Economic Performance of Organic Farms in Europe

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The individual contributions in this publication remain the responsibility of the authors.

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Executive Summary

This report is part of the research project „Effects of the CAP reform and possible further development on organic farming in the EU“. The main objective of this report is to give an overview of the socio-economic performance of organic farming in Europe at the farm and regional levels for all EU member states and three non-EU countries (Norway, Switzerland and the Czech Republic). Specifically, the physical and financial impacts are assessed in a review of current and previous studies. As part of the analysis of this data, specific attention is paid to the impact of direct support for organic farming under EC Reg. 2078/92, as well as the impact of the mainstream CAP reform measures.

The analysis is based on a literature review and data collected by national experts. Evaluated were published and unpublished studies, farm accounting data and expert assessments.

Methodology

The comparability of economic calculations between countries is a common problem for economic analysis, due not only to the differences in definitions. Different costs of living and purchasing power parities make comparisons of absolute figures less meaningful. Therefore, all analysed indicators of the organic farms were related to those of comparable conventional farms. A comparison of these ratios can be made between countries and studies, with differences in methodology and definitions being of much less consequence for the results. Profit, as given by the definition of Family Farm Income of the Farm Accountancy Data Network of the EU, was chosen as an indicator for the overall economic situation of the farms.

Resources and production structure

In most countries, organic farms are on average larger than conventional farms. Labour use is higher than on comparable conventional farms, but the extent of the higher labour requirements is strongly dependent on the farm type. The majority of the studies evaluated report an increase of labour needs in the range of 10-20 %. Production structures of organic farms differ significantly from conventional ones, quite generally the area of cereals, oilseeds and maize for silage is reduced. On the other hand, the area of leys, fodder crops, vegetables, potatoes and pulses is relatively larger. Stocking rates are on average lower, at 60-80 % of the respective rate on comparable conventional farms.

Yields, prices and costs

Yields in organic crop production are in general significantly lower than under conventional management. However, these yield differences vary between crops, and to a certain extent also between countries and regions analysed. For cereals, the range of observed typical yield ratios is quite narrow for most countries, especially in central and western Europe. Cereal yields are typically 60-70 % of those under conventional management. For most countries the studies evaluated show a high variation in both the absolute and the relative yield levels of potatoes. This variation exists within countries, between countries, and for data of different years. Vegetable yields are often just as high as under conventional management. Few data are available on pasture and grassland yields in organic farming, reported values lie in the range of 70-100 % of conventional yields, depending on the intensity of use. In livestock production, performances per head are quite similar to those in conventional farming. But, due to the lower stocking rates observed in organic farms, performances per hectar are lower.

An important aspect of the profitability of organic farms is the opportunity of receiving higher farm gate prices for organically produced goods than for conventionally produced ones. Prices vary considerably between the different marketing channels. The realised average organic price depends on the level of these prices and on the quantities marketed via the respective sales channels. For many products, the calculation of an 'average organic farm gate price' has to take into account that often part of the production still has to be sold at conventional prices. Currently, premium prices are very high for most crop products. In nearly all countries, average farm gate prices for organically produced wheat were 50-200 % higher than for conventionally produced wheat, while for potatoes average premia were in the range of 50 % to up to more than 500 %. In contrast, the average premium prices realisable for livestock products are generally significantly lower. Organically produced milk received on average a premia of 8-36 % on conventional prices. Data on prices for organically produced meat was available for only a few countries. While average farm gate prices for organic beef exceeded conventional prices by 30 %, the respective premia was 20-70 % for pork. Still, during the last few years, prices for some crop products came under pressure, while for livestock products, premium prices can increasingly be realised.

For many costs items, variance is high between countries, even if costs are expressed relative to the costs of comparable conventional farms. In most countries, total costs of organic farms are on average only slightly lower than on comparable conventional farms (80-100 %), and they are higher for the samples analysed in Denmark and the Netherlands. While variable costs are generally significantly lower (60-70 %), fixed costs are up to 45 % higher than those of the conventional reference group in several countries.

Profits

The analysis of the economic situation of organic farms in Europe shows that on average profits are similar to those of comparable conventional farms, with nearly all observations lying in the range of +/- 20 % of the profits of the respective conventional reference groups, but variance within the samples analysed is high. Profitability varies between the countries surveyed, and between different farm types.

Due to the high price premia realisable in the last few years, and the design of the general Common Agricultural Policy (CAP) measures (set-aside, compensatory arable payments), organic arable farms have in several countries been more successful than the average.

For dairy farms, in general relative profitability is higher if measured per family work unit than if measured per ha utilisable agricultural area. With the exception of one study in Italy, the observed profits per family work unit were equal to or higher than in comparable conventional farms in all countries for which data was available. On the other hand, average profits per hectar were for only a few samples as high as those of the conventional reference group.

Very few data are available for horticultural farms or for pig and poultry farms. The respective studies highlight both the risks and the opportunities that exist for these farms.

For specialised, highly intensive farms, it would as a rule currently not be profitable to convert to organic farming.

The economic performance is in most countries significantly influenced by the support payments for organic farming, which on average contribute approximately 16-24 % of profits in DE, CH, AT and DK. Even more important is often the marketing situation. Data from Great Britain and Germany show higher prices for organic products to account for 40-73 % of profits for arable farms, while the respective share is lower for dairy farms (10-48 %).

Impact of the CAP reform

The CAP reform has for several reasons increased the relative competitiveness of organic farming.

Especially in countries where no support for organic farming was available before the reform, the introduction of support payments under EC Reg. 2078/92 has improved profitability. Price reductions for organic products due to the increase of supply did not take place to degree feared; quite the contrary, in some countries a positive development of the market for organic products was observed as a result of the increase in supply which facilitated more efficient processing and marketing structures.

In addition, some of the general measures of the CAP reform, namely the set-aside schemes and the compensatory payments, decoupling the support level from the output level, had on average a positive impact on the relative profitability of organic farming.

The positive effect varies between farm types and regions, and is diminished by high payment levels of competing agri-environmental programmes, the lack of support for continuing organic farming in Great Britain and France, and, especially in the first years of the reform, the inflexible design of set-aside regimes and eligible livestock quotas in some countries, notably Great Britain.

Except for the set-aside schemes, the CAP reform measures have in general had no impact on organic production structures.

For the new EU-member states (Austria, Finland and Sweden) the accession has led to a sharp decline of conventional producer prices. In combination with the support for organic farming according to EC Reg. 2078/92, this has increased the relative competitiveness of organic farming.

Regional impacts

No studies were found that have assessed the regional effects of organic farming in the past or at its current level.

Assuming that the additional demand for labour in organic farms is 20 % per ha UAA, and that this additional demand is fully covered by new full-time jobs, estimates for 1996 suggest that throughout the EU, with 1.3 % of total agricultural land farmed organically about 18 000 more people were employed in agriculture than would have been in a situation without organic farming. This is equivalent to about 0.3 % of the total agricultural labour force (in annual work units) in the EU.

In the case of a major expansion of organic farming, it would be false to assume an average increase in labour demand based on a linear projection of the current levels. Possibilities for increasing income by means of on-farm processing and direct marketing, which are one reason for the increase in labour demand, do not exist in all regions; moreover, such benefits will also decrease, as more farms in a region follow this trend. An expansion will also result in a marked decrease in the demand for inputs such as chemical-synthetic fertilisers or pesticides, and a reduced demand for feed concentrate, as well as lower output levels. Consequently, capacities in the upstream and downstream industries will not be fully utilised, and, if enterprises in these sectors are unable to adjust to this situation, redundancies will normally result and may lead to job losses.

Future development and research implications

In most European countries, the availability of data on the economic situation of organic farms is not satisfactory. This is in sharp contrast to the strong expansion of organic farming, as well as the political support it receives.

In order to be able to evaluate and monitor the efficiency of the existing support schemes, as well as provide adequate advisory support, improving data availability will be essential.

The future development of the competitiveness of organic farming is influenced by a number of factors. Especially the development of prices for organic products and the development of technical progress both in organic and conventional farming will determine the evolution of relative profitability. In addition, agricultural policy is likely to continue to have a substantial impact on the economic viability of organic farms.

Further areas of interest for future research into the economics of organic farming include the analysis of

- the factors determining the absolute and relative economic profitability of organic farms;
- the cost structures of organic farms in different countries, with a view to providing advice to the farmers and also assessing the competitiveness of organic farms in different regions;
- the impact of future agricultural policies - Agenda 2000 - on organic farming;
- the economic viability of direct marketing and on-farm-processing;
- the potential of the new media (Internet) for the marketing of organic produce by producers.

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Exchange rates

Financial data were converted to ECU using the annual average budgetary conversion rates (see Table 0-1).

Table 0-1: Exchanges rate for conversion of national currency into ECU (budgetary rates)

	1 ECU =					1 national currency =				
Yearly average	1993	1994	1995	1996	1997	1993	1994	1995	1996	1997
ATS	13.62	13.54	13.18	13.43	13.82	0.07342	0.07386	0.07587	0.07446	0.07234
BEF/LUF	40.47	39.66	38.55	39.30	40.53	0.02471	0.02521	0.02594	0.02545	0.02467
DEM	1.94	1.92	1.87	1.9095	1.96	0.51546	0.52083	0.53476	0.52369	0.50907
DKK	7.59	7.54	7.33	7.36	7.48	0.13175	0.13263	0.13643	0.13587	0.13363
ESP	149.12	158.92	163.00	160.75	165.89	0.00671	0.00629	0.00613	0.00622	0.00603
FIM	6.70	6.19	5.71	5.83	5.88	0.14925	0.16155	0.17513	0.17153	0.17005
FRF	6.63	6.58	6.53	6.49	6.61	0.15083	0.15198	0.15314	0.15408	0.15123
GBP	0.78	0.78	0.83	0.81	0.69	1.28205	1.28205	1.20482	1.23457	1.44445
GRD	268.57	288.03	302.99	305.55	309.36	0.00372	0.00347	0.00330	0.00327	0.00323
IEP	0.80	0.79	0.82	0.79	0.75	1.25000	1.26582	1.21951	1.26582	1.33776
ITL	1841	1915	2130	1959	1929	0.00054	0.00052	0.00047	0.00051	0.00052
NLG	2.18	2.16	2.10	2.14	2.21	0.45872	0.46296	0.47619	0.46729	0.45232
PTE	188.37	196.90	196.11	195.76	198.59	0.00531	0.00508	0.00510	0.00511	0.00504
SEK	9.12	9.16	9.33	8.51	8.65	0.10965	0.10917	0.10718	0.11751	0.11559
CHF	1.73	1.62	1.55	1.57	1.64	0.57797	0.61680	0.64694	0.63780	0.60827
CZK	na	na	34.77	34.46	35.93	na	na	0.02876	0.02902	0.02783
NOK	8.31	8.37	8.29	8.20	8.02	0.12034	0.11941	0.12069	0.12200	0.12471

Source: Statistisches Bundesamt, Statistisches Jahrbuch für das Ausland; Data for 1997 and Czech Republic: Eurostat

na = not applicable

Abbreviations

AAP	Arable Area Payments
AWU	Annual Work Unit
CAP	Common Agricultural Policy
CEE	Central and Eastern Europe
FADN	Farm Accountancy Data Network
FFI	Family Farm Income
FWU	Family Work Unit
LU	Livestock Unit
NFI	Net Farm Income
ONI	Occupiers Net Income
ÖPUL	Österreichisches Programm zur Förderung Umweltgerechter Landwirtschaft
RICA	Reseau d'Information Comptable Agricole (French acronym for FADN)
UAA	Utilisable Agricultural Area

Country Abbreviations

AT	Austria
BE	Belgium
CH	Switzerland
CZ	Czech Republic
DE	Germany
DK	Denmark
ES	Spain
FI	Finland
FR	France
GB	Great Britain & Northern Ireland
GR	Greece
IE	Ireland
IT	Italy
LU	Luxembourg
NL	Netherlands
NO	Norway
PT	Portugal
SE	Sweden

1 Introduction

1.1 Objectives of the report

The main objective of this report is to give an overview of the socio-economic performance of organic farming in Europe at the farm and regional levels. Specifically, the physical and financial impacts will be assessed in a review of current and previous studies. On the basis of these data, the socio-economic impacts will be determined by comparing the incomes of organic and similar conventional farms. As part of the analysis of this data, specific attention will be paid to the impact of direct support for organic farming under EC Reg. 2078/92, as well as the impact of the mainstream CAP reform measures.

This report is part of the research project "Effects of the CAP reform and possible further development on organic farming in the EU" (FAIR 3-CT96 1794), carried out with financial support from the Commission of the European Communities. The general objective of the project is to provide an assessment of the impact of the 1992 CAP reform on organic farming, and thus contribute to a better understanding of the effects that current EU policies have on this sub-sector.

The methodology adopted will be presented and discussed in Chapter 2. The economic analysis will be introduced by an overview of the resources and production structure of organic farms in Chapter 3. Chapter 4 presents and analyses the survey results for yields, prices and costs. In the light of these findings, the profits of organic farms in relation to comparable conventional farms will be presented in Chapter 5, differentiated by country and farm types. A more detailed look at the specific situation in each of the countries surveyed will provide further explanations and insights into the economic performance of organic farms in these countries. The impact of the 1992 CAP reform on organic farming is dealt with in detail in Chapter 6; this is followed by a discussion of regional impacts of organic farming in Chapter 7. Finally, Chapter 8 provides conclusions and an outlook on the competitiveness of organic farming, as well as important research topics for farm economics.

1.2 Data sources

Data collection for this report was carried out by national experts in each of the EU and three non-EU countries, who were either sub-contractors or partners in the project. All of them are native speakers and recognised experts in organic farming. The five project partners are responsible for particular aspects of the study and act as national experts for the organic sector in their own countries. Each partner is also responsible for supervising the data collection by the sub-contractors in a number of countries.

In line with the procedures adopted for the whole project, the authors developed a standardised questionnaire that specified the data requirements for the analysis and provided a common format for data collection. The questionnaire was circulated to all project partners and to all contributors for feedback. It was modified accordingly and guidelines were drawn up, as was an example of a completed questionnaire. In the next step, the questionnaire was pre-tested by one project partner before the final version was sent to all national experts.

The national experts were advised to utilise the following data sources:

- literature reviews of scientific journals and specialised literature as well as the relevant grey literature,
- unpublished results of ongoing research projects, and
- farm accounting data.

2 Methodology used to analyse the economic performance of organic farms

In this section the methodology used in the analysis is outlined. In addition, it has proved necessary to supply a definition for several economic terms that are used throughout this report, as the meaning of some terms may differ substantially from country to country.

This report, like many other economic investigations, will focus on financial economic indicators (e.g. profit) instead of broader aspects (e.g. utility) for reasons of practicability. Financial performance is widely seen as an important factor determining the acceptance of organic farming. Still, as several surveys have shown, the motives for conversion to organic farming are numerous, and often the 'economic' incentive is less important in this decision than other factors, such as concerns about the environment or working conditions (see e.g. Schulze Pals 1994, Köhne and Köhn 1998, Padel and Lampkin 1994). This aspect should be kept in mind when evaluating the economic data of organic farms, despite the strong growth in the adoption of organic management practices following the introduction of financial support for organic farming in most countries, which highlights the increased importance of financial aspects.

In the following paragraphs, some basic definitions regarding the subject of investigation and performance measures will be given to provide the necessary background for this analysis. As the research project covers 18 countries in Europe, the problems of cross-country comparisons of economic performances will be addressed specifically.

2.1 Definition of the subject of investigation

The very first question to be answered is *who* and *what* has to be investigated to be able to analyse the economic performance of organic farms. Is it sufficient to analyse single production processes? Which activities are relevant for the evaluation of organic farming? A clear identification of the level or unit that is the subject of investigation is necessary, not only for the choice of methodology, but also for the interpretation of results and comparisons of different studies and countries.

 Methodology

2.1.1 The level of investigation

An analysis of the economics of single enterprises or production processes provides an insight into the relative profitability of these processes. Corresponding information, e.g. gross margin data, is valuable for farm planning, as it aids the determination of optimal production structures when production processes are competing for scarce resources like agricultural land. The survey thus collected information on the economics of single production processes for the different countries. This information will be used at a later stage of this project to model organic farming.

But for an evaluation of the profitability of organic farming, analysing the economics of single production processes will not suffice. Complementary relationships between production processes are even more common and important in organic than in conventional production systems (Schulze Pals 1994). Only whole farm measures can fully take into account these close complementary relationships of organic production processes. In addition, the importance of variable costs as a profit factor is reduced in organic farming as compared to conventional farming (Padel and Lampkin 1994) and the importance of overheads increases. Therefore ***an analysis at the level of the whole farm is required***.

2.1.2 Narrowing down the subject of investigation

The final economic decision unit of farms is usually the household. Still, as the focus in this report is on the specifics of organic farming, the analysis can concentrate on the economics of those ***farm activities that are related to organic farming***: That means non-agricultural activities such as off-farm work need not be included in the analysis, while activities that prove to be 'linked' to organic farming are important for the evaluation of the socio-economic performance of organic farming. 'Linked' here means that the occurrence of some activities, or at least the extent to which they occur, can be attributed to the fact that the farm is managed organically. Possible examples of such activities may be direct marketing (Dabbert 1990) or agri-tourism.

2.2 Measuring the 'economic performance' of organic farms

2.2.1 Defining the reference system

The criteria for measuring and evaluating the economic performance of organic farms depend on the objectives of the farmer and the time horizon of the analysis. A minimum requirement would be that organic farming is ***economically viable***, that means the monetary return to the activity has to be high enough to cover all the expenses incurred, including consumption by the farm household.

In the long run and with a more widespread conversion to organic farming, ***relative profits*** and the criteria of profit maximisation are becoming more important for analysing the economic performance of organic farming. In this report, organic farming will be called ***economically profitable*** if the profits are higher than those of other possible activities. Thus, organic farming is economically profitable if the return to the production factors used exceeds their opportunity costs. While there are a large number of possible uses for most production factors, and many analyses on the economics of agriculture have tried to compare the income from farming to incomes in other sectors of the economy, here the emphasis is on the ***comparison with other management practices***. The underlying argument is that the focus of the study is on the agricultural sector and on the use of production factors that are nearly exclusively used by agriculture, like agricultural land. Therefore, the opportunity costs are defined by alternative agricultural non-organic land uses.

There are a multitude of possible non-organic farming practices, e.g. intensive or extensive conventional farming, integrated farming and other management practices supported by EC Reg. 2078/92. In this report, a comparison will be made with 'conventional' farming. The ***term 'conventional' will actually mean 'non-organic' here***, and usually represent the most common agricultural production system in the respective region.

2.2.2 Designing the reference system: The concept of 'comparable conventional farms'

When comparing, for example, the profit of an organic farm to that of conventional management, the underlying question is:

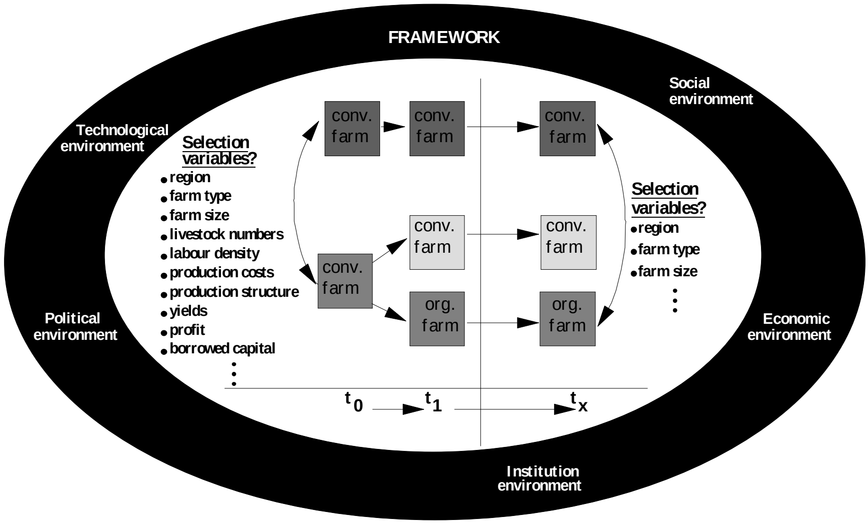
What profit would the farm realise if it was managed conventionally?

To answer this question would actually require the assessment of the profits of a farm in a hypothetical situation. Such an assessment clearly has to make a number of assumptions regarding the production structure, yields, etc. While a few studies exist that have attempted to calculate hypothetical profits by drawing on ***expert information or models***, such an approach is time-consuming and the results very much depend on the assumptions made.

There are several possibilities to obtain an approximate answer to the above question by using actual farm data of conventional farms. The choice of a conventional reference farm depends on the availability of data and resources. In the following paragraphs, different approaches will be outlined and their strengths and weaknesses discussed. An overview of the ways of identifying an appropriate reference system is given in Figure 2-1.

Methodology

Figure 2-1: ***The selection of a conventional reference system for the analysis of organic farms***



Source: Nieberg and Offermann (1998)

An obvious solution would be to compare the situation of the organic farm ***before and after conversion*** (in Figure 2-1:, this corresponds to comparing the organic farm at a point in time t_x with its conventional situation at a point in time t_0). The economic data for the period before conversion is often easily accessible, and thus does not need to be estimated or calculated. A serious drawback of this procedure is that a comparison with an earlier situation neglects any development the farm would have undergone even if it had not converted. The longer the time span since conversion, the less viable is this approach, since changes in external parameters like prices, policies and technical progress would have substantially influenced economic performance, even without conversion.

A better assessment is possible using the income of conventional farms in the year of observation as an indicator for the hypothetical 'conventional' income of the observed organic farm. To avoid comparing two things that are in fact very different, these conventional farms should be 'comparable' to the observed organic farms. This will be the case if they have a similar 'potential', that is, a similar endowment with production factors. As the objective is to isolate the effect of the farming system on profits, the choice of characteristics for the selection of ***comparable conventional farms*** has to be restricted to 'non-system determined' factors. Examples of factors that are clearly 'non-system determined' are locational factors such as region, soil texture, topography, climate and market distance (Fowler, Lampkin and Midmore 1998). A very simple first approach for assessing the potential income of the conventionally managed farm is therefore to use average data of a sample of conventional farms in the same region. This data is available in most countries as part of their national farm accounting systems. In Figure 2-1, this approach is illustrated on the right-hand side of the diagram, comparing organic and selected conventional farms at a point in time t_x.

Comparability improves as more factors are taken into account in the selection of the group of conventional farms used for comparison[1]. The problem is that for many farm characteristics, the distinction between 'non-system' and 'system-determined' factors is not so clear as in the examples given above (Dabbert 1990; Nieberg and Offermann 1998). Is there no link at all between the size of a farm and the system? This might not be the case, if there is a clear correlation between farming system and annual growth of farm size. There is an obvious link between production structure and farming system; but to what extent is there no such link with the farm type? Intensive livestock farms are often seen to reduce their livestock after conversion and move towards a mixed farm. So, should comparable conventional farms be mixed or intensive livestock farms? Similar problems exist for labour. Despite these difficulties, factors that are generally seen as non-system determined and thus used for selecting a group of comparable conventional farms are: location, size and a rough classification of the farm type.

A solution to many of these problems is possible where the situation before conversion is known; the farms used for comparison are therefore selected such that their past situation resembles that of the now organic farm in its former conventional situation (in Figure 2-1:, selecting conventional farms which are comparable at a point in time t_0, and comparing the farms at a point in time t_x). This procedure ensures that conventional and organic farms have similar conventional starting positions. It requires the application of multivariate (cluster) analysis and the observation of the comparable farms over the years.

One problem that is possibly system-determined, and which, even with this approach, cannot be solved, concerns the abilities of the farm manager: Is there a correlation between managerial abilities and inclination to conversion?

To sum up the discussion above, four main approaches have been identified for choosing a reference system:

- Calculation of the hypothetical profits by drawing on expert information or models
- For short-term comparisons, comparing the situation of the farm before and after conversion
- Approximation of the potential income by analysing the economic situation of conventional farms that are comparable with respect to a few important non-system determined characteristics
- Comparison with conventional farms that are selected so as to resemble the analysed organic farm in the years before conversion.

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[1] On the other hand, there are clearly difficulties involved in increasing the number of variables used. The greater the number of factors considered, the smaller the possibility to match each variable well (Fowler, Lampkin and Midmore 1998).

Some studies evaluated in this report did not identify a reference system. Therefore, experts in each country were asked to provide data for comparable conventional farms whenever necessary, to ensure that the basis used for comparison reflects regional conditions and structures.

2.2.3 Economic measurements for the analysis of organic farming in comparison to conventional management

Various measures of the economic performance of farms exist. Which measure is the most appropriate depends on the purpose of the analysis. ***'Profit'*** is generally one of the most common and accepted indicators for the success of an economic activity. Still, profit definitions vary between countries and studies. To ensure the comparability of the economic data as far as possible, the questionnaire used in the survey for this report provided a definition of profit (Table 2-1), which is based on the definition of '***Family Farm Income'*** according to the Farm Accountancy Data Network (FADN) of the Commission of the European Union (EC 1989).

Table 2-1: Definition of profit: Family farm income

	+	Market revenues from sales of agricultural products
Farm	+	Subsidies, compensatory payments
output	+	Other farm income (rents, contract work for others, ...)
	+	Net value of change in stock
	+	Value of farmhouse consumption
	-	Specific costs / variable costs
	-	Overheads (including depreciation)
minus costs	-	Wages, salaries paid to seasonal and non-family workers
	-	Interest paid on borrowed capital
	-	Rent paid
	=	**Profit (family farm income)**

Family farm income is an income measure that is close to the financial decision making on the farms. It represents the return to the farm family's own labour, land and capital. For comparative purposes, it is therefore important that the reference farms have similar characteristics with respect to land tenure, availability of unpaid family labour, and reliance on borrowed capital. In some countries, notional charges for family labour and family-owned land are made, or certain payments, such as rent and interest, are excluded, to put all farms on the same basis (see below, and Padel and Lampkin 1994).

Typically, profits are expressed in relation to

- agricultural land: profits per ha utilisable agricultural area (UAA)
- family labour: profits per family work unit (FWU)

Wherever possible, we have tried to account for differences in national definitions and adjust the data accordingly. The major remaining differences in the profits are listed below.

In ***Austria***, profits include income from forestry. Forestry accounts for about 8 % of revenues in 1996 for the sample of organic farms.

For ***Denmark***, gross profit from agriculture is used. Interest and rent are not included in the costs.

In ***Great Britain,*** the most notable differences relate to the profitability indicators used. One of the most commonly available measures of success here is ***net farm income (NFI)***. NFI is farm profit after adding back interest and ownership charges, minus imputed costs for unpaid family labour and notional rent. It represents the reward to the farmer and spouse for their own manual labour, management and interest on capital invested in the farm, whether owned or not (MAFF 1997). NFI is designed to allow comparability between farms irrespective of land, labour and capital resource endowment. It has therefore been used for the comparative analysis of farms in Great Britain. In addition, ***occupiers' net income (ONI)***, which is closer to the definition of farm family income, has been calculated wherever the necessary information was available. ONI corresponds to farm profit minus a notional charge for unpaid family labour (not farmer and spouse).

The ***comparability*** of profitability calculations between countries is a common problem for economic analysis, due not only to the differences in definitions. Different costs of living and purchasing power parities make comparisons of absolute figures less meaningful. These problems are less severe in the approach chosen for this report. As the focus is on the relative profitability of organic as compared to conventional farming, a comparison of this ratio can be made between countries and studies, with differences in methodology and definitions being of much less consequence for the results.

2.2.4 Factors influencing profitability

The economic performance of organic farms is influenced by a number of factors. It is necessary to clearly differentiate between the determinants of 'absolute' profitability (level of farm profits) and the determinants of relative profitability (profits compared to profits under conventional management). Naturally, many of these determinants are important for both types of profitability, e.g. good market access; but the impact that some of them have may be very different. Good natural production conditions will have a positive impact on profits, due to the positive influence on yields. At the same time, they may have a negative impact on relative profitability, due to the increased competitiveness of intensive conventional farming systems - a hypothesis which is backed by the observed concentration of organic farms in less favoured areas.

The determinants of ***absolute profits*** are in general very similar to those in conventional farming, though their relative importance may vary. Whole farm performance is influenced by yields, prices, costs, enterprise structure and labour requirements under organic farming (Padel and Lampkin 1994). Comparing successful and less successful organic farms in the new *Laender* in Germany, Nolte (1997) also found that size, soil quality, and the degree of specialisation affected financial performance.

Schulze Pals (1994) identified natural conditions, market access, the possibilities of increasing farm size (land market), low stocking rates and payments for organic farming as factors influencing ***relative profitability***. Grouping farms by their relative performance as compared to paired conventional reference farms, Nieberg (1997) showed that farm size, farm type, cereal and milk yields, prices and fixed costs are important determinants.

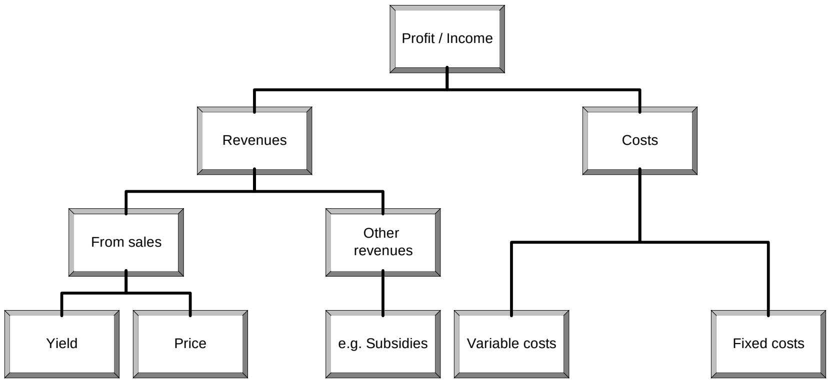
The influence of the farm manager's abilities on economic performance has not been measured, but can be assumed to be one of the most important determinants, as is the case also in conventional farming. The question whether managerial abilities are more important for the financial success than in conventional farming remains unanswered.

2.2.5 Procedure

Based on the discussion above, the economic analysis in this report is structured according to the composition of farm profits as shown in Figure 2-2. This analysis of the major components of profit will not only provide explanations for whole farm performance in different countries and for different farm types; it will also give an indication of the economic performance of organic farms in those countries where no data on whole farm profits was available.

The economic analysis will be introduced by an overview of the resources and production structures of organic farms, followed by the presentation and analysis of the survey results for yields, prices and costs. In the light of these findings, the presentation of the profits of organic farms in relation to comparable conventional farms will be differentiated according to countries and farm types. A more detailed look at the specific situation in each of the countries surveyed will provide further explanations and insights into the economic performance of organic farms in the respective countries. Specific attention is paid to the importance of premium prices and support payments for organic farming for farm profits.

Figure 2-2: Components of profits



3 Resources and production structure of organic farms

3.1 Resources

One determinant of the financial performance of farms is their resource endowment. In this chapter, a short overview of the resource base of organic farms is given as a background for the interpretation of economic results.

3.1.1 Agricultural land

Important characteristics of the endowment of farms with respect to the production factor 'land' are size (area per farm) and land quality (soil quality, natural conditions).

3.1.1.1 Farm size

The size of the farms, measured in ha UAA, will influence not only total income per farm, but also income per ha UAA, as in agriculture cost degression is an important phenomenon.

Most comparisons in this report are made between organic and comparable conventional farms. To eliminate farm size-related differences and isolate the impact of the farming system, the size of the farms was one of the most important criteria in the selection of comparable conventional farms (Chapter 2). Thus, a comparison of the area of organic farms to that of comparable conventional farms is not useful here, as the two will in general be similar with respect to the size of UAA. To allow a basic classification of organic farms according to size, the average organic farm size here is compared to the average farm size of all farms in each of the surveyed countries (Table 3-1).

Table 3-1: Average organic farm size as a percentage of average national farm size, 1995

SE	NO	LU	FR	GB	BE	GR	DK	DE	CH	FI	IE	NL	ES	AT	IT	PT	EU 15
55	56	71	89	90	98	99	106	109	118	118	120	124	127	140	277	398	138

Source: Own calculations based on Foster and Lampkin (1999); data for CH for 1997 (Hartnagel 1998); no data was available for CZ.

The figures in Table 3-1 show the high variation in average organic farm size in relation to national averages. But the figures also indicate that, in the EU and in the majority of countries, ***organic farms are larger*** on average. The reasons for this vary from country to country. In Germany, the size of full-time organic farms in the national accounting system is equal to the size of all full-time farms (BMELF 1998) in the old *Laender* - which might suggest that a greater average size is due to a higher share of full-time farms, since part-time farms are often smaller. Also, the relatively high proportion of organic farming in the new *Laender*, where farm sizes exceed those anywhere else in the European Union, contributes to this phenomenon. In Switzerland, the share of full-time organic farms is equal to the national average, and the larger size of organic farms is attributed to the high proportion of relatively large organic farms in mountainous regions, where it seems to be easier for larger farms to compensate for reduced forage yields (Hartnagel 1998).

A lower share of typically smaller farm types, like intensive pig and poultry farms, may also contribute to organic farms being larger.

3.1.1.2 Development of farm size

An interesting and important aspect is the development of farm size. As in the rest of the agricultural sector, farm sizes are increasing steadily. To analyse this farm growth, it is again useful to draw a comparison with the respective development of comparable conventional farms. In her comparison of a sample of organic farms in Germany with a group of comparable conventional farms, which were of the same size as the organic farms <u>before</u> these had converted, Nieberg (1997) shows a ***similar increase in farm size*** over time for both groups.

3.1.1.3 Location

Recent studies carried out in Central European countries show a clear link between soil quality and natural conditions and the distribution of organic farms. On average, natural conditions are worse and soil quality in organic farms is lower than the national average (e.g. Germany: Osterburg, Wilhelm, Nieberg 1997), and relatively more organic farms are located in less favoured areas (e.g. Austria: Groier 1998, Switzerland: Hartnagel 1998).

3.1.2 Labour

3.1.2.1 Labour use

Labour requirements on organic farms are subject to intensive discussion. According to Schulze Pals (1994), increased labour requirements in organic farms may be expected, due to

- more labour-intensive production activities, especially for arable crops (mechanical weed control),
- a higher share of more labour-intensive crops (e.g. vegetables, potatoes),
- more marketing and on-farm processing activities,
- an increase in information requirements.

On the other hand, reduced stocking rates (see below) will have a labour-saving effect.

As the exact determination of labour input is difficult, the data has to be interpreted with some care. Some of the most common methodological problems encountered are listed below.

- The definition of labour input may vary between studies. Often, the calculation of labour units is based on standardised figures, e.g. one Annual Work Unit (AWU) for each person between 18 and 65 years who works full-time on the farm - this will often produce different results than studies, which try to estimate actual working hours using a process analytical approach.
- Indirect labour requirements, i.e. external services (contract work), are generally neglected; while this will not directly affect labour use in farm-level accounting, it should be taken into consideration if a more general evaluation of the differences in labour requirements is to be performed (Marino et al. 1997).
- The selection of conventional farms used for comparison varies between studies, and selection criteria that are well-suited to economic comparisons may not always be as well-suited for comparisons of labour requirements.
- Almost no studies exist that have applied statistical tests to verify the significance of any differences in mean (Marino et al. 1997).

In spite of all these limitations, the large number of studies evaluated for this report will at least allow an estimation of trends, and a rough assessment of the order of the average differences in labour requirements between organic and conventional farms.

Figures for labour use on organic farms in relation to comparable conventional farms vary between countries and studies (Figure 3-1 and Table 3-2). Most commonly, labour use ***per ha UAA is on average 10 %-20 % higher on organic farms***, but for some countries, labour requirements are lower on organic farms than on comparable conventional farms. The value of ‘AWU per ha UAA’ relative to conventional farms is very much ***dependent on the farm type*** (see Annex 5). All studies report

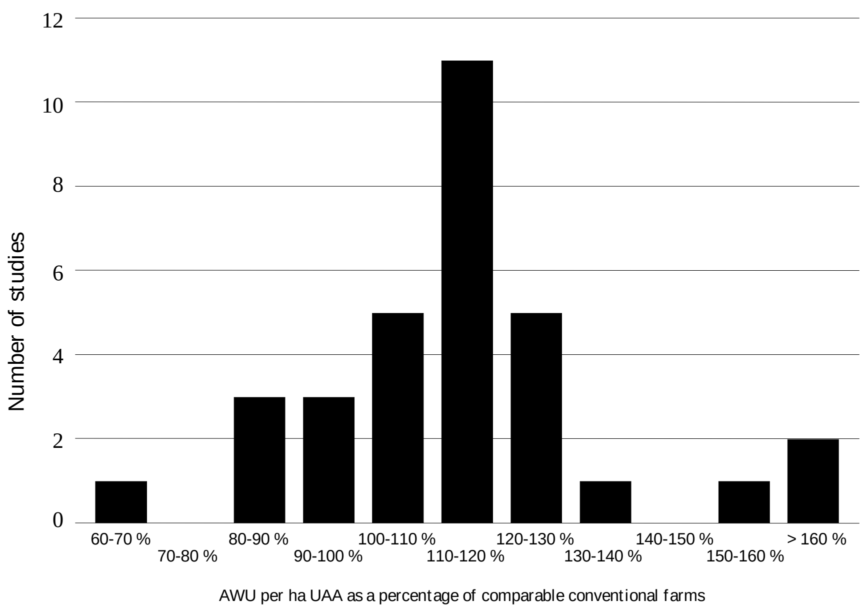
Table 3-2: AWU per ha UAA on organic farms as a percentage of comparable conventional farms in different countries

	AT	CH	DE	DK	FI	FR	LU	IT	NL
Years	1993	1993-96	1993-97	1996/97	1995	1997	1997	1992-95	1995
%	91	110-132	102-118	105	89	(125)[1]	(125)[1]	60-90 (214)[2]	157

Source: Own calculations based on Schneeberger (1995) for AT, FAT (diff. years) and Mühlebach and Mühlebach (1994) for CH, BMELF (diff. years) and Nieberg (1997) for DE, DIAFE (1998) for DK, AERI (1997) for FI, Salghetti (1997), Zanoli, Fiorani and Gambelli (1998), Santucci and Chiorri (1996) as quoted in Marino et al. (1997), Zanoli and Fiorani (1997) for IT, Dutch FADN for NL

[1] Expert estimate
[2] Single study (Cerasola and Marino 1995), year of data unknown

Figure 3-1: AWU per ha UAA on organic farms relative to comparable conventional farms: an overview of results from various studies (1990-1997)



Source: Own calculations based on survey of literature and expert assessments. See Annex 5.

higher values for labour per ha UAA on organic arable and mixed farms, while organic dairy farms use the same amount of labour or less than comparable conventional farms. On horticulture farms, labour requirements are much higher than on conventional farms. Few data exists on pig and poultry farms, but labour per ha UAA seems to be similar to conventional farms, as livestock density is reduced. Data on grazing livestock farms is ambiguous, and both higher or lower labour uses than on conventional farms have been reported.

Compared to national averages (as opposed to comparable conventional farms), the values for AWU per ha UAA are often significantly higher on organic farms than the above-mentioned 10 % to 20 %, which may be explained by the fact that farm types with higher labour requirements constitute a higher share of the organic farms (BMLF 1996).

Surprisingly, in contrast to the results for AWU per ha UAA, the resource endowment of ***family labour*** per ha UAA is almost always lower on organic than on comparable conventional farms (see Annex 5). There is no clear explanation for this phenomenon. It might be related to the different sociological characteristics of organic farms. Possibly, as organic farms are more often managed by younger, better educated farmers, the spouse is more likely to have an off-farm job and may thus not be counted as farm labour.

3.1.2.2 Development of labour use

Due to technical progress, which has made many operations less labour-intensive, and to economic circumstances, the agricultural workforce has been continuously and drastically reduced over the last decades. Generally, it is to be expected that these developments will affect organic farms in a similar way.

For Switzerland and Germany, time series of labour use on organic farms were analysed. ***Labour per ha UAA has been sharply reduced in the last years*** (by approx. 35 % since 1990, Figure 3–2). In general this is not so much due to fewer labour units per farm, but due to an increase in farm sizes. As labour use has not been reduced by the same margin on comparable conventional farms, the ratio of AWU per ha UAA on organic in contrast to conventional farms has steadily declined. A similar phenomenon can be observed from the evaluation of some other studies (e.g. in Denmark). The earlier the studies[2], the higher the frequency with which higher relative values for labour use in organic farming are reported. One possible explanation for this is that the share of more labour-extensive farm types has increased over the years. Also, reduced labour requirements may be due to the development and spread of labour-saving technology in organic farming (e.g. flame weeders) in recent years.

