	18%	10%	0%	0%	0%	1%	8%	0%
% temporary grass on total ha forage	%	20%	5%	91%	94%	92%	13%	27%	33%
% permanent pasture on total ha forage	%	49%	70%	1%	2%	2%	82%	59%	56%
% rough grazing on total ha forage	%	11%	6%	7%	5%	4%	5%	2%	5%
% other forage crops on total ha forage	%	2%	9%	1%	0%	2%	1%	4%	5%
Purchased concentrates/dairy cow	€/cow	591	1,322	554	1,222	862	518	947	692
Purchased fodder/dairy cow	€/cow	24	325	6	38	29	25	81	75
Purchased fertiliser/ha	€/ha	55	53	158	176	24	144	238	16
Annual working units on the farm		2.1	2.3	2.0	2.1	2.3	1.9	3.1	3.1
% family labour of total labour	%	96	86	88	89	82	88	57	53

[1] SOLID indicator: the sum of economic costs of purchased concentrated feed and fodder for grazing livestock, costs for fertilisers, crop protection, energy and fuel divided by grazing livestock units (GLU).

Farm scale

When we compare LI, HI and ORG dairy farms throughout Europe, we observe that the number of dairy cows and utilisable agricultural area (UAA) on the farm are lowest for LI dairy farms. This implies that LI dairy farms are small farms. The number of dairy cows is similar for HI and ORG dairy farms, but the amount of UAA is lower for HI farms in comparison with ORG dairy farms, indicating that these farms have a more intensive farming system than the two other farm types. At country level, these results differ: in Spain and Finland, there were no differences in the number of dairy cows when comparing LI, HI (and ORG). In the United Kingdom, HI and ORG farms have more dairy cows. In Spain and the UK, LI dairy farms also have less UAA than HI and ORG while in Finland there is statistically no difference between LI, HI and ORG dairy farms. This indicates that the three different farming systems in Finland do not differ in farm structure.

Production and financial output

In Europe, milk production per dairy cow is lowest on LI dairy farms and highest on HI dairy farms; ORG dairy farms are situated in between. Milk price is highest on ORG farms and lowest on LI farms. The percentage of milk output as part of total financial output is lowest for LI and ORG dairy farms. This result can be interpreted in two different ways: on the one hand, the higher milk production of HI farms can result in a higher total output from milk on HI farms. On the other hand, LI and ORG dairy farms have the option to gain output from other activities on the farm. The share of financial output from meat as part of the total output confirms this interpretation: LI and ORG farms acquire more output from meat output than HI dairy farms, indicating that these farms also have meat finishing enterprises on the farms.

These European conclusions are partially confirmed when comparing the variables in the different countries, where milk production per cow is lower for LI farms

compared with HI dairy farms. In Finland, the organic milk production per dairy cow is comparable to LI dairy farms; in the UK the organic farms are in between the two other systems. There are no differences in milk prices in Finland. In UK, the milk price is the same for LI and HI dairy farms but higher for ORG dairy farms. In Spain, the milk price is the highest for HI dairy farms. Again in Finland, there are no differences in percentage milk and meat output on total output, indicating that we did compare farms with a similar enterprise mix.

Land use – Feed production

The percentage of land used for forage production in Europe differs significantly between LI, HI and ORG dairy farms, being the lowest for HI and highest for LI dairy farms. ORG dairy farms are closer to HI dairy farms, but have different cropping patterns than HI dairy farms. This supports the conclusion that land use on HI dairy farms is more intensive than on organic and LI farms. This is also confirmed by the fact that these HI farms purchase more concentrates and fodder crops per dairy cow and have a higher percentage of fodder maize in their rotation. LI and ORG dairy farms have more permanent pasture and rough grazing. ORG dairy farms also grow other forage crops like lucerne.

At the country level, the following conclusions apply. In the United Kingdom, LI dairy farms use more land for their forage production than HI farms. The percentage forage production on ORG farms is situated in between. In Spain, the share for forage production is the same for LI and HI dairy farms. The Spanish results show that HI farms use more land to produce forage for the same number of animals. Expressed per cow, HI farms also purchase more concentrates and fodder for their animals. In Finland, LI dairy farms use a lower percentage of their land for forage production. This indicates that Finnish LI dairy farms produce forage more intensively and also grow other crops on their land. This is confirmed by the fact that Finnish dairy farms do not differ for number of dairy cows and UAA. Moreover HI dairy farms in Finland also have higher purchase costs for concentrates per dairy cow, indicating that they are more specialised in dairy production.

Labour

Throughout Europe, LI dairy farms have fewer workers (expressed in annual working units (AWU) per farm) on their farm than the other groups. ORG dairy farms are situated between LI and HI dairy farms. LI farms have the highest percentage of family labour followed by ORG and HI farms. The Finnish results do not confirm this, as these dairy farms employ the same amount of labour and the same percentage of family labour. In UK, ORG and HI farms have more AWU per farm and this includes a higher share of paid labour in comparison with LI farms. Finally in Spain, LI and HI farms use the same amount of labour, but HI dairy farms employ less family labour.