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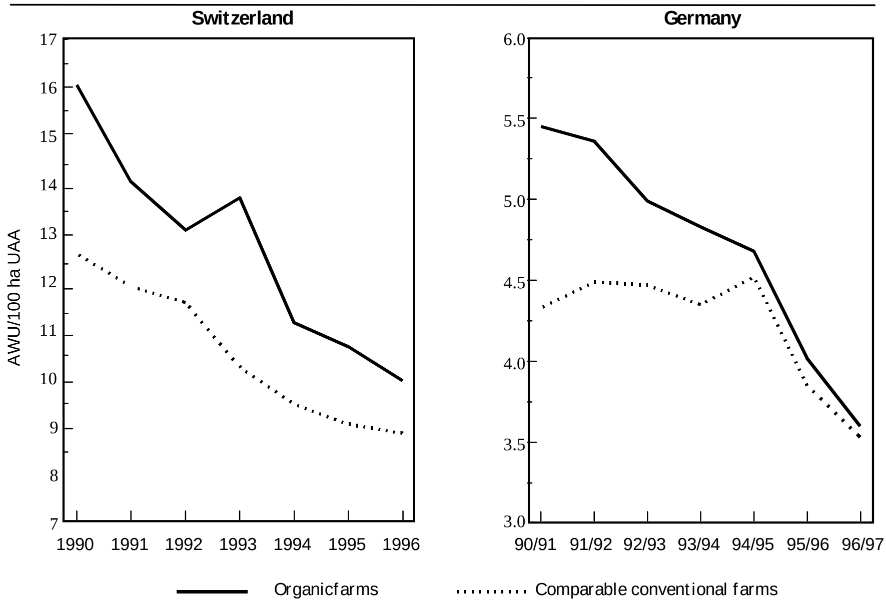
[2] An overview of studies on labour use in organic farms is given in Annex 5.

Figure 3-2: ***Development of labour (AWU) per ha UAA on organic and comparable conventional farms in Germany and Switzerland***



Sources: FAT (diff. years) for Swiss and BMELF (diff. years) for German data.

The development of labour use in the years directly following conversion may differ from the above results. Nieberg (1997) reports a 11 % labour increase per ha UAA on organic farms within four years after conversion, whereas the comparable conventional farms reduced AWU per ha UAA by 11 % in the same period. This increase was most pronounced for arable farms, which used 37 % more labour than before conversion.

Again, it has to be pointed out that methodology, the time period analysed, and the selection procedure for comparable conventional farms will considerably influence the results with respect to labour use, and that these should be interpreted carefully, especially when extrapolating observations for prognoses.

Labour requirements are higher in organic farming, but the actual levels often seem to be exaggerated in public discussion. This may be so because changes observed in the last few years are not taken into account. But it may also be the result of people overestimating the importance of some quite labour-intensive organic production processes (e.g. vegetables) for total labour use, while at the same time underestimating the labour-saving effect of reduced stocking rates (see below).

3.1.2.3 Excursus: Creating new jobs through organic farming?

Unemployment is high in many regions in the EU, and therefore the impact of organic farming on rural employment is of special interest. As shown above, the average increase in labour use per ha is about 20 %. Consequently, organic farming will potentially create new jobs in rural areas.

Assuming that the additional demand for labour on organic farms is 20 % per ha UAA, and that this additional demand is fully covered by new full-time jobs, estimates for 1996 suggest that throughout the EU, with 1.3 % of total agricultural land farmed organically about 18 000 more people were employed in agriculture than would have been in a situation without organic farming (Table 3-3). This is equivalent to about 0.3 % of the total agricultural labour force (in annual work units) in the EU.

However, an increased demand for labour will not necessarily result in the creation of sustainable full-time employment.

- In some of the farms (exact figures are not known), the increased demand for labour is covered by the existing family workforce. On some farms where the workforce capacity was not fully used under conventional farming, conversion to organic farming may have resulted in full utilisation of these capacities. On others, where the increased labour demand is met from within the family, some family members suffer from an excessive workload.
- In many farms, the increased demand for labour is to a large extent covered by seasonal workers. In some countries and regions within the EU, these come from non-member states such as Eastern European countries or North Africa.

Although organically managed farms have a relatively higher labour demand, they, like conventionally managed farms, aim to increase labour efficiency. With the implementation of technical progress and the constant increase in farm size, a clear trend towards reduced labour demand per ha has emerged in many organic farms. Therefore it can be assumed that organic farming alone will not stop the general European trend towards fewer farms and a growth in economic scale.

Table 3-3: Estimates of the additional demand for labour in the EU due to organic farming, 1996

	Conventional land area ha UAA	Organic land area ha UAA	Total labour force in annual work units	Of which: additional labour force of organic farms	Additional labour force of organic farms as % of total
AT	3 118 911	309 089	141 500	2 506	1.77
BE	1 368 739	4 261	79 100	49	0.06
DE	16 861 289	473 711	683 000	3 713	0.54
DK	2 676 011	44 989	83 900	277	0.33
ES	29 515 265	103 735	1 029 700	721	0.07
FI	2 058 445	84 555	178 300	1 396	0.78
FR	30 077 916	137 084	1 031 300	935	0.09
GB	15 808 465	49 535	393 300	246	0.06
GR	5 157 731	5 269	598 100	122	0.02
IE	4 509 504	20 496	223 400	202	0.09
IT	14 736 824	334 176	1 687 100	7 449	0.44
LU	125 406	594	4 700	4	0.09
NL	1 956 615	12 385	223 300	281	0.13
PT	3 947 809	9 191	573 400	266	0.05
SE	3 027 688	162 312	87 400	880	1.01
EU-15	134 947 618	1 751 382	7 017 400	17 935	0.26

Source: Eurostat (1998), European Commission (1998), Foster and Lampkin (1999) and own calculations.

One also needs to take into account that, in the case of a major expansion of organic farming, it would be false to assume an average increase in labour demand based on a linear projection of the current levels. Possibilities for increasing income by means of on-farm processing and direct marketing, which are one reason for the increase in labour demand, do not exist in all regions; moreover, such benefits will also decrease, as more farms in a region follow this trend.

In an overall assessment of the effects on employment, one also has to consider a number of indirect impacts on labour demand. As more agricultural enterprises move into processing and direct marketing, this development increasingly affects agro-industrial processing and marketing enterprises. An expansion will also result in a marked decrease in the demand for inputs such as chemical-synthetic fertilisers or pesticides, and a reduced demand for feed concentrate, as well as lower output levels. Consequently, capacities in the upstream and downstream industries will not be fully utilised, and, if enterprises in these sectors are unable to adjust to this situation, redundancies will normally result and may lead to job losses.

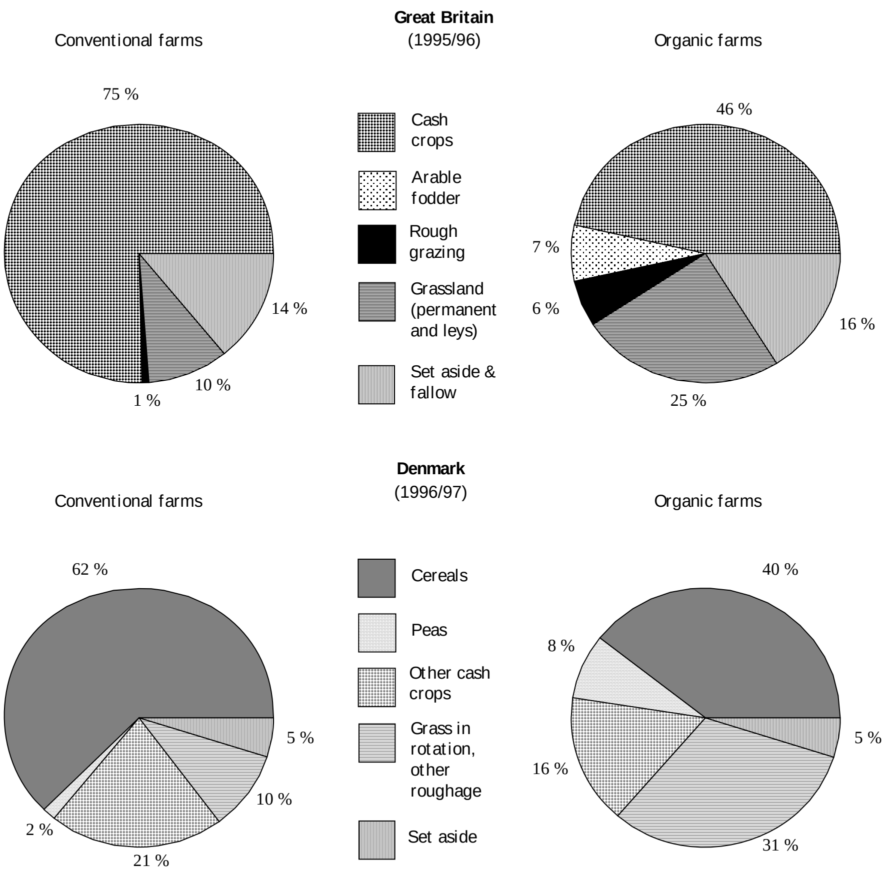
3.2 Production structure

3.2.1 Land use

Due to the greater importance of the 'integrating forces', organic farming systems are characterised by higher diversity with respect to enterprise mix than are comparable conventional systems. Product-price relations that differ from those in conventional farming will also influence cropping structures. Quite generally (compare Annex 7), the area of cereals, oilseeds and maize for silage is reduced. On the other hand, the area of leys, vegetables, potatoes, pulses and forage crops is relatively larger. Within a crop group, diversity is often higher, e.g. cereal patterns are less dominated by winter wheat and winter barley, than in conventional farming. The set-aside area is often equivalent to that of comparable conventional farms.

A typical example of the differences in land use is shown in Figure 3–3 for arable farms in Denmark and Great Britain.

Figure 3-3: ***Land use of organic and comparable conventional arable farms in Denmark and Great Britain***



Source: Fowler, Lampkin and Midmore (1998) for Great Britain; DIAFE (1998) for Denmark.

3.2.2 Stocking rates

A lower stocking rate on organic than on conventional farms seems likely, due to

- the organic farming standards, which in many countries set an upper limit of two Livestock Units (LU) per ha UAA;
- the striving to feed livestock with feed produced on the farm wherever possible, when at the same time forage yields are lower and purchases of feedstuffs are restricted;
- high prices for organic cropping products and often modest prices for organic livestock products, which makes selling grain more profitable than feeding it, leading to stocking rates that are more adapted to the carrying capacity of grassland and pastures.

Table 3-4 gives an overview of the stocking rates in organic farms as a percentage of those on comparable conventional farms. ***On average, stocking rates are consistently lower*** on the organic farms. Still, a more differentiated analysis reveals that relative stocking rates are to a considerable degree ***dependent on the farm type***. While the results for grazing cattle and dairy farms are quite similar to the average results in Table 3-4, arable farms often have a similar or higher stocking rate than comparable conventional farms; this is a consequence of strong 'integrating forces'. On the other hand, pig (and large poultry) farms often face strong pressures to reduce livestock when converting to organic farming, resulting in significantly lower stocking rates than on conventional farms.

Table 3-4: Stocking rates on organic farms relative to comparable conventional farms

GB	NL	FI	DE	CH	DK	AT
74 %	70 %	82 %	62 %	88 %	76 %	71 %

Sources: Own calculations based on Fowler, Lampkin and Midmore (1998) for GB, Dutch FADN for NL, AERI (1997) for FI, BMELF (1998) for DE, FAT (1997a) for CH, DIAFE (1998) for DK, BMLF (1996) for AT. See Annex 7.

4 Comparative analysis of yields, prices and costs in organic and conventional farming

4.1 Yields

Yield levels are an important determinant of the relative competitiveness of farming systems. Yields in organic farming are generally assumed to be lower than in conventional farming. The objective of the following paragraphs is to scrutinise this generality, and to quantify the yield differences with respect to products and countries.

The survey of literature and expert opinions was aimed at collecting data on yields both in organic farms and in field experiments, with a special focus on the collection of comparable conventional yields. To assess the development of yields over time, an attempt was made to collect time series data.

A detailed overview of absolute yields is given in the literature review in Annex 1 and Annex 2, whereas this chapter will concentrate on yields relative to conventional yields.

4.1.1 The determinants of yields in organic farming

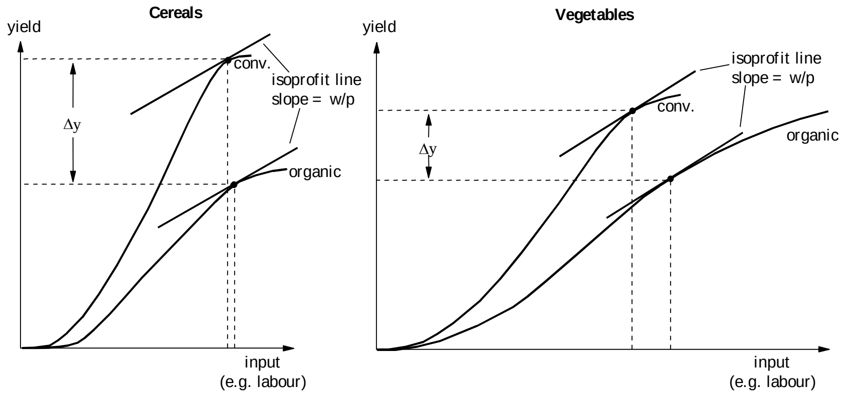
While the ***absolute*** yield level is mainly determined by the same factors as in conventional farming, e.g. climate, crop rotation and soil quality for crop yields or breeds for livestock performance, the degree of influence is often very different. Typical such examples are crop rotation and stocking rate, which have a greater influence in organic than in conventional farming. Some yield-influencing factors, like the time under organic management, are specific to organic farming.

Thus, the ***relative*** difference of yields as compared to conventional management depends on a multitude of factors, particularly

- the intensity of the prevailing conventional system (Padel and Lampkin 1994),
- the intensity of the organic system,
- the level of conventional yields (Piorr and Werner 1998),
- the farm type,
- the natural conditions, and
- the type of crop or animal.

Often, the discussion about yields in conventional relative to those in organic farming is characterised by a ‘technical’ approach, focusing on the production function of the different sets of technologies used in conventional and organic farming respectively. The yield level that will actually be realised in practice is dependent on both the production function, which describes the relation between yield and input levels, and the prices of products and inputs, as these influence the economically optimal yield level. Figure 4-1 illustrates these relationships and shows their impact on the yield differences observed for different crops.

Figure 4-1: Determinants of optimal yield levels in organic and conventional farming



w = factor price (e.g. wage)
p = product price
Δy = yield difference

Figure 4-1 shows the production functions for organic and conventional technology, concentrating on just one varying production factor, e.g. labour, for two products. Profit maximisation requires that the “value marginal product of each factor must be equal to its price”, which in the diagram is characterised by the point of tangency of the isoprofit line[3] and the production function. The difference between the resulting optimal yields for organic and conventional production respectively is rather small for the product in the graph on the right, which could represent the situation for vegetables; it is quite pronounced in the diagram on the left, which exemplifies the situation for cereals. The diagrams illustrate the factors determining the relative difference.

On the one hand, the position and progression of the production function, i.e. both the value of technically feasible maximum yields, and the steepness of the function, have an impact.

[3] Here, the isoprofit line represents all sets of input and output levels with similar profits when prices (w, p) are fixed.

These will be called ***'technical determinants of relative yields'.***

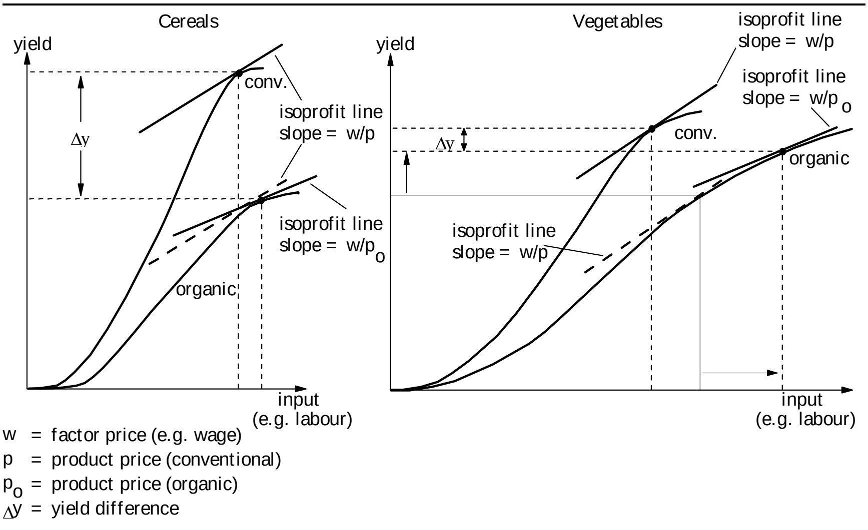
In the case of vegetables, an increased input, e.g. of labour for mechanical weed control, will increase yields over a large range of input levels, with maximal yields not much lower than under conventional management. In the case of cereals, the curve is steeper, and soon a point is reached where increased labour input will hardly increase the yield - but where organic yields are still significantly lower than conventional yields.

On the other hand, the diagram shows that the slope of the isoprofit line, which is determined by product and factor prices, will influence the optimal yield level.

These will be called ***'economic determinants of relative yields'.***

If, for example, the prices for the organic product rose, i.e. if an organic price premium could be realised, then the optimal yield level would increase. This effect is illustrated in Figure 4-2. In the example, due to the progression of the production function, it would be much more worth while to increase labour input and thus yields for vegetables than for cereals, and in the case of the latter the response to price increases would be marginal. A higher price for cereals will in general lead to an increase in output through the extension of the area cropped with cereals, while for vegetables, a significant increase in yield may also be expected. A similar effect on yields would result from decreased input prices, with the difference that the optimal conventional yield level would be affected as well.

Figure 4-2: Impact of price level on yield differences between organic and conventional farming



As the 'price', or the opportunity costs, for some production factors, e.g. (family) labour, varies between farms, observed yields may be different for the same crop on farms with similar natural (or 'technical') conditions.

The impact of the different farming systems on yields is determined by the ***interaction of economic and technical determinants.***

4.1.2 Yields in comparison to conventional yields

4.1.2.1 Yields in crop production

The main factors influencing the yields of arable crops are soil quality and climate, crop rotation, stocking rate and time under organic management (Padel and Zerger 1994; see also Dabbert 1990, 1994). In Europe, crop yields are generally lower in organic farming than with conventional management[4].

Table 4-1 to Table 4-5 give an overview of organic yields relative to conventional ones for different crops in the 18 countries surveyed. A detailed list of the evaluated studies on organic yields is given in Annex 1. The data given below is a ***comprehensive summary of the studies that have observed yields on farms***. It was attempted to select the studies that are most representative in terms of the number of farms analysed, and to capture the variability of yield levels by giving the range of typical yield observations.

[4] Organic yields in developing countries are often reported to be higher than those from conventional (=traditional) farming systems (Planck, 1998).

Table 4-1: Cereal yields as percentages of conventional reference yields (farm data)

	AT	BE	DE	DK	ES	FI	FR	GB	GR	IE	IT	LU	NL	PT	SE	CH	CZ	NO
Cereals (average)			61-67	64-75			*(50-60)**	63	*(70)*									
Soft wheat	62-67	63	58-63	59		45-74	44-55	46-61	*(70)*	*(60)*	78-98	*(51)*	69-77		62	65-74	66-76	76
Durum wheat							73		*(70)*		53-87							
Barley	58-70	65	62-68	45-89		37-67	*(70-80)*	61-68	*(70)*	*(60)*	55-94	*(48)*	79		66	65-84	60-72	82
Oats	56-75					53-75		61-83	*(70)*	*(62)*	88	*(61)*	64		76	73-94		80
Rye	65-85		60-62			61-94			*(70)*			*(66)*	*(77)*			62-73	70-83	
Grain maize			70				66-*(80)*		*(70)*		55-93		95			85-88		

Source: Own calculations based on literature review and survey data. See Annex 1 for details.

* Figures in brackets represent expert assessments.

Table 4-2: Yields of oilseeds, root crops and pulses as percentages of conventional reference yields (farm data)

	AT	BE	DE	DK	ES	FI	FR	GB	GR	IE	IT	LU	NL	PT	SE	CH	CZ	NO
Oilseeds (Sunflower)	78-88		60-67				67-(80)*				48-50							
Beets			75-107	86			57				71		112					
Potato	39-54	50	54-69	71		86-121	68-79	38-82	(57-76)	(74)	62-99	(53)	58-83			62-68	59-66	100
Pulses	83-85		49-73				83	108	(70)	(70)	73-100		(74-81)			88		

Source: Own calculations based on literature review and survey data. See Annex 1 for details.

* Figures in brackets represent expert assessments.

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Table 4-3: ***Vegetable yields as percentages of conventional reference yields (farm data)***

	DE	FR	GB	GR	IT	NL	CH	NO
Vegetables	82							
Tomato		75		*(70)**	86-120			
Onion		62	87		74-83	64-75		
(Water) Melon					103-109			
Garlic		78			48			
Pepper				*(70)*	107			
Carrot	90	71				98	87	113
Spinach					105			
Basil					112			
Chicory					163			
Leek		76			133			
Courgette		76			99			
Cabbage	65-67				95			

Source: Own calculations based on literature review and survey data. See Annex 1 for details.

* Figures in brackets represent expert assessments.

Table 4-4: ***Yields of permanent crops as percentages of conventional reference yields (farm data)***

	DE	GR	FR	IT	CH
Olive		*(100)**		73	
Apple	*(50)*	*(50)*	60	34-50	81
Pear		*(50)*		15	
Peach		*(50)*		43	
Kiwi				128	
Grapes (for wine)	*(80)*	*(70-100)*		51-65	

Source: Own calculations based on literature review and survey data. See Annex 1 for details.

* Figures in brackets represent expert assessments.

Table 4-5: Yields of grassland and pastures as percentages of conventional reference yields (farm data)

	AT	DK	SE	NO
Grass/clover, green fodder	(70-100)*	83	79	90-95

Source: Own calculations based on literature review and survey data. See Annex 1.

* Figures in brackets represent expert assessments.

While the tables show that average yields are clearly lower for most crops in most countries, they can in individual cases be as high as or higher than conventional reference yields (see Annex 1).

A detailed interpretation of the condensed information given in the tables has to be done with some care. The ranges of yields observed are clearly greater the more studies are available, and where only one figure is given in the table, this usually does not mean that no variation in relative yield differences was observed for that country, but that only one study was available. Still, for some yield ratios a high degree of similar results and trends surfaced from the studies carried out in different countries.

For ***cereals***, the range of observed typical yield ratios is quite narrow for most countries, especially in central and western Europe. While it is not possible to deduce a single figure as an 'average' typical yield ratio, the rule of thumb that yields in organic farming are 60-70 % of those under conventional management (e.g. Padel and Zerger 1994; Dubgaard 1994; Padel and Lampkin 1994), is, at least for cereals on average, again confirmed. The suggestion that yield differences are higher for more intensive crops, such as wheat (Dubgaard 1994; Padel and Lampkin 1994) is supported by the data collected in the survey for some countries. However, this is not unequivocally so, and the difference in typical yield ratios between different cereals does not seem to be very great in many countries.

For most countries the studies evaluated show a high variation in both the absolute and the relative yield levels of ***potatoes***. This variation exists within countries, between countries, and for data of different years. High fluctuations in yield levels are observed also for conventionally grown potatoes, and whether the degree of variation is dependent on the farming system would be an interesting object for further study. Due to the high variation, it would not be practical to give a general conclusion on typical yield reductions for potatoes. Still, it should be noted that, while in some countries the observed yield gap for potatoes is significantly greater than for cereals, in other countries organically grown potatoes regularly have yields as high as conventionally grown ones.

Little data is available on the yield of ***oilseeds*** and sugar and fodder ***beets***, which is not surprising, considering the insignificant share of these crops in organic farms in most countries (see Chapter 3). For oilseeds reported yield levels are in the range of 50-88 % of conventional yields. The data on beet yields shows an even higher variation of relative yields (57-112 %). The high organic yields for sugar beet in Germany achieved in some years have been attributed to high (labour) input (Schulze Pals 1994).

For ***pulses***, the typical relative yield difference is around 20 % and thus considerably smaller than for cereals.

For ***vegetables***, it is difficult to draw a general conclusion, due to the high diversity of different vegetables and the restricted information available. Even in those countries where data was obtainable, this is in general based on single studies, thus reducing the representativeness and reliability of the results. Still, the studies strikingly often report yields for organically grown vegetables that are as high as or higher than those of comparable conventional farms. While no study-based explanation can be offered, one argument might be that vegetables are cared for with an especially high input of labour and organic fertiliser, because they contribute a major part of the profit for many organic farms due to the high price premia available for organic vegetables.

Very little research is available on the yield of ***arable feed crops and grassland*** under organic management. The lower stocking rates per ha of main forage area can only partly be taken as an indicator for reduced yields, since they also reflect the reduced share of concentrates in the feed rations. In Austria, yield differences are negligible on extensive alpine sites, while in the intensive grassland areas yields are reduced by 30 % (Maurer and Wieshofer, personal communication).

For crop production, the impact of different farming systems on yields is quite substantial. Crop yields are to a considerable extent influenced by external factors like climate, soil quality and pests, and consequently the prohibition of the use of artificial chemical fertilisers and pesticides has a strong effect on the yields of many crops. The 'technical determinants' for relative yields often predominate, though there are a few crops where favourable economic and technical determinants will result in yields similar to those in conventional farming.

4.1.2.2 Performance in livestock production

When analysing relative performance in livestock production, one has to differentiate between performance per head and performance per ha. Performance per head is much less affected by the choice of farming system, since the impact of differences between conventional and organic farming systems is much smaller in livestock than in crop production. Differences in housing standards will in general have only marginal impacts on the standard performance per head. The main impact will come from differences in feed rations, due to restrictions of purchases and higher feed prices, and also from the use of different breeds. Performance measured per ha will in general be lower due to lower yields of feed crops and lower stocking rates (see Table 3-3).

Far fewer data and studies are available on performance in livestock production than for crop yields (see Annex 2). This is not so surprising for intensive livestock production (pigs and poultry), which, until this decade, was seldom seen in organic farming (Padel and Zerger 1994). It is, however, quite astonishing that performance in grazing livestock production, with the exception of dairy yields per cow, has so far received little attention in most of the countries surveyed.

Comparative data on dairy yields per cow was available from almost all countries (Table 4-6), and typical performance is in the range of 80 % to 105 % of that on comparable conventional farms. On the other hand, stocking rates are often lower on organic farms (see also Chapter 3), and milk production per ha of main forage area is thus lower, with relative values of 70 % reported from the Netherlands (Dutch FADN) and Germany (Nieberg 1999) and 80 % in Switzerland (FAT 1997a) and Sweden (Danielsson and Arnesson 1998).

Table 4-6: Dairy yields per cow and year as percentages of comparable conventional yields

AT	BE	DE	DK	ES	FI	FR	GB	GR
	106	79-95	92-98		90-94	78	97	
IE	**IT**	**LU**	**NL**	**PT**	**SE**	**CH**	**CZ**	**NO**
(75)*	92-107	(80)	93-96		96	89	104	76

Source: Own calculations based on literature review and survey data. See Annex 2 for details.

* Figures in brackets represent expert assessments.

For other performance measures, the little data that was available is in general often based on single studies. Daily live weight gains in beef production were found to be similar in organic and conventional farming if measured per head, but due to a reduced stocking rate, beef production per ha was significantly lower in organic farming (Younie and Mackie 1993). Fertility-related performance measures like piglets raised (BMELF 1995-97, LBA 1997, 1998) or lambs reared (Keatinge and Elliot 1997) were the same or better on organic farms. Observed performances of laying hens (egg/hen/year) were similar in Switzerland (LBL 1997) and 19 % lower in the Netherlands (Dutch FADN).

The data collected for this report (see also Annex 2) shows that the relative yield difference to conventional yields is smaller in animal production than it is for crops, which is consistent with earlier surveys (e.g. Mühlebach and Mühlebach 1994).

For livestock production, technical determinants have much less influence on performance per head, and economic factors often prevail.

4.1.2.3 Field experiments

The yield data supplied above is derived from actual farm data. There also exists a multitude of studies on field experiments. In the past, these were often directed at determining the yield losses as compared to conventional management, while nowadays they are increasingly conducted with the objective of examining the suitability of different varieties for organic farming. Data on yields of field experiments is very important to determine the technical production function and analyse the effects of the variation of yield-determining factors. Here, for the assessment of actually 'realised' yield levels, these data have to be treated carefully for two reasons. Firstly, especially in the past, 'organic' management did not reflect actual organic farming practices; the 'organically managed' plots sometimes resembled just 'zero-plots', neglecting any adjustments usually made in response to the non-use of artificial chemical fertilisers and pesticides. This resulted in very high yield differences. To mirror 'real' conditions, the experiments need to be designed to take into account the whole system of organic farming, e.g. crop rotations. Secondly, there is the danger of determining yields under optimised conditions, thus overestimating the potential of crops or varieties for organic farming. In addition, experiments are sometimes focused exclusively on the 'technical determinants' of yields.

Still, the intensified research on and selection of varieties specially adapted to organic management seems likely to increase both the absolute yield and the yield stability attainable in organic farming. The experiments also show the potential of organic farming, e.g. that winter wheat yields in good years can exceed 10 t/ha (Cormack and Elliot 1994-1997).

4.1.3 Time series of yields

When analysing the development of organic yields over time, one has to differentiate two aspects:

- the development of yields during conversion, i.e. a farm-level analysis of yields during the process of conversion;
- the development of average yields over time.

4.1.3.1 Yield development during conversion

The conversion period is legally defined by EC Reg 2092/91 and lasts 2 years. The process of conversion, defined as the transitional phase from a conventional to a 'steady' organic system, usually takes longer. With respect to yield levels during conversion as compared to yields in an established organic system, no single hypothesis exists.

On the one hand, it is argued that yields will only be lower in the conversion period and rise again later. This is due to the time it takes to adapt the agro-ecosystem and especially soil conditions to the new methods of production (Dabbert 1994), as well as to an initial lack of knowledge resulting in mistakes made by the farmers.

- On the other hand, it is argued that mineral supplies of soils are well stocked after years of conventional (over-)fertilising, and that weed pressure is initially reduced due to the chemical eradication in the past, leading to non-sustainable higher yield levels in the years immediately following conversion.
- Other authors (compare Padel and Lampkin 1994b) find no evidence that output levels are related to time under organic management.

It can be concluded that conversion-specific crop yield reductions are not found universally.

4.1.3.2 Yield development over time

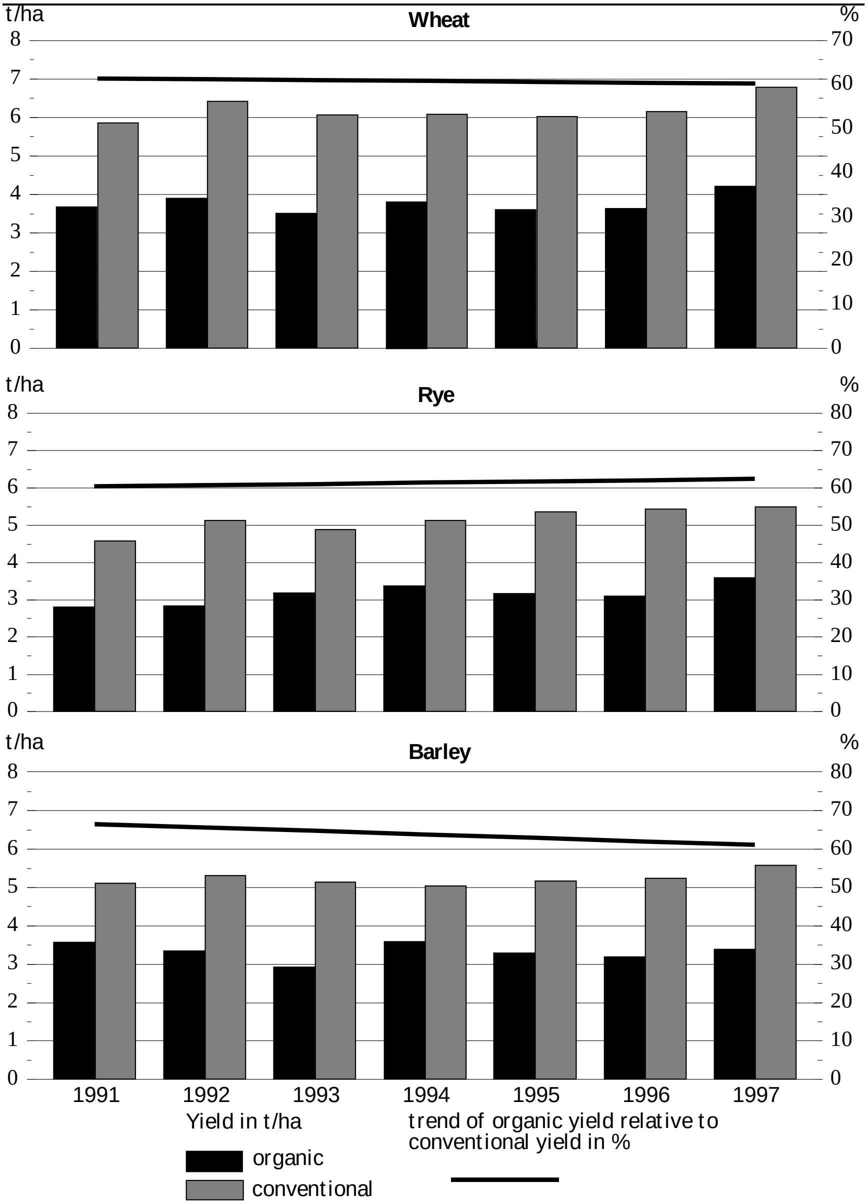
An important point of discussion has been the development of yields over time. Several authors have observed an increase of organic yields over the years, e.g. Padel and Zerger (1994) for Germany for the years 1981-1992; Mühlebach and Mühlebach (1994) for Switzerland in the period 1980-1991. But they also point out that conventional yields have increased even more, resulting in a widening gap not only of absolute yield differences but also of relative ones (Padel and Lampkin 1994). The analysis of the absolute and relative yield developments is clearly of major interest for assessing the future of organic farming systems, as it will influence relative competitiveness. Moreover, physical output is an important issue in political discussions on subjects as diverse as surplus reduction and world food security. Unfortunately, more recent time series on organic yields in comparison to conventional yields have been identified only for Germany and Switzerland (Figure 4-3 and Figure 4-4). The time series cover only 7 consecutive years and therefore an analysis is not strictly reliable from a statistical point of view. Also, it has to be noted that the sample varies over the years, and that it is not known since when the farms have been managed organically (which can have implications for the yield difference, see above). But even with this in mind, a look at the yield trends reveals that the data does not unequivocally support the statements quoted above. For Switzerland, the hypothesis of a positive trend of yield levels in organic farming could not be confirmed. While the relative yield gap to conventional yields widened for wheat and especially rye, it seemed to narrow for barley. On the other hand, the farm data from Germany show an increase in absolute organic yield and a very stable relative yield difference between organic and conventional farming for wheat and rye. Quite in contrast to the observations made in Switzerland, the relative yield difference for barley seems to grow.

The observed growing relative yield difference in the earlier decades (1970-1990) has been attributed to the continuing intensification of conventional farming (Padel and Lampkin 1994). While the analysis of the more recent time series of yields for Germany and Switzerland cannot be statistically substantiated, the tentative conclusions of a stable relative yield gap in Germany seem plausible considering the changing political framework in the period analysed: the CAP reform of 1992 has potentially slowed the intensification of conventional farming (Zeddies et al. 1994). Other sources report a general slowdown of conventional yield growth (Brown 1998). Of course, another explanation may be that the growth rates of organic yields have increased in the last decade.

This point is very difficult to analyse, as data for more years would be needed, and the (for some crops) high yearly variations of both conventionally and organically grown crops make a statistically sound analysis demanding. It also seems necessary to further examine the question whether yield trends are different for different sites and regions.

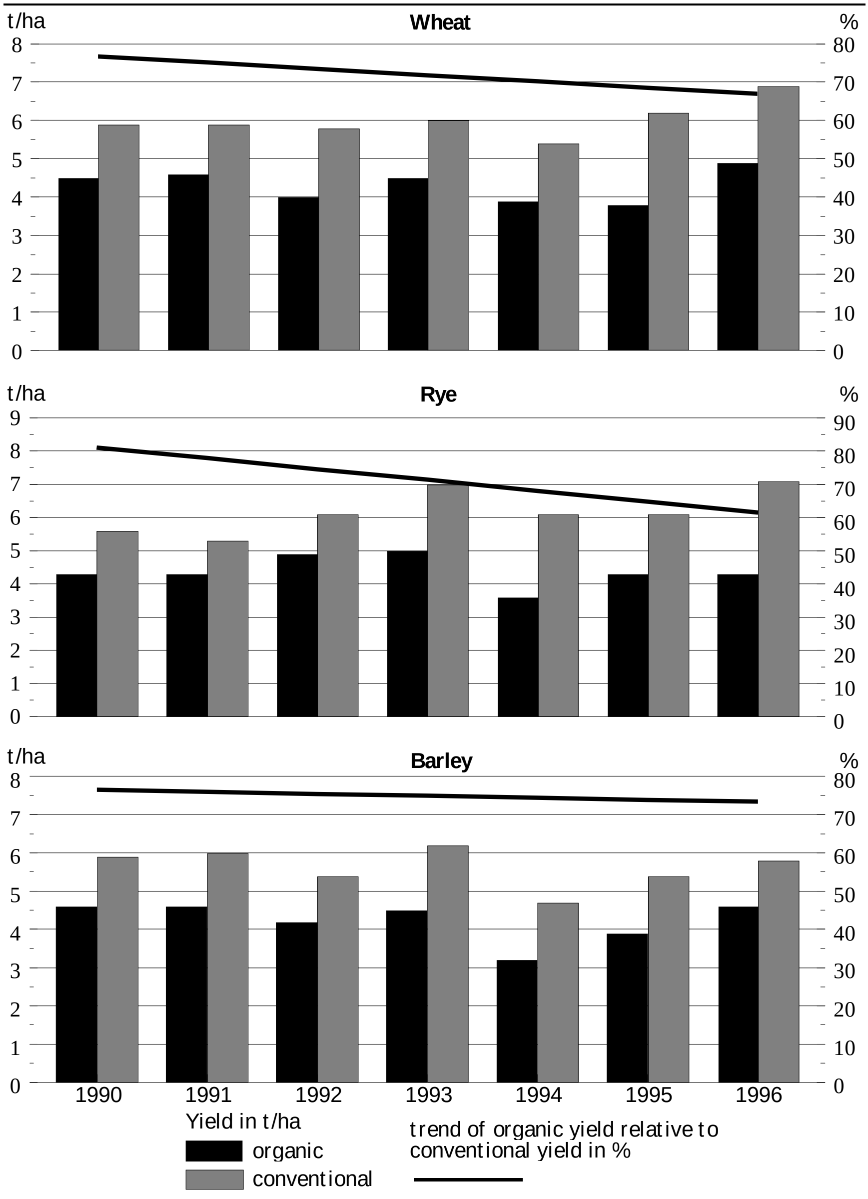
The future development of yields will be determined by a multitude of factors. Some of these factors will be new and their impact on yields cannot be forecasted. Genetic engineering might lead to higher growth rates of yields in conventional farming, as intensified research in organic farming might lead to a stronger increase of organic yields. On the other hand, environmental legislation, rising input costs and decreasing output prices, as proposed by the Agenda 2000, might reduce intensity and yield increases of conventional farming, and maybe also of organic farming.

Figure 4-3: Yield trends in organic and conventional farms in Germany



Source: Own calculations based on BMELF (1992-1998)

Figure 4-4: Yield trends in organic and conventional farms in Switzerland



Source: Own calculations based on FAT (different years)

4.2 Prices

In this chapter an overview of farm gate prices for organic products is given[5]. As an introductory remark, it shall be pointed out that it is not generally possible to determine one organic farm gate price for a product, because

- the number of different sales channels is high for organic products, and prices vary considerably between sales channels;
- prices vary far more between individual organic than individual conventional farms, due to the great differences in the individual farms' access to the sales channels.

Whenever possible, we tried to calculate an ***'average organic farm gate price'*** by weighting the prices received through different sales channels with the quantity actually sold by the farms via this channel. If part of the production had to be marketed at conventional prices, this is reflected in the 'average organic farm gate price'. It should be kept in mind that the 'average' price will be different for each farm, as it is dependent on its marketing strategy.

For all countries, studies on organic prices were evaluated. If no such studies existed, experts in each country were asked to give estimates. The availability of information on prices for organic products varied substantially between the countries surveyed. In some countries, statistical centres or trading boards provide publicly accessible up-to-date price information, often on a weekly or monthly basis. Another frequently used source for this survey were studies or farm accounts that give information on past (average) prices. In some countries, representative prices had to be estimated by country experts. In a few cases, the experts asked to provide such estimates felt unable to do so for all important products, because of the perceived high variation of prices between farms, regions, seasons and sales channels. This impressively illustrates the high degree of uncertainty that farmers considering conversion will face with respect to possible future revenues for their products in these countries.

4.2.1 Prices in different marketing channels

Table 4-7 gives an overview of the prices for a few important products that have been realised in different sales channels.

[5] An analysis of consumer prices is given by Michelsen, Hamm and Roth (1999).

Table 4-7: Farm gate prices realised in different sales channels (price in ECU)

Country and source		Product	Year	Unit	Direct marketing to the consumer	Shops and small scale food processors	Whole salers and other large scale buyers	Others	Aver. Conv. Price
CH	4)	Wheat	1996	t	1403-2424	1276-2041	746		568
	4)	Potatoes	1996	t	893	638	478		319
	4)	Milk	1996	kg	1.02-1.21	0.96			
	4)	Beef	1996	kg	19.13	16.58			
	4)	Pork	1996	kg	10.84-13.39	9.57			
	4)	Eggs	1996	no.	0.41	0.35			
DE	1)	Cereals	1994	t	882	573	326	305	153
	2)	Cereals	1996	t	593	396	296	273	140
	3)	Wheat	1996	t	770	580-613	351		
	1)	Potatoes	1994	t	539	627	365		254
	2)	Potatoes	1996	t	563	462	311		
	3)	Potatoes	1996	t	623	524	445		
	1)	Milk	1994	kg	0.78		0.35		
	1)	Beef	1994	kg	15.61	10.45	10.45		
	1)	Eggs	1994	no.	0.20	0.17	0.17		
F	5)	Wheat	1993-95	t	426	365	251		137
	6)	Wheat	1997	t	454		250		129
LU	7)	Wheat	1997	t	617	493	370	222	141
	7)	Potatotes	1997	t	1604	1234	1234		192
	7)	Beef	1997	kg	4.93	3.21			2.22
SE	9)	Cererals	1997	t	260	191	139		105
	9)	Potatoes	1997	t	485	590	231		197
UK	8)	Poultry	1996	kg	4.94-6.17		3.52-4.94		
	8)	Eggs	1996	no.	0.108-0.205	0.164-0.195	0.139-0.144		

Source: 1) Nieberg (1997) 2) Nieberg (1998a) 3) ZMP (1997) 4) VZSB (1996) and LBL (1997) 5) Gaillard et al (1996); 6) Antoine (1997) 7) Expert estimation 8) Lampkin (1997b) 9) Eco Trade (1997)

The ***prices vary considerably between the different marketing channels***, with prices realised via direct marketing to the consumer often being twice as high as those received from wholesalers. On the other hand, costs, especially labour requirements, are also very different for the different marketing channels, and often the labour capacity of the farms will determine which sales channels are more profitable. The development of some market channels may also require high investments, especially if products have to be processed before they can be marketed directly to the consumer.

4.2.2 Importance of different marketing channels

An overview of the importance of the different sales channels is given in Table 4-8.

Several interesting facts are revealed by the overview of the share of the sales channels in different countries.

- The importance of different sales channels for the same product may vary significantly between countries. Together with the observed dependence of the price on sales channels, this implies differences in average revenues as well.
- Still, a common trend can be observed for some products across all countries, e.g. the high share of potatoes that are sold in direct marketing, in contrast to cereals, where wholesale marketing is often the most important sales channel.
- The importance of sales channels may change over time. Several influences may cause such shifts. Firstly, the establishment of special organic sales channels can take the farms several years, as has been observed (Table 4-8, Nieberg 1998a) for the sales of cereals to specialised shops in Germany. Secondly, such shifts reflect a changing market structure, e.g. wholesalers entering the organic market. And thirdly, since the quantities that can be sold in direct marketing are generally limited, one phenomenon that can be observed in years with good harvests is the decreasing relative importance of direct marketing.

The actual importance of a marketing channel for total revenues from the sales of a product is dependent on both the price received and the quantity sold via this channel. But one should not be misled by the high prices realisable in direct marketing as regards their importance for revenues. Since the amounts that can be marketed directly to the consumer are often limited, contribution to total revenues is modest for many products. Figure 4-5 illustrates the importance of different marketing channels for total revenues for a few countries and products. While, for potatoes, direct marketing accounts for more than 40 % of total revenues, for cereals / wheat, this share is well below 10 % in the countries depicted in Figure 4-5.

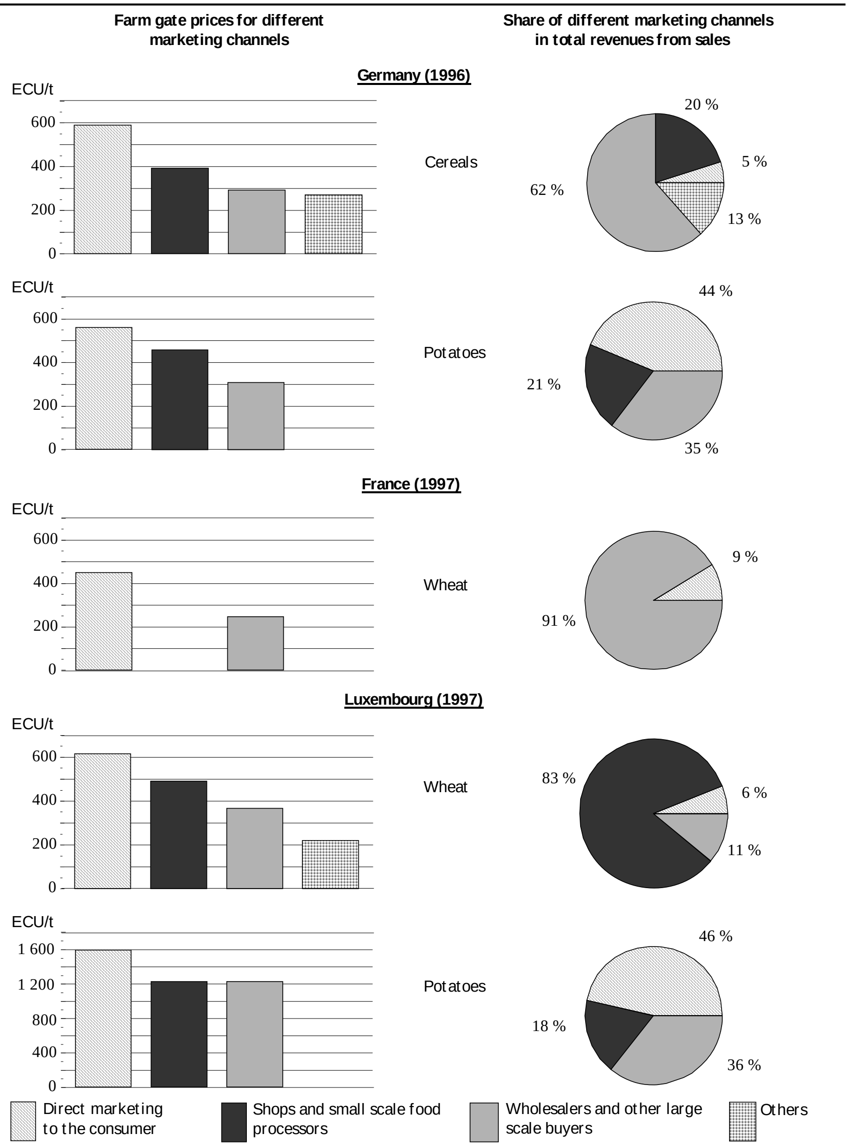
Table 4-8: Share of different marketing channels in total sales

Country and source		Product	Year	Direct marketing to the consumer	Organic shops and small scale processors	Whole salers and other large scale buyers	Other sales channels	Sold at conv. Price as % of total sales
DE	1)	Cereals	1994	2 %	8 %	85 %	6 %	13 %
	2)	Cereals	1994	2 %	10 %	81 %	7 %	0 %
	2)	Cereals	1996	3 %	16 %	66 %	16 %	2 %
	1)	Potatoes	1994	44 %	12 %	45 %		17 %
	2)	Potatoes	1994	44 %	19 %	37 %		2 %
	2)	Potatoes	1996	33 %	19 %	48 %		0 %
F	4)	Wheat	1997	5 %		95 %		
FI	6)	All products		31 %	46 %	10 %	13 %	
IT	7)	Wine grapes	1995	40 %	16 %	32 %	12 %	
	8)	All products	1992[a]	26 %	25 %	19 %	29 %	
	9)	All products	1993[b]		21 %	50 %	29 %	
LU	5)	Wheat	1997	5 %	85 %	15 %		
	5)	Potatoes	1997	40 %	20 %	40 %		
	5)	Milk	1997			25 %		75 %
	5)	Beef	1997	75 %	5 %			20 %
NO	3)	Wheat	1997	25 %	25 %	50 %		
	3)	Potatoes	1997	25 %	25 %	50 %		
SE	11)	Cereals	1997	3 %	12 %	83 %	2 %	28 %
	11)	Potatoes	1997	32 %	13 %	55 %		8 %
UK	10)	Poultry	1996		90 %	10 %		
	10)	Eggs	1996		30 %	70 %		

Source: 1) Nieberg (1997) 2) Nieberg (1998a) 3) Own data (Producer Organisation for Trading of Organic Food) 4) Own data (LIGEA cooperative)
5) Expert estimation 6) Expert estimation 7) Zanoli and Santi (1997)
8) Miele (1994) 9) Foglia (1993) 10) Lampkin (1997b) 11) Eco Trade (1997)

[a] Data for Toscana
[b] Data for Emilia-Romagna-Region

Figure 4-5: Importance of different marketing channels for revenues



Source: Own calculations based on: Nieberg (1998a) for Germany; Antoine (1997) for France; expert assessment (1997) for Luxembourg.

The importance of the different sales channels as shown in Table 4-8 and Figure 4-5 is a snapshot of the current situation, and changes seem likely as the market for organic products develops further.

4.2.3 Average price premia for organic products

Organic products often receive premium prices as compared to prices for conventionally produced products. When looking at the 'average' organic price, i.e. taking into account the shares and prices of different marketing channels (including those parts of production that may have had to be sold at conventional prices), the premium observed will be due to two effects:

- The share of marketing channels where a higher price is realised is often larger for organic products than for conventionally produced ones.
- Within the same marketing channel, organic prices are often higher than conventional ones.

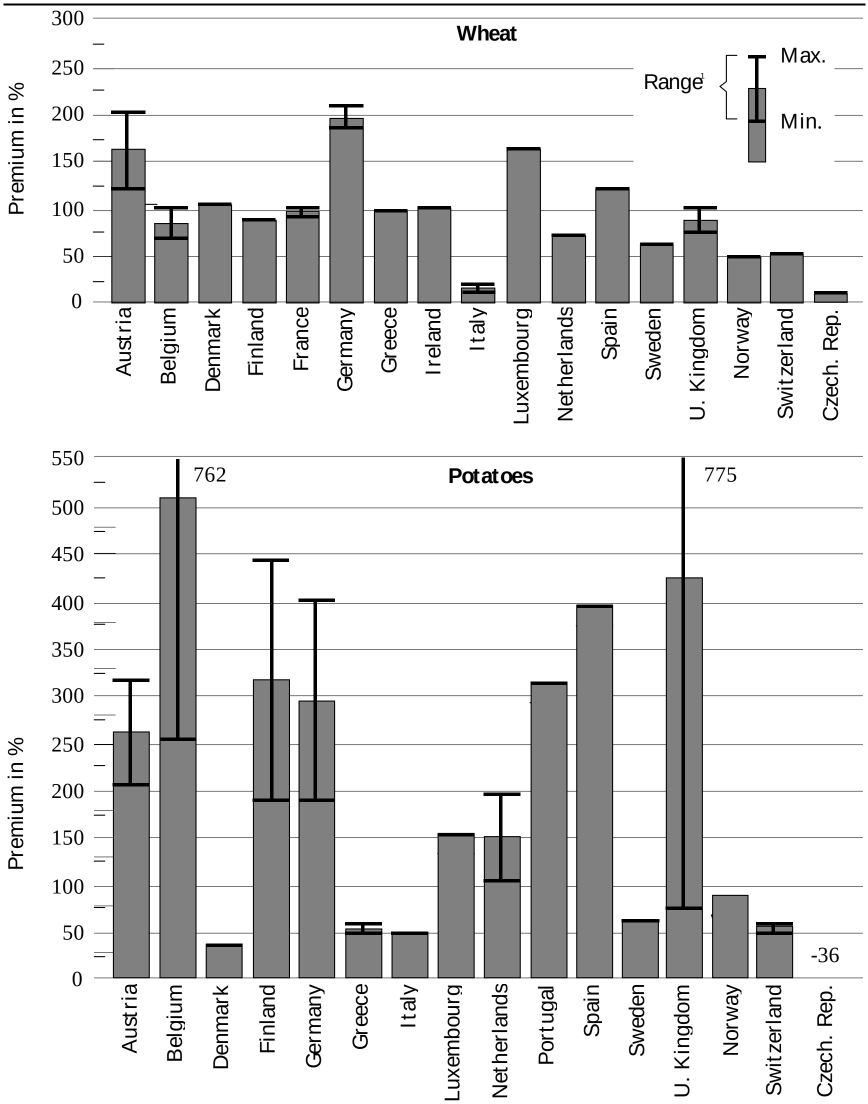
The second effect at first glance seems to describe the 'pure' price premium for organic products, which is due to the fact that the product is organic and consumers therefore are prepared to pay a higher price. But the influence of the different pattern of marketing channels as compared to conventional farming is system-inherent and therefore has to be taken into account when calculating farm gate premium prices.

The availability and size of price premia is highly dependent on the product and varies from country to country. Below, relative price premia for different important products or product groups are illustrated. The diagrams very impressively highlight the ***widely available premia for crop products*** (Figure 4-6), and, in contrast, the ***rather small relative price premia for livestock products*** (Figure 4-7). This marked difference has been attributed to a lack of market outlets, and problems of supply co-ordination for livestock products (Padel and Lampkin 1994; Schulze-Pals 1994). A reduced meat consumption by the 'typical' consumer of organic products as compared to the 'average' consumer is also seen as an explanation for the difficulties in widespread premium marketing (Schulze-Pals 1994).

The ***premia also vary from crop to crop and from country to country***, reflecting both the demand for organic food in each country, and the level of conventional prices (Padel and Lampkin 1994).

Wheat is often sold at prices of 50-200 % above conventional prices. While the premia reported from Austria, Germany and Luxembourg are at the upper end of this range, they are at the lower end in Switzerland and Norway, where the price level for conventionally produced wheat is generally high. Exceptionally low premia are reported from Italy and the Czech Republic. Figure 4-6 illustrates the high degree of variation in premia for potatoes, which corresponds to the yield fluctuations of both organically and conventionally grown potatoes (see Chapter 4.1), and also to the high yearly variability of the conventional price. For milk, price premia are almost always in the range of 10 to 30 %, with the highest values reported from Denmark. The premium for milk has recently also increased in Great Britain, which is partly due to a reduction in prices for conventionally produced milk because of the strong British pound.

Figure 4-6: Typical price premia for selected organically produced crop products in different countries (1994-1997)

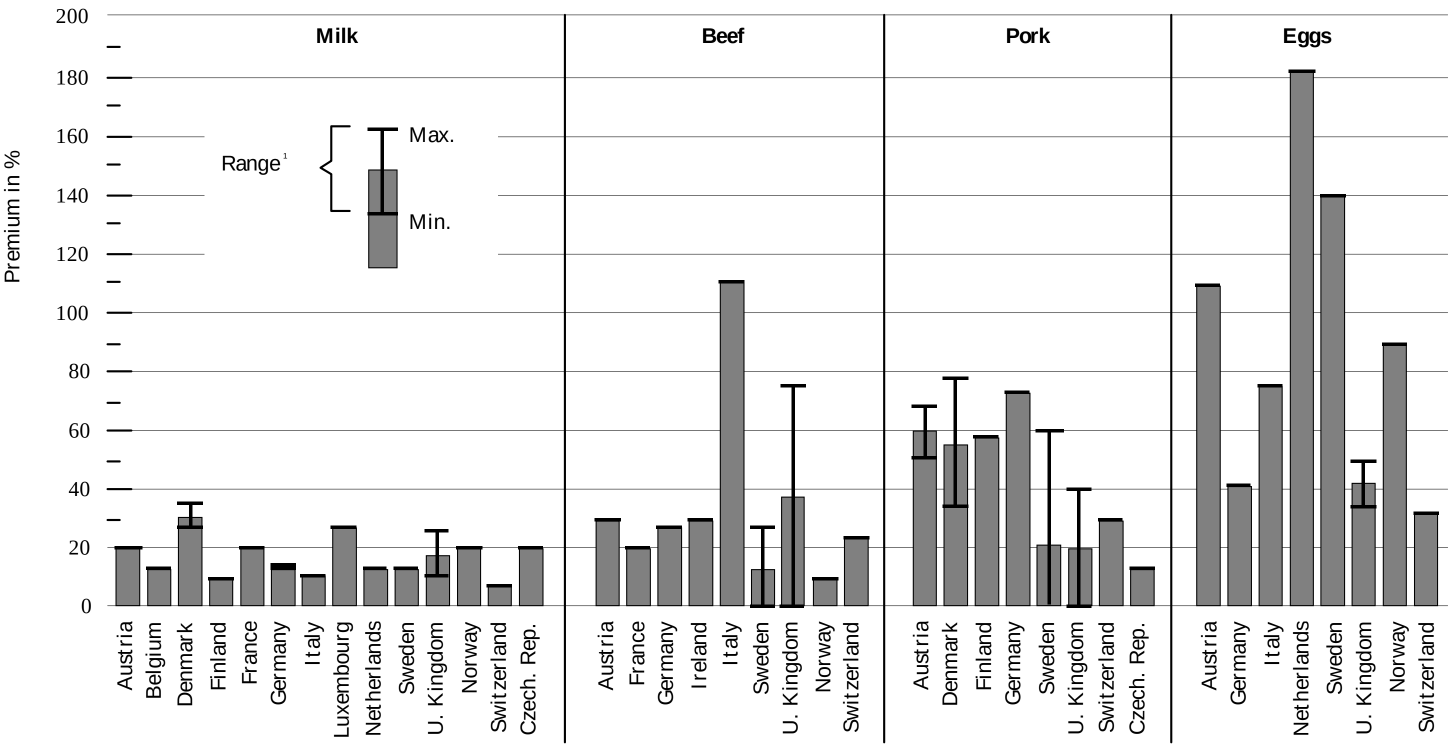


Source: Own calculations based on survey of literature and expert assessments. See Annex 4.

[1] Range of typical price premiums.

Premium prices for pork are typically around 60 %, whereas beef premia are more often in the range of 20-30 %. Eggs have the highest premia of livestock products, which may be attributed to a high share of direct marketing, a strong demand by consumers and higher production costs as a result of high premia for organic cereals. It has to be noted, though, that this premium is lower when the price is compared to the price of conventional free range eggs (which seems more appropriate) rather than to the price for conventional cage eggs.

Figure 4-7: Typical price premia for selected organically produced livestock products in different countries (1994-1997)



Source: Own calculations based on survey of literature and expert assessments. See Annex 4.

[1] Range of typical price premiums.

4.2.4 Price trends / time series

The market for organic products is in many cases still at an early stage of development, with prices changing quite a lot over time. Important aspects in the analysis of the time series of prices for organic products are both the trend of the absolute level of prices, and the development of the prices relative to conventional prices. Older data on farm gate prices is even more scarce than recent data, and an analysis of time series of prices is further complicated by the price differences in the different marketing channels discussed above. Still, time series of prices for some important organic products could be identified for several countries, and, supplemented by the collection of expert assessments, they give a picture of the broader trends in farm gate prices.

While the trends vary from country to country, reflecting the different developmental stages of the respective organic markets and organic processing industries, a common feature of most markets is the positive trend of prices for livestock products. These products often received no price premium in the past, a situation that is slowly changing in many countries. The demand for organic meat has increased, not least due to food scares like BSE. On the other hand, the often high price premia for crop products, especially for organic cereals, seem to come under pressure or be subject to high fluctuations. These statements are underlined by the data and observations collected in the survey for this report.

In ***Germany***, the ZMP (1997) has analysed the time series for organic and conventional farm gate prices on a monthly basis for the years 1993 to 1996. The focus of the analysis was on the question whether the price trends and fluctuations for organic and conventional products were linked. For vegetables, the study found strong seasonal price fluctuations that occurred simultaneously on both markets. Fluctuations were larger on conventional markets, resulting on some occasions in conventional prices being higher than organic prices. The long-term trend of the price level was slightly declining for conventional products, while prices were firm for organic vegetables. For potatoes, the link between prices was at best weak in the past, and the market for organic potatoes did not seem to react to (climate-induced) changes in supply. The authors indicated that, due to the recent strong increase of the area of organically grown potatoes, a closer link of organic and conventional prices seemed likely. For cereals (bread wheat and rye) no link between the prices for organic and conventional products could be observed. The price level for organically produced bread cereals is continually declining.

In ***Ireland***, livestock products like lamb and beef achieved price premia only in the last 2 years, and a significant chance of receiving a premium for milk has existed only since 1997. Prices for crop products remained stable at about 20 % above the conventional price level.

In ***Great Britain*** premia for milk and meat have been available only recently. On the other hand, prices for organic cereals have been very volatile, an indication of still unstable market equilibria.

In ***Switzerland***, a common price trend could not be observed for all products, but again the trend for livestock prices, which have remained stable over the last few years, was generally more favourable than for crop products, where prices were more often declining.

Prices were quite stable in ***Norway***, with a slightly more positive trend for livestock products, due to a developing market.

In ***Denmark***, a strong increase of the farm gate prices for pigs was observed, in spite of the falling prices for conventionally produced pigs in the same period. On the other hand, cereal prices seem to have passed their peak; e.g. prices for organically produced barley increased until 1996, while conventional prices were decreasing, but since then organic prices have started to drop as well.

A decreasing price level was also observed in ***Luxembourg***.

In ***Italy***, prices have been dropping for some products (olive oil, lentils) for several years now.

An exception with respect to the price trends has been ***Austria***, where one of the big players on the demand side ('Ja!Natürlich') has been guaranteeing fixed yearly prices since 1994, and the difference to conventional prices has stayed the same.

In the future, the growing trade with organic products, both within the EU and internationally, is likely to have an important influence on the development of prices, with a tendency of reducing the farm gate price differences for organic products in the EU member states.

4.3 Costs

The cost structure of organic farms differs significantly from comparable conventional farms (Annex 3). The level of overall costs per ha UAA may be either higher or lower on organic farms, as for some cost items reduced expenses are to be expected, while for others it seems plausible to expect increased outlays.

Reduced variable costs are to be expected due to the restricted use and replacement of external inputs (e.g. fertilisers, pesticides and concentrates / purchased feedstuffs) with farm-derived resources (Padel and Lampkin 1994). On the other hand, prices for purchased organically produced inputs (e.g. feedstuffs, seeds) are higher and may reduce these benefits.

Some fixed costs, e.g. wages and salaries, are presumably higher on organic farms, as labour in conventional farming is often substituted by external inputs, e.g. herbicides. While depreciation of machinery may on the one hand be lower due to reduced fertiliser and spraying applications, the increased importance of mechanical weed control and tillage may on the other hand lead to higher machinery costs. Stricter rules on livestock housing make increased depreciation figures for buildings likely. Investments may be necessary for processing and marketing activities.

The ***data*** is based on studies that have evaluated farm accounts. The definition of what is included in the costs varies from country to country (see notes to the tables in Annex 3 for details), and to enable cross-country comparisons in spite of these differences, the costs have been expressed in relation to the costs of comparable conventional farms in the respective country.

Generally, the variance of costs is high for both the conventional and the organic farm groups. In Table 4-9, an overview of the costs on organic farms relative to comparable conventional farms is given. The ***total costs*** per ha UAA ***are often lower*** than those on comparable conventional farms for most farm types and countries, with a few notable exceptions being reported from the Netherlands and Italy. Even where cost savings occur, they do not normally exceed the range of 10 % to 25 %.

Since a detailed analysis of the cost structures is beyond the scope of this report, only the main differences in costs will be highlighted and explained, and illustrated using examples from the data collected. A compilation of the cost data taken from the farm accounts evaluated for this report is given in Annex 3.

Table 4-9: Overview of the costs per ha UAA on organic farms as percentages of the costs of comparable conventional farms

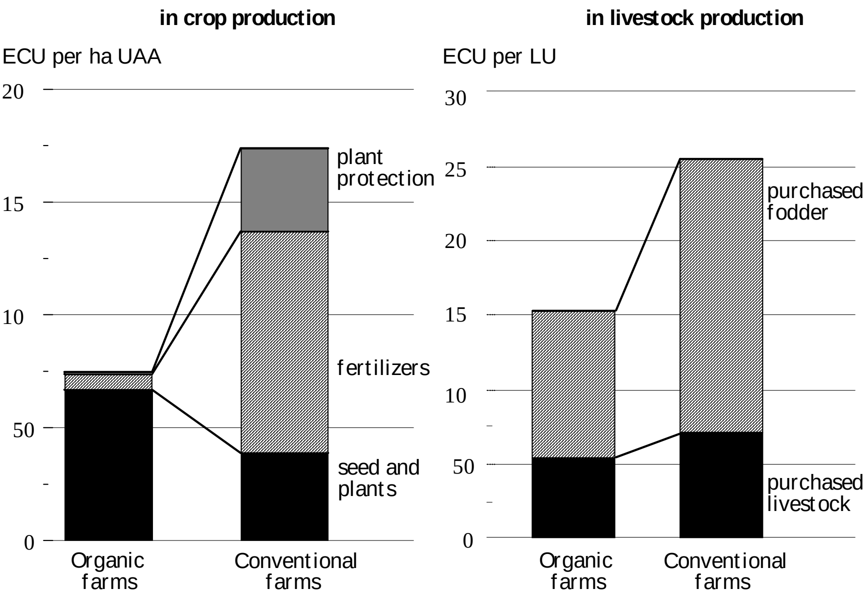
Country	Farm type	Year	Total costs	Fixed costs	Variable costs
			as % of conventional farms		
CH	All farms[1]	1996	92	103	67
DE	All farms[1]	1995/96-96/97	82	99	59
DK	All farms[1]	1996/97	102	121	72
FI	All farms[1]	1994-95	81		
GB	All farms[1]	1995/96	76	85	58
IT[2]	All farms[1]	1994-95	97	145	64
NL	All farms[1]	1995	121	143	95
CH	Dairy	1996	84	93	64
CH	Mixed	1996	98	110	70
DK	Arable	1996/97	106	120	68
DK	Dairy	1996/97	102	122	73
FI	Arable	1994-95	91		
FI	Dairy	1994-95	75		
GB	Arable	1995/96	80	86	66
GB	Horticulture	1995/96	49	51	40
GB	Dairy	1995/96	79	85	72
GB	Sheep+cattle	1995/96	107	119	85
GB	Mixed	1995/96	60	73	36
GB	Dairy	1991-94	91	112	67
IT[3]	Dairy	1995	83	67	87
IT[4]	Mixed	1992-94	177	391	70
NL	Arable	1995	197	208	182
NL	Outdoor horticulture	1995	273	292	245
NL	Dairy	1995	74	90	53
NL	Mixed cropping	1995	91	122	65

Source: Own calculations based on survey of literature. See Annex 3.

[1] Sample averages [2] Region: Marche [3] Region: Emilia Romagna [4] Region: Umbria

The distinction between variable and fixed costs does not always totally meet textbook definitions. It also varies slightly between countries, because the data was in some cases available only at an aggregated level and could not be recalculated according to a common scheme. Still, as can be seen from Table 4-9, cost differences between organic and conventional farms are consistently and significantly lower for variable costs than for fixed costs. Typical ***variable cost reductions*** are in the range of 30 % to 40 %. As already suggested above, the expenses for most external inputs (fertilisers, pesticides and concentrates) are sharply reduced, while for some that are organically produced, e.g. feedstuffs, premium prices have to be paid; this can, in some cases, lead to higher expenses. Seed costs in some countries are higher on organic farms (e.g. DE, DK, NL, see Annex 3), which is partly due to the higher prices for organic seeds, but can also be attributed to the greater use of green manures, catch crops and more expensive legumes (Padel and Zerger 1994). As a typical example, some variable costs differentiated for crop and livestock production on organic and comparable conventional farms in Germany are illustrated in Figure 4-8.

Figure 4-8: ***Comparison of important costs of organic and comparable conventional farms in Germany (old Laender, ∅ 1996/97 and 1997/98)***



Source: Own calculations based on BMELF (1997 and 1998).

Fixed costs are often higher on organic farms, but the extent and the reasons vary from country to country and also depend on the farm type. The only fixed cost which is almost always higher on organic farms than on conventional ones (with the notable exception of most farm types in Great Britain), are the expenses for paid labour as measured in wages and salaries per ha UAA (see Table 4-10). This difference in labour costs will be less pronounced if the imputed costs for unpaid family labour are taken into account, as family labour input on organic farms is often lower.

Table 4-10: Overview of the costs for hired labour on organic farms per ha UAA as a percentage of the costs on comparable conventional farms

Country	Farm type	Year	Wages and salaries as % of conventional farms
CH	All farms[1]	1996	137
DE	All farms[1]	1995/96-96/97	173
DK	All farms[1]	1996/97	206
GB	All farms[1]	1995/96	88
FI	All farms[1]	1994-95	115
NL	All farms[1]	1995	391
CH	Dairy	1996	94
CH	Mixed	1996	157
DK	Arable	1996/97	241
DK	Dairy	1996/97	195
FI	Arable	1994-95	21[2]
FI	Dairy	1994-95	136
GB	Arable	1995/96	85
GB	Horticulture	1995/96	16
GB	Dairy	1995/96	67
GB	Sheep+cattle	1995/96	204
GB	Mixed	1995/96	88
GB	Dairy	1991-94	106
NL[3]	Arable	1995	554
NL[3]	Horticulture	1995	1089
NL	Dairy	1995	451
NL	Mixed cropping	1995	177

Source: Own calculations based on Fowler, Lampkin and Midmore (1998) and Haggar and Padel (1996) for GB, Dutch FADN for NL, FAT (1997a) for CH, BMELF (1997, 1998) for DE, DIAFE (1998) for DK, AERI (1996, 1997) for FI. See Annex 3.

[1] Sample averages. [2] Small absolute figures. [3] Organic farms have a higher share of vegetables.

The greater importance of marketing and processing on organic farms may imply higher investments in the respective facilities, and lead to an increase in the depreciation figures for buildings (Padel and Zerger 1994); but the data available is not detailed in this respect. An overview of depreciation figures relative to those of comparable conventional farms is given in Table 4-11. Overall depreciation is very similar to that on conventional farms in Denmark, Switzerland, Germany and cropping farms in Great Britain. While machinery costs are in most cases slightly lower, depreciation of buildings is on average slightly higher. Still, differences between countries and farm types are great and do not allow any generalisation.

Table 4-11: Overview of depreciation on organic farms per ha UAA as a percentage of the depreciation on comparable conventional farms

Country	Farm type	Year	Depreciation	Depreciation machinery	Depreciation buildings
			as % of conventional farms		
CH	All farms[1]	1996	106	94	119
DE	All farms[1]	1995/96-96/97	95	98	89
DK	All farms[1]	1996/97	105		
GB	All farms[1]	1995/96	71	77	147
NL	All farms[1]	1995	114	114	131
CH	Dairy	1996	98	96	100
CH	Mixed	1996	106	93	134
DK	Arable	1996/97	99		
DK	Dairy	1996/97	108		
GB	Arable	1995/96	99	75	
GB	Horticulture	1995/96	27	40	
GB	Dairy	1995/96	52	62	
GB	Sheep+cattle	1995/96	59	139	
GB	Mixed	1995/96	63	63	
NL	Arable	1995	165	127	288
NL	Outdoor horticulture	1995	210	145	345
NL	Dairy	1995	70	89	73
NL	Mixed cropping	1995	120	155	87

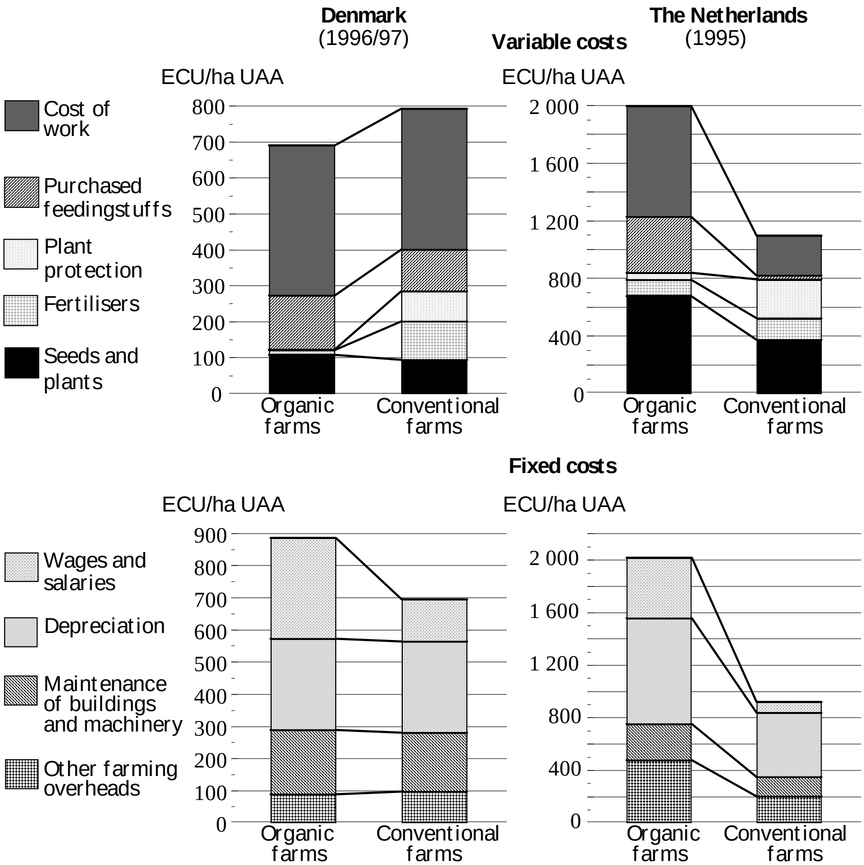
Source: Own calculations based on Fowler, Lampkin and Midmore (1998) and Haggar and Padel (1996) for GB, Dutch FADN for NL, FAT (1997a) for CH, BMELF (1997, 1998) for DE, DIAFE (1998) for DK. See Annex 3.

[1] Sample averages

An increase of the building costs in organic farms is to be expected when the proposed EU regulation on organic livestock production comes into effect, due to the stricter requirements for housing.

A more detailed, comparative illustration of the cost structures of organic and conventional farms is given in Figure 4-9, for one of the rather typical examples, namely arable farms in Denmark, and an ‘atypical’ one, i.e. the average of a group of arable farms in the Netherlands.

Figure 4-9: Costs of organic arable farms in Denmark and the Netherlands in comparison to conventional farms



Source: Own calculations based on DIAFE (1998) and Dutch Farm Accountancy Network (LEI-DLO)

The overall costs per ha UAA are slightly higher for organic than for conventional farms in Denmark, with lower variable and higher fixed costs under organic management. The diagram illustrates that the reduced variable costs are due to the decreased use of purchased fertilisers and the nearly non-existent expenses for crop protection. Seed costs are, as argued above, slightly higher. The higher expenses for feedstuffs can only partly be explained by a 17 % higher stocking rate on the organic farms; the remaining increase in feed costs is quite probably due to higher prices for organically produced concentrates. The higher fixed costs are mainly the result of the expenses for hired labour, which are more than twice as high per ha UAA on the organic farms.

The organic arable farms in the Netherlands show an astounding level of costs per ha UAA, which are twice as high as on the conventional farms used for comparison. This example illustrates the impact of both the system-inherent differences in production structure, and the problems of choosing a group of conventional farms for comparison: Firstly, the organic farms have a significantly higher share of horticultural crops, which partly explains the higher costs incurred per ha UAA, e.g. due to the enormous differences in labour input required for vegetables as compared to, for example, cereals. Additionally, the organic arable farms have a stocking rate of 41 LU/100 ha UAA versus only 7 LU/100 ha UAA on the conventional farms, which to some extent explains the much higher expenses for purchased feedstuffs on the organic as compared to the conventional farms. Costs of contract work are also significantly higher on the organic farms, and might reflect the limited labour resources.

5 Comparative analysis of profits

5.1 Profits of organic farms in Europe - an overview

The emphasis in this chapter will be on the comparison of profits of organic farms and comparable conventional farms.

5.1.1 Data and methodology

For all countries, we have tried to collect studies on and farm accounts of the profits of organic farms. To make cross-country and cross-study comparisons, we have tried to calculate profits as given by the definition in Chapter 2.2.3 whenever possible. Still, it became obvious that in many cases the necessary data was not available, and that some methodological differences in the calculation of profits between countries remained. This problem was solved by calculating the relative coefficient of profits compared to profits of conventional farms in the same region. Country experts were asked to select data of comparable conventional farms, if this information did not already form part of the studies or data sets. A comparison of this ratio can be made for different countries and studies, with differences in methodology and definitions thus having much less impact on the results (see Chapter 2).

A table with all the profit data collected in the survey can be found in Annex 6. Figure 5-1 to Figure 5-4 give an overview of the profits of organic farms relative to the profits of comparable conventional farms for different countries and farm types. To diagrammatically illustrate the ‘representativeness’ of observations, the size of each dot corresponds to the sample size of the relevant organic farms, i.e. the bigger the dot the more farms are included. Expert assessments provide valuable information especially where no ‘hard data’ is available, and are thus included and graphically distinguished. As far as possible, data from farms that are still in conversion has been excluded.

Naturally, the choice of the conventional farms used for comparison has a high impact on the level of the relative value for profits. In the diagrams, results are only shown where a ‘comparable’ group was available. Comparisons with national averages for all farms often show that the average profits of organic farms are lower. This is mainly because

a) organic farms are on average more often located in less favoured areas;

b) the distribution of farm types is different for organic farms and all farms in a country.

For instance, few intensive livestock farms (pig and poultry) are organic, but these farms often had high profits in the survey period, and thus increased the figure for the national average of farm income.

5.1.2 Results

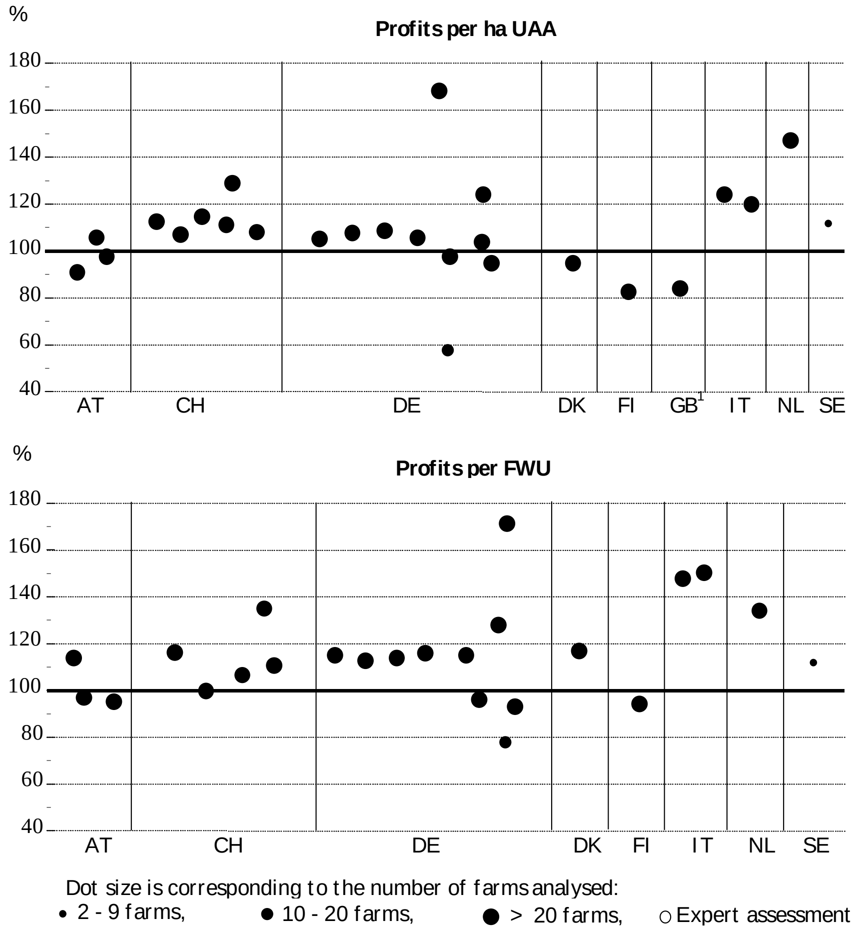
An overview of the relative profits of organic farms is given in Figure 5-1. Here, data is shown that refers to samples of organic farms of different farm types. This kind of data often comes from national accounting / monitoring systems. Especially for the central European countries, which have a long tradition of organic farming, such regular yearly data is available.