Financial implications

The data helps to explain some profitability indicators presented in Table 2. The different variables are expressed in euro per annual working unit (AWU).

Total output

Total financial output on dairy farms includes sales value of milk and meat and farmhouse consumption. The value also includes purchase and sales of breeding stock for the accounting year and the changes in the valuation of the livestock. If farms have other smaller enterprises, like cash crop production, the output from these is also added to the total output. Throughout Europe, the total output of the different groups differs significantly: LI farms have the lowest total economic output, HI farms have the highest and the ORG farms lie in between.

At country level, these results are confirmed in Spain and the United Kingdom. In Finland, however, no significant differences were found between the different groups. The results can be explained by some structural data (see Table 1): HI farms have more dairy cows (UK), a higher milk price (Spain) and higher milk production per dairy cow (Spain, Finland, UK) and use land for the production of cash crops (UK). Finland is an exception as LI farms use less land to produce forage and also have the possibility to produce cash crops. The output of this cash crop production will minimise the difference in total output.

Table 2: Whole farm accountancy data of 2011 for Spain, Finland and United Kingdom (EU-FADN - DG AGRI)

	Spain		Finland			United Kingdom		
Variable (€/AWU)	LI	HI	LI	HI	ORG	LI	HI	ORG
Total output	**62117**	**105471**	**77158**	**71472**	**70766**	**104528**	**196237**	**143264**
- Direct costs (such as seeds, fertilisers)	36057	87250	58662	65668	60915	67581	141150	94240
+ Balance: Subsidies and taxes	8141	12404	35875	36273	43207	12527	13172	16853
= Gross farm income	**34202**	**30625**	**54371**	**42076**	**53058**	**49475**	**68260**	**65877**
- Depreciation	2926	10742	18122	19281	19472	13475	15074	12425
= Farm Net Value Added	**31276**	**19883**	**36249**	**22795**	**33586**	**36000**	**53185**	**53452**
- Total overhead costs (hired labour, rented land, interest on loans)	1427	4002	6847	6370	10277	7769	20036	19707
+ Balance: investment, subsidies and taxes	-41	1204	935	348	885	1439	318	280
= Farm Net Income	29808	17086	30336	16773	24193	29669	33467	34024
- Unpaid family factor costs	132360	144367	35995	37083	33540	48572	36533	31918
= Net Economic Profit	**-102552**	**-127281**	**-5659**	**-20310**	**-9347**	**-18903**	**-3066**	**2106**

Farm net income and net economic profit

A range of indicators for whole farm results are used in the European Farm accountancy system FADN (see Table 2). Farm Net Income is an indicator of the profit before unpaid family factor. To calculate Farm Net Economic Profit further non-cash costs are taken into account, such as remuneration for family labour, own land and own capital. For example, the own land cost can be estimated as rent which the owner would have to pay if the land were rented instead of owned.

At European level, the farm net income of ORG dairy farms is higher than HI and LI dairy farms. The big differences in total output are reduced significantly, indicating that HI and ORG farms have higher production costs than LI dairy farms. Economic profit is lower for LI and ORG farms than for HI dairy farms. At European level, economic profit is negative for all types of dairy farms. This shows that there is not enough output to remunerate the unpaid family production factors.

Farm net income and economic profit vary between countries and between the different groups at country level. In Spain, the difference between LI and HI at the level of total output disappears when comparing gross farm income. This indicates that the operational (direct) costs of HI dairy farms are much higher than for LI farms. The cost of purchased concentrated feed per dairy cow and the SOLID indicator in Table 1 give already an indication of these differences. Farm net income is higher for LI dairy farms in comparison with HI dairy farms as HI farms have higher depreciation costs, indicating that these farms have more investment costs. The economic profit is lower for HI farms than LI farms. For HI farms, the economic profit is negative, which indicates that HI farms are not able to remunerate their own factor costs.

In Finland, the farm net income differs much between LI and HI dairy farms, but not at a statistically significant level. The economic profit is recognised as significantly different, making LI and ORG dairy farms more profitable than HI dairy farms. This validates the results in Table 1, where it was difficult to separate LI from HI dairy farms. Finally, the profitability indicators of the type of farms in the United Kingdom are significantly different for LI and HI dairy farms, with LI less profitable than HI dairy farms. ORG dairy farms have about the same profitability as HI dairy farms. This is primarily explained by the higher output HI dairy farms gained by keeping more animals and producing more milk per dairy cow.

Conclusions and recommendations

In SOLID, we distinguished low-input dairy farms based on their input use (compared to the national average for dairy farms) and compared them to high-input and organic farms at country (Spain, Finland and UK) across Europe and in three countries at national level.

In some countries, low-input and high-input dairy farms represent two clearly different farming strategies, whereas in others the differences are not so clear. However, the examples illustrate that low-input farms can be more efficient and gain a better profit.

Organic dairy farms need to be seen as a separate group and show different results in different countries. In some countries organic dairy farms are structurally more similar to the low-input systems (e.g. Finland), whereas in the UK they are structurally more similar to high-input farms (e.g. United Kingdom).

References

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EU-FADN DG-AGRI, 2011

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