The overview of relative profits of these samples in recent years (Figure 5-1) shows a remarkably uniform picture across countries. The ***profits*** of organic farms ***are quite similar*** to those of comparable conventional farms, with nearly all observations in the range of +/- 20 % of the profits of comparable conventional farms. More often than not, the profits of the analysed samples of organic farms are higher than those of the conventional farms. In general, the relative profits of organic farms are higher per FWU than per ha UAA. This is due to the fact that, for almost all samples, less family labour per ha is used on the organic than on the conventional farms - the increased labour requirements are covered by paid labour (see Chapter 3.1).

As a first conclusion, it can be said that, on average, the decision to convert to organic farming has proved to be financially successful in the past few years for the farms analysed. However, this conclusion has to be taken with care. Not only are there some samples where profitability is lower than that of comparable conventional farms, but the degree of ***variation within the samples is also very high*** (e.g. Nieberg 1997, DIAFE 1998, Landwirtschaftskammer Westfalen-Lippe 1998).

Relative success is dependent on a number of factors (see also Chapter 2.2.4). One of the major determinants is, of course, the economic performance of the conventional farms used for comparison, and thus factors like region and farm type are important. This effect explains the one very low relative value in Figure 5-1, which corresponds to organic farms located in Germany in the region Westfalen-Lippe, an area with an extremely high density of intensive pig producing farms. Here, it has proved difficult to identify a sample of comparable conventional farms, as all available farm samples had on average significantly more pigs than the organic farms. It seems that, given the current problems of organic pig production and the relatively good prospects for conventional pig production in the observation years, organic farming was an economically profitable alternative only for a limited number of farms in this region.

Figure 5-1: Profits of organic farms relative to comparable conventional farms in different countries: All farms (sample averages)



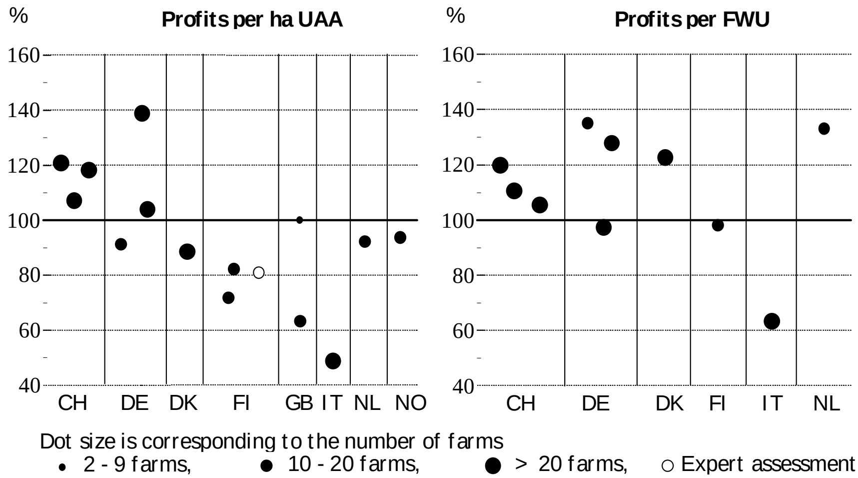
Source: Own calculations based on survey of literature (profits in 1992-1997) and expert assessments. See Annex 6.

1 Due to missing data only profits per ha UAA are shown.

The farm type has a considerable influence on relative profitability (see Figure 5-2 to Figure 5-4), also due to the differences in access to premium prices for different products (compare Chapter 4.2).

In Figure 5-2, an overview is given of the relative financial performance of ***dairy farms***. While the ***results vary substantially between countries***, in general relative profitability is higher if measured per FWU than if measured per ha UAA. With the exception of one study in Italy, the observed profits per FWU were equal to or higher than in comparable conventional farms in all countries for which data was available. On the other hand, average profits per ha were for only a few samples (in CH, DE and GB) at least as high as those for the reference group.

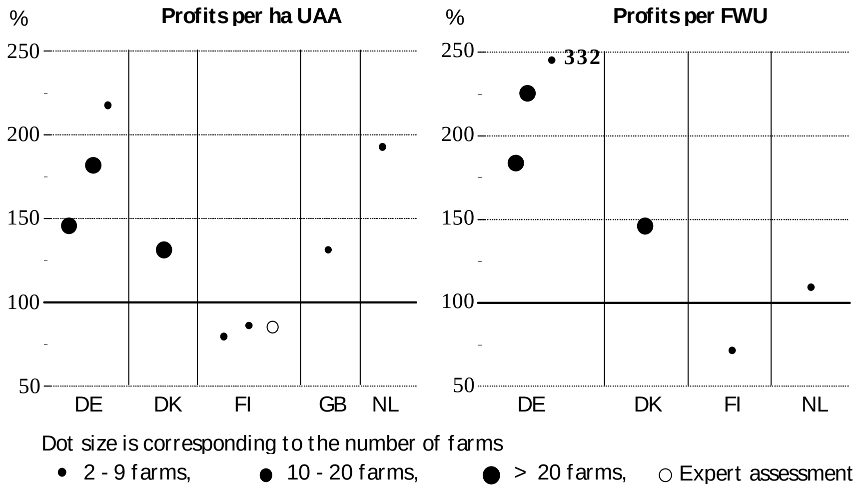
Figure 5-2: ***Profits of organic dairy farms relative to comparable conventional farms in different countries***



Source: Own calculations based on survey of literature (profits in 1992-1997) and expert assessements. See Annex 6.

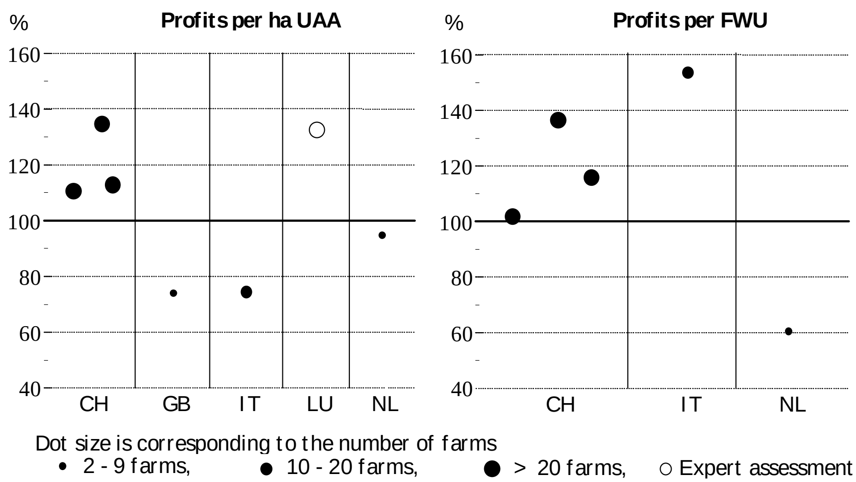
The observed profits of the organic ***arable farms*** (Figure 5-3) ***show remarkably high profits*** relative to comparable conventional farms. The positive result is for the most part due to the high prices that are available for organic crop products (see Chapter 4.2). Again, the high variation of relative profits between the countries is remarkable; this is also true, albeit to a lesser degree, for the results of mixed farms shown in Figure 5-4.

Figure 5-3: Profits of organic arable farms relative to comparable conventional farms in different countries



Source: Own calculations based on survey of literature (profits in 1992-1997) and expert assessments. See Annex 6.

Figure 5-4: Profits of organic mixed farms relative to comparable conventional farms in different countries



Source: Own calculations based on survey of literature (profits in 1992-1997) and expert assessments. See Annex 6.

Few data is available on the profits of other farm types. The samples analysed for pig and poultry farms and for horticultural farms are small, and therefore the results presented in Table 5-1 should be interpreted cautiously. Still, the studies highlight the wide range of relative financial performances of these farm types, and show both the risks and the opportunities that exist for these farms.

Table 5-1: Profitability of organic pig and poultry farms and organic horticultural farms

Country	Farm type	Year	No of farms in sample	Profit / ha UAA	Profit per FWU
				as % of comparable conventional farms	
DE	Pigs and poultry	1992/93	5	148 %	182 %
DE	Pigs and poultry	1993/94	5	761 %	811 %
GB	Horticulture	1995/96	5	57 %	
NL	Horticulture	1995	6	466 %	381 %

Source: Based on Nieberg (1997) for DE, Fowler, Lampkin and Midmore (1998) for GB, Dutch FADN for NL

5.2 Overview of the financial performance of organic farms in the study countries

5.2.1 Austria

Due to the high number of organic farms in Austria, they constitute a considerable share of the sample of farms included each year in the 'Green Report' (Grüner Bericht), which evaluates the situation of Austrian agriculture. Some economic results based on the farm accounts of these organic farms, and a selected subsample, for which a reference group of conventional farms was available, are shown in Table 5-2. It has to be noted that the sample of organic farms may include farms still in conversion. Still, the ***profits*** from agriculture and forestry of both organic and comparable conventional farms in the period 1994-1996 were ***quite similar***.

Table 5-2: Profits in organic farming in Austria

Year	Organic farms (all farms)	Organic farms with >40 % of SGM[2)] from cropping	Comparable conventional farms	as % of conventional farms
		Profit[1] in ECU per ha UAA		
1994	1 138	1 181	1 208	98
1995	1 361	1 223	1 135	108
1996	1 290	1 129	1 239	91
		Profit[1] in ECU per FWU		
1994	10 061	9 136	9 655	95
1995	13 252	13 364	13 792	97
1996	12 241	12 051	10 573	114

Source: Based on BMLF (1995-97)

1 Income from agriculture and forestry
2 Standard gross margin

Several studies exist that have analysed the relative economic performance of organic farming using ***farm models*** of different farm types. As participation in the agri-environment programmes (ÖPUL) is widespread, the calculations often apply not only to organic and ‘conventional’ farming, but also to different options within ÖPUL, thus providing a more realistic basis for comparison. An overview of the results of these analyses is given in Table 5-3. In general, as a result of the high level of payments for organic farming, this type of farming is the option with the highest whole farm gross margin, even without price premia. The very positive model results for arable farms stand in marked contrast to the low share of arable farms actually converting to organic farming; currently only 3.4 % of organic farms are arable farms (vs. a share of 13 % of all farms in Austria). Eder (1998a) sees the cause in the often lacking know-how required for a successful conversion of arable farms, and in the increased financial risk associated with conversion. On the other hand, organic dairy farms are currently confronted with problems in marketing their main products (Eder 1998a). As in other countries, the conversion of intensive pig farms is in general not economically attractive.

Table 5-3: ***Overview of the results of model calculations on the relative profitability of organic farming in Austria***

Farm type	Stockless arable	Stockless arable	Grazing livestock, dairy	Intensive dairy	Pig farm
Studies	Eder 1997a, Eder 1997c, Eder 1997d	Eder 1995a	Eder 1997d, Eder 1997b	Eder 1995c, Eder 1995b	Eder, Lindenthal, Amon 1997
Compared to	Extensive conventional cereal farm eligible for some ÖPUL payments	Extensive cereal farm, several different agri-environmental programmes	Farming under other agri-environmental programmes	Conventional farming	Conventional farming
Assumptions	No change in fixed costs. All products marketed organically.	No change in fixed costs	No change in fixed costs	Constant dairy yield	
Results	Considerably higher profitability of organic farming. Even during conversion, the economic result is better. But increasing dependency on direct subsidies.	The organic option yields the best results, even without price premia, at a set-aside rate of 12 %. If more land is needed for fertility building, profitability will be reduced (e.g. similar profits as conv. farming at 33 % set-aside).	Profitability is increased if products are marketed at a price premium (15 % for milk and beef). Similar profitability as with other agri-environmental options during conversion.	Slightly increased profitability during conversion, considerably better situated if products can be marketed organically.	Profitability is similar to conventional farming if price premia of 35 % are realised. Considerably reduced profit during first two years of conversion.
Conclusions	Conversion more profitable the more extensive the farm and the less sugar beet is grown before conversion. For more specialised farms, organic farming is more risky, due to higher fixed costs and the higher dependency of profits on revenues from sales. On the other hand, these farms have a high potential for considerable profits if marketing is good and technical know-how available.	Especially for farms with low to medium yield potential, conversion is very profitable.	The current problems in the marketing of organic milk and beef make profitability questionable (in 1995, about 75 % of these products had to be sold at conventional prices).	With current support levels, conversion may be a successful strategy for securing farm survival, as income losses after accession to the EU are almost compensated	High risk as great changes in farm organisation (cropping structure, stocking density) are required. High investments in buildings may be necessary to comply with organic standards. An increase of the share of organic pig farms is seen as unlikely under current conditions.

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5.2.2 Belgium

As the size of the organic farming sector is very small compared to conventional farming (0.46 % of agricultural land), there are only few studies, and these are in general case studies. The national agricultural accounting network currently includes only three organic farms, and thus data could not be obtained as anonymity would not have been ensured. The demonstration farm network and the organic producers' associations provide gross margin calculations for many products, but no representative whole farm calculations are available which take into account fixed costs.

CARAB (Centre d' Animation et de Recherche en Agriculture Biologique) carried out two studies covering most of the organic farms of certain production lines in ***Wallonia***, concentrating on dairy farms and farms with cereal production respectively (Ghesquiere 1996, 1997). Based on data collected from the farms, gross margins were calculated for these production lines. For the ***dairy farms***, the gross margin for milk production is relatively close to the gross margin for the whole farm, since on average less than 5 % of the farm area was used to grow crops for sale. Taking the average of the years 1994-1996, the gross margin per cow was 12 % higher on organic farms than on conventional ones, but due to a considerably lower stocking density, the gross margin per ha was lower. For the cereal farms, gross margins were calculated for the whole rotation to capture the system-inherent differences in crop rotation patterns. The gross margin was slightly higher (5 %) on organic farms, but the report points out that the result may be different for profits, as fixed costs and labour costs are not taken into account. Also, the organic farms are mixed farms with relatively high stocking rates of 1.1 LU/ha, and thus no conclusion can be given with respect to farm profits as no calculations have been made with respect to livestock production.

In Flanders, intensive specialised farming (horticulture, pigs, poultry, dairy farms) prevails. ***Conversion is in general not attractive*** for these farms, due to the major adjustments that would be necessary. Also, because of the high population density, soil prices are high in Flanders, and to establish extensive (i.e. land intensive) farming systems requires higher prices for organic products, or higher support payments than are currently available (van Boxem 1998).

A particular obstacle is posed by the high specialisation of herds in conventional cattle breeding in Belgium. The typical breed for beef production is Blanc Bleu Belge, which is not acceptable by the new organic standards because of the high rate of Caesareans necessary. The need to adapt the herd to more extensive breeds when converting to organic farming poses a significant problem for many farms.

5.2.3 Czech Republic

Economic data on organic farms is still scarce, and due to very different economic categories, it is not comparable either. Both private and co-operative mixed (livestock-cropping) farms seem to have negative 'profits' and to perform worse than conventional farms. With only 30 % of products sold at home, of which only 15 % get a price premium, organic farming is highly dependent on exports to the European Union (Ziegler 1997). Currently, no financial support is available for organic farming, and the investments necessary for conversion are seen as a major obstacle for the conversion of many larger farms (Ziegler 1997).

5.2.4 Denmark

Detailed information on the economics of organic and comparable conventional farms is published by the Danish Institute of Agricultural and Fisheries Economics (DIAFE 1998). The data is based on the 1996/97 account statistics from 158 farms which are representative of 1018 holdings with an area of 5 hectares or more each. Comparable conventional farms have been selected for arable and dairy farms, such that size of farm and age of farmer are about the same. The statistics show the results for both in-conversion and fully organic farms. The analysis published by DIAFE compares the average of all farms in the samples, even though only 57 % of them were fully converted at the time. In the following, the emphasis is on the financial results of the sample of fully organic farms, which can sell their products as '*organic*' according to EC Reg. 2092/91. Comparability with the sample of conventional farms is not much affected for dairy farms, where the sizes of fully converted and converting farms are very similar. Fully organic arable farms were slightly larger than those converting or the conventional farms[6]. For the whole sample, farm size and farmers' age are fairly similar for fully organic and in-conversion farms.

Organic milk production plays an important role in Denmark, and dairy farming is the most important farm type in organic farming. The price premium for organically produced milk is higher than in the other European countries (see Chapter 4.2), and compared to the arable farms, dairy farms have a significantly higher income (Figure 5-5). Dairy farms are almost always full-time farms, while 80 % of the organic arable farms are part-time farms.

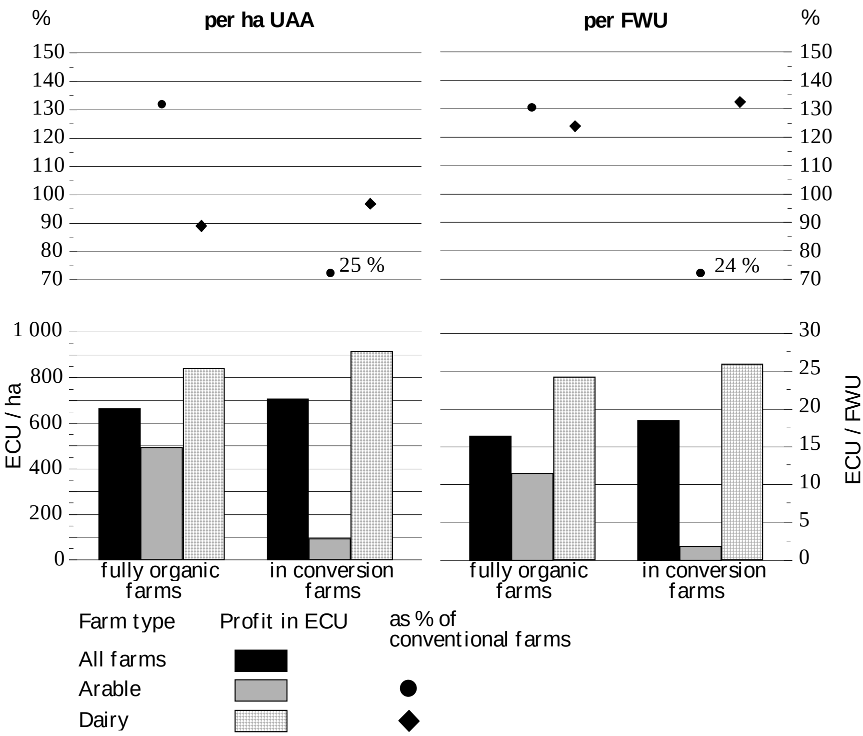
[6] 21.5 ha versus 17.0 ha for the comparable conventional farms.

Still, the organic ***arable farms*** compare quite favourably with the sample of conventional farms:

- Gross profits are higher, by 32 % per ha UAA and 46 % per FWU of conventional farms.
- Even without the payments for organic farming, profits would have been slightly higher for the organic farms.

On the other hand, the ***arable farms*** that are still ***in*** conversion realise only a fraction of the profits per ha UAA (-75 %) compared to the conventional farms, highlighting the importance of access to premium prices for organic products for arable farms. The support payments were much too low for arable farms to compensate for reduced revenues in the first two years of conversion. Consequently, supplementary payments for arable farms have been introduced in 1997.

Figure 5-5: Profits of organic and in-conversion farms in Denmark, 1996/97



Source: DIAFE (1998)

Organic dairy farms have

- a lower profit per ha UAA (- 11 % compared to the reference group)
- higher returns to family labour (+ 23 %)
- very high investments in agricultural assets, especially in buildings for cattle. This is not only an indication of the higher requirements of livestock sheds in organic farming, but also shows that capacities are increasing and that these farms are growing faster than comparable conventional farms.

Converting dairy farms have even higher profits, mainly due to higher yields and lower costs.

The higher profitability of organic milk production is also indicated by a study of the Danish Agricultural Advisory Centre (1997), which analysed the economics of 17 dairy farms for several years. The conventional farms selected for comparison had approximately the same size, the same number of cows and the same stocking density of cows. The gross margin per cow in 1995 was 32 % higher than on comparable conventional farms. The price premium accounted for nearly a fifth of the total gross margin per cow, and was sufficient to compensate for reduced dairy yields. Payments for organic farming have a similar order of magnitude, and thus the gross margin would have been the same as for conventional management without the payments, or if no price premium had been available.

A comparison of the profits with the average of all conventional farms in Denmark shows that the profits of organic farms were on average 20 % lower. This difference was mainly due to the high income of intensive conventional pig farms, for which conversion was generally not financially attractive. Since prices for conventionally produced pork have recently dropped significantly, this is no longer the case.

A grouping of all organically managed farms (fully converted and in conversion) by size of gross profit shows that ***on nearly 30 % of the holdings gross profit is negative*** (Table 5-4), and that the farm family depends totally on non-farm income. These farms are significantly smaller on average and account for about 14 % of the organically farmed area.

Table 5-4: Distribution of gross profits of organic[1] farms in Denmark, 1996/97

	Gross profit per holding in 1000 ECU					
	negative	0-33	34-66	67-100	more than 100	all farms
Number of holdings	302	388	151	103	74	1 018
% of sample	30 %	38 %	15 %	10 %	7 %	
Size in ha UAA	19.8	20.1	58.8	82.8	141.1	40.8
Profit, ECU per holding	-6 710	8 340	51 227	84 562	145 894	27 999
Profit in ECU per ha UAA	-339	415	871	1 021	1 034	686
Profit in ECU per family man-hour	-7.51	6.70	19.18	33.84	50.31	17.42

Source: Own calculations based on DIAFE (1998)

[1] Fully organic and in-conversion farms

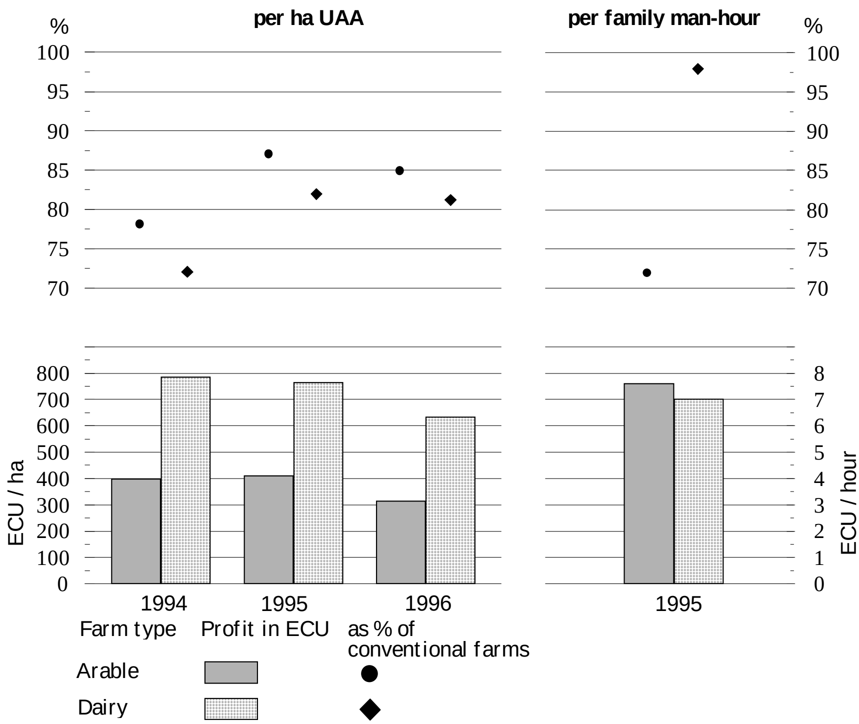
5.2.5 Finland

In Finland, two major growth periods of the organic farming sector can be distinguished. In the years 1990-1994, payments were granted for 3 years to farms converting to organic farming, and the number of organic farms almost tripled in the first year (1990). After accession to the EU, the number of organic farms doubled in a single year.

Information on the profits of organic and comparable conventional farms was available only for the years 1994 and 1995, from the Agricultural Economics Research Institute, which publishes research reports on the results of bookkeeping farms in Finland (AERI 1996, 1997). The data shows (see Figure 5-6) that, before and in the first year of ***accession to the EU***,

- the profits per ha UAA of organic farms were significantly lower than those of comparable conventional farms (at about 80 % - 85 % of the profits of conventional farms);
- the income per FWU was nearly the same as under conventional management for dairy farms, but was considerably lower for arable farms at only 72 %;
- while the absolute level of family farm income per ha UAA in organic farms was lower on arable than on dairy farms, it was higher on arable farms if measured per family work unit.

Figure 5-6: Profits of organic farms in Finland



Sources: profits in 1994: AERI (1996); profits in 1995: AERI (1997); profits in 1996: expert assessment.

The accession of Finland to the European Union in 1995 has substantially ***increased the relative competitiveness*** of organic farming. Farm gate prices for conventional products have fallen by 26 % (Heinonen 1998) to 40 % (Koikkalainen and Vehkasalo 1997) (see also Chapter 6), and with the introduction of EC Reg. 2078/92, support for organic farming has been extended beyond the three-year conversion support of the pre-accession scheme. Model calculations (e.g. Miettinen et al. 1997, Koikkalainen 1996) show that

- with these relatively generous support payments, the profitability of organic farming can be similar to conventional farming for most product lines (milk, cereals, beef) even without price premia, if management is optimal and fertility of soils good;
- for pig and horticultural farms though, the support payments are not sufficient to compensate for income losses, and higher prices are necessary to achieve similar profits as under conventional management. The offsetting premium price for organic pork would be about 10 % in southern Finland.

With respect to these calculations, Rajala (1998, personal communication), cautions that some of the assumptions made are too positive for the conversion period, e.g. they do not take into account the often increased need for investments and also neglect usually necessary purchases of fertilisers like lime. Koikkalainen and Vehkasalo (1997) also point out that the studies do not give a clear indication of the relative profitability of organic farming in the long run, due to the necessary changes in fixed costs and increasing requirements on housing conditions for organic livestock.

Further analysis will have to wait until farm accounting data is available for the years following accession.

5.2.6 France

No data or recent studies on the economics of organic farming were available, except for a few case studies of individual farms. Country experts assessed that on average the profits of organic farms were similar to comparable conventional farms, but that economic performance varied greatly between farms. Technical problems were cited as one of the major obstacles for many farms, while successful farms had these problems under control and were in general characterised by good marketing.

5.2.7 Germany

The results will be presented separately for the old and the new *Laender* because

- agricultural structures still vary rather a lot between these regions;
- in the new *Laender,* results are influenced by the transformation process.

5.2.7.1 Old *Laender*

Since 1983, evaluations of organic farm accounts have been published in the annual national agricultural report, with economic performance compared to a selected reference group of conventional farms. In 1996/97, the organic farms realised a ***profit*** that was 6 % ***higher*** per ha UAA and 15 % higher per FWU than in the reference group. Compared to all conventional full-time farms, profits were 13 % lower. Characteristically, revenues from sales were clearly lower for livestock products, due to a lower stocking rate, but considerably higher for crop products, due to high price premia for these products. Profits per FWU have been slightly increasing during the last few years; an overview of the development of profits is given in Chapter 5.3.

Results of a long-term study analysing 58 farms that converted to organic farming in 1990 are reported by Nieberg (1999). Using cluster analysis,

comparable conventional farms were selected such that they resembled the organic farms in their last year prior to conversion (compare Chapter 2.2.2).

Table 5-5 shows that six years after conversion, the organic farms had on average a ***60 % higher profit*** than the carefully selected conventional reference group. Especially for arable farms the decision to convert has proved to be economically very successful. Still, it should be remembered that these positive results are based on several years of market development efforts by the farmers (see also Chapter 5.5). Variance within the sample is high, and 25 % of the organic farms had lower profits than the respective comparable conventional farms.

Table 5-5: Profits of organic farms in Germany six years after conversion (1995/96). Results of a long-term study.

	All farms		Arable farms		Grazing livestock farms (mainly dairy)	
Number of farms	58[1]		22		32	
	ECU	Relative[2)]	ECU	Relative[2)]	ECU	Relative[2)]
Profit per ha UAA	651	161 %	684	182 %	592	138 %
Profit per FWU	26 825	162 %	51 210	218 %	15 907	120 %

Source: Nieberg (1999)

1 Four mixed or pig and poultry farms included
2 Profits as a percentage of comparable conventional farms

Results of organic farms are available also for Bavaria and the region of Westfalen-Lippe (part of Northrhine-Westphalia). No specifically selected group of comparable conventional farms exists for these samples. In ***Bavaria***, profits of the organic farms are similar to the average profit of all conventional full-time farms. A differentiation of results ***by size of agricultural area*** (Table 5-6) shows higher profits per ha UAA for the smaller farms than for the medium- and larger-sized farms. On the other hand, the return to family labour is considerably higher in the group of larger farms than in the other two size groups. There is a clear link between stocking rates and farm size; smaller farms have higher stocking rates. The apparent impact of size on economic results seems therefore to be at least partly due to different weights that individual farm types have in the different size groups.

Table 5-6: Profits of organic farms in Bavaria in 1995/96 by size of agricultural area.

	10-30 ha	30-60 ha	60-150 ha	Average
No. of farms	30	28	6	64
UAA in ha	23	41	71	35
Stocking rate (LU/100 ha UAA)	134	96	59	101
Profit, ECU per ha UAA	***926***	***527***	***579***	***660***
Profit, ECU per FWU	***16 689***	***15 897***	***28 626***	***17 548***

Source: Based on LBA (1997)

The farm accounts of organic farms in the region of ***Westfalen-Lippe*** are differentiated by economic performance, showing the ***high variation of profits*** (Table 5-7). The bottom 25 % of farms (with respect to profitability) have on average negative profits, while the top 25 % of farms realise a remuneration of family labour that is more than three times as high as the average of the sample. The most successful farms are larger than average, while stocking rates do not vary much between the groups. A detailed analysis of the factors determining the economic performance of the farms in this sample is not available (see Chapter 2.2.4 for a discussion of factors influencing profits).

Table 5-7: Profits of organic farms in the region of Westfalen-Lippe in 1996/97, by profitability

	Top 25 % of farms	Average	Bottom 25 % of farms
No. of farms	5	18	5
UAA in ha	87	60	59
Stocking density (LU/100 ha UAA)	92	93	107
Profit, ECU per ha UAA	***715***	***323***	***-305***
Profit, ECU per FWU	***56 355***	***16 293***	***-16 344***

Source: Based on Landwirtschaftskammer Westfalen-Lippe (1998)

5.2.7.2 New *Laender*

The situation in the New *Laender* is for several reasons still very different from most other regions in Germany and the EU. Major characteristics of East German agriculture are

- many of the farms are successors to the former agricultural co-operatives (LPG);
- more than half the land is farmed by legal persons (companies with limited liability). In contrast to family farms, all labour is paid labour;
- farms run as partnerships are also much more common than elsewhere;
- the average farm and field sizes are larger than anywhere else in the EU;
- the share of rented land is very high.

Following ***unification***, the converting farms faced both restructuring due to conversion, and restructuring due to ***transformation.*** For many farms, the decision to take part in the organic scheme of the former extensification programme (based on EC 4115/88) was also influenced by their liquidity problems following unification: extensification payments were attractive, as they provided a stable, steady source of income.

In Table 5-8 and Table 5-9, the results of two different studies are presented. To make economic comparisons between farms of different legal status possible, a profitability indicator that is commonly used is "***profit plus wages***". All wages and salaries paid (as well as corporate tax) are added to the profit, to account for the fact that there is no unpaid labour on farms who have the status of legal persons.

Table 5-8: Profits of organic farms in the New Laender in 1996 (in ECU)

Legal status	Legal persons		Natural persons		Natural persons	
Farm type	Arable and grazing livestock farms		Grazing livestock farms		Arable farms	
Number of farms	7		6		4	
UAA in ha	905		203		393	
	ECU	Relative[1)]	ECU	Relative[1)]	ECU	Relative[1)]
Profit/ha			325	112 %	642	259 %
Profit+Wages/ha	474	97 %	358	85 %	917	303 %
Profit+Wages/AWU	30 616	151 %	36 630	226 %	52 081	190 %

Source: Based on Köhne and Köhn (1998), Gorn (1997), Köhn (1997)

1 Profits as a percentage of the respective conventional average in the New Laender

Table 5-9: Profits of organic farms in the New Laender in 1994 (in ECU)

Legal status	Legal persons		Natural persons		Natural persons	
Farm type	Grazing livestock farms		Dairy farms		Arable farms	
UAA in ha	1472		405		405	
	ECU	Relative[1)]	ECU	Relative[1)]	ECU	Relative[1)]
Profit/ha	-93		182	91 %	554	218 %
Profit+Wages/ha	346	69 %	375		609	
Profit+Wages/AWU	15 043		22 371		111 208	
Profit/FWU			35 352	135 %	220 078	332 %

Source: Based on Stolze (1998)

[1] Profits as a percentage of the respective conventional average in the New Laender

Samples are relatively small, and for neither of the studies were there groups of comparable conventional farms available; nevertheless, the main conclusions are mostly similar:

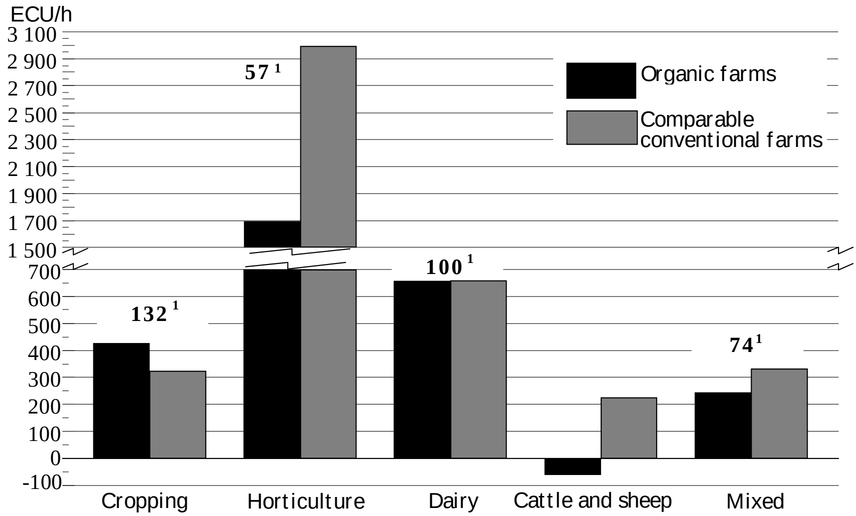
- ***Natural persons***: organic arable farms compare very favourably with the average of the respective conventional farms. Grazing livestock farms have lower profits than organic arable farms. Compared to the respective conventional group, they have similar profits per ha and a higher return to labour.
- ***Legal persons***: the results for relative profitability vary between the studies. Still, both studies conclude that the economic performance of these farms is not good enough to ensure their viability in the long run. This conclusion is also valid for the average of the conventional farms. One of the main determinants is the still significantly higher labour use on farms with the status of legal persons than on those with the legal status of natural persons. On the other hand, it has to be pointed out that farm account data, especially for legal persons, has for various reasons to be treated very cautiously, since the incentives for and possibilities of misrepresenting economic performance should not be underestimated.
- The payments for organic farming constitute a substantial part of the profits, especially in the less favoured areas.

5.2.8 Great Britain

An extensive overview of the financial performance of organic farms in England and Wales in 1995/96 is given by Fowler, Lampkin and Midmore (1998). The study combined and evaluated data from several organic research projects, thus being able to provide financial results differentiated for five different farm types (Figure 5-7).

- ***Organic cropping farms*** compared quite favourably to the respective group of conventional farms, mainly due to considerably lower input costs, which more than compensated for lower outputs and reduced arable area payments.
- The marked difference in incomes between organic and conventional ***horticulture farms*** may partly be due to difficulties in selecting comparable conventional farms, as the organic farms were not situated on typical vegetable-growing land. One important reason for lower incomes on these farms is also the need to use part of the land for fertility-building crops. The income foregone on this area could not be compensated for, even with 60 % of the organic farms using livestock to graze the leys.
- Net farm income per ha UAA was equal on organic and conventional ***dairy farms***. Lower stocking rates on the organic farms were balanced by higher prices for organic milk, and by reduced costs, especially the reduced expenses for concentrates and labour.
- ***Organic cattle and sheep farms*** had a negative net farm income, and performed worse than the conventional reference group due to both lower output and higher costs.
- The results of the ***mixed farms*** show lower net farm incomes per ha UAA than the conventional farms.

Figure 5-7: Net farm income on organic and comparable conventional farms in Great Britain, 1995/96



Source: Fowler, Lampkin and Midmore (1998).

1 In % of comparable conventional farms.

Using farm models and 1997 prices, Lampkin (1997a) calculated the profitability of conversion for different farm types, specifically taking into account the transition period (Table 5-10). The results indicate that most farm types can maintain income levels once converted, although some still face significant transition costs despite the availability of Organic Aid Scheme payments. Conversion is more profitable for dairy and cereal farms due to the premia obtainable in 1997, while systems involving organic beef and sheep are less rewarding.

Table 5-10: Organic conversion models: Financial returns under conventional and organic management and during the transition period (£/ha, 1997 prices)

Farm type	Conventional	Transition[1)]	Organic
Specialist dairy	1489	1566	1860
Mainly dairy	1077	1137	1356
Stockless arable	799	848	942
Mainly arable	692	627	654
Lowland livestock	655	589	595
Upland livestock	450	459	482
Hill livestock	338	326	318

Source: Lampkin (1997a)

1 5 year average

A conversion study by Haggar and Padel (1996) finds that, in accordance with the above results, and 'contrary to widespread opinion that organic farming is only suitable for mixed farms, the specialist dairy farms appeared to adjust better to the organic management'.

5.2.9 Greece

Greece is the EU country with the smallest share of organic area, and no recent economic studies or data on the profits of organic farms were available.

5.2.10 Ireland

No data or recent studies on organic farming, except for a case study of individual farms, were available.

5.2.11 Italy

Organic farming has experienced a strong growth in Italy in recent years, but the share of organic farming in total agriculture varies enormously between regions. The unchallenged leader in terms of its importance in organic farming is Sicily, which is followed by Apulia, Sardinia, Emilia-Romagna and Tuscany. Agricultural structures and natural conditions vary considerably between regions, and due to the regional design and implementation of EC Reg. 2078/92, the payments for organic farming can differ greatly as well. In addition, the economic studies available for different regions cannot be compared, due to different methodological approaches (Zanoli 1998), and so no overall picture on the economic situation of organic farms in Italy can be given.

The most comprehensive study in terms of regional coverage is provided by INEA (1998), which has conducted a survey on 141 organic farms in the INEA/RICA database. The data refer to the 1996 accounting year, and to farms located in the following 10 regions: Piedmont, Liguria, Lombardy, Trento Province, Friuli V.G., Tuscany, Umbria, Abruzzi, Calabria, Sicily. Comparisons are only made with the averages of all conventional farms. According to this last survey, organic farms in Italy generally appear to be much larger than conventional farms (29 ha UAA vs. 22 ha for the average RICA farm). Mountain farms are much larger (36 ha), while lowland farms are smaller (14 ha); in the case of the latter, organic farms are smaller than the average conventional farms (21 ha). In terms of enterprise structure, 55 % of the organic UAA are involved in extensive animal production (livestock & sheep), 14 % of the agricultural area are permanent crops (mainly olive trees & vineyards), and 10 % of the UAA are devoted to arable crops. The net income[1] of organic farms is, on average, 23 000 ECU per farm; this places organic farms above the survival level, i.e. they are not going out of business. The most profitable farms are those located in less favoured areas of the mountains, and which are larger. In terms of net income per hectare, the most profitable farms are those located in the lowlands, often specialised horticultural farms. The average net income per hectare of organic farms is 562 ECU; this compares to 817 ECU for conventional RICA farms, showing a lower profitability of organic farms in terms of the land factor. In the mountains, though, organic farms have a higher profitability per ha UAA than conventional ones.

Several studies are available that have analysed the economic performance of organic and (comparable) conventional farms in individual regions (Figure 5-8).

Salghetti (1997) analysed a sample of 33 ***organic dairy farms*** in the ***Emilia-Romagna*** region for the year 1995. He reports a significant diversification of activities on the organic farms, with an increase in on-farm processing, marketing activities and farm tourism. While the study concluded that in general organic farming proved to be economically viable for these farms, the variability of financial returns to family labour was high. It also has to be noted that, compared to conventional dairy farms, the ***profits were considerably lower***, with only 50 % of conventional profits per ha UAA and 63 % per FWU. The rather low values for relative profits may partly be due to the conventional farms obtaining very high prices for milk used for parmesan production. Another explanation can be found in the way the comparison was made, and in the way comparable farms were selected.

A study covering three years (1994-1996) compared the data of 28 organic farms in the ***Marche*** region with a carefully selected sample of conventional farms (Zanoli, Fiorani, Gambelli 1998). The organic farms had 20 % ***higher returns*** per ha UAA, and a 50 % higher remuneration of family labour.

For ***Umbria***, Santucci and Chiorri (1996) analysed the economic data of 19 organic farms. The averages of the period 1992-1994 were compared to the average result of conventional farms in Umbria (including the very highly profitable horticultural lowland farms, flower producers and tobacco producers), using the RICA-FADN data bank. While return to land was only 75 % of the regional conventional average, return to family labour was 50 % higher. The authors conclude that, within the present economic context, organic farming cannot compete with conventional production in the most fertile areas, where yields and subsidies are very high, whereas it can represent a sound alternative in less favoured areas.

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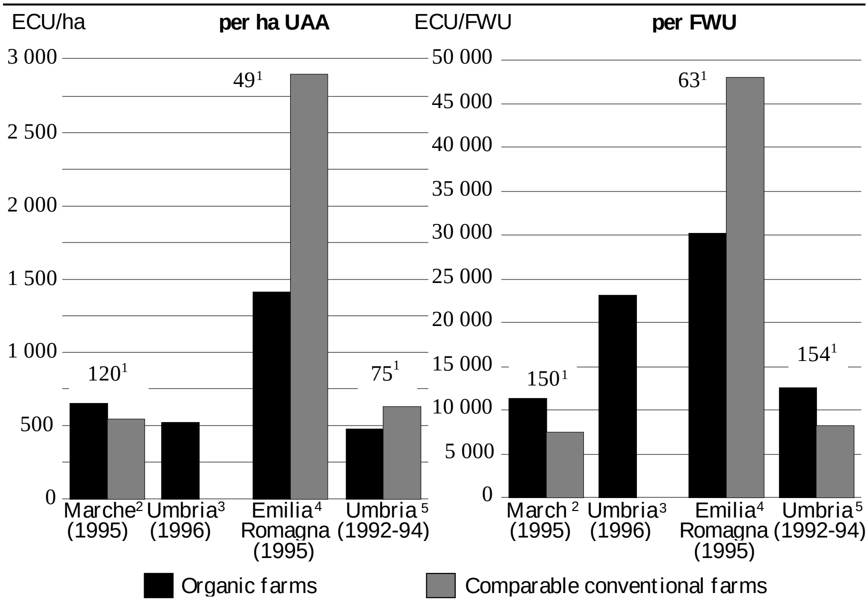
[7] Net income is in this study defined as gross output less variable & fixed costs less imputed family worker costs excluding the farmer.

Figure 5-8: *Profits of organic farms in Italy*



1 As a percentage of comparable conventional farms.
2 All farm types (Zanoli, Fiorani and Gambelli 1998).
3 All farm types (Chiorri and Santucci 1997).
4 Dairy farms (Salghetti 1997).
5 Mixed farms (Santucci and Chiorri 1996).

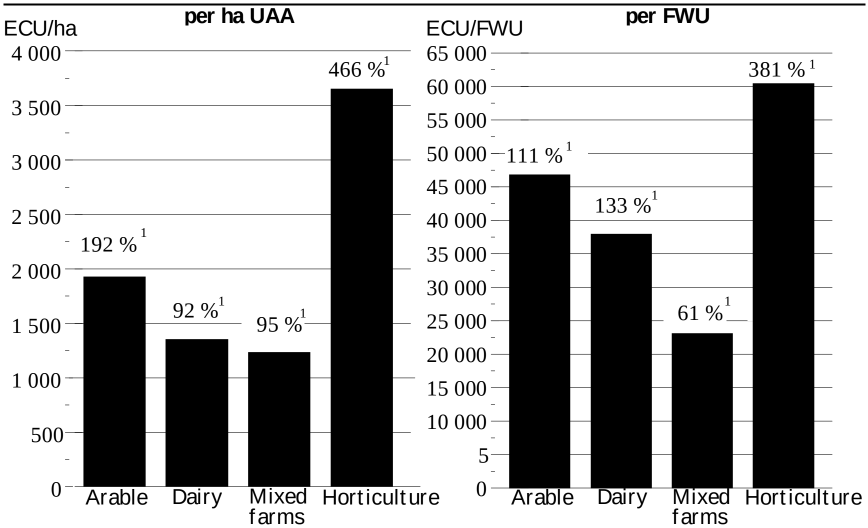
5.2.12 Luxembourg

No studies were available, but estimates on the profits of organic farms could be obtained from agricultural advisors (see Annex 6). On average, incomes of organic and conventional farms are similar, but organic farms which derive their main income from milk and meat often have lower profits, as the marketing structure for these products is still inadequate. It was pointed out that the conversion to organic farming can rarely secure the survival of small farms in Luxembourg.

5.2.13 Netherlands

The share of organic farming is still much lower in the Netherlands than in its neighbouring countries. The prevailing intensive conventional farming systems often make conversion difficult. LEI-DLO has evaluated data of organic farms included in the Dutch Farm Accountancy Data Network. An overview of the profits of organic farms in 1995 is given in Figure 5-9. ***Arable farms*** compare very favourably with the conventional reference group, but it has to be noted that the organic farms have a significantly higher share of horticultural crops than the reference group. ***Dairy farms*** have 8 % lower profits per ha UAA, but considerably higher returns to family labour. ***Mixed farms*** have a much lower remuneration of family labour than comparable conventional farms. The conventional horticultural farms used for comparison have a higher share of arable crops than the organic groups, thus making a comparison difficult. Still, the results show that the ***organic horticultural farms*** realise very high profits, both per ha UAA and per FWU.

Figure 5-9: Profits of organic farms in the Netherlands, 1995



Source: Dutch accountancy Data Network FADN (LEI-DLO).

1 In % of comparable conventional farms.

5.2.14 Norway

As part of the so-called '30 farm project', the Norwegian Centre for Ecological Agriculture (NORSØK) and the Norwegian Agricultural Economics Research Institute (NILF) surveyed and analysed the economics of organic milk production. One related study (Vitterso 1995) evaluated the data of 11 ***organic dairy farms***, and compared these results to two groups of conventional farms, representing regions with high and low crop yields respectively.

- Average profit per ha UAA of the organic farms was 83 %-109 % of the conventional reference group for the period 1989-1992.
- Grants for organic farming were important in that they compensated for reduced revenues, and the shift towards production-neutral subsidies in the period of observation has proved to be favourable for the more extensive farms.

In a second study (Vitterso 1997), 9 organic dairy farms were analysed for the period 1989-1996.

- Average net income per cow on the organic farms was only 80 % of the conventional reference group, and an increase in the milk price of 0.03 to 0.19 ECU/kg would be necessary to equalise incomes.
- The main determinants of these results are the degree of yield reduction, the percentage of imported feed, and the amount of additional labour needed.

The studies point out that the profitability of conversion to organic dairy farming depends strongly on feed supply and utilisation. A yield reduction cannot be fully compensated by the increased import of conventionally grown feed, due to the restrictions imposed by the regulations for organic primary production. This has to been seen in the context of the high dependence of dairy farms in Norway on purchased feedstuff, with expenses for concentrates constituting about 79 % of total variable costs for the group of conventional farms. Farms that experience large yield reductions have had to implement measures to compensate for the losses, e.g. by increasing the use of non-cultivated grazing land and by renting land. The authors conclude that farms with only slight yield reductions and milk quotas that are small relative to their feed supply can actually improve their profitability under the existing subsidy schemes for conversion to organic dairy farming.

A recent analysis of the profitability of ***organic cropping systems*** based on farm models has been carried out by Repstad and Eltun (1997). The production data used for the models is based on experiments that took place from 1990 to 1996. Data from 15 typical farms located in the lowlands and valleys of Eastern Norway established the basis for the model; these were supplemented by gross margin data of the experiments and 1996 prices for organic products. Calculations were carried out for both conventional and organic management with and without livestock production on the farms.

- For both systems, the mixed cropping-livestock system had higher returns than the stockless system.
- The calculations show that financial returns to the organic system are at least as high as with conventional management.
- While net farm income is similar for the two systems in the scenario with livestock production, it is higher on the organic farms for the stockless scenario, with net farm income being higher by 23 % per ha UAA and 29 % per hour of labour.
- The results show that, with the yields realised in the cropping system experiment (which, due to its experimental character, may be slightly higher than average yields in practice), and the higher prices that were obtainable for organic products in 1996, organic crop production seems to be an economically viable alternative.

5.2.15 Portugal

No economic studies or data on the profits of organic farms were available. Organic farming is still mainly found in the form of subsistence farming.

5.2.16 Spain

No economic studies or data on the profits of organic farms were available, a gap that stands in marked contrast to over 100 000 ha being supported under the organic scheme of EC Reg. 2078/92 in Spain.

5.2.17 Sweden

In spite of the relatively large organic sector, few data on the profitability of organic farming is available. A study of four dairy farms in Western Sweden showed profits on the organic farms to be 12 % higher than on comparable conventional farms (Danielsson and Arnesson 1998).

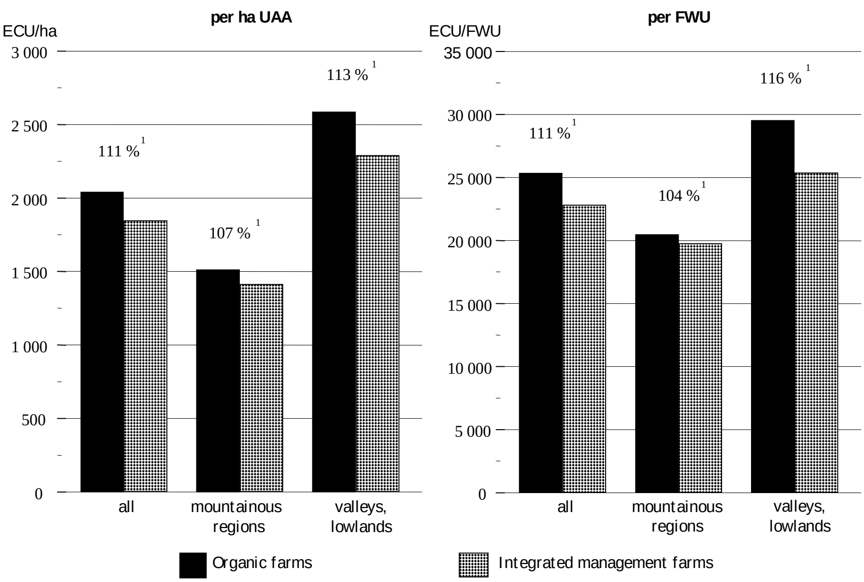
As a consequence of accession to the EU and the introduction of the organic support programme according to EC Reg. 2078/92, the relative profitability of organic farming has increased. Organic price premia have remained stable and support payments have increased, while the conventional price level has decreased. The main exception is the vegetable sector, since it appears as if here the organic price closely follows the price level of conventional products. Also, competition from imported organic vegetables is strong. A special phenomenon is the large number of small holdings for which it proved advantageous to convert even without selling certified products. An explanation for this may be that these farms are part-time or labour-extensive, which are paid premia for environmentally friendly production, while the size and nature of this production is such that transaction costs of certification are much too high when compared to the potential earnings from sales. Products thus do not appear on the market, as they are either used for self-sufficiency, sold at premium prices and without any formal certificate to small sections of the population, or delivered without premia to conventional wholesaling or processing firms.

5.2.18 Switzerland

In Switzerland, documentation of the economic performance of organic farms is well established, and the FAT has for years published analyses of organic farms based on data of the national farm accounting system. Results have been compared to a reference group of conventional farms, and recently to a group of comparable integrated farms. An integrated farming system, due to the high support payments received under agri-environmental programmes, is often a more likely alternative to organic farming than 'conventional' farming. Also, it is the aim of Swiss agricultural policy to replace conventional farming with integrated farming as the standard farming system (Agra-Europe 1998), and it seems likely that this will be achieved in the medium term (Freyer 1998).

The organic and integrated farms are ***considerably more successful than conventionally managed farms*** (Hilfiker, 1998). A comparison of organic and selected comparable integrated farms is given in Figure 5-10. On average***, profits are 10 % higher in organic farms than in integrated farms***. In the mountain area, profits are generally lower than in the valleys, and the profits of organic farms are only slightly higher than those of integrated farms. The higher prices for organic products, especially for bread grain and potatoes, but also for milk and pork have contributed considerably to the financial success of organic farms (Hilfiker 1998).

Figure 5-10: Profits in organic and comparable integrated management farms in Switzerland



Source: FAT (1997a).

[1] As a percentage of comparable integrated management farms.

The majority of the analysed farms are mixed farms (valleys), and dairy or grazing livestock farms (mountain area). Model calculations based on 1995 prices (Hilfiker and Malitius 1995) show that conversion is in general not economically attractive for pig and cattle fattening farms. High beef prices and payments for grazing livestock have recently increased the attractiveness of fattening on pasture and suckler cow husbandry. Conversion will continue to be a problem for very intensive conventional farms, pig and poultry farms, and farms with crops like vegetables, fruits or viniculture (Hartnagel 1998).

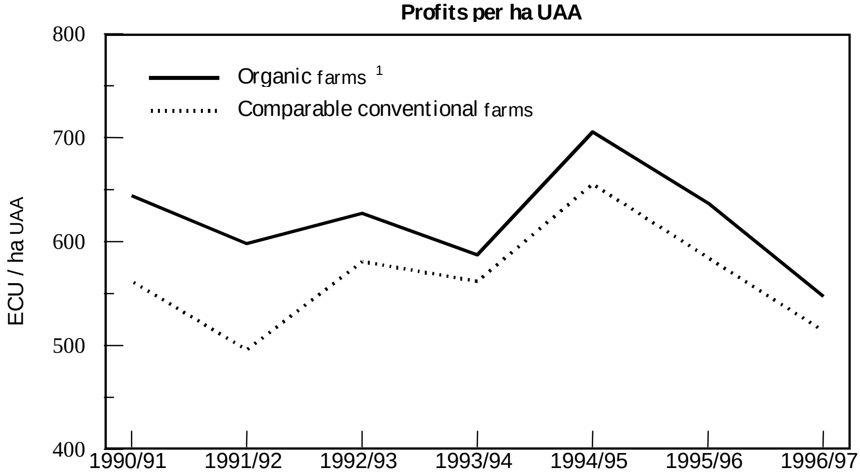
An overview of the development of profits on organic and comparable conventional farms in the last years is given in Chapter 5.3.

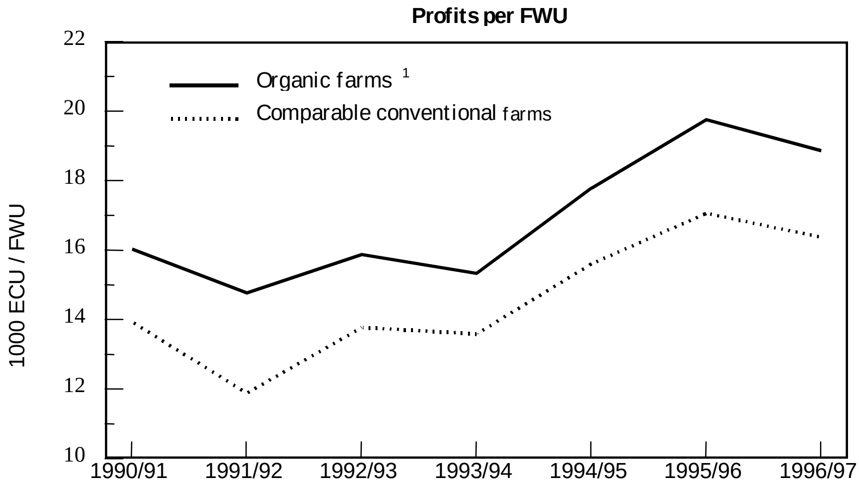
5.3 Time series of profits

Long-term observations of profits for organic and comparable conventional farms are available only for Switzerland and Germany (Figure 5-11 and Figure 5-12). The figures illustrate the degree of variation in profits for both organic and conventional farms, regardless of whether the profit is calculated per ha UAA or per FWU. Interestingly, the fluctuation in profits is very similar for the two farming systems, highlighting the dominance of external factors like climate, policies and prices for the development of profits. These 'synchronised' profit curves were observed for Germany also in earlier years (1981-1991) (Padel and Zerger 1994). The divergent development of the profits of the two farming systems in Switzerland in 1995 coincides with a significant raise of the payment levels for organic farming in that year.

While no clear trend can be discerned for the return to land in Germany, the return to family labour has increased slightly, due to the distinct reduction of labour per ha on the organic farms in the past years (see Chapter 3.1). For the same reasons, the decreasing trend of profits in Switzerland (more noticeable if measured in national currency, as the Swiss Franc has gained slightly against the ECU in the last years) is more pronounced if measured per ha UAA than per FWU.

Figure 5-11: Time series of profits of organic farms in Germany (old Laender)

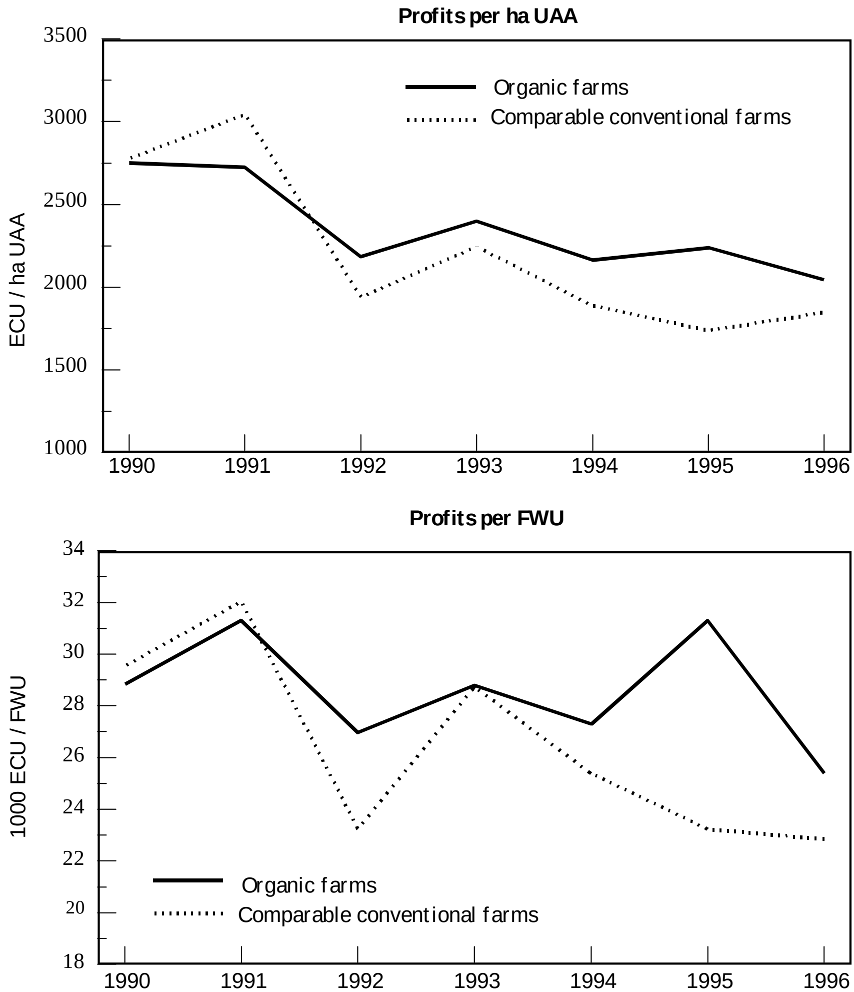




Source: Based on BMELF (different years).

[1] Number of farms is varying in different years (95-126 organic farms).

Figure 5-12: Time series of profits of organic farms in Switzerland



Source: Based on FAT (different years).

5.4 Development of profits during conversion

Conversion is a dynamic process that usually takes longer than the 2-year period defined by EC Reg. 2092/91. The interaction between the development of yields, costs and new market channels leads to a farm-specific development of profitability in this period. This report does not cover the conversion process in detail, but we will highlight a few important aspects that are typical of the conversion period.

- No access to premium prices for organic products in the first 2 years of conversion. This aspect is especially relevant for those farm types whose economic success is more dependent on realising higher prices.
- Due to restructuring, higher investments are needed in the first years - on the other hand some machinery may be sold, and quota may need to be purchased or may be sold as a direct consequence of conversion.
- Higher information needs and costs in the first years of conversion.

For a detailed analysis of conversion-specific aspects, see the respective chapter in Lampkin and Padel (1994), and the in-depth studies by Schulze Pals (1994), Nieberg (1997) and Haggar and Padel (1996).

5.5 Importance of premium prices

Many consumers are prepared to pay higher prices for organically produced goods. The realisation of premium prices may therefore make an important contribution to the profitability of organic farming. On the other hand, the realisation of price premia, especially in direct marketing, may require higher labour input as well as increased expenses for processing and marketing. These costs have to be taken into account when evaluating the importance of premium prices.

As highlighted in Chapter 4.2, the variability of price premia for organic products is high, as are the differences in access to special marketing channels for different products in different countries. The importance of price premia for farm profits will therefore vary depending on farm type and country. To calculate the respective indicator ‘share of profits due to higher prices’ for the whole farm requires a detailed knowledge of prices, the share of sales channels, and quantities sold.

Only a single study was identified that has analysed existing organic farms to determine the importance of premium prices for the profit of farms. Nieberg (1997) investigated 107 farms in the old *Laender* of ***Germany*** that had converted to organic farming in 1990 with support from the organic farming scheme of the extensification programme (EC Reg. 4115/88). Four years after conversion, the share of profits resulting from higher prices had grown to 52 % on average. The importance of premium prices was much more pronounced for arable farms, where higher prices accounted for 73 % of profits, than for grazing livestock farms, for which this share was 28 %. The grazing livestock farms often faced marketing problems, especially as there was a lack of dairies processing organically produced milk in some regions. For both arable and grazing livestock farms, the realisation of premium prices was on average a necessary condition to achieve profits that were at least as high as those of comparable conventional farms. Six years after conversion, the share of profits resulting from higher prices had risen to 67 % on average for a remaining subsample of 58 farms. The increase was mainly due to an improved marketing situation of the grazing livestock farms.

An indication of the varying importance of price premia for different farm types in ***Great Britain*** at present is given by model calculations based on 1997 prices by Lampkin, Measures and Unwin (1997). Price premia have been related to the net margin (gross margin plus support payments less allocatable fixed cost changes), showing that for ***specialist arable farms*** higher prices account for 40 % of the net margin, while for ***dairy farms*** this figure is only around 10 %. Comparing this to the financial returns under conventional management reveals that the higher profits of the arable farm model under organic management are only due to the access to premium prices. The organically managed dairy farm on the other hand compares favourably to the conventional situation even without a premium price for milk.

In a modelling study covering Baden-Württemberg, Germany, Braun (1995) calculated that a 25 % price premium for all products would suffice to make conversion attractive for 95 % of farms[1]. The necessary level of price premia varied largely between farm types, being highest for intensive pig and poultry farms and lowest for mixed and grazing livestock farms.

5.6 Importance of the payments for organic farming

Organic farming is supported in all member states of the European Union within the framework of agri-environmental programmes according to EC Reg. 2078/92. To determine the importance of these payments for the economic performance of organic farms, we tried to collect information on the share of these payments in farm profits. The actual payments that the farms received cannot easily be calculated, since their level is determined by

- the (regionally varying) payment rates,
- the farms' production structures,
- special eligibility requirements (e.g. maximum payment levels),
- and the time under organic management.

This information was in general not available. Only for a few countries was it possible to derive the payments from farm accounts or from studies which had determined the average 'actual' premia that the average farm received per ha UAA.

Table 5-11 gives an overview of the results of these calculations. The absolute level of payments received varies significantly. But, it is noticeable that for Austria, Denmark and Germany, the share of these payments in profits is very similar, at around 20 %. The very low importance of these payments in Great Britain is due to both the relatively low level of payments, and the fact that only converting farms are eligible for payments under the organic farming scheme. For comparison, the data for a non-EU-member state are shown. The indicator for organic farms in Switzerland shows a slightly higher importance of the support payments for the profits of organic farms.

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[8] Permanent crops were not included in the analysis.

Table 5-11: Payments for organic farming

	AT[1)]	DE[2)]	DK	GB[3)]	CH
Year	1996	1995-1997	1996/97	1995/96	1996
	Payments as a percentage of profits				
All farms	18 %	18-22 %	16 %	4 %	24 %
Arable farms		17 %	19 %	0 %	
Dairy farms		22 %	13 %	5 %	26 %
Mixed farms				5 %	23 %
	Average actual payments in ECU per ha				
All farms	216	120-130	101	11	490
Arable farms		114	94		
Dairy farms		130	113	35	393
Mixed farms				13	591

Source: Own calculations based on BMLF (1997), BMELF (diff. years), DIAFE (1998), FAT (1997a), Fowler, Lampkin and Midmore (1998) and Nieberg (1999)

1 Calculation based on actual average premia (Eder 1998b).
2 Calculation based on payments for agri-environmental programmes. Some farms may be included that did not receive any payments.
3 Payments for organic farming as % of net farm income.

Based on the scarce information available on the share of payments in profits (Table 5-11), and the economic results presented at the beginning of this chapter, preliminary conclusions for the sample averages are that

- usually, the payments were on average necessary to ensure a profitability that was similar to the conventional reference group;
- the payments are not always (notably in Great Britain) high enough to cover conversion-induced losses;
- with payments amounting to 20 % of profits, the dependency of supported organic farms on the agri-environmental programmes and on the outcome of general EU budget discussions is quite high.

6 Impacts of the CAP reform on organic farming

6.1 Introduction

The reform of the CAP in 1992 has been one of the greatest policy-induced changes in the economic conditions for agriculture in the European Union in the last decade. The main characteristics of the reform were the reduction of the price support system coupled with compensatory payments and obligatory set-aside, and the introduction of agri-environmental programmes. The impacts of this reform on conventionally managed farms and the agricultural sector have been frequently analysed. While some of the reform measures have affected both organic and conventional farms in quite a similar way, there are many areas of the CAP reform that have had very specific consequences for organic farming. Only few studies exist that have dealt specifically with this topic; the findings of these studies will be presented in this chapter. Moreover, we will attempt to give a plausible picture of the effect the CAP reform has had on organic farming, drawing on

- the expert assessments and observations that have been collected during this survey;
- a pool of studies that did not primarily investigate the effects of the reform, but nevertheless provide results and indicators that can be used to deduce the trend of the impacts.

The analysis of the impact the CAP reform has had on organic farming will have to answer the following two questions:

- What consequences has the reform had on the profitability and production patterns of existing organic farms?
- How has the reform influenced the relative profitability of conversion (i.e. the relative profitability of organic farming compared to 'conventional' management)?

Both questions require an assessment of the performance of the farms before and after the reform, and also of the hypothetical situation that no reform had taken place in 1992. As with all 'with and without' ex-post comparative analyses, a difficult methodological problem is posed by the calculation of farm performance for the hypothetical case, since a static comparison will neglect adjustment reactions that are due to changing external parameters.

In the following paragraphs, an overview is given of the impact of individual measures of the CAP reform, generally based on a ceteris-paribus assumption. At the end of this chapter, the results of attempts to estimate the overall impact of the CAP reform on organic farming are presented.

6.2 Introduction of the agri-environmental programme - EC Reg. 2078/92

Part of the CAP reform were so-called 'accompanying measures'. Of particular interest for this analysis is the introduction of support for organic farming under the agri-environmental programme EC Reg. 2078/92. The impact analysis in this report will be restricted to the direct support offered in the form of area payments. Several countries have taken the opportunity to support organic farming via other 2078/92 measures such as training programmes (see Lampkin et. al. 1999). While these have been of considerable importance for the success of organic farms, the estimation of quantitative effects is most difficult and will be looked at in more detail in the forthcoming report by Michelsen (1999).

The implementation of direct support for organic farming according to EC Reg. 2078/92 has varied greatly between the different member countries and regions of the EU, both in terms of the levels of payments, and the design and requirements of, and eligibility for the programmes (for details see Lampkin et. al. 1999). When assessing the impact of this support, one has to differentiate between programmes for continuing organic farming, and support for conversion. Also, the evaluation has to take into account whether any support for organic farming had been available before the CAP reform.

The following analysis will deal with several possible impacts of the payments on the profitability of organic farming, as well as discuss some important aspects of the multifaceted design of the support schemes in the member states of the European Union.

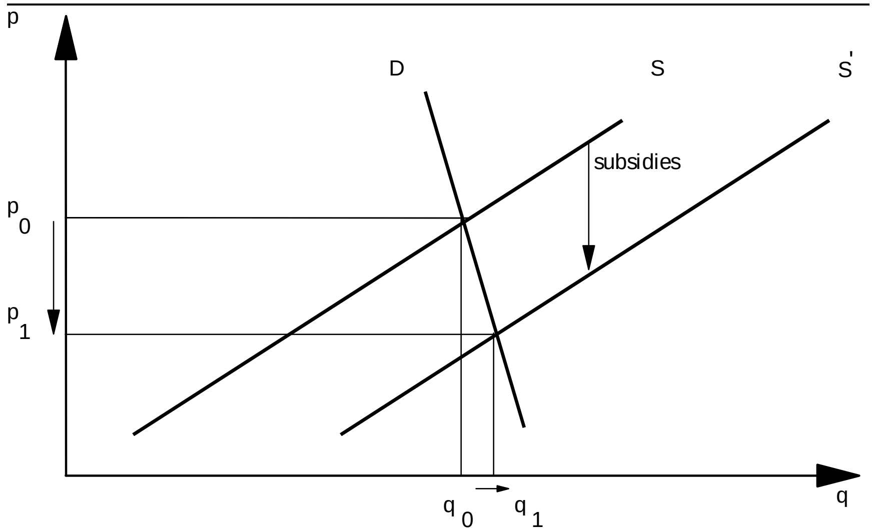
6.2.1 Impacts on the profitability of organic farming

6.2.1.1 Impact when no support was available prior to EC Reg. 2078/92

Where no support to organic farming had been available before the introduction of EC Reg. 2078/92, the ceteris-paribus effects of area payments have obviously been ***positive for organic farms***, since they (nearly) fully translate into an increase in profit. The share of these payments in profit could only be calculated for a few countries (see Chapter 5.6). These calculations indicate that 2078/92 payments amount to approximately 20 % of profits in Germany, Austria and Denmark, while in Great Britain they amount to only 4 % of profits, due to both the relatively low level of the payments and the fact that only converting farms are eligible for payments under the organic farming scheme.

But while the introduction of the payments has ceteris paribus increased the profitability of organic farming, any resulting conversions will increase the supply, thus carrying the ***risk of eroding the price premia*** for organic products. Criticism of a one-sided support policy has been repeatedly voiced by market observers in the past. Hamm (1997) illustrates that, in a case of inelastic demand, supporting conversion and hence the entry of new enterprises to organic farming may harm not only existing producers; the induced price decreases can in fact nearly cancel out any supportive effect the subsidies might otherwise have (Figure 6-1). The payments will lead to a downward shift of the supply curve as indicated in the diagram (S to S'). The more inelastic the demand curve, the lower the new equilibrium price p_1, and the smaller the supply increase (q_1-q_0) will be.

Figure 6-1: Impact of supply subsidies when demand is inelastic



Source: Hamm (1997).

This possible effect is of special concern in France and Great Britain, where no organic payments are available to organic farms beyond the 5-year conversion aid payments.

On the other hand, it is argued that the ***increased supply base*** is a necessary precondition for efficient processing and marketing, and ***may create demand***. In Ireland, this phenomenon is believed to have been keeping prices for organic products strong, and in Finland the increased supply base is seen as the cause of market development and even rising price premia.

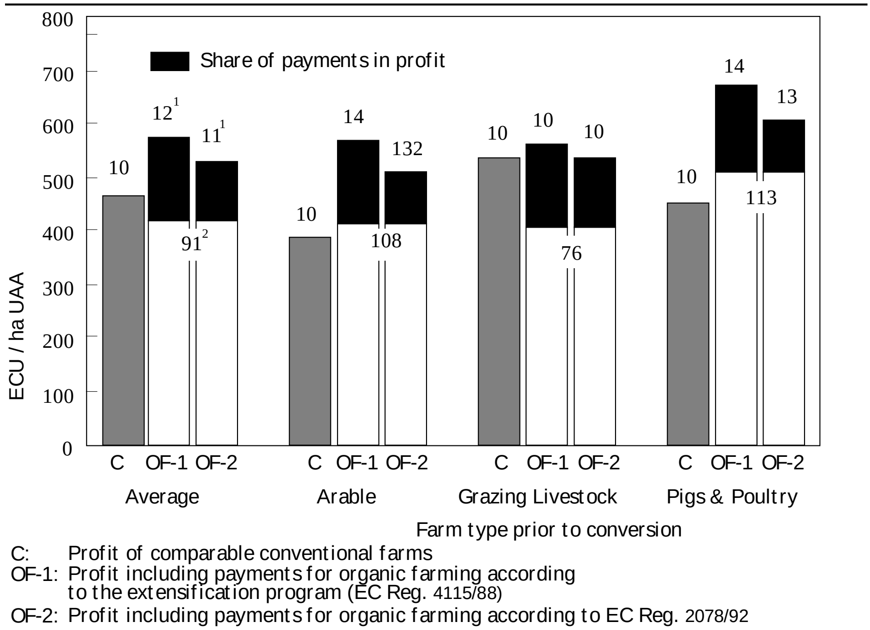
Both price effects described above are important, but the extent of their influence can in general not be isolated from the impact of other factors. It seems that, at least in the first years following the CAP reform, other determinants and developments were more important than any possible erosion of price premia, due to the support given to organic production.

6.2.1.2 Impact when support was available prior to EC Reg. 2078/92

In countries where earlier support programmes have been replaced by EC Reg. 2078/92, e.g. Germany and Denmark, the payments actually received by farmers (now and then) need to be compared (assuming the old programme had continued unchanged). Differences in payment levels as well as differing eligibility criteria and requirements will determine whether the replacement of earlier support programmes has had a positive or a negative impact on organic farms.

For ***Germany***, a study by Eckhardt (1996) gives an estimation of the impact of replacing the support for organic farming according to the EU extensification programme (EC Reg. 4115/88) with the implementation of EC Reg. 2078/92. The analysis is based on data from 107 farms located in the old *Laender*, which converted to organic farming in 1990 with the support of the so-called 'extensification programme'. The farm data was used to simulate the impact of replacing the extensification programme with EC Reg. 2078/92 (Figure 6-2).

Figure 6-2: Impact of the replacement of the extensification programme with EC Reg. 2078/92 in Germany (old Laender) 1992/93



Source: Eckhardt (1996).

[1] Profits of organic farms relative to the profits of comparable conventional farms.

[2] Profits excluding payments for organic farming relative to the profits of comparable conventional farms.

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Arable farms and intensive livestock farms were hurt most, with a ***profit reduction*** of around 10 %, while grazing livestock farms lost only 4 %. These different impacts of the introduction of EC Reg. 2078/92 on different farm types result from the fact that arable area payments have fallen more than those for grassland compared to the former extensification programme payment levels. On average, the profits per ha UAA of the organic farms fell by 7.3 %, but the average profit within a group was still at least as high as that of the conventional reference group for all farm types.

But if one takes into account that the support given to organic farming under the former extensification programme was available only to converting farms, the evaluation of EC Reg. 2078/92 will generate quite different results for existing organic farms, as ***continuing organic farming*** is supported under this latter regulation as well. The ***increase in profit*** for these farms is equal to the payments made under the organic farming scheme of EC Reg. 2078/92.

6.2.1.3 Impact on the relative profitability of organic farming : Competitive schemes

With the introduction of EC Reg. 2078/92, support schemes were offered for different extensive, environmentally friendly ways of production. So, while the organic farming schemes have increased the income of organic farms, the introduction of other agri-environmental schemes has also increased the attractiveness of non-organic farming systems, like for example integrated crop management.

Since the incentive effect for conversion is dependent on the profitability of available alternatives, an evaluation of the effect of EC Reg. 2078/92 on the relative profitability of conversion to organic farming has thus to take into account the ***other agri-environmental schemes*** as well. The area supported by other agri-environment schemes of EC Reg. 2078/92 is large in many countries, totalling more than 20 million ha in the EU (Foster and Lampkin 1999), which is evidence of the relative attractiveness of these schemes.

Alternative options under EC Reg. 2078/92 may be either ***competitive or complementary*** (see Lampkin et. al. 1999). Where measures can be combined, they have the potential of actually increasing the acceptance of the organic farming scheme, even if its payment levels are low. Schemes that may typically be combined include for example environmentally and nitrate sensitive area schemes and habitat protection schemes.

On the other hand, competitive schemes with rates of payments only slightly below those for organic farming, but at the same time with significantly less restrictive requirements, have been identified as a serious problem (Lampkin et. al. 1999). Particularly competitive are input reduction measures relating to arable or horticultural crops, such as integrated crop management.

Few studies have compared the competitiveness of the organic support scheme to the other options of the agri-environmental programme. In ***Austria***, the agri-environmental programme ÖPUL has found high acceptance among farmers, and several extensification measures represent obvious competitive alternatives to the conversion to organic farming. Model calculations by Eder (1995a, 1997a/b/c/d) show that, especially for extensive stockless farms, organic farming seems to be the most profitable option, even during conversion. For grazing livestock and dairy farms, a favourable result of the organic farming system is dependent on access to premium prices. If the organic products have to be sold at conventional prices (which in 1995 was the case for 75 % of the concerned products), other agri-environmental options present a profitable alternative.

The significance of the impact of competitive agri-environment schemes is highlighted by the withdrawal of more than 6000 farms from organic farming in Austria in 1995, which has been attributed mainly to the availability of other, less restrictive agri-environmental schemes offering similar payments (Lampkin et. al. 1999).

In ***Germany***, a survey of 107 farms that converted in 1990 with the support of the former extensification programme (EC Reg. 4115/88) showed that approximately 15 % of the farms reconverted when the five-year contract period ended (Eckhardt 1996). The majority of the reconverting farms switched to other agri-environmental programmes. These represent a profitable alternative to organic farming, especially for grazing livestock farms with limited access to premium prices for milk and beef, due to nearly similar payment levels for less restrictive extensive grassland schemes.

6.2.1.4 Impact of the payments on risk

As the payments for organic farming according to the agri-environmental programmes provide a reliable base of income, they have the ***positive effect of reducing risk***. Though no studies exist that have thoroughly analysed whether the income of organic farms is prone to higher yearly fluctuations than that of conventional ones, several of the country experts have voiced the opinion that risk reduction is one of the positive effects of the payment scheme. Especially during the conversion process, risk and uncertainty are perceived as high by many farmers, not only with respect to technical problems and crop loss, but also with respect to the access to the 'organic' market.

6.2.2 Impacts of different payment rates of the organic farming schemes

The implementation of the direct support for organic farming according to EC Reg. 2078/92 has varied greatly between the member countries and regions of the EU, both in terms of the levels of payments, and the design and requirements of and eligibility for the programmes. The levels of direct payments vary between regions, and can also be different for different crops or different types of land.

Flexible payment rates offer the possibility to account for differences in

- conversion costs in different regions[9]
- conversion costs of different crops / farm types
- regional objectives

and thus contribute to achieving (environmental) objectives at a low cost[10].

On the other hand, any policy measure carries the ***risk of competitive distortions***. Differences in payment rates will influence the competitiveness of organic farms, in contrast to a fully competitive market, or a uniform payment level which increases profitability but does not distort competitiveness between individual organic farms. This aspect is especially relevant as there is a special market for organically produced goods, and organic farms increasingly compete on a common market. The high variation in the design of the organic farming schemes may lead to distortions with respect to

- the regional distribution of organic farming
- the production structure
- the distribution of converting farm types.

In the following paragraphs, studies as well as observations by country experts on the possible impacts of the varying designs of the organic farming schemes are presented.

An indication of the extent of influence that the regionally differentiated design of support programmes can have on profits is given by Eckhardt (1996) for ***Germany,*** where the design and payment levels under EC Reg. 2078/92 vary greatly between different *Laender*. While the number of the survey farms in some *Laender* is not high enough to be representative, Table 6-1 gives a first impression of the distorting impact that the regionally differentiated support schemes have on the relative profitability of organic farming in Germany. To compare the *Laender* schemes, farm profits were simulated using the payment rates (for continuing organic farming) and the design of the regionally implemented organic farming schemes according to EC Reg. 2078/92. The profits per ha UAA were then compared with those

[9] Optimally, 'region' refers to a geographically defined area of homogenous production conditions and similar production costs. In contrast, the schemes of EC Reg. 2078/92 are usually defined using administrative criteria; this often results in similar payments to farms with very different conversion costs.

[10] This applies as long as higher administrative costs due to greater differentiation do not surpass the respective benefits.

the farms would have realised with a uniform national support programme (as defined by the framework of the 'Gemeinschaftsaufgabe Agrarstruktur und Küstenschutz'). The calculations took into account regional peculiarities of the 2078/92-schemes, e.g. maximum payment limits in Rhineland-Palatinate and Bavaria.

Table 6-1: Impact of regionally differentiated implementation of organic farming schemes[1] according to EC Reg. 2078/92 on profits - The case of Germany

Land (Federal state)	Difference in profit as compared to profits with a uniform national support programme in ECU per ha UAA
Hesse	+ 94
Bavaria	+ 59
Rhineland-Palatinate	+ 40
Baden-Württemberg	+ 36
Lower Saxony	+ 24
Northrhine-Westphalia	+/- 0
Schleswig-Holstein	- 95

Source: Eckhardt (1996)

1 Scheme designs as of 1995, payment rates for continuing organic farming

The impact of the EC Reg. 2078/92 payments for organic farming on relative profitability has been analysed by Cicia and D'Ercole (1997) for 6 representative farms in Campania, ***Italy***. The selected farms represent different sites and cropping systems. Three of the farms are located in the inland hills, where an extensive cereal-fodder system prevails; the other three farms are situated in the coastal plains, which are characterised by intensive agricultural systems with vegetable and cash crop production. The net revenues of the farms in a base scenario with conventional management were compared to the performance of a simulated organic management with and without payments under the organic farming scheme. To isolate the incentive for conversion of EC Reg. 2078/92, the simulation was based on the assumption that no price premium for the organic products was available and that the production structure was the same as in the base scenario. While this represents a 'worst case' scenario, the assumption of conventional prices is reasonable, at least for the first two conversion years.

Without payments, farm net revenues were lower under organic management than under conventional management for all six farm models (see Table 6-2). With the payments, the relative profitability increased dramatically in most cases, resulting in higher net returns than in the base scenario for those three farms that are located in the inland hills. The very small increase of the net revenues of Farm 3 can be explained by the regional modulation of the organic farming scheme: fodder crops do not qualify for payments in the region where this farm is located. If Farm 3 did receive payments for fodder crops, its net revenues would increase

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substantially. This highlights the competitive distortions resulting from the regional variation in the design of 2078/92-schemes.

While the simulated net revenues of Farms 4 and 5 are lower than in the base scenario, the difference is moderate and might well be compensated for if the farms are able to market their products with a price premium. Adjustments in production structure may also reduce costs. The marked difference to the economic result of Farm 6 is due to the cropping system: Farms 4 and 5 have perennial cropping systems, while Farm 6 relies on vegetable and intensive cereal production.

The authors draw the conclusion that payments under the organic farming scheme provide a strong incentive for conversion in the case of extensive cropping systems and also of olive production systems at higher altitudes. But they criticise that for some crops the payments made according to EC Reg. 2078/92 are too low to make conversion attractive; this especially affects vegetable farms. It has to be noted though, that the calculations are based on the assumption that no price premia for organic products are received, and that no estimates are given regarding the level of the price premium needed to equalise the calculated losses. The relative importance of the payments will, of course, decrease if price premia for organic products can be realised.

Table 6-2: Net revenues of 6 representative farms in Campania, Italy, under organic management compared to conventional management

Region and farm systems	Inland hills extensive cereal-fodder systems			Coastal plains intensive vegetable and cash crop production		
Farm model	**Farm 1**	**Farm 2**	**Farm 3**	**Farm 4**	**Farm 5**	**Farm 6**
Without EC Reg. 2078/92	- 9.3 %	- 12.8 %	- 4.8 %	- 50.0 %	- 96.6 %	- 112 %
Including payments according to EC Reg. 2078/92	+ 33.2 %	+ 18.4 %	+ 0.7 %	- 10.4 %	- 12.9 %	- 92.2 %

Source: Cicia and D'Ercole (1997)

Simulation results, assuming conventional prices and no change in production structure

An indication of the influence the payment levels have on the production structure of the organic agricultural sector is given for ***Belgium*** by Radelet (1997), who has compared the share of payments for organic farming with the standard gross margin for different crops. While payments are negligible for vegetables, where they amount to a bare 2.6 % of the standard gross margin, they have a share of 9.5 % of the standard gross margin for fruits and about 12 % of that for cereals. For grassland, payments amount to more than 22 % of the standard gross margin. These large differences are seen as a major factor in explaining the current progression of grassland and the stagnation of horticultural surfaces in the support scheme for organic farming of EC Reg. 2078/92 in Belgium.

Very similar observations were made in ***Finland***, where the incentive effect of the payments was reported to be nearly negligible for vegetable farms. Instead the payments favour crops that require little labour and provide relatively low revenues; examples of this are hay and grass production, which cover over 50 % of the land area in organic farming in Finland.

No studies were identified that have dealt in depth with the implications of the regional variations in the design and payment levels of the organic support schemes. The studies and expert opinions quoted above reveal that the topic is discussed controversially. From an economic point of view, differences in regional payment levels should be matched by differences in regional (environmental) values associated with organic farming.
EC Reg. 746/96, which clarifies the implementation of EC Reg. 2078/92, establishes a clear link between costs incurred when participating in the agri-environmental programmes, and payment levels. While it seems unlikely that the costs of participating are always a good indicator of the (environmental) benefits gained, at present no monetary measurements of these benefits of organic farming exist - thus, even though the current approach for determining payment levels is clearly more oriented at improving 'budgetary' efficiency than economic efficiency, no ready solutions are available.

More research on this topic is urgently needed, as markets for organic products are growing together and conflicts with respect to competitive distortions will increasingly arise on the political agenda.

6.3 Compensatory arable area payments

One of the main aspects of the CAP reform was the reduction of price support for many agricultural products. The support system was changed to area payments. These were decoupled from the quantities produced, with the level of payments determined according to average regional yields produced before the reform, to compensate for the reduction of revenues.

The impact of these payments on organic farming is difficult to quantify. The transfer of the price reduction for conventional products to the organic market has not been analysed so far. Depending on the extent of a possible decrease in organic prices induced by the reform of the price support schemes for conventional products, the effect on the profits of organic farms relative to the impact on conventional farms can be either positive or negative:

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- Organic yields for most crops and regions are lower than conventional yields (see Chapter 4.1). So, if organic prices declined with the same absolute margin as conventional prices, then an 'over-compensation' would have taken place, since the level of compensation payments is determined according to the 'conventional' reference yields.
- On the other hand, if the price reduction for conventional prices induced an organic price decrease of equal relative margin, then the impact might well be negative, due to the higher loss of revenues in organic farming.
- For products and farms that do not have access to premium markets and have to sell at conventional prices, the reform of the support scheme would result in an 'over-compensation' if organic yields were lower than the regional reference yields.

These considerations can be illustrated using a simple example. Let us assume a region where the regional average cereal yield is 6 t/ha and the price before the CAP reform was 200 ECU/t. If the CAP reform reduced the price to 150 ECU/t, that is -50 ECU/t or –25 %, then the compensatory payments (assuming exact compensation) would be 300 ECU/ha. The impact on organic cereal production for the three discussed cases is shown in Table 6-3.

Table 6-3: Effect of the compensatory arable area payments on revenues depending on the extent of the price reduction for organic products

	Case 1: Organic price reduction of same absolute margin	Case 2: Organic price reduction of same relative margin	Case 3: No access to premium prices
Organic yield	4 t	4 t	4 t
Organic price prior to CAP reform	400 ECU/t	400 ECU/t	200 ECU/t
Organic price after CAP reform	350 ECU/t (= - 50 ECU/t)	300 ECU/t (= - 25 %)	150 ECU/t
Revenue loss due to price reduction	200 ECU/ha	400 ECU/ha	200 ECU/ha
Compensation payment	300 ECU/ha	300 ECU/ha	300 ECU/ha
Total impact	***+ 100 ECU/ha***	***- 100 ECU/ha***	***+ 100 ECU/ha***

Source: Own Calculations

To isolate the effects that the reform of the price support system plus the arable area compensation payments have had on organic prices, is nearly impossible, as they overlap with other effects, mainly the introduction of support payments for organic farming under EC Reg. 2078/92. As described above, while in Ireland organic prices remained constant, this was seen as a consequence of the improved supply base for organic products due to the support according to EC Reg. 2078/92; whether an isolated reform of the price support would have had an effect on organic price levels remains speculation.

As organic farms grow more crops that are not eligible for arable area payments than comparable conventional farms, they receive on average significantly fewer of these payments. The analysis of farm samples in four countries indicates that this difference is in the range of 14 %-28 % (Table 6-4), and equivalent to 15-48 ECU per ha of organic agricultural area.

Table 6-4: Arable area payments (AAP) per ha UAA on organic farms

	GB	DE	DK	NL
No. of farms in sample	38	126	60	30
AAP in ECU per ha UAA	113	95	127	65
AAP as % of comparable conventional farms	78 %	86 %	73 %	72 %

Source: Own calculations based on Fowler, Lampkin and Midmore (1998) for GB, Dutch FADN for NL, BMELF (1998) for DE, DIAFE (1998) for DK

Similar to the payments under EC Reg. 2078/92 for organic farming, the compensatory arable area payments provide a reliable source of income and thus have the positive effect of reducing risk. Table 6-5 gives an overview of the share of arable area payments in profits for different farm types. Especially in the case of arable farms, the importance of these payments is much lower for organic than for conventional farms.

Table 6-5: Share of compensatory arable area payments in profits for different farm types

		All		Arable		Dairy		Mixed	
Country	Year	OF[1)]	Conv[2)]	OF	Conv	OF	Conv	OF	Conv
GB[3)]	1995/96	37 %	40 %	46 %	78 %	2 %	3 %	37 %	44 %
DK	1996/97	17 %	23 %	26 %	56 %	14 %	17 %		
DE	1996/97	17 %	21 %						
NL	1995	2 %	5 %	4 %	10 %	1 %	1 %	5 %	4 %

Source: Own calculations based on DIAFE (1998) for DK, BMELF (1998) for DE, Fowler, Lampkin, Midmore (1998) for GB, Dutch FADN for NL.

1 OF: Organic farms
2 Conv : Comparable conventional farms
3 Profits = Net farm income

Another important question is whether the introduction of arable area compensation payments has had an effect on the ***production structure*** of organic farms. No comprehensive study is available on this topic. Country experts generally did not notice any change (France, Belgium, The Netherlands). In Italy, the area of alfalfa and other forage legumes has increased due to the dehydration grants paid to mills. In the UK, only a few isolated cases were observed where the subsidies have induced a change in cropping patterns, like the growing of maize and the inclusion of peas and other eligible crops into whole crop silage to claim a higher protein rate.

6.4 Livestock headage payments

The general effects of the introduction of livestock headage payments to compensate for a decreased price support are quite similar to those of the introduction of arable area payments. But, in contrast to the yields of arable crops, the yields per head in organic livestock production are nearly the same as in conventional farming (see Chapter 4.1). Thus, the switch from price support to headage payments will more or less have had a neutral impact on the profits of organic farms, if production had to be marketed at conventional prices. If premium prices were available and stable, the headage payments would have increased profitability.

Livestock headage payments are of much lower importance than arable area payments, with the exception of the sample of British farms, where headage payments amount to nearly 50 ECU per ha UAA (Table 6-6). In general, organic farms have a significantly lower stocking rate than comparable conventional farms (see Chapter 3), which reduces the amount of livestock headage payments they receive. On the other hand, many organic farms have benefited from the extra extensification payment for stocking rates below 1.4 LU/forage ha (Lampkin et al. 1999). Compared to the conventional reference groups, the level of payments received by organic farms is lower in several countries (by up to - 44 %). In contrast, in the Netherlands organic farms receive more livestock payments due to the higher number of eligible livestock on arable and mixed farms.

Table 6-6: Livestock headage payments per ha UAA on organic farms

	GB	DE	DK	NL
No. of farms in sample	38	126	60	30
Livestock headage payments in ECU per ha UAA	48	22	10	19
Livestock headage payments as % of comparable conventional farms	62 %	94 %	56 %	126 %

Source: Own calculations based on Fowler, Lampkin and Midmore (1998) for GB, Dutch FADN for NL, BMELF (1998) for DE, DIAFE (1998) for DK

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Where livestock headage payments are limited by quotas, as is the case for suckler cows and sheep, conversion may be affected adversely: arable farms that are converting tend to increase the area of grassland and number of livestock, but they can only get access to some livestock premia through quota purchase. This aspect was reported to be a problem in Great Britain, even though more flexibility with respect to eligibility has been introduced lately.

6.5 Impact of set-aside schemes

To limit the excess production of certain arable crops, the CAP reform has introduced the instrument of the obligatory set-aside. Small producers can opt for the simplified scheme and avoid set-aside, but then protein crops and oilseeds are eligible only for the lower uniform cereal payment rate. Organic farms are subject to the same obligatory set-aside rate as conventional farms, even though they already contribute to a reduction of surplus products both through reduced yields and a different production pattern.

6.5.1 Importance of set-aside schemes for organic farms

Almost no published data is available with respect to the importance of the simplified scheme and the general scheme respectively for organic farms. The interviews with country experts indicate that in many countries (Finland, Luxembourg, Ireland, Italy, Netherlands, Spain) most organic farms have opted for the simplified scheme, and set-aside regulations have thus not had an impact here. In Great Britain, where the average farm size is much larger, the share of organic farms that have opted for the simplified scheme has been estimated to be below 30 %. In Germany, in a sample of 107 farms in the old *Laender*, 57 % of the farms had opted for the simplified scheme. In contrast, of a sample of 43 farms in the new *Laender*, 83 % were subject to the general scheme (Nieberg 1998b).

6.5.2 Impact of set-aside schemes on organic farms

In most countries, the impact of the set-aside regime plus the set-aside payment was assessed to be ***neutral or positive***, as organic farms often use the ***set-aside for fertility building*** by including legumes in set-aside mixtures. Especially ***arable farms*** with little or no livestock will generally profit.

The favourable impact is particularly pronounced in countries that allow a cumulation of set-aside payments and payments for organic farming, for example Belgium (see Lampkin et al. 1999).

In a survey in the old *Laender* in ***Germany*** (Nieberg, 1998b), 107 farmers were asked about the impact of the set-aside schemes on the profitability and production structure of their farms. The answers (Table 6-7) show that the majority of the farms have opted for the simplified scheme. For the farms that were subject to the general scheme, positive appraisals by far outweigh negative ones. The results were evaluated for different farm types, and while arable farms were naturally more often subject to the general set-aside scheme, in this group of farms, a positive appraisal of the introduction of the set-aside schemes also prevails. Still, it has to be noted that nearly 13 % of arable farmers said that the obligatory set-aside scheme had worsened their economic situation.

The impact of the set-aside scheme on the ***production pattern*** of the surveyed organic farms is quite small, since the majority (57 %) has opted for the simplified scheme, and nearly 20 % of the farms would have used fallow land for rotational reasons anyway. About 8 % of the farms noted a small impact, while 15 % of the farmers said that the impact of the scheme was significant, because they would not have set aside land without the scheme.

The results for the new *Laender* differ, which is mainly due to the much larger size of the farms in this region. More than 80 % of the farms in the sample are subject to the general scheme, which partly explains the higher percentage of farms negatively affected by the set-aside regulations. In addition, the sample includes a high proportion of mixed farms in less favoured areas, which sometimes encounter shortages in feed supply if they have to set aside arable land.

Table 6-7: Impact of the set-aside schemes introduced as part of the CAP reform on the economic situation of organic farms[1]

	Old *Laender*			New *Laender*
	All farms	Arable farms	Grazing live-stock farms	All farms
No impact because have opted for simplified scheme	57 %	23 %	80 %	17 %
Economic situation worse than before	7 %	13 %	3 %	29 %
No change	8 %	13 %	7 %	50 %
Economic situation better than before	28 %	51 %	10 %	14 %

Source: Nieberg (1998b)

1 Survey of 107 organic farms in the old Laender and 43 organic farms in the new Laender of Germany in 1995. Farmers were asked how the set-aside schemes had affected the economic situation of their farm

6.6 Overall impact of the CAP reform

6.6.1 Studies

Very few studies exist that have dealt with the overall impact of the CAP reform on organic farms.

In a survey in the old *Laender* in **Germany** (Nieberg, 1998b), 107 farmers were asked about the impact of the CAP reform on the profitability of their farms. Of course, due to the complexity of the reform and the length of the time period considered, the identification of clear causal relationships is difficult and the answers need to be interpreted cautiously. Still, the farmers' assessment gives a good overview of the general trends of the impact the CAP reform has had. The aggregated answers of all farms show a very ambiguous picture (Table 6-8). More information is revealed when the answers are differentiated by farm type. The impact of the CAP reform on the economic situation is clearly more positively appraised by arable farmers than by grazing livestock farmers.

Table 6-8: Impact of the CAP reform on the economic situation of organic farms in Germany

	Old *Laender*			New *Laender*
	All farms	Arable farms	Grazing live-stock farms	All farms
Economic situation worse than before	11 %	3 %	17 %	2 %
Economic situation slightly worse than before	15 %	13 %	18 %	0 %
Economic situation has not changed	37 %	37 %	37 %	28 %
Economic situation slightly better than before	22 %	32 %	15 %	60 %
Economic situation better than before	15 %	16 %	13 %	9 %

Source: Nieberg (1998b)

Survey of 107 organic farms in the old *Laender* and 43 organic farms in the new *Laender* of Germany in 1995. Farmers were asked how the CAP reform (lower prices, compensatory payments, headage premia and set-aside scheme) had affected the economic situation of their farms. Farms had been eligible for organic support schemes before the CAP reform, and thus the introduction of EC Reg. 2078/92 was not taken into account.

Köller (1995) has modelled the impact of the CAP reform on three organic farms of different farm type in **Germany**, which receive support under the extensification programme 4115/88. These farms represent an arable farm without livestock, a mixed (combined livestock-arable) farm, and a dairy farm respectively. On the basis of actual farm data of the farming year 1991/92, farm models are constructed using linear programming. These models are used to estimate the impact of the CAP reform compared to a reference scenario without CAP reform. The main focus of the analysis is on the effects on production patterns; especially the relative profitability of the different regimes of set-aside are investigated in detail.

The model results show only a slight increase in the area of those crops that are eligible for compensatory payments, though gross margins of these crops increase significantly. The stockless arable farm opts for the general regime with set-aside. As discussed above, it profits from the set-aside payments since it is dependent on annual fallow in the crop rotation (with grass leys / clover) to improve soil fertility. The mixed farm opts for the simplified regime (no set-aside). Calculations show that even with a base area of up to 30 ha, this farm should opt for the simplified scheme. This at first sight perplexing result is due to the design of the organic farming scheme according to EC Reg. 2078/92 in Germany. Set-aside land is not eligible for payments for organic management, and for this farm the resulting loss in premia and revenues outweighs the higher compensatory payments for oilseeds and protein crops, even with the set-aside payments.

Due to programmes that granted subsidies to organic farms and for set-aside before the CAP reform, the gross income of farms in Germany is only marginally affected (Table 6-9). Had the farms not taken part in the pre-reform programmes, the CAP reform would have significantly improved their economic success. Even though the analysis is not representative, the results confirm the impression that the relative profitability of organic arable farms as compared to other farm types has increased significantly. This distorting effect is aggravated in Germany by the fact that price premia are generally available for arable products, while organic livestock products often have to be sold at or just slightly above conventional prices.

Table 6-9: Impact of the CAP reform on different farm types in Germany: Relative change of gross income compared to different base scenarios

Base scenario	Stockless arable farm	Mixed farm	Dairy farm
Pre-CAP reform, incl. voluntary set-aside programmes and support for organic farming according to extensification program EC Reg. 4115/88	+ 3 %	+ 4 %	+/- 0 %
Pre-CAP reform, no set-aside payments, no support for organic farming	+ 45 %	+ 31 %	+ 26 %

Source: Köller (1995)

A positive overall assessment of the impact of the CAP reform on the profitability of organic farming in Germany is also indicated in studies by Kilian (1995) and Hofman, Steinhauser and Winkelhofer (1994).

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6.6.2 Conclusions

There are very few studies that have analysed the overall impact of the CAP reform on organic farming. The combined effect of

- the support of organic farming according to EC Reg. 2078/92,
- the introduction of compensatory payments decoupling the support level from the output level,
- and the set-aside premia

has led on average to a ***positive effect*** of the CAP reform on the profitability of organic farming. The positive effect varies between farm types and regions, and is ***diminished by***

- high payment levels of other competing agri-environmental programmes
- the lack of support for continuing organic farming in Great Britain and France
- especially in the first years of the reform, the inflexible design of set-aside regimes and eligible livestock quota systems in some countries, notably Great Britain.

While the CAP reform was a first step towards decoupling agricultural support from production, much still needs to be done. As eligibility for most payments is dependent on crop or livestock type, this influences the production structure. As chance will have it, especially in crop production CAP payments are made for crops that are grown less in organic than in conventional farming. Livestock premia are paid per head, and thus organic farms will not profit from these to the same extent as conventional farms, due to lower stocking rates. However, the extra extensification payment for stocking rates below 1.4 LU/forage ha alleviates this problem, as organic farms often benefit from these payments. The often discussed shift of agricultural support towards production-neutral uniform payments is likely to further increase the relative profitability of organic farming.

6.7 Impact of the accession to the EU - The cases of Austria, Finland and Sweden

For the accession countries Finland, Sweden and Austria, the transition from their respective national agricultural policies to the CAP has led to a very sharp decline in conventional producer prices for most products. Thus, especially where organic price premia are available, accession has improved the relative profitability of organic farming more or less 'overnight'. This phenomenon was seen as one of the causes of the rapid adoption of organic farming in Finland in the years following its entry to the European Union. In Sweden, accession has had positive impacts on many farms, as the level of support payments to organic farming has increased and the price premia have remained more or less unchanged. The main exception are organic vegetable growers, who have been hurt by the

lower prices for conventional vegetables, and who now face hard competition from imported organic vegetables. The introduction of the CAP in Sweden was also seen as the reason why a relatively large share of farms (40 % of the organic area) has converted to organic farming without selling certified products. In Austria, the relatively generous design of payment levels of the agri-environmental programmes seems likely to have contributed to the continued growth of the organic farming sector, but no further information on the impact of the accession of Austria was available.

For further information, see also the respective country overviews in Chapter 5.2.

Conclusions

7 Conclusions and outlook

In the following, we will focus on a number of aspects relating to the present and future economic situation of organic farms. We will also draw conclusions regarding some other important research issues.

7.1 Competitiveness of organic farming: Today and tomorrow

Present situation

This analysis of the economic situation of organic farms in Europe has shown that they on average achieve similar levels of income as comparable conventional farms. However, variance within the samples is high.

Differences in performance were found between countries, as well as between the individual farm types.

The economic viability of farms is clearly affected by support payments, but also by the existence of an adequate marketing structure for organic products.

Due to the high price premia obtainable with crop products, and the design of the general CAP measures (set-aside, compensatory arable payments), especially arable farms have achieved above average performances over the last years.

Organic dairy farms generally have a higher return to family labour but lower returns per ha UAA than comparable conventional farms.

For specialised, highly intensive farms, it would currently as a rule not be profitable to convert to organic farming.

This analysis has shown that, as a result of the CAP reform, organic farming has become more attractive. This is due not only to the support given to this type of farming under current agri-environmental schemes, but also to general reform measures, which have improved the relative competitiveness of organic farms.

Future development

As a number of important determinants of performance are clearly going to change over time, one cannot easily predict future trends on the basis of the current situation. How the economic situation of organic farms is going to develop depends especially on the factors listed below.

a) Technical progress

Technical progress in organic and in conventional farming will affect the relative future competitiveness of both types of farming. As organic farming is gaining in importance, one can also expect increased technical progress in this sector, which will have a positive impact on its relative competitiveness. It remains to be seen to what extent new technologies such as genetic engineering will be able to improve the economics of conventional farming.

It is also possible that consumers' scepticism regarding genetically modified food will result in an increased demand for food products that have been organically produced and not genetically altered.

b) Price development

Even though prices for organically produced food have mostly remained strong in the past, despite the strong expansion in organic farming, the risk of prices plummeting is still to be reckoned with. However, an increased supply will make improvements in the efficiency of marketing and processing possible, thus counteracting a supply-induced drop in producer prices. Taking into account also the uncertain development of the demand for organic produce, this study can therefore give no assessment of future trends in general price development.

However, recent years have seen an improvement of the marketing structure for animal products, resulting in higher average price premia in some countries. An EU-wide regulation of organic livestock production, similar to regulations for plant production (EC Reg. 2092/91) can be expected to further strengthen this development.

c) Political development

The direct support given to organic farming via area payments will continue to have a substantial impact on the economic viability of farms. Any decision regarding how current schemes within the framework of EC Reg. 2078/92 will be handled in the future, and what financial support will be available through them, is thus of major importance.

As developments of the CAP (Agenda 2000) continue, there are indications of further moves away from production-related price support, and towards more decoupled transfer payments. The purpose of the 1992 CAP reform is similar in a number of areas. An analysis of its impact on organic farming shows that it tends to improve the competitiveness of this type of farming. In the case of the Agenda 2000, this applies especially to the area of livestock production.

7.2 Research implications for farm economics

In most European countries, the availability of data on the economic situation of organic farms is not satisfactory. This is in sharp contrast to the strong expansion of organic farming, as well as the political support it receives.

In order to be able to evaluate and monitor the efficiency of the existing support schemes, as well as provide adequate advisory support, improving data availability will be essential. Specifically one should focus on standardising methods internationally, improving the representativeness of samples and on studying a selected number of farms over longer periods of time (time series).

Further areas of interest for future research into the economics of organic farming are:

- studying the factors determining the absolute and relative economic profitability of organic farms, in order to be able to assess the chances and risks of conversion for individual farms, and thus be in a position to provide well-founded advisory support;
- analysing the cost structures of organic farms in different countries, with a view to providing advice to the farmers and also assessing the competitiveness of organic farms in different regions;
- quantifying the impact of future agricultural policies - Agenda 2000 - on organic farming;
- developing further an efficient scheme of (area) support payments for organic farming;
- studying the economic viability of direct marketing and on-farm-processing;
- investigating the potential of the new media (Internet) for the marketing of organic produce by producers.

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Annex 1 Literature review on yields in crop production

AUSTRIA

Reference: BMLF (1995, 1996)

Data: Farm data, ∅ 1995 and 1996

Methodology: Farm accounts of 27 organic farms were compared with data from 27 comparable conventional farms.

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Wheat	3.51	5.43	Rye	2.49	3.40
Barley	2.79	4.40	Oats	2.56	3.96
Sunflower	2.45	2.94	Field beans	3.28	
Peas	2.53	3.02	Potato	11.20	24.90

Reference: Eder and Henöckl-Zehetner (1998)

Methodology: Catalogue of standard gross margin calculations for organic farming, data based on farm surveys and literature

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Winter wheat	3.5	Winter rye	3.6
Tritcale	3.5	Winter barley	3.2
Sommer barley	3.4	Dinkel	4.0
Oats	3.2	Field Peas	3.3
Field beans	3.0	Soy bean	2.6
Corn maize	4.5	Sunflower	2.1
Potatoes	21.0	Grassland, valleys	45.0-50.0

BELGIUM

Reference: Ghesquiere (1996)

Data: Farm data, 1995

Methodology: Survey based on 16 organic farms representing the majority of organic cereals farmers.

Region: Wallonia

Comments: Conventional yields have been supplemented and represent averages for Wallonia.

	Yield t/ha			Yield t/ha	
Crop	**Organic**	**Convent.**	**Crop**	**Organic**	**Convent.**
Wheat	4.64	7.32	Triticale	4.76	
Winter barley	4.67	7.23	Dinkel	4.64	5.34
Potato	23.00	46.10			

Reference: Groupe Agriculture Biologique de la Faculte Agronomique de Gembloux (1992)

Data: Field experiment

Methodology: Experiments on wheat varieties for organic farming

Region: Region Limoneuse, loess soil, most fertile soils in Belgium

		Yield t/ha				Yield t/ha	
Crop	**Year**	**Organic**	**Convent.**	**Crop**	**Year**	**Organic**	**Convent.**
Wheat	1989	3.91		Wheat	1990	5.54	
Wheat	1991	4.57		Wheat	1992	4.16	
Rye	1991	5.12					

Reference: Research and information centre of Rumbeke-Beitem (1996)

Data: Field experiment

Methodology: Experiments on organic farming in one farm

		Yield t/ha				Yield t/ha	
Crop	**Year**	**Organic**	**Convent.**	**Crop**	**Year**	**Organic**	**Convent.**
Wheat	1993	5.13		Wheat	1994	4.0	
Wheat	1995	5.22					

Reference: Peeters and Van Bol (1993)

Data: Field experiments

Methodology: Preceding crop: 3-6 years temporary grassland. Manure: 50 t/ha of composted bovine solid manure. Yields are given for marketable potatoes (>35 mm).

Region: Region Limoneuse, loess soil, most fertile soils in Belgium

		Yield t/ha				Yield t/ha	
Crop	Year	Organic	Convent.	Crop	Year	Organic	Convent.
Potato	1991	27.33		Potato	1992	33.0	

DENMARK

Reference: DIAFE (Danish Institute of Agricultural and Fisheries Economics) (1998)

Data: Farm data, 1996/97

Methodology: Evaluation of farm accounts, average of 80 organic farms (representative for 578 organic farms) compared to average of more than 2000 conventional farms.

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Spring barley	3.61	5.12	Wheat	4.07	6.95
Cereals	3.80	5.93	Potatoes	18.10	30.50

Reference: DIAFE (1998)

Data: Farm data, 1996/97

Methodology: Evaluation of farm accounts, comparison of the average of 34 dairy farms and 26 arable farms with comparable conventional farms.

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
	Dairy farms			*Arable farms*	
Spring barley	4.27	4.82	Spring barley	2.35	5.17

Reference: National Institute of Animal Science, Denmark (1991-1997) and Halberg and Kristensen (1997)

Data: Farm data, ∅ 1989-1992

Methodology: Average of 17 farms

Crop	Yield t/ha Organic	Yield t/ha Conv.	Crop	Yield t/ha Organic	Yield t/ha Conv.
Spring sown grain	4.4	5.9	Winter cereals	5.4	8.5
Grass/clover	5.9	7.1	Fodder beets	9.7	11.3

FINLAND

Reference: AERI (Agricultural Economics Research Institute) (1996, 1997)

Data: Farm data, ∅ 1994/1995

Methodology: Evaluation of bookkeeping data, 10-16 cattle and 5-6 arable farms.

Cattle husbandry farms

Crop	Yield t/ha Organic	Yield t/ha Convent.	Crop	Yield t/ha Organic	Yield t/ha Convent.
Wheat	2.27	3.07	Rye	1.48	1.58
Barley	2.36	3.51	Oats	2.67	3.55
Potato	16.97	13.97			

Arable farms

Crop	Yield t/ha Organic	Yield t/ha Convent.	Crop	Yield t/ha Organic	Yield t/ha Convent.
Wheat	1.84	4.13	Rye	1.70	2.78
Barley	1.50	4.02	Oats	2.03	3.86
Potato	19.20	22.43	Oilseeds	0.51	1.63

FRANCE

Reference: Urvoy (1997)

Data: Farm data

Methodology: Average of 15 farms.

Region: East of France, Alsace

Crop	Year	Yield t/ha Organic	Yield t/ha Convent.
Sugar beet	1996	40	70

Reference: CDER (1991)

Data: Farm data, ∅ 1985-1989

Methodology: Average of 4 organic farms

Region, classification of site: Centre, Champagne, below average natural sites

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Wheat	3.9	Rye	2.7
Oats	3.8		

Reference: Biocivam de l'Aude (1993)

Data: Farm data

Methodology: Average of 6 farms.

Region: South-west, on above average natural sites

Crop	Year	Yield t/ha Organic	Yield t/ha Conv.	Crop	Year	Yield t/ha Organic	Yield t/ha Conv.
Hard wheat	1993	2.2	3.0	Wheat	1993	2.1	4.0
Sunflower	1993	2.0	3.0				

Reference: De Marcillac (1996)

Data: Field experiment, 1995

Region: South-east, Languedoc, on average natural sites

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Garlic	5.0	6.4	Carrot	25.0	35.0
Courgette	22.0	29.0	Leek	13.0	17.0
Potato	24.5	30.9	Apple	17.8	29.7
Tomato (intensive production)	90.0	120.0	Tomato (large scale)	45.0	60.0

Reference: GERFAB-ENESAD (1996)

Data: Field experiment

Region: East Burgundy, on average natural sites

		Yield t/ha				Yield t/ha	
Crop	Year	Organic	Convent.	Crop	Year	Organic	Convent.
Wheat	1994	3.2	5.8	Onion	1994	28	45
Potato	1994	13	19				

Reference: Cauwell (1994)

Data: Field experiment, 1994

Region: South-west, on above natural sites

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Soy Bean	3.4	4.1	Wheat	2.3	5.2
Maize	9.1	13.7			4

GERMANY

Reference: BMELF (1992-1998)

Data: Farm data

Methodology: Data from national farm monitoring system, about 100 (95-126) organic farms each year (sample not constant). About 500 (338-766) comparable conventional farms (mainly mixed cereal-grazing livestock farms and dairy farms on sites with similar natural conditions).

Region: Old *Bundeslaender*

		Yield t/ha				Yield t/ha	
Crop	**Year**	**Organic**	**Convent.**	**Crop**	**Year**	**Organic**	**Convent.**
Cereals	∅ 1991-95	3.42	5.42	Wheat	∅ 1991-94	3.74	6.13
					∅ 1995-97	3.83	6.34
Rye	∅ 1991-94	3.07	4.95	Barley	∅ 1991-94	3.38	5.17
	∅ 1995-97	3.30	5.45		∅ 1995-97	3.30	5.34
Potatoes	∅ 1991-94	16.30	29.90	Sugar	∅ 1991-94	43.80	52.70
	∅ 1995-97	16.30	27.90	beet	∅ 1995-97	55.90	52.30

Reference: LBA (1997 and 1998)

Data: Farm data

Methodology: Evaluation of farm accounts. Comparison of the average of 64-83 organic farms with the average of more than 3000 conventional farms.

Region: Bavaria

		Yield t/ha				Yield t/ha	
Crop	**Year**	**Organic**	**Conv.**	**Crop**	**Year**	**Organic**	**Conv.**
Cereals	∅ 1995-1996	3.72	5.97	Potatoes	∅ 1995-1996	17.30	31.20
Sugar beet	1995	50.70	58.50	Corn maize	∅ 1995-1996	5.45	7.72
Oilseeds	1996	1.65	2.59				

Annex 1

Reference: Schulze Pals (1994) and follow up-study Nieberg (1997)

Data: Farm data

Methodology: Annual survey of 107 farms that converted to organic farming in 1990/91. 1605 conventional farms (15 for each organic farm) for comparison have been selected such that important key characteristics are similar to those of organic farms before conversion.

Region: Old *Bundeslaender*, 2/3 of farms are located in less favoured areas

		Yield t/ha					Yield t/ha		
Crop	Year	Organic	Convent.		Crop	Year	Organic	Convent.	
Wheat	1990		5.44	(6.06)[1]	Barley	1990		5.22	(5.33)[1]
	∅ 1991-1992	4.01	6.28			∅ 1991-1992	3.75	5.46	
	∅ 1993-1994	3.83	6.62			∅ 1993-1994	3.46	5.24	
Rye	1990			(4.72)[1]	Oats	1990			(4.75)[1]
	∅ 1991-1992	3.47				∅ 1991-1992	4.03		
	∅ 1993-1994	3.34				∅ 1993-1994	3.57		
Cereals	1990		5.38	(5.98)[1]	Potatoes	1990		31.7	(32.2)[1]
	∅ 1991-1992	4.00	5.95			∅ 1991-1992	20.30	30.5	
	∅ 1993-1994	3.58	5.89			∅ 1993-1994	20.50	28.8	
Pulses	1990		3.61	(3.46)[1]	Oilseeds	1990		3.26	(3.16)[1]
	∅ 1991-1992	1.81	3.70			∅ 1991-1992	2.09	3.15	
	∅ 1993-1994	2.37	3.21			∅ 1993-1994	1.89	2.81	
Sugar	1990		50.2	(51.7)[1]					
beet	∅ 1991-1992	45.70	50.5						
	∅ 1993-1994	40.40	53.7						

[1] Yield in brackets refers to yield before conversion of the organic farming group.

Reference: Nieberg (1998a)

Data: Farm data

Methodology: Annual survey of 59 farms that converted to organic farming in 1990/91. 885 conventional farms (15 for each organic farm) for comparison have been selected such that important key characteristics are similar to those of organic farms before conversion. Identical sample of farms each year.

Region, classification of site: old *Bundeslaender*

		Yield t/ha					Yield t/ha		
Crop	**Year**	**Organic**	**Convent.**		**Crop**	**Year**	**Organic**	**Convent.**	
Wheat	1990		5.83	(6.19)[1]	Barley	1990		5.29	(5.26)[1]
	∅ 1991-1992	3.95	6.75			∅ 1991-1992	3.74	5.48	
	∅ 1993-1994	3.76	6.67			∅ 1993-1994	3.58	5.20	
	∅ 1995-1996	4.06	6.59			∅ 1995-1996	3.37	5.33	
Rye	1990			(4.46)[1]	Oats	1990			(5.04)[1]
	∅ 1991-1992	3.16				∅ 1991-1992	4.08		
	∅ 1993-1994	3.30				∅ 1993-1994	3.56		
	∅ 1995-1996	3.67				∅ 1995-1996	3.73		
Cereals	1990		5.45	(5.95)[1]	Potatoes	1990		32.6	(29.9)[1]
	∅ 1991-1992	3.87	6.00			∅ 1991-1992	20.40	32.1	
	∅ 1993-1994	3.54	5.94			∅ 1993-1994	20.40	30.1	
	∅ 1995-1996	3.78	5.94			∅ 1995-1996	20.70	29.8	
Sugar	1990		53.3	(52.9)[1]	Oilseeds	1990		3.49	(3.07)[1]
beet	∅ 1991-1992	38.40	48.5			∅ 1991-1992	1.96	3.24	
	∅ 1993-1994	36.10	53.6			∅ 1993-1994	1.71	2.84	
	∅ 1995-1996	52.30	50.9			∅ 1995-1996	1.29	2.80	

[1] Yield in brackets refers to yield before conversion of the organic farming group.

Reference: Mösenthin and Nolte (1997)

Data: Farm data, ∅ 1992-1995

Methodology: Average of 46 organic farms. Farms divided in two soil classes.

Region: New *Bundeslaender*

Crop	Yield t/ha Natural conditions below average	Yield t/ha Natural conditions above average.	Crop	Yield t/ha Natural conditions below average	Yield t/ha Natural conditions above average.
Winter wheat	2.83	4.29	Summer wheat	2.64	3.18
Winter barley	2.55	4.27	Summer barley	2.50	3.54
Winter rye	1.95	4.10	Summer rye	1.34	2.97
Triticale	1.88	4.12	Dinkel	2.52	2.70
Oats	2.17	3.47	Potato	16.63	17.10
Sugar beet	42.78	39.31	Fodder beet	64.02	72.50
Field bean	2.00	1.22	Pea	1.09	2.12
Grain lupin	0.94	1.55	Rape	0.69	0.99
Sunflower	0.82	2.53			

Reference: Zerger (1995)

Data: Farm data, ∅ 1989-1992

Methodology: 111 annual farm balances for the period 1988/89-1991/92 from a total of 60 farms where analysed. For about 50 % of farms conversion is less than 2 years ago.

Region: Schleswig-Holstein (34 farms), Northrhine-Westfalia (23 farms), Lower Saxony (3 farms)

Comments: High yearly variation of carrot and field bean yields

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Winter wheat	3.63	Summer wheat	3.29
Rye	3.01	Oats	3.84
Summer barley	2.70	Potatoes	16.0
Carrots	50.5	Field beans	3.36

Reference: Menge et.al. (1998)

Data: Farm data, ∅ 1995-1997

Methodology: Analysis of farm accounts (approx. 243 fields, 1290 ha) for farms that participated in the agri-environmental program. Yields are compared to farms that did not participate.

Region: Saxony

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Winter wheat	3.96	6.79	Winter rye	3.04	5.93
Winter barley	2.90	6.16	Summer barley	3.23	4.64
Potatoes	20.30	34.10	Maize for silage	27.80	40.90

Reference: Landwirtschaftskammer Schleswig-Holstein (1998)

Data: Field Experiments

Methodology: Yield comparisons of different breeds

Region: Schleswig-Holstein

Comments: Field beans have been prone to high losses is some years due to pest. Oats yields have been subject to high yearly variations (3.33-7.41 t/ha).

Crop	Year	Organic Yield t/ha	Crop	Year	Organic Yield t/ha
Winter wheat	∅ 1995-1997	5.40	Triticale	1997	4.78
Summer wheat	∅ 1995-1997	4.89	Oats	∅ 1995-1997	5.55
Field beans	∅ 1995-1997	5.71	Peas	∅ 1995-1997	5.02
Potatoes	∅ 1995-1997	22.10	Leys	1997	11.90-16.30

Reference: Landesforschungsanstalt für Landwirtschaft und Fischerei, Mecklenburg-Vorpommern (1998)

Data: Farm data, ∅ 1993-1996

Region: Mecklenburg-Vorpommern

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Winter wheat	3.36	Oats	3.52
Triticale	2.76	Dinkel	2.83
Summer wheat	3.55	Summer barley	3.23
Winter rye	3.03	Fodder peas	2.74
Field bean	1.63	Lupin	1.86
Summer rape seed	0.92	Winter rape seed	0.53

Reference: Lehr- und Versuchsanstalt für Acker- und Pflanzenbau Bernburg (1997)

Data: Field experiment, 1993/94

Methodology: The average of organic yields without and with livestock compared with the average of conventional yields under two different fertilizing intensities for the year 1993/1994

Region: Sachsen-Anhalt

Comments: Low fertilizing intensity = L; High fertilizing intensity = H

	Yield t/ha				Yield t/ha		
Crop	Organic		Conv.	Crop	Organic		Conv.
	Stockless	Mixed			Stockless	Mixed	
Winter	L: 7.39	L: 7.81	L: 8.07	Summer	L: 5.87	L: 6.66	L: 4.88
wheat	H: 7.60	H: 7.66	H: 7.88	barley	H: 5.54	H: 6.57	H: 5.37
Winter	L: 5.36	L: 5.53	L: 4.86	Oats	L: 7.06	L: 6.13	L: 7.12
rye	H: 5.30	H: 5.54	H: 4.67		H: 6.63	H: 6.08	H: 7.16
Potatoes	L: 23.00	L: 31.30	L: 33.50				
	H: 25.10	H: 32.60	H: 33.70				

Reference: Meyercordt and Freimann (1997)

Data: Field experiment

Region: Lower Saxony

Crop	Year	Organic yield t/ha Site classification below average	average	above average
Winter wheat	1995		5.85	5
	1996	4.74		6.43
	1997	3.98	6.13	5.47
Winter rye	1995	2.32		4.51
	1996	2.28		5.77
	1997	1.36		4.42
Dinkel	1997		4.85	4.92

Reference: Freimann and Meyercordt (1997)

Data: Field experiment

Methodology: Average yields of different varieties of various summer crops

Region: Lower Saxony; Schleswig-Holstein

Crop	Year	Organic yield t/ha	Crop	Year	Organic yield t/ha
Summer rye	∅ 1994-1996	2.31	Summer wheat	∅ 1994-1996	4.54
Oats	∅ 1994-1996	4.58	Potatoes	∅ 1994-1996	31.10
Fodder peas	∅ 1995-1996	2.99	Yellow lupin	∅ 1995-1996	1.42

Reference: Ernst and Heiting (1992)

Data: Field experiment

Methodology: Comparison of the average yield of grassland under organic management with the average yield under conventional management for the period 1984-1991

Region, classification of site: Rheinland

Crop	Year	Yield t/ha Organic	Convent.
Grassland	∅ 1984-1990	9.0	14.8

GREAT BRITAIN

Reference: Fowler, Lampkin and Midmore (1998)

Data: Farm Data, 1995/96

Methodology: Survey of organic farms, yield data is based on data from 3-13 farms.

Region: England and Wales

Comments: Conventional yields have been taken from various regional statistics (Murphy 1997, Ansell and Vaughan 1997, Williams 1997, MAFF 1997b).

	Yield t/ha			Yield t/ha	
Crop	**Organic**	**Conv.**	**Crop**	**Organic**	**Conv.**
Barley	4.2	6.2	Oats	3.8	6.2
Winter wheat	3.7	8.0	Winter beans	2.8	2.6
Spring wheat	2.7		Spelt wheat	3.2	
Potato	27.0	32.9			

Reference: Murphy (1992)

Data: Farm data, 1989

Methodology: Partly organic farms. Comparison of yields of organically and conventionally grown crops within these farms

Region: Great Britain

	Yield t/ha			Yield t/ha	
Crop	**Organic**	**Conv.**	**Crop**	**Organic**	**Conv.**
Winter wheat	3.73	6.16	Winter barley	3.22	5.31
Spring wheat	3.24	4.95	Cereals total	3.44	5.50
Oats	3.67	4.41	Onions	42.82	49.47
Potato - Main	19.65	51.27	Beans - tic	0.97	2.94

Reference: Cormack and Elliott (1994-1997)

Data: Experimental site

Methodology: Average of three different rotation systems, including stockless system

		Yield t/ha				Yield t/ha	
Crop	Year	Organic	Convent.	Crop	Year	Organic	Convent.
Wheat	1993	7.52	8.55	Potatoes	1993	21.96	49.26
	1994	5.38	8.90		1994	33.91	30.43
	1995	6.80	10.67		1995	18.04	35.02
	1996	10.23	9.70		1996	41.26	43.37

ITALY

Reference: Zanoli, Florani and Gambelli (1998)

Data: Farm data, ∅ 1994/1995

Methodology: Comparison of the average of 28 organic farms with a panel of 28 conventional farms which resulted from a k-means cluster analysis of 383 farms around the organic farms used as centroids

Region: Marche

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Durum wheat	3.60	4.15	Soft wheat	3.30	4.40
Barley	2.40	4.40	Sunflowers	1.15	2.35
Alfa-alfa	5.35	7.35	Wine grapes	5.75	11.35

Reference: Santucci and Chiorri (1996)

Data: Farm data, ∅ 1992-1994

Methodology: The average of 19 organic farms is compared with the average data of conventional farms, elaborated from the RICA FADN data bank.

Region: Umbria

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Wheat	2.8	4.3	Barley	2.5	3.8
Emmer	2.1		Sunflower	1.3	2.6
Wine grapes	1.1	1.5	Grassland	6.2	
Lentil	0.8	0.8			

Reference: Bartola, Pollastri and Zanoli (1990)

Data: Farm data, 1987/88

Methodology: Average of 25 farms

Region: Emilia Romagna

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Tomatoes	59.3	49.6	Potatoes	20.9	33.5
Onion	26.9	32.5	Soft wheat	5.1	5.0
Grain maize	4.6	8.3	Barley	4.4	4.7

Reference: Mosso and Pagella (1992)

Data: Farm data, 1989

Methodology: Questionnaire sent to 160 farmers; 71 farms were analysed

Region: Piemonte

Comments: Data of yields of comparable conventional farms refer to 1986 and 1987

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Soft wheat	4.1	4.2	Grain maize	6.3	6.8
Barley	4.4	4.2	Apple	7.8	23.2
Peas	3.7	24.6	Peach	7.3	17.1
Kiwi	14.3	11.2	Wine grapes	4.9	8.3

Reference: Berna (1996)

Data: Farm data, 1994

Methodology: Comparison of 4 organic farms and 3 conventional farms

Region: Umbria-Toscana

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Durum wheat	1.7	3.2	Sunflower	1.1	2.3
Wine grapes	5.1	8.5	Apple	20.0	40.0

Reference: De Meo and Fino (1994)

Data: Farm data, 1991

Methodology: Average of 22 farms

Region: Puglia

Crop	Organic Yield t/ha	Crop	Organic Yield t/ha
Leek	28.5	Fennel	60.0
Cauliflower	20.0	Salad	11.2
Cabbage	48.0	Radish	18.0
Spinach	16.0	Beet	3.33
Potatoes	10.0	Cucumber	8.33
Pepper	42.5	Aubergine	35.0
Water melon	30.8	Melon	10.0
Courgette	21.6	French bean	16.0
Tomato for canning	50.0	Coldhouse salad	25.0
Coldhouse tomato	77.0	Coldhouse cucumber	38.5
Olive oil	0.33	Wheat	3.6
Coldhouse french bean	30.0		

Reference: Chiorri (1997a)

Data: Farm data, ∅1992-1995

Methodology: Survey on 19 organic farms

Region: Umbria

Crop	Organic yield t/ha
Lentil	0.78 (Standard deviation: 0.46)

Reference: Chiorri (1997b)

Data: Farm data, 1996

Methodology: Average of 14 organic farms

Region: Umbria

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Olive	1.3	Olive oil	0.2

Reference: Crescimanno, Guccione and Schifani (1996)

Data: Farm data, 1994/1995

Methodology: Average of 11 farms

Region: Sicilia

Crop	Yield t/ha Organic	Yield t/ha Convent.
Olive	2.6	1.1

Reference: Cicia and D'Ercole (1994)

Data: Farm data, 1992

Methodology: Comparison of organic with conventional cereal production; average of 11 farms

Region: Molise

Crop	Yield t/ha Organic	Yield t/ha Convent.	Crop	Yield t/ha Organic	Yield t/ha Convent.
Durum wheat	2.7-3.2	3.0-3.5	Soft wheat	3.2-3.5	3.5-4.0
Oats	3.0	3.4	Barley	3.0	3.4
Emmer	2.8				

Reference: Londero (1991, 1992)

Data: Farm data, 1991

Methodology: Comparison of the average of 11 organic farms with the average of 29 conventional farms in 1991

Region: Friuli Venezia Giulia

Crop	Yield t/ha Organic	Yield t/ha Conv.	Crop	Yield t/ha Organic	Yield t/ha Conv.
Tomato (for canning)	25.3	29.3	Coldhouse tomato	78.9	80.0
Pepper	30.0	28.0	Onions	27.8	37.5
Spinach	12.0	11.4	Basil	9.5	8.5
Potatoes	15.7	15.8	Strawberry	11.1	7.1
Beet	17.0	24.0	Chicory	6.5	4.0
Leek	5.3	4.0	Courgette	20.0	20.3
Cabbage	13.9	14.6			

Reference: Furnari (1994)

Data: Farm data, ∅ 1990/91- 1992/93

Methodology: Average of 15 organic and in conversion farms

Region: Sicily

Crop	Organic Yield t/ha	Crop	Organic Yield t/ha
Orange tarocco	21.5	Orange sanguinello	20.0
Orange sanguinello	15.0	Orange valencia late	18.0
Orange moro	21.5	Orange naveline	17.0
Orange salustiana	18.5	Orange new hall	21.0
Clementine monreal	20.0	Clementine apirene	18.0
Lemon monachello	24.0	Lemon femminollo	28.5
Late tange-rine of Ciaculli	18.0	Tangerine avana	10.0
Grape fruit star ruby	8.0	Grape fruit marsh seedless	10.0

Reference: Chiorri (1997c)

Data: Farm data, 1996

Methodology: Average of 7 organic farms

Region: Umbria

Crop	Organic yield t/ha
Wine grapes	5.4

Reference: Petrella (1997a)

Data: Farm data, 1996

Methodology: Average of 4 organic

Region: Umbria

Crop	Organic yield t/ha
Durum wheat	3.2

Reference: Consolani and Petrella (1997)
Data: Farm data, 1996
Methodology: Average of 12 organic farms
Region: Umbria

Crop	Organic yield t/ha
Soft wheat	2.6

Reference: Chiorri and Consolani (1997)
Data: Farm data, 1996
Methodology: Average of 7 organic farms
Region: Umbria

Crop	Organic yield t/ha
Emmer	2.4

Reference: Chiorri (1997d)
Data: Farm data, 1996
Methodology: Average of 6 organic farms
Region: Umbria

Crop	Organic yield t/ha
Lentil	0.6

Reference: Petrella (1997b)
Data: Farm data, 1996
Methodology: Average of 9 organic farms
Region: Umbria

Crop	Organic yield t/ha
Sunflower	0.9

NETHERLANDS

Reference: Dutch Farm Accountancy Data Network (Lei-DLO)

Data: Farm data

Methodology: Evaluation of FADN annual bookkeeping, average results.

		Yield t/ha				Yield t/ha	
Crop	Year	Organic	Conv.	Crop	Year	Organic	Conv.
Wheat	∅ 1992-94	6.49	8.91	Onions	∅ 1992-94	37.13	53.16
	1995	6.44	8.87		1995	27.59	43.23
Ware potatoes	∅ 1992-94	34.84	48.23	Seed potatoes	∅ 1992-94	32.40	34.90
Barley	1995	4.46	5.63	Carrots	1995	66.44	67.66
Oats	1995	3.41	5.33	Grain maize	1995	6.38	6.70
Potatoes	1995	29.84	44.42	Sugar beet	1995	63.33	56.34

NORWAY

Reference: Kerner (1994)

Data: Farm data, ∅ 1989-1992

Methodology: Average of 22 organic farms compared with the average of conventional farms

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Wheat	3.8 (2.0-7.2)	5.0	Barley	3.6 (1.2-6.3)	4.4
Rye	3.8 (1.3-5.3)	n. a.	Oats	3.7 (2.3-5.3)	4.6
Potato	25.5 (10.0-55.0)	25.4	Swede	62.8 (11.4-104.2)	n. a.
Carrot	40.5 (8.3-74.5)	36.0			

n.a. = not applicable

Reference: Kolstad (1995)

Data: Farm data

Methodology: Comparison of organic farms with conventional farms based on different sources. The study is based on the study of Kerner, K. N. (1994), information from farmers, conversation with advisors etc.

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Potato	15	19	Carrot	28	36
Onion	24	32	Beetroot	18	22
Cabbage	25	35	Swede	23	32

Reference: Kerner (1993)

Data: Farm data, ∅ 1989-1992

Methodology: Average of 30 farms

	Yield t/ha	
Crop	Organic	Convent.
Green fodder	2 810	3 120

SWEDEN

Reference: Danielsson and Arnesson (1998)

Data: Farm data, ∅ 1996 and 1997

Region: Province of Västra, Götaland

	Yield t/ha	
Crop	Organic	Convent.
Feed grains	4.1	4.24
Ley	5.7	7.20

Reference: Nordlander, personal communication, (1998)

Data: Farm data, ∅ 1994 – 1996

Region: Province of Västra, Götaland

	Yield t/ha	
Crop	Organic	Convent.
Wheat	3.9	6.3
Barley	2.9	4.4
Oats	3.1	4.1
Field peas	2.3	4.0

SWITZERLAND

Reference: Bio Suisse, Forschungsinstitut für biologischen Landbau (FiBL) and Eidg. Forschungsanstalt für Agrarwirtschaft und Landtechnik (FAT) (1996)

Data: Farm data, 1996

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Wheat	4.91	Rye	4.56
Barley	4.57	Oats	5.00
Dinkel	4.21	Grain maize	7.08
Potato	25.25	Soy bean	2.32
Red beets	43.34	Carrot (mechanized)	50.62

Reference: Landwirtschaftliche Beratungszentrale Lindau (LBL), Service Romand de Vulgarisation Agricole (SRVA) and Forschungsinstitut für biologischen Landbau (FiBL) (1997)

Data: Farm data, 1997

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Wheat	4.00	5.5	Rye	4.00	5.5
Barley	4.00	5.5	Oats	4.00	5.0
Dinkel	4.35	4.0	Grain maize	6.50	7.0
Potato	24.5	36.0	Oilseed rape	2.40	2.7
Soy bean	2.30	2.6	Red beets	38.0	47.2
Carrot (mechanized)	38.00	43.9	Apple	26.0	32.0

Reference: FAT (1997b)

Data: Farm data, 1996

	Yield t/ha			Yield t/ha	
Crop	Organic	Convent.	Crop	Organic	Convent.
Wheat	4.93	6.63	Barley	5.05	6.01
Potato	24.50	39.40			

Reference: FAT (1996a)

Data: Farm data, 1995

Crop	Organic yield t/ha	Crop	Organic yield t/ha
Wheat	3.74	Rye	4.07
Barley	3.89	Oats	3.74
Dinkel	3.20	Grain maize	6.64
Potato	18.95	Red beets	35.00
Carrot	43.60		

Reference: FAT (1997a)

Data: Farm data, 1996

	Yield t/ha			Yield t/ha	
Crop	Organic	Conv.	Crop	Organic	Conv.
Wheat	4.9	6.9	Rye	4.3	7.1
Barley	4.6	5.8	Oats	4.8	5.1
Dinkel	4.3	5.2	Potato	26.1	41.2

Annex 2: Literature review on performances in livestock production

BELGIUM

Reference: Ghesquiere (1997)

Data: Farm data, 1996

Methodology: Survey based on 18 organic farms representing nearly 80 % of organic milk production in Wallonia.

Region: Wallonia

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	5 525	5 218
Cows, dairy yield kg/ha main forage area/year	5 441	

DENMARK

Reference: DIAFE (1998)

Data: Farm data, 1996/97

Methodology: Evaluation of farm accounts, average of 34 organic farms and 321 comparable conventional farms.

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	6 355	6 929

Reference: National Institute of Animal Science, Denmark (1991-1997) and Kristensen and Kristensen (1998)

Data: Farm data, ∅ 1990-1993

Methodology: Average of 13 organic farms compared to the average of 18 conventional farms.

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	7 164	7 279

Reference: Jensen, Kristensen and Kristensen (1998)

Data: Farm data, ∅ 1994-1997

Methodology: Average of 4 farms.

Performance measure	Organic
Laying hen, kg eggs/year	15

FINLAND

Reference: Turkki,A.; Vitala, H. (1996)

Data: Farm data, ∅ 1991-1993

Methodology: Average of 16 organic farms compared to the average of 368 conventional farms.

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	6 409	7 127

Reference: AERI (1996, 1997)

Data: Farm data, ∅ 1994-1995

Methodology: Comparison of organic and conventional cattle husbandry farms.

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	7 078	7 552

FRANCE

Reference: Prat (1997)

Data: Farm data, 1997

Methodology: Average of 3 organic farms

Region: Britanny

Performance measure	Organic	Conventional
Cows, dairy yield l/cow/year	6 226	8 000

Annex 2

GERMANY

Reference: BMELF (different years)

Data: Farm data

Methodology: Data from national farm monitoring system, about 100 (95-126) organic farms each year (sample not constant). About 500 (338-766) comparable conventional farms (mainly mixed cereal-grazing livestock farms and dairy farms on sites with similar natural conditions).

Region: Old *Bundeslaender*

Performance measure	Year	Organic	Conventional
Cows, dairy yield	∅1991-1994	3 966.0	4 840.0
kg/cow/year	∅1995-1997	4 332.0	5 487.0
Piglets raised	∅1991-1994	14.6	15.0
per sow and year	∅1995-1997	17.6	16.8

Reference: Schulze Pals (1994) and follow up-study Nieberg (1997)

Data: Farm data

Methodology: Annual survey of 107 farms that converted to organic farming in 1990/91. 1605 conventional farms (15 for each organic farm) for comparison have been selected such that important key characteristics are similar to those of organic farms before conversion. Identical sample of farms each year.

Region: Old *Bundeslaender*, $^2/_3$ of farms are located in less favoured areas.

Performance measure	Year	Organic	Conventional
Cows, dairy yield	1989/90		5 015 (5 210)[1]
kg/cow/year	∅ 1991/92-1992/93	5 095	5 150
	∅ 1992/93-1993/94	5 146	5 376
Cows, dairy yield	1990		9 522 (8 270)[1]
kg per ha main	∅ 1991-1992	6 907	9 610
forage area	∅ 1993-1994	6 736	9 860

1 Yield in brackets refers to yield before conversion of the organic farming group.

Annex 2

Reference: Nieberg (1999)

Data: Farm data

Methodology: Annual survey of 59 farms that converted to organic farming in 1990/91. 885 conventional farms (15 for each organic farm) for comparison have been selected such that important key characteristics are similar to those of organic farms before conversion. Identical sample of farms each year.

Region: Old *Bundeslaender*

Performance measure	Year	Organic	Conventional
Cows, dairy yield	1994/95	5 202	5 499
kg/cow/year	1995/96	5 342	5 568
Cows, dairy yield	1994/95	6 945	10 156
kg per ha main forage area	1995/96	7 349	10 344

Reference: LBA (1997 and 1998)

Data: Farm data, ∅ 1995 –1996

Methodology: Evaluation of farm accounts. Comparison of the average of 64-83 organic farms with the average of more than 3000 conventional farms

Region: Bavaria

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	4 451.0	5 201.0
Piglets raised per sow and year	17.0	17.2

Reference: Zerger (1995)

Data: Farm data, ∅ 1989-1992

Methodology: Evaluation of 111 annual farm balances for the period 1988/89-1991/92 from a total of 60 farms: 57 balance sheets with milk production, 16 with egg production. For about 50 % of farms conversion is less than 2 years ago.

Region: Schleswig-Holstein, Northrhine-Westfalia, Lower Saxony

Performance measure	Organic
Cows, dairy yield kg/cow/year	5 134
Hens, eggs per hen and year	139

Reference: Roeckl (1992)

Data: Farm data, 1990

Methodology: Average of 35 organic farms compared with the average of conventional farms

Region: Hessen

Performance measure	Organic	Conventional
Dairy yield, kg/cow/year	4 500	5 900

GREAT BRITAIN

Reference: Fowler et al (1998)

Data: Farm data, 1995/96

Methodology: Data of 6 organic dairy farms was compared to comparable conventional farms.

Region: England & Wales

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	5 271	5 416

Reference: Keatinge and Elliot (1997)

Data: Experimental farm, 1996

Methodology: Comparison of organic and conventional Dipper flocks.

Region: Hills and uplands.

Performance measure	Organic	Conventional
Lambs reared (%)	133	129

Reference: Younie and Mackie (1993)

Data: Experimental site, ∅ 1988-1992

Methodology: Physical parameters of organic and intensive grasland-based beef production were established in a three-year systems comparison.

Region: Scotland

Performance measure	Organic	Conventional
Beef, daily liveweight gain kg/head	0.84	0.86
Beef, liveweight gain kg/ha	1 481	1 921

ITALY

Reference: Antellini et al. (1993)

Data: Farm data, 1991

Methodology: Average of 149 organic farms. Data of comparable conventional farms in 1990.

Region: Lombardia

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	4 700	5 100

Reference: Ansaloni (1996)

Data: Farm data, 1994

Methodology: Comparison of the average of 7 organic farms with the average of 22 conventional farms.

Region: Emilia Romagna, Marche

Comments: 22 conventional farms are in their first year of conversion

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	3 496 (standard deviation: 1306)	3 280 (standard deviation: 674)

Annex 2

NETHERLANDS

Reference: Dutch Farm Accountancy Data Network (Lei-DLO)

Data: Farm data

Methodology: Evaluation of FADN annual bookkeeping, average results.

Performance measure	Year	Organic	Conventional
Cows, dairy yield kg/cow/year	∅ 1992-94	6 500	6 865
	1995	6 654	6 977
Cows, dairy yield kg/ha main forage area/year	1995	8 951	12 795
Laying hens, eggs/hen/year	1995	248	305

NORWAY

Reference: Strom and Olesen (1997)

Data: Farm data, 11 farms, 1995

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	4 802	6 328

SWEDEN

Reference: Danielsson and Arnesson (1998)

Data: Farm data, 3 farms

Region: Province of Västra, Götaland

Performance measure	Year	Organic	Convent.
Cows, dairy yield kg/cow/year	∅ 1995 and 1996	8 207	8 540
Cows, dairy yield kg/ha main forage area/year	∅ 1996 and 1997	5 700	7 200

SWITZERLAND

Reference: FAT (1997a)

Data: Farm data, 1996

Methodology: Comparison of the average of organic farms with the average of integrated management farms.

Performance measure	Region	Organic	Conventional
Cows, dairy yield kg/ha main forage area/year	average	6 282	7 874
	mountain area	4 362	5 288
	flat land	8 723	11 069

Reference: Bio Suisse, Forschungsinstitut für biologischen Landbau (FiBL) and Eidg. Forschungsanstalt für Agrarwirtschaft und Landtechnik (FAT) (1996)

Data: Farm data, 1996

Performance measure	Organic
Cows, dairy yield kg/ha main forage area/year	6 514

Reference: Landwirtschaftliche Beratungszentrale Lindau (LBL), Service Romand de Vulgarisation Agricole (SRVA) and Forschungsinstitut für biologischen Landbau (FiBL) (1997)

Data: Farm data, 1997

Performance measure	Organic	Conventional
Laying hen, eggs/hen/year	265	265

Reference: FAT (1997b)

Data: Farm data, 1996

Performance measure	Organic	Conventional
Cows, dairy yield kg/cow/year	5 075	5 674

Reference: FAT (1996a)

Data: Farm data, 1995

Performance measure	Organic
Cows, dairy yield kg/ha main forage area/year	7 606

Annex 3: Cost structure of organic and comparable conventional farms

Costs of organic and comparable conventional farms in ECU/ha UAA in 1995/96

GREAT BRITAIN

Farm type	Cropping		Horticulture		Dairy		Cattle and sheep		Mixed	
	Org.	Conv.	Org.	Conv.	Org.	Conv.	Org.	Conv.	Org.	Conv.
No. of farms	6	73	5	56	6	62	12	135	9	97
Total costs[1]	***873***	***1094***	***6488***	***13373***	***1777***	***2240***	***1220***	***1137***	***748***	***1249***
Specific / variable costs[2]	232	352	1259	3149	669	936	325	383	163	453
Seeds & plants	77	63	278	1027	31	26	16	12	28	35
Fertilisers	42	88	148	460	9	16	11	59	15	80
Crop protection	47	107	4	356	4	12	0	14	9	53
Purchased feedingstuffs	12	49	123	0	296	506	149	174	28	157
Overheads / fixed costs[3]	641	742	5228	10223	1107	1304	895	754	585	796
Cost of contract work	26	52	15	79	101	120	46	31	44	51
Maintenance[4]	94	89	322	658	173	173	106	100	62	88
Fuel	20	27	162	286	48	36	28	28	17	26
General farming costs	95	78	575	1327	185	165	138	93	67	88
Wages and salaries	142	167	470	2941	178	267	194	95	157	179
Rent paid	59	28	28	22	89	60	21	40	41	31
Interest paid	30	32	0	0	83	86	11	47	15	40
Depreciation	112	114	283	1043	85	163	59	101	75	120
...Depreciation machinery	86	115	283	704	79	128	106	77	63	100
...Depreciation buildings	16	-1	0	340	32	35	62	23	10	19

Source: Fowler, Lampkin and Midmore (1998)

1 Purchased livestock not included.
2 Total variable costs do not include contract work, but include other categories such as vet&med, homegrown concentrate. The sum therefor is not equal to the items below.
3 Does contain contract charges. The total also includes notional charges for farmers and spouse labour, other unpaid family labour, a rental value for owner occupied farms and a category call land expenses.
4 Machinery and tenant type building expenses only, does not include land lord type building.

Annex 3

Costs of organic and comparable conventional farms in ECU/ha UAA in 1995

THE NETHERLANDS

Farm type	Arable		Outdoor horticulture		Grazing cattle		Mixed cropping	
	Organic	Conv.	Organic	Conv.	Organic	Conv.	Organic	Conv.
No. of farms	7	176	6	9	12	448	5	13
Total costs	***4812***	***2449***	***9112***	***3333***	***2969***	***4027***	***4630***	***5077***
Seeds & plants	681	375	1043	497	58	42	630	521
Fertilisers	110	149	151	180	33	173	43	130
Crop protection	49	269	19	230	0	21	17	282
Purchased feedingstuffs	388	28	0	6	638	1303	211	1454
Cost of contract work	769	277	1999	401	220	235	884	353
Maintenance	274	148	366	182	202	207	216	194
Water, energy	30	4	12	8	20	16	4	58
Other farming overheads	447	199	814	385	375	486	507	396
Wages and salaries	461	83	2049	188	226	50	588	333
Rent paid	465	252	926	205	113	112	284	255
Interest paid	333	178	613	519	460	492	457	445
Depreciation	805	488	1120	533	623	889	788	656
...Depreciation machinery	440	347	629	434	258	289	494	320
...Depreciation buildings	333	116	421	122	268	367	224	257

Source: Dutch Farm Accountancy Data Network (LEI-DLO)

Annex 3

Costs of organic and comparable conventional farms in ECU/ha UAA in 1996

SWITZERLAND

Farm type	Average		Dairy		Mixed	
Region			Mountain area		Flat land	
	Organic	Conv.	Organic	Conv.	Organic	Conv.
No. of farms	75		40		35	
Total costs	***3639***	***3939***	***2630***	***3122***	***4678***	***4773***
Specific / variable costs	***800***	***1193***	***600***	***943***	***1007***	***1448***
Seeds & plants	87	89	12	22	164	158
Fertilisers	15	58	8	19	24	97
Crop protection	5	50	1	8	10	92
Purchased feedingstuffs	263	542	209	512	319	573
Cost of contract work	145	140	89	57	202	226
Overheads / fixed costs	***2839***	***2746***	***2031***	***2179***	***3671***	***3325***
Maintenance	122	116	61	105	185	128
Water, energy	87	99	64	86	112	113
Wages and salaries	406	295	166	177	652	416
Rent paid	135	172	103	119	168	227
Interest paid	248	323	157	260	342	388
Depreciation	878	826	700	714	996	939
...Depreciation machinery	402	427	362	376	443	478
...Depreciation buildings	476	399	338	338	617	462
Other farming overheads	963	915	778	719	1216	1115

Source: FAT (1997a)

Annex 3

Costs of organic and comparable conventional farms in ECU/ha UAA, average of 1995/96 and 1996/97

GERMANY

Farm type	Different farm types	
	Organic	Conv.
No. of farms	115-126	518-736
Total costs	***1647***	***2015***
Variable Costs	***520***	***878***
In crop production	95	183
...Seeds and plants	66	38
...Fertiliser	7	97
...Pesticides	1	37
In livestock production	229	549
...Purchased livestock	54	116
...Purchased feedingstuffs	98	298
In marketing and processing	58	8
Contract work	73	73
Other	65	66
Fixed costs	***1127***	***1137***
Wages and salaries	98	56
Depreciation	317	334
...Depreciation of buildings	66	74
...Depreciation of machinery	195	199
Maintenance	181	188
Insurance	83	93
Rent	112	121
Other general farm expenses	336	344

Source: BMELF (1997 and 1998)

Annex 3

Costs of organic and comparable conventional farms in ECU/ha UAA, third year after conversion (1991-1994)

GREAT BRITAIN

Farm type	Dairy	
	Organic	Conv.
No. of farms	7	176
Total costs	***1295***	***1423***
Total variable costs	***431***	***649***
Seeds & plants	25	31
Fertiliser	24	106
Other crop costs	36	64
Purchased concentrates	211	282
Home grown concentrates	16	22
Other feed	23	20
Vet & med	45	44
Other	58	79
Total fixed costs	***864***	***774***
Paid regular labour	280	251
Casual labour	4	15
Contract work & leasing	101	45
Machinery repairs and insurance	79	77
Fuel	29	33
Machinery & equipment depr.	49	121
General farming expenses	142	128
Rents & rates	140	65
Other land charges	41	38

Source: Haggar and Padel (1996)

Annex 3

Costs of organic and comparable conventional farms in ECU/ha UAA in 1996/97

DENMARK

Farm type	Arable		Dairy	
	Organic	Conv.	Organic	Conv.
No. of farms	26	230	34	321
Total costs	***1576***	***1489***	***2171***	***2136***
Seeds	109	94	78	54
Fertilizers	12	107	8	82
Plant protection	0	84	0	41
Purchased feedingstuffs	152	116	565	710
Energy	58	57	75	69
Maintenance	200	182	230	192
Services	417	391	506	472
Depreciation	283	285	340	315
Wages + salaries	314	130	337	173
Other	32	41	32	29

Source: Based on DIAFE (1998), in-conversion farms excluded

Costs of organic and comparable conventional farms in ECU/ha UAA, average of 1994 and 1995

FINLAND

Farm type	Arable		Dairy	
	Organic	Conv.	Organic	Conv.
No. of farms	5-6	67-72	10-16	128-161
Total costs	***1169***	***1288***	***2116***	***2810***
Wages + salaries	4	21	53	39

Source: AERI (1996, 1997)

Costs of organic and comparable conventional farms in ECU/ha UAA

ITALY

Farm type	Different farm types		Dairy		Mixed	
Region	Marche		Emilia Romagna		Umbria	
Year	∅ 1994-1995		1995		∅ 1992-1994	
	Organic	Conv.	Organic	Conv.	Organic	Conv.
No. of farms	7	28	33	38	19	407
Total costs	1002	1035	1999	2418	2218	1253
Specific / variable costs	393	615	1633	1871	582	835
Overheads / fixed costs	609	420	366	547	1636	418

Sources: Zanoli, Fiorani and Gambelli (1998) for Marche, Salghetti (1997) for Emilia Romagna, Santucci and Chiorri (1996) for Umbria

Annex 4: Overview of price premia for important products

Average farm gate prices and premia for organically produced wheat

	Year	Source	Price for organic product in ECU/t A	Price for conventional product[1] in ECU/t B	Premia % =(A-B)/B*100
Austria	1997	Eder and Henöckl-Zehetner (1998)	307	107	186
	1997	Expert information	326-354	*107*-159	123-203
Belgium	1996	Coppens (1998)	242	142	70
	1996	Ghesquiere (1996)	267	132	102
Denmark	1996	Jensen, Kristensen and Kristensen (1998)	270	*132*	105
Finland	1997	Expert information	281	*150*	88
	1993-95	Gaillard, David and Gautronneau (1996)	278	137	103
France	1997	Antoine (1997)	250	129	94
	1996	Calmejeane (1996)	270	*133*	103
	1994/95	BMELF (1996)	487	142	242
	1995/96	BMELF (1997)	406	136	199
Germany	1996/97	BMELF (1998)	410	133	209
	1995	Nieberg (1998a)	369	138	168
	1996	Nieberg (1998a)	278	135	107
Greece	1996	Expert information	206	153	100
Ireland	1997	Expert information	201	*99*	103
Italy	1995	Zanoli, Fiorani, Gambelli (1998)	188	157	20
	1995	Zanoli, Fiorani, Gambelli (1998)[2]	215	188	14
Luxembourg	1997	Expert information	370	141	163

Average farm gate prices and premia for organically produced wheat (cont.)

	Year	Source	Price for organic product in ECU/t A	Price for conventional product[1] in ECU/t B	Premia % =(A-B)/B*100
Netherlands	1995	Dutch FADN	262	151	74
Spain	1994-96	FANEGA (1994-1996)	373	*168*	123
Sweden	1997	Eco Trade (1997)	201	123	64
	1994	Cormack and Elliot (1994-1997)	256	141	81
Great Britain	1995	Cormack and Elliot (1994-1997)	235	133	77
	1996	Cormack and Elliot (1994-1997)	247	121	104
	1993-96	Cormack and Elliot (1994-1997)	248	131	89
Norway	1997	Producer organisation for trading of organic food	436	287	52
Switzerland	1995	LBL, SRVA, FiBL (1997)	860	563	53
Czech Rep	1996	Ing. MADA (1997)	127	116	10

1 Figures in italics: Conventional price as given by Eurostat
2 Durum wheat

Annex 4

Average farm gate prices and premia for organically produced potatoes

	Year	Source	Price for organic product in ECU/t A	Price for conventional product[1] in ECU/t B	Premia % =(A-B)/B*100
Austria	1997	Eder and Henöckl-Zehetner (1998)	326	*78*	317
	1997	Expert information	289-311	*78*-101	207-270
	1997	Expert information[2]	234-296	*44*	531-672
Belgium	1996	Coppens (1998)	382	*44*	762
	1995	Ghesquiere (1996)	259	73	256
Denmark	1996	Jensen, Kristensen and Kristensen (1998)	256	*189*	36
Finland	1997/98	Expert information[2]	340-800	*180*	189-444
	1994/95	BMELF (1996)	347	133	161
	1995/96	BMELF (1997)	325	112	191
Germany	1996/97	BMELF (1998)	318	89	259
	1995	Nieberg (1998a)	522	104	401
	1996	Nieberg (1998a)	377	79	380
Greece	1996	Expert information	322-377	208-243	50-60
Ireland	1997	Expert information	187		
Italy	1997	Expert information	622	415	50
Luxembourg	1997	Expert information	493	192	156
Netherlands	1997	Spigt and Janssen (1997)	213	*72*	196
	1995	Dutch FADN	215	105	105
Portugal	1997	Expert information	554	*134*	315
Spain	1994-96	FANEGA (1994-1996)	684	*138*	395
Sweden	1997	Eco Trade (1997)	324	197	65
	1994	Cormack and Elliot (1994-1997)	404	308	31
	1995	Cormack and Elliot (1994-1997)	361	139	161

Average farm gate prices and premia for organically produced potatoes (cont.)

	Year	Source	Price for organic product in ECU/t A	Price for conventional product[1] in ECU/t B	Premia % =(A-B)/B*100
Great Britain	1996	Cormack and Elliot (1994-1997)	216	25	775
	1993-96	Cormack and Elliot (1994-1997)	283	133	113
	1995/96	UWA (1994-1996)	427	242	77
Norway	1997	Producer organisation for trading of organic food	468	249	88
Switzerland	1995	LBL, SRVA, FiBL (1997)	459	285	61
	1996	LBL, SRVA, FiBL (1997)[2]	478	319	50
	1996	FAT (1997a)	360		
Czech Rep	1996	Ing. MADA (1997)	98	152	-36

[1] Figures in italics: Conventional price as given by Eurostat [2] Price at wholesale

Annex 4

Average farm gate prices and premia for organically produced milk

	Year	Source	Price for organic product in ECU/kg A	Price for conventional product[1] in ECU/kg B	Premia % =(A-B)/B*100
Austria	1997	Eder and Henöckl-Zehetner (1998)	0.33	0.27	21
	1997	Expert information	.	.	20
Belgium	1996	Ghesquiere (1997)	0.36	0.31	14
Denmark	1996	Jensen, Kristensen and Kristensen (1998)	0.42	0.31	36
	1996/97	DIAFE (1998)	0.41	*0.32*	27
Finland	1997	Expert information	0.37	0.33	10
France	1997	Expert information	.	.	20
	1994/95	BMELF (1996)	0.36	*0.32*	13
Germany	1995/96	BMELF (1997)	0.35	0.30	15
	1996/97	BMELF (1998)	0.34	0.30	13
	1993/94	Nieberg (1997)	0.36	0.35	5
Ireland	1997	Expert information	0.37	0.37	0
Italy	1998	Expert information	0.41	0.37	11
Luxembourg	1997	Expert information	0.36	0.28	27
Netherlands	1995	Dutch FADN	0.41	0.36	13
Sweden	1997	Eco Trade (1997)	0.39	0.35	13
Great Britain	1995/96	UWA (1994-1996)[2]	0.34	0.30	11
	1996/97	UWA (1994-1996)	0.37	0.29	26
Norway	1997	Producer organisation for trading of organic food	0.45	0.37	20
Switzerland	1995	LBL, SRVA, FiBL (1997)	0.67	*0.62*	8
Czech Rep	1996	Ing. MADA (1997)	0.25	0.21	21

1 Figures in italics: Conventional price as given by Eurostat, raw cows' milk, 3.7 % fat content
2 Comparable conventional price taken from MAFF (1997)

Annex 4

Average farm gate prices and premia for organically produced beef

	Year	Source	Price for organic product in ECU/kg A	Price for conventional product[1] in ECU/kg B	Premia % =(A-B)/B*100
Austria	1997	Eder and Henöckl-Zehetner (1998)	4.34		
	1997	Expert information	3.33	2.56	30
Belgium	1997	Agreement on beef prices	4.19-5.67		
Finland	1997	Expert information	3.23		
France	1997	Expert information			20
Germany	1994	Nieberg (1997)	2.51	1.97	27
Ireland	1997	Expert information	3.29	2.53	30
Italy	1997	Expert information	5.70	2.72	110
Sweden	1997	Eco Trade (1997)	2.53-3.22	2.53	0-27
Great Britain	1995	Lampkin (1997b)			0-75
Norway	1997	Producer organisation for trading of organic food	4.12	3.74	10
Switzerland	1996	LBL, SRVA, FiBL (1997)	6.00	4.85	24
Czech Rep	1996	Ing. MADA (1997)	1.04	1.05	0

[1] No prices were supplemented from Eurostat, because of the high price variations depending on beef quality

Annex 4

Average farm gate prices and premia for organically produced pork

	Year	Source	Price for organic product in ECU/kg A	Price for conventional product[1] in ECU/kg B	Premia % =(A-B)/B*100
Austria	1997	Eder and Henöckl-Zehetner (1998)	2.10	*1.39*	51
	1997	Expert information	2.13-2.24	1.27-*1.39*	62-69
	1996	Jensen, Kristensen and Kristensen (1998)	2.58	1.45	78
Denmark[2]	1995	Jensen, Kristensen and Kristensen (1998)	2.31	1.32	75
	1994	Jensen, Kristensen and Kristensen (1998)	1.81	1.35	34
Finland	1997	Expert information	2.28	*1.44*	58
Germany	1994	Nieberg (1997)	2.02	1.17	73
Sweden	1997	Eco Trade (1997)	1.21-2.31	1.44	-16 - 60
Great Britain	1995	Lampkin (1997b)			0-40
Switzerland	1995	LBL, SRVA, FiBL (1997)	2.91	2.24	30
Czech Rep	1996	Ing. MADA (1997)	1.16	1.03	13

1 Figures in italics: Conventional price as given by Eurostat, average of price for grade I and grade II pig carcasses

2 Price for sales to processors

Average farm gate prices and premia for organically produced eggs

	Year	Source	Price per	Price for organic product in ECU A	Price for conventional product[1] in ECU B	Premia % =(A-B)/B*100
Austria	1997	Eder and Henöckl-Zehetner (1998)	1000 eggs	131		
	1997	Expert information	1000 eggs	159-166	80	109
Denmark	1996	Jensen, Kristensen and Kristensen (1998)	1000 eggs	118		
	1996	Jensen, Kristensen and Kristensen (1998)	kg	1.76		
Germany	1993/94	Nieberg (1997)	1000 eggs	172	121	42
Ireland	1997	Expert information	1000 eggs	223		
Italy	1997	Expert information	1000 eggs	155	88	76
Netherlands	1995	Dutch FADN	1000 eggs	1.58	0.56	182
Sweden	1997	Eco Trade (1997)	kg	2.08	0.87	140
Great Britain	1995	Lampkin (1997b)[2]				35-50
Norway	1997	Producer organisation for trading of organic food	kg	2.49	1.31	90
Switzerland	1995	LBL, SRVA, FiBL (1997)	1000 eggs	323	246	32

1 No prices were supplemented from Eurostat, because they refer mostly to industrially produced eggs
2 Compared to price for free-range eggs

Annex 5: Labour use on organic farms and comparable conventional farms

AUSTRIA

				AWU / per 100 ha UAA			FWU / per 100 ha UAA		
Reference	Farm type	Year of observation	No of farms in sample	Organic farms	Comp. conv. farms	%[1]	Organic farms	Comp. conv. farms	%[1]
Schneeberger (1995)	average of different farm types	1993	124	11.40			11.23		
BMLF (1995)	average of different farm types	1994	168				11.31		
BMLF (1996)	average of different farm types	1995	240				10.27		
BMLF (1997)	average of different farm types	1996	348				10.22		
Schneeberger (1995)	>40 % of standard gross margin from cropping	1993	36	12.40	13.70	***91***	11.78	13.68	***86***
BMLF (1995)	>40 % of standard gross margin from cropping	1994	26				12.93	12.51	***103***
BMLF (1996)	>40 % of standard gross margin from cropping	1995	27				9.15	8.23	***111***
BMLF (1997)	>40 % of standard gross margin from cropping	1996	27				9.37	11.72	***80***

[1] as a percentage of comparable conventional farms

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DENMARK

					AWU / per 100 ha UAA				FWU / per 100 ha UAA		
Reference	Farm type	Year of observation	No of farms in sample		Organic farms	Comp. conv. farms[2]	%[1]		Organic farms	Comp. conv. farms	%[1]
Østergaard and Nielsen (1994)	dairy	1989-1993	12	h/ha	4.40						
Dubgaard (1994)	average of different farm types	1988	36	h/ha	6.18	3.41	***181***				
DIAFE (1998)	average of different farm types	1996/97	80	h/ha	61.9	*(54.0)*	***(115)***	h/ha	40.3	*(39)*	***(103)***
DIAFE (1998)	average of arable and dairy farms	1996/97	60	h/ha	65.2	62.0	***105***	h/ha	39.0	47.9	***81***
DIAFE (1998)	arable	1996/97	26	h/ha	72.6	58.7	***124***	h/ha	47.7	47.4	***101***
DIAFE (1998)	dairy	1996/97	34	h/ha	61.5	63.5	***97***	h/ha	34.6	48.1	***72***

[1] as a percentage of comparable conventional farms [2] Figures in brackets refer to comparisons with ***all*** conventional farms (as opposed to comparable conventional farms).

FINLAND

					AWU / per 100 ha UAA				FWU / per 100 ha UAA		
Reference	Farm type	Year of observation	No of farms in sample		Organic farms	Comp. conv. farms	%[1]		Organic farms	Comp. conv. farms	%[1]
Expert estimate	arable				64	60	***107***				
Expert estimate	dairy				124	156	***79***				
AERI (1997)	arable	1995	6	h/ha	54	48	***113***				
AERI (1997)	dairy	1995	16	h/ha	116	137	***85***				
AERI (1997)	average of different farm types	1995	22	h/ha	99	112	***89***	h/ha	94	107	***88***

[1] as a percentage of comparable conventional farms

FRANCE

				AWU / per 100 ha UAA			FWU / per 100 ha UAA		
Reference	**Farm type**	**Year of observation**	**No of farms in sample**	**Organic farms**	**Comp. conv. farms**	**%** [1]	**Organic farms**	**Comp. conv. farms**	**%** [1]
CDER (1991)	arable	1985-1989	4	1.88					
FNAB (1998)	horticulture	1997	n.a.	118.00	38.00	***311***			
FNAB (1998)	dairy	1997	n.a.	3.60	4.40	***82***			
FNAB (1998)	grazing livestock (bovine)	1997	n.a.	3.10	5.10	***61***			
FNAB (1998)	grazing livestock (sheep)	1997	n.a.	5.60	4.80	***117***			
Expert estimate	average of different farm types					***120-130***			

1 as a percentage of comparable conventional farms
na = not applicable

GERMANY

				AWU / per 100 ha UAA			FWU / per 100 ha UAA		
Reference	**Farm type**	**Year of observation**	**No of farms in sample**	**Organic farms**	**Comp. conv. farms**[2]	**%** [1]	**Organic farms**	**Comp. conv. farms**	**%** [1]
BMELF (1992)	average of different farm types	1990/91	95	5.45	4.33	***126***	4.01	4.02	***100***
BMELF (1993)	average of different farm types	1991/92	100	5.36	4.49	***119***	4.05	4.18	***97***
BMELF (1994)	average of different farm types	1992/93	101	4.99	4.47	***112***	3.95	4.22	***94***
BMELF (1995)	average of different farm types	1993/94	112	4.83	4.35	***111***	3.83	4.13	***93***
BMELF (1996)	average of different farm types	1994/95	123	4.68	4.52	***104***	3.95	4.19	***94***
BMELF (1997)	average of different farm types	1995/96	115	4.02	3.84	***105***	3.22	3.43	***94***
BMELF (1998)	average of different farm types	1996/97	126	3.60	3.53	***102***	2.90	3.14	***92***

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GERMANY (CONT.)

Reference	Farm type	Year of observation	No of farms in sample	AWU / per 100 ha UAA Organic farms	AWU / per 100 ha UAA Comp. conv. farms[2]	AWU / per 100 ha UAA %[1]	FWU / per 100 ha UAA Organic farms	FWU / per 100 ha UAA Comp. conv. farms	FWU / per 100 ha UAA %[1]
LBA (1997)	average of different farm types	1995/96	64	4.26	*(4.04)*	***(105)***			
LBA (1998)	average of different farm types	1996/97	83	4.45	*(3.97)*	***(112)***			
Landwirtschaftskammer Westfalen-Lippe (1998)	average of different farm types	1996/97	18	3.23	*(3.24)*	***(100)***			
Nieberg (1997)	average of different farm types	1992/93	107	3.48	3.14	***111***	2.83	2.94	***96***
Nieberg (1997)	average of different farm types	1993/94	107	3.56	3.03	***118***	2.77	2.86	***97***
Zerger (1995)	average of different farm types	1988/89-1991/92	60	4.77					
Nieberg (1997)	arable	1992/93	39	2.50	2.29	***109***	1.61	2.05	***79***
Nieberg (1997)	arable	1993/94	39	2.63	2.21	***119***	1.60	2.01	***80***
Zerger (1995)	arable	1988/89-1991/92	23	3.74					
Nieberg (1997)	grazing livestock	1992/93	61	4.38	3.86	***113***	3.97	3.71	***107***
Nieberg (1997)	grazing livestock	1993/94	61	4.47	3.73	***120***	3.89	3.58	***109***
Zerger (1995)	grazing livestock	1988/89-1991/92	37	5.39					
Nieberg (1997)	pig+poultry	1992/93	5	4.15	4.25	***98***	3.06	3.94	***78***
Nieberg (1997)	pig+poultry	1993/94	5	4.10	3.92	***105***	3.26	3.64	***90***

[1] as a percentage of comparable conventional farms [2] Figures in brackets refer to comparisons with ***all*** conventional farms (as opposed to comparable conventional farms).

GREAT BRITAIN

Reference	Farm type	Year of observation	No of farms in sample	AWU / per 100 ha UAA Organic farms	AWU / per 100 ha UAA Comp. conv. farms	AWU / per 100 ha UAA % [1]	FWU / per 100 ha UAA Organic farms	FWU / per 100 ha UAA Comp. conv. farms	FWU / per 100 ha UAA % [1]
Haggar and Padel (1996)	dairy	3rd year after conversion	10	2.13					
Haggar and Padel (1996)	dairy	4th year after conversion	10	1.89					

[1] as a percentage of comparable conventional farms

LUXEMBOURG

Reference	Farm type	Year of observation	No of farms in sample	AWU / per 100 ha UAA Organic farms	AWU / per 100 ha UAA Comp. conv. farms	AWU / per 100 ha UAA % [1]	FWU / per 100 ha UAA Organic farms	FWU / per 100 ha UAA Comp. conv. farms	FWU / per 100 ha UAA % [1]
Expert estimate	horticulture			150.00					
Expert estimate	arable			1.00					
Expert estimate	dairy			5.00					
Expert estimate	grazing livestock			3.00					
Expert estimate	mixed			3.00					
Expert estimate	mixed livestock-cropping			7.00					
Expert estimate	viniculture			50.00					
Expert estimate	average of different farm types					***120-130***			
Expert estimate	mixed livestock-cropping		1996	4.55	2.26	***201***			

[1] as a percentage of comparable conventional farms

ITALY

Reference	Farm type	Year of observation	No of farms in sample	AWU / per 100 ha UAA			FWU / per 100 ha UAA		
				Organic farms	Comp. conv. farms	% [1]	Organic farms	Comp. conv. farms	% [1]
Chiorri and Santucci (1997)	average of different farm types	1996	30	3.90					
Salghetti (1997)	dairy	1995	33	6.00	7.12	***84***	3.23	6.03	***54***
Zanoli, Fiorani and Gambelli (1998)	average of different farm types	1994	28	6.86	7.63	***90***	6.17	7.35	***84***
Zanoli, Fiorani and Gambelli (1998)	average of different farm types	1995	28	6.42	7.09	***91***	5.73	7.13	***80***
Zanoli, Fiorani and Gambelli (1998)	average of different farm types	1996	28	6.64			5.93		
Mastronardi and Scardera (1996)	average of different farm types	1993/1994	46	9.12					
Piani (1995)	average of different farm types	1995	30	25.22					
Cerasola and Marino (1995)	average of different farm types	n.a.	92	15.00	7.00	***214***	11.70		
Salghetti (1997)	average of different farm types	1995	90	6.79			4.57		
Santucci and Chiorri (1996)	average of different farm types	average 1992/93/94	19	5.96	9.86	***60***	3.80	8.00	***48***
Zanoli and Fiorani (1997), as quoted in Marino et al (1997)	average of different farm types	average 1994/95	28	10.75	12.80	***84***			

[1] as a percentage of comparable conventional farms

NETHERLANDS

Reference	Farm type	Year of observation	No of farms in sample	AWU / per 100 ha UAA Organic farms	Comp. conv. farms	% [1]	FWU / per 100 ha UAA Organic farms	Comp. conv. farms	% [1]
Dutch FADN	arable	1995	7	6.51	2.69	***242***	4.12	2.38	***173***
Dutch FADN	horticulture	1995	6	16.71	6.16	***271***	6.05	4.94	***122***
Dutch FADN	grazing livestock	1995	12	4.64	5.48	***85***	3.57	5.20	***69***
Dutch FADN	mixed cropping	1995	5	8.98	4.79	***187***	5.33	3.41	***156***
Dutch FADN	all	1995	30	7.10	4.53	***157***	4.24	3.88	***110***
Dutch FADN	arable+vegetable	1993	13	11.98	7.74	***155***	6.62	4.81	***138***
Dutch FADN	arable+vegetable	1996	13	16.35	14.15	***116***	8.39	7.86	***107***

[1] as a percentage of comparable conventional farms

SWITZERLAND

Reference	Farm type	Year of observation	No of farms in sample	AWU / per 100 ha UAA Organic farms	AWU / per 100 ha UAA Comp. conv. farms	AWU % [1]	FWU / per 100 ha UAA Organic farms	FWU / per 100 ha UAA Comp. conv. farms	FWU % [1]
Mühlebach and Mühlebach (1994)	average of different farm types	1989/1991	34	16.33	13.53	***121***			
FAT (1992a)	average of different farm types	1990	n.a.	16.00	12.67	***126***			
FAT (1992b)	average of different farm types	1991	n.a.	14.00	12.00	***117***			
FAT (1994)	average of different farm types	1992	n.a.	13.00	11.67	***111***			
FAT (1995)	average of different farm types	1993	n.a.	13.67	10.33	***132***			
FAT (1996b)	average of different farm types	1994	n.a.	11.10	9.57	***116***			
FAT (1996c)	average of different farm types	1995	n.a.	10.60	9.16	***116***			
FAT (1997a)	average of different farm types	1996	75	9.90	8.97	***110***			
FAT (1997a)	dairy	1996	40	8.10	8.10	***100***			
FAT (1997a)	mixed	1996	35	11.30	9.90	***114***			

[1] as a percentage of comparable conventional farms

Annex 6: Profits of organic and comparable conventional farms

AUSTRIA

				Profit in ECU per ha UAA			Profit in ECU per FWU		
Reference	Farm type	Year of observation	No of farms in sample	Organic farms	Comp. conv. farms	% [1]	Organic farms	Comp. conv. farms	% [1]
BMLF (1995)	average of different farm types	1994	168	1138			10061		
BMLF (1995)	>40 % of standard gross margin from cropping	1994	26	1181	1208	***98***	9136	9655	***95***
BMLF (1996)	average of different farm types	1995	240	1361			13252		
BMLF (1996)	>40 % of standard gross margin from cropping	1995	27	1223	1135	***108***	13364	13792	***97***
BMLF (1997)	average of different farm types	1996	348	1290			12241		
BMLF (1997)	>40 % of standard gross margin from cropping	1996	27	1129	1239	***91***	12051	10573	***114***

[1] as a percentage of comparable conventional farms

DENMARK

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms[2]	%[1]	Profit in ECU per FWU (Per hour): Organic farms	Profit in ECU per FWU (Per hour): Comp. conv. farms	%[1]
DIAFE (1998)	all farms	1996/97	80	665	*(818)*	***(81)***	16.50	*(20.95)*	***(79)***
DIAFE (1998)	average of arable and dairy farms	1996/97	60	728	768	***95***	18.69	16.03	***117***
DIAFE (1998)	arable	1996/97	26	497	376	***132***	10.42	7.94	***131***
DIAFE (1998)	dairy	1996/97	34	843	949	***89***	24.34	19.73	***123***

[1] as a percentage of comparable conventional farms [2] Figures in brackets refer to comparisons with ***all*** conventional farms (as opposed to comparable conventional farms).

FINLAND

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms	%[1]	Profit in ECU per FWU (Per hour): Organic farms	Profit in ECU per FWU (Per hour): Comp. conv. farms	%[1]
AERI (1996)	average of different farm types	1995	22	671	807	***83***	7.12	7.55	***94***
AERI (1996)	arable	1994	5	399	510	***78***			
AERI (1997)	arable	1995	6	412	475	***87***	7.63	10.55	***72***
Expert estimate	arable	1996		316	373	***85***			
AERI (1996)	dairy	1994	10	787	1089	***72***			
AERI (1997)	dairy	1995	16	766	937	***82***	7.02	7.15	***98***
Expert estimate	dairy	1996		636	789	***81***			

[1] as a percentage of comparable conventional farms

FRANCE

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms	%[1]	Profit in ECU per FWU: Organic farms	Profit in ECU per FWU: Comp. conv. farms	%[1]
Trouilloud (1990)	average of different farm types	1988	2	601					
Trouilloud (1990)	average of different farm types	1990	3	400					

[1] as a percentage of comparable conventional farms

GERMANY

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms[2]	%[1]	Profit in ECU per FWU: Organic farms	Profit in ECU per FWU: Comp. conv. farms	%[1]
BMELF (1994)	average of different farm types	1992/93	101	627	581	***108***	15866	13774	***115***
BMELF (1995)	average of different farm types	1993/94	112	587	562	***105***	15321	13589	***113***
BMELF (1996)	average of different farm types	1994/95	123	706	655	***108***	17786	15605	***114***
BMELF (1997)	average of different farm types	1995/96	115	637	585	***109***	19754	17060	***116***
BMELF (1998)	average of different farm types	1996/97	126	547	514	***106***	18862	16366	***115***
LBA (1997)	average of different farm types	1995/96	64	660	673	***98***	17548	18298	***96***
LBA (1998)	average of different farm types	1996/97	83	696	667	***104***	17235	18525	***93***
Landwirtschaftskammer Westfalen-Lippe (1998)	average of different farm types	1996/97	18	323	*(559)*	***(58)***	16293	*(20857)*	***(78)***
Nieberg (1997)	average of different farm types	1992/93	107	575	465	***124***	20148	15791	***128***
Nieberg (1997)	average of different farm types	1993/94	107	598	356	***168***	21341	12466	***171***
Nieberg (1999)	average of different farm types	1994/95	58	732	383	***191***	28453	15459	***184***

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GERMANY (CONT.)

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA			Profit in ECU per FWU		
				Organic farms	Comp. conv. farms[2]	%[1]	Organic farms	Comp. conv. farms	%[1]
Nieberg (1999)	average of different farm types	1995/96	58	651	403	***161***	26825	16603	***162***
Zerger (1995)	average of different farm types	1988/89	24	394			16845		
Zerger (1995)	average of different farm types	1989/90	35	448			19795		
Zerger (1995)	average of different farm types	1990/91	32	387			15140		
Zerger (1995)	average of different farm types	1991/92	20	404			16956		
Zerger (1995)	average of different farm types	ϕ 1988-1992	60	411			17347		
Nieberg (1997)	arable	1992/93	39	571	388	***147***	34893	18905	***185***
Nieberg (1997)	arable	1993/94	39	553	304	***182***	34116	15152	***225***
Nieberg (1999)	arable	1994/95	22	1452	645	***225***	100806	39249	***257***
Nieberg (1999)	arable	1995/96	22	1292	711	***182***	96776	44320	***218***
Köhne and Köhn (1998)	arable	1995	4	589					
Köhne and Köhn (1998)	arable	1996	4	642			52081		
Zerger (1995)	arable	1988/89	ca. 12	175			10724		
Zerger (1995)	arable	1989/90	ca. 17	381			21955		
Zerger (1995)	arable	1990/91	ca. 16	376			14413		
Zerger (1995)	arable	1991/92	ca. 10	295			14706		
Zerger (1995)	arable	ϕ 1988-1992	23	332			16385		
Stolze (1998)	arable	1994	6	554	254	***218***	220078	66216	***332***

GERMANY (CONT.)

				Profit in ECU per ha UAA			Profit in ECU per FWU		
Reference	Farm type	Year of observation	No of farms in sample	Organic farms	Comp. conv. farms[2]	% [1]	Organic farms	Comp. conv. farms	% [1]
Stolze (1998)	dairy	1994	10	182	198	***91***	35352	26183	***135***
Nieberg (1997)	grazing livestock (mainly dairy)	1992/93	61	563	540	***104***	14170	14543	***97***
Nieberg (1997)	grazing livestock (mainly dairy)	1993/94	61	594	429	***139***	15273	11965	***128***
Nieberg (1999)	grazing livestock (mainly dairy)	1994/95	32	1313	855	***154***	32528	25904	***126***
Nieberg (1999)	grazing livestock (mainly dairy)	1995/96	32	1119	808	***138***	30060	24983	***120***
Köhne and Köhn (1998)	grazing livestock	1995	6	433					
Köhne and Köhn (1998)	grazing livestock	1996	6	325			36630		
Zerger (1995)	grazing livestock	1988/89	app. 12	484			19365		
Zerger (1995)	grazing livestock	1989/90	app. 17	516			17636		
Zerger (1995)	grazing livestock	1990/91	app. 16	401			16090		
Zerger (1995)	grazing livestock	1991/92	app. 10	606			21134		
Zerger (1995)	grazing livestock	ϕ 1988-1992	36	491			18310		
Nieberg (1997)	pigs and poultry	1992/93	5	671	452	***148***	21958	12040	***182***
Nieberg (1997)	pigs and poultry	1993/94	5	1084	142	***761***	33380	4115	***811***

[1] as a percentage of comparable conventional farms [2] Figures in brackets refer to comparisons with ***all*** conventional farms (as opposed to comparable conventional farms).

GREAT BRITAIN

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms	% [1]	Profit in ECU per FWU: Organic farms	Profit in ECU per FWU: Comp. conv. farms	% [1]
Fowler, Lampkin and Midmore (1998)	average of different farm types	1995/96	38 NFI:	306	362	***84***			
Fowler, Lampkin and Midmore (1998)	average of different farm types	1995/96	38 ONI:	345	424	***81***			
Murphy (1992)	average of different farm types	1989	117	58					
Fowler, Lampkin and Midmore (1998)	arable	1995/96	6 NFI:	428	324	***132***			
Fowler, Lampkin and Midmore (1998)	arable	1995/96	6 ONI:	473	422	***112***			
Murphy (1992)	arable	1989	8	-179					
Fowler, Lampkin and Midmore (1998)	dairy	1995/96	6 NFI:	659	661	***100***			
Fowler, Lampkin and Midmore (1998)	dairy	1995/96	6 ONI:	576	672	***86***			
Haggar and Padel (1996)	dairy	3rd year after conversion	10 ONI:	145					
Haggar and Padel (1996)	dairy	3rd year after conversion	10 NFI:	313	497	***63***			
Haggar and Padel (1996)	dairy	3rd year after conversion	10 MII:	183	377	***49***			
Haggar and Padel (1996)	dairy	4th year after conversion	10	219					

GREAT BRITAIN (CONT.)

					Profit in ECU per ha UAA			Profit in ECU per FWU		
Reference	**Farm type**	**Year of observation**	**No of farms in sample**		**Organic farms**	**Comp. conv. farms**	**%** [1]	**Organic farms**	**Comp. conv. farms**	**%** [1]
Haggar and Padel (1996)	dairy	4th year after conversion	10	NFI:	347					
Haggar and Padel (1996)	dairy	4th year after conversion	10	MII:	190					
Murphy (1992)	dairy	1989	8		124					
Lampkin and Batemen (1993)	mainly dairy (Wales)	1989	6		470					
Lampkin and Batemen (1993)	mainly dairy (Wales)	1989	6	NFI:	606	273	***222***			
Fowler, Lampkin and Midmore (1998)	horticulture	1995/96	5	NFI:	1696	2994	***57***			
Fowler, Lampkin and Midmore (1998)	horticulture	1995/96	5	ONI:	1806	3093	***58***			
Murphy (1992)	horticulture	1989	61	NFI:	310					
Fowler, Lampkin and Midmore (1998)	grazing livestock	1995/96	12	NFI:	-60	227				
Fowler, Lampkin and Midmore (1998)	grazing livestock	1995/96	12	ONI:	10	241	***4***			
Lampkin and Batemen (1993)	grazing livestock	1989	5		-48	0				
Lampkin and Batemen (1993)	grazing livestock	1989	5	NFI:	109	48	***228***			

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GREAT BRITAIN (CONT.)

				Profit in ECU per ha UAA			Profit in ECU per FWU		
Reference	**Farm type**	**Year of observation**	**No of farms in sample**	**Organic farms**	**Comp. conv. farms**	**% [1]**	**Organic farms**	**Comp. conv. farms**	**% [1]**
Fowler, Lampkin and Midmore (1998)	mixed farms	1995/96	9 NFI:	245	333	***74***			
Fowler, Lampkin and Midmore (1998)	mixed farms	1995/96	9 ONI:	296	402	***74***			
Murphy (1992)	mixed farms	1989	39	42	0				

[1] as a percentage of comparable conventional farms

THE NETHERLANDS

				Profit in ECU per ha UAA			Profit in ECU per FWU		
Reference	**Farm type**	**Year of observation**	**No of farms in sample**	**Organic farms**	**Comp. conv. farms**	**% [1]**	**Organic farms**	**Comp. conv. farms**	**% [1]**
Dutch FADN	average of different farm types	1995	30	1744	1187	***147***	41089	30630	***134***
Dutch FADN	arable	1995	7	1931	1006	***192***	46859	42327	***111***
Dutch FADN	dairy	1995	12	1356	1481	***92***	38010	28505	***133***
Dutch FADN	horticulture	1995	6	3657	784	***466***	60472	15872	***381***
Dutch FADN	mixed farms	1995	5	1235	1303	***95***	23169	38234	***61***

[1] as a percentage of comparable conventional farms

ITALY

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms	% [1]	Profit in ECU per FWU: Organic farms	Profit in ECU per FWU: Comp. conv. farms	% [1]
Zanoli, Fiorani and Gambelli (1998)	average of different farm types	1994	28	502	405	***124***	8139	5511	***148***
Zanoli, Fiorani and Gambelli (1998)	average of different farm types	1995	28	654	544	***120***	11412	7631	***150***
Zanoli, Fiorani and Gambelli (1998)	average of different farm types	1996	28	720			12146		
Chiorri and Santucci (1997)	average of different farm types	1996	30	525			23136		
Zonin (1996)	average of different farm types	1990	47	2980					
Zonin (1996)	average of different farm types	1990	12	3135					
Piani (1995)	average of different farm types	1990	30	2642					
Salghetti (1997)	dairy	1995	33	1412	2898	***49***	30193	48040	***63***
Santucci and Chiorri (1996)	mixed farms	1992	19	530			13243		
Santucci and Chiorri (1996)	mixed farms	1993	19	429			11712		
Santucci and Chiorri (1996)	mixed farms	1994	19	491			11339		
Santucci and Chiorri (1996)	mixed farms	ϕ 1992-1994	19	482	638	***75***	12613	8210	***154***
Furnari (1994)	citrus farms	ϕ 1991-1993	15	14596					

[1] as a percentage of comparable conventional farms

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LUXEMBOURG

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Comp. conv. farms	%[1]	Profit in ECU per FWU: Organic farms	Comp. conv. farms	%[1]
Expert estimate	arable	1997		493					
Expert estimate	dairy	1997		740					
Expert estimate	grazing livestock	1997		740					
Expert estimate	mixed livestock	1997		1234					
Expert estimate	mixed farms	1997		666	508	***131***			

[1] as a percentage of comparable conventional farms

NORWAY

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Comp. conv. farms	%[1]	Profit in ECU per FWU: Organic farms	Comp. conv. farms	%[1]
Vittersø (1995)	dairy	1989-1992	11	1909	2026	***94***			

[1] as a percentage of comparable conventional farms

SWEDEN

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Comp. conv. farms	%[1]	Profit in ECU per FWU: Organic farms	Comp. conv. farms	%[1]
Danielsson and Arnesson (1998)		1996/97	4	472	423	***112***	12203	10932	***112***

[1] as a percentage of comparable conventional farms

SWITZERLAND

Reference	Farm type	Year of observation	No of farms in sample	Profit in ECU per ha UAA: Organic farms	Profit in ECU per ha UAA: Comp. conv. farms	% [1]	Profit in ECU per FWU: Organic farms	Profit in ECU per FWU: Comp. conv. farms	% [1]
FAT (1992a)	average of different farm types	1990		2751	2777	***99***	28835	29541	***98***
FAT (1992b)	average of different farm types	1991		2726	3044	***90***	31309	32038	***98***
FAT (1994)	average of different farm types	1992		2186	1940	***113***	26953	23247	***116***
FAT (1995)	average of different farm types	1993		2399	2245	***107***	28792	28741	***100***
FAT (1996b)	average of different farm types	1994		2164	1889	***115***	27294	25395	***107***
FAT (1996c)	average of different farm types	1995		2238	1738	***129***	31290	23239	***135***
FAT (1997a)	average of different farm types	1996	75	2044	1849	***111***	25380	22847	***111***
FAT (1996b)	dairy (mountain area)	1994		1736	1430	***121***	23852	19816	***120***
FAT (1996c)	dairy (mountain area)	1995		1773	1501	***118***	24547	22180	***111***
FAT (1997a)	dairy (mountain area)	1996	35	1515	1416	***107***	20497	19798	***104***
FAT (1996b)	mixed farms (flat land)	1994		2459	2206	***111***	30896	30365	***102***
FAT (1996c)	mixed farms (flat land)	1995		2596	1920	***135***	33678	24652	***137***
FAT (1997a)	mixed farms (flat land)	1996	40	2588	2292	***113***	29560	25397	***116***

1 as a percentage of comparable conventional farms

No recent data on farm profits was available for BE, ES, F, IE, PT, GR

Annex 7: Production structure of organic and comparable conventional farms

DENMARK (1996/97)

		All farms	
		Organic farms	Conv. farms
Number of farms		158	2307
Agricultural area	ha UAA	40.9	40.8
Spring barley	% of UAA	12.6	23.3
Wheat	% of UAA	4.0	24.3
Other cereals	% of UAA	7.0	8.5
Peas	% of UAA	2.6	2.2
Potatoes	% of UAA	2.8	1.6
Horticultural crops	% of UAA	2.0	0.9
Other cash crops	% of UAA	1.7	8.1
Fodder beet	% of UAA	0.8	1.7
Maize for roughage	% of UAA	0.9	1.5
Cereals for roughage	% of UAA	18.0	4.9
Grass in rotation	% of UAA	31.5	7.9
Permanent grass	% of UAA	11.1	6.8
Set aside	% of UAA	5.0	8.3
Stocking rate			
Total	LU/100 ha UAA	88.3	90.0
Dairy cows	Number /100 ha UAA	51.1	27.2
Nurse cows	Number /100 ha UAA	5.4	5.2
Heifers	Number /100 ha UAA	58.4	33.8
Bulls and Bullocks	Number /100 ha UAA	12.5	16.4
Breeding pigs	Number /100 ha UAA	1.0	39.2
Other pigs	Number /100 ha UAA	19.1	374.0

Source: DIAFE (1998)

DENMARK (1996/97)

		Arable farms	
		Organic farms	Comp. conv. farms
Number of farms		42	230
Agricultural area	ha UAA	19.1	17.0
Cereals	% of UAA	39.4	62.6
Peas	% of UAA	8.1	1.6
Potatoes	% of UAA	4.1	3.4
Horticultural crops	% of UAA	8.2	8.8
Other cash crops	% of UAA	3.9	8.9
Grass in rotation	% of UAA	24.2	4.7
Other roughage	% of UAA	7.2	5.2
Set aside	% of UAA	4.9	4.8
Stocking rate			
Total	LU/100 ha UAA	25.1	22.4
Dairy cows	Number /100 ha UAA	2.6	0.0
Other cattle	Number /100 ha UAA	29.8	22.9
Pigs	Number /100 ha UAA	18.3	30.6

		Dairy farms	
		Organic farms	Comp. conv. farms
Number of farms		82	321
Agricultural area	ha UAA	76.6	60.6
Cereals	% of UAA	17.1	25.5
Potatoes	% of UAA	2.4	0.5
Other cash crops	% of UAA	2.6	3.1
Fodder beet and maize	% of UAA	2.7	11.9
Cereals for roughage	% of UAA	22.5	20.4
Grass in rotation	% of UAA	36.9	21.4
Permanent grass	% of UAA	11.2	11.4
Set aside	% of UAA	4.6	5.8
Stocking rate			
Total	LU/100 ha UAA	112.0	151.8
Dairy cows	Number /100 ha UAA	79.2	101.5
Heifers	Number /100 ha UAA	78.2	107.6
Bulls and Bullocks	Number /100 ha UAA	12.4	33.0
Pigs	Number /100 ha UAA	4.8	3.1

Source: DIAFE (1998)

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FINLAND (1995)

		Cattle husbandry		Grain cultivation	
		Organic farms	Comp. conv. farms	Organic Farms	Comp. conv. farms
Number of farms		16	128	6	67
Agricultural area	ha UAA	35.7	37.3	34.7	38.8
Cereals	% of UAA	13.2	14.2	34.6	45.9
Oilseeds	% of UAA		0.2	5.7	8.1
Root crops	% of UAA		0.4		11.5
..Potatoes	% of UAA	0.1	0.2	4.0	3.8
Arable fodder (=oats and mixed grain)	% of UAA	19.8	14.0	1.6	11.9
Leys	% of UAA	61.7	66.1	31.5	6.3
Set-aside	% of UAA	0.1	3.0	14.9	13.9
Other crops	% of UAA	5.2	2.1	11.7	2.4
Stocking rate					
Total	LU/100 ha UAA	24.1	28.7	0.5	3.8
Cattle	LU/100 ha UAA	14.9	19.1		
..Dairy cows	LU/100 ha UAA	14.9	19.1		

Source: AERI (1997)

GERMANY (1996)

		Organic farms	Comp. conv. farms
Number of farms		126	518
Agricultural area	ha	46.03	46.28
Arable area	% of UAA	52.81	50.27
Permanent grassland	% of UAA	47.14	49.58
Perennial crops	% of UAA	0.03	0.11
Cereals (including corn maize)	% of arable area	52.19	46.98
Potatoes	% of arable area	3.33	1.49
Sugar beet	% of arable area	0.00	1.54
Maize for silage	% of arable area	2.03	23.90
Other arable fodder	% of arable area	27.14	13.20
Set-aside	% of arable area	5.68	6.14
Other crops	% of arable area	9.63	6.75
Stocking rate			
Total	LU/100 ha UAA	100.74	162.05
Cattle	LU/100 ha UAA	94.32	150.49
...dairy cows	LU/100 ha UAA	43.85	70.28
...young cattle and cattle for fattening	LU/100 ha UAA	28.59	60.87
Pigs	LU/100 ha UAA	2.27	10.12
...pigs for fattening	LU/100 ha UAA	1.78	8.48
...sows	LU/100 ha UAA	0.24	0.83
Poultry	LU/100 ha UAA	2.94	0.86

Source: BMELF (1998)

GERMANY (1994/95)

		Organic farms				Comp. conv. farms
		Sample average	Arable	Grazing livestock	Pigs & poultry	Sample average
Number of farms		107	39	61	5	1805
Agricultural area	ha UAA	60.2	80.2	48.9	46.3	55.4
Wheat	% of UAA	11.2	16.6	5.1	14.9	15.1
Rye	% of UAA	7.8	9.7	5.3	15.2	3.7
Barley	% of UAA	3.6	4.3	2.9	4.4	12.1
Triticale	% of UAA	0.5	0.3	0.6	0.0	1.5
Dinkel	% of UAA	3.9	5.5	1.9	9.9	
Oats	% of UAA	2.3	2.8	1.5	8.1	2.3
Maslin	% of UAA	1.0	0.4	1.5	0.0	
Cereals total	% of UAA	30.3	39.5	18.7	52.4	36.4
Winter rape seed	% of UAA	0.8	1.7	0.0	0.0	5.6
Sunflowers, flax(oil)	% of UAA	1.0	2.0	0.1	0.0	
Oilseeds total	% of UAA	2.0	4.0	0.1	0.0	6.5
Field beans	% of UAA	1.2	2.0	0.2	2.0	
Peas, lupines	% of UAA	0.9	1.7	0.2	0.0	
Pulses total	% of UAA	2.1	3.7	0.4	2.0	0.6
Maize	% of UAA	1.6	0.7	2.6	1.3	7.8
Potatoes	% of UAA	2.5	4.2	0.8	2.5	1.6
Sugar beet	% of UAA	0.4	0.6	0.2	0.0	3.1
Vegetables, herbs	% of UAA	0.8	1.3	0.1	2.7	0.3
Crops to be hoed total	% of UAA	5.4	6.7	3.8	6.5	12.8
Arable fodder	% of UAA	8.8	6.0	11.4	8.0	2.3
Set aside	% of UAA	8.5	13.6	2.3	21.0	9.9
Permanent grassland	% of UAA	41.9	24.5	63.3	9.6	31.9
Other crops	% of UAA	1.0	2.0	0.1	0.4	

Source: Nieberg (1997)

GREAT BRITAIN

Farm type		Cropping		Horticulture		Dairy		Cattle and sheep		Mixed	
		Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms
No. of farms		6	73	5	56	6	62	12	135	9	97
Agricultural area	ha UAA	357	278	8	5	98	95	92	77	220	195
Cash crops (includes cereals, vegetables and others)	% of UAA	46.4	75.0	47.0	77.0	5.0	6.0	14.0	11.0	27.0	44.0
Fodder and non-cash crops	% of UAA	7.0	0.3	0.0	0.0	8.0	9.0	2.0	0.5	7.0	3.0
Rough grazing	% of UAA	5.8	0.8	2.0	0.0	1.0	1.0	8.0	13.0	1.0	1.0
Total grassland (permanent grassland and temporary leys)	% of UAA	24.6	9.7	51.0	2.0	77.0	83.0	71.0	73.5	55.0	44.0
Set-aside & fallow	% of UAA	16.1	14.0	0.0	19.0	8.0	1.0	6.0	2.0	10.0	8.0
Other crops	% of UAA	0.1	0.2	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0
Total	LU/100 ha UAA	16.0	23.0	56.0	0.0	143.0	186.0	113.0	125.0	59.0	87.0
Cattle	LU/100 ha UAA	14.7	14.1	18.5	0.0	138.5	187.5	65.5	68.8	31.1	57.7
... Dairy cows	LU/100 ha UAA	0.0	0.0	0.0	0.0	95.6	124.2	12.1	9.5	13.0	18.6
... Suckler cows	LU/100 ha UAA	8.5	9.9	0.0	0.0	0.0	1.4	21.9	27.9	0.0	10.1
Pigs	LU/100 ha UAA	0.0	3.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	2.6
Poultry	LU/100 ha UAA	0.0	0.1	8.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sheep and goats	LU/100 ha UAA	0.9	4.5	29.6	0.0	3.1	7.4	43.1	35.4	19.5	22.7

Source: Fowler, Lampkin and Midmore (1998)

THE NETHERLANDS (1995)

Farm type		Arable		Horticulture		Grazing livestock		Mixed cropping	
		Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms
Number of farms		7	176	6	9	12	448	5	13
Agricultural area	ha UAA	42.7	48.4	21.0	25.5	45.7	27.9	33.2	42.0
Cereals	% of UAA	28.2	27.8	15.5	22.3	0.0	0.7	33.1	18.9
Root crops	% of UAA	25.8	48.2	14.4	36.4	1.0	1.0	17.4	49.5
... Potatoes	% of UAA	18.4	29.7	14.4	20.6	1.0	0.5	17.3	32.0
Arable fodder	% of UAA	0.9	0.4	4.3	0.0	12.3	13.5	0.0	1.1
... Maize	% of UAA	0.0	0.4	0.0	0.0	7.4	13.2	0.0	1.1
... Other food crops	% of UAA	0.0	0.0	0.0	0.0	4.8	0.1	0.0	0.0
... Temporary grassland	% of UAA	0.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Permanent grassland	% of UAA	6.2	2.0	0.0	1.8	86.7	83.1	3.0	4.8
Set-aside	% of UAA	6.6	8.0	0.0	0.0	0.0	0.0	0.0	0.0
Other crops	% of UAA	32.4	13.6	65.9	39.5	0.0	1.7	46.5	25.7

THE NETHERLANDS (1995) (CONT.)

Farm type		Arable		Horticulture		Grazing livestock		Mixed cropping	
		Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. Conv. farms	Organic farms	Comp. conv. farms
Total stocking rate	LU/100 ha UAA	41	7	0	18	175	332	67	189
Ccattle	LU/100 ha UAA	14	4	0	1	165	249	67	28
... Dairy cows	LU/100 ha UAA	1	0	0	0	117	152	0	7
... Beef cattle	LU/100 ha UAA	5	3	0	1	5	16	28	18
... Young cattle	LU/100 ha UAA	0	0	0	0	45	97	4	3
... Suckler cows	LU/100 ha UAA	8	1	0	0	2	7	35	0
Pigs	LU/100 ha UAA	0	1	0	16	3	48	0	135
Poultry	LU/100 ha UAA	26	2	0	0	1	6	0	25

Source: Dutch FADN (LEI-DLO).

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SWITZERLAND (1996)

Farm type		All farms		Dairy farms		Mixed farms	
		Organic farms	Comp. Conv. farms	Organic farms	Comp. conv. farms	Organic farms	Comp. conv. farms
No. of farms		75		40		35	
Agricultural area	ha UAA	18.2	18.2	19.7	19.7	16.8	16.8
Cereals	% of UAA	9.3	11.8	0.8	3.3	18.0	20.5
Root crops	% of UAA	3.4	4.0	0.3	0.5	6.7	7.5
... Potatoes	% of UAA	1.4	1.5	0.1	0.3	2.8	2.9
Vegetables	% of UAA	1.1	0.1	0.2	0.0	2.1	0.4
Corn	% of UAA	1.9	4.9	0.0	1.1	4.0	8.8
Leys	% of UAA	10.3	12.4	0.4	6.0	20.6	18.9
Permanent grassland	% of UAA	73.9	65.6	98.4	88.7	48.9	42.0
Other crops	% of UAA	0.1	1.2	0.0	0.4	0.0	1.9
Stocking rate							
Total[1]	LU/100 ha UAA	114.0	129.0	92.0	105.0	136.0	154.0
Cattle	RLU/100 ha UAA	113.0	127.0	96.0	108.0	130.0	147.0
Pigs	LU/100 ha UAA	5.0	21.0	2.0	7.0	9.0	19.0
Poultry (laying hens)	LU/100 ha UAA	1.7	0.3	0.7	0.2	2.7	0.5
Sheep and goats	LU/100 ha UAA	1.5	0.4	2.4	0.9	0.4	0.0

Source:FAT (1997a)

[1] Total stocking rate differs from sum below, as cattle stocking rate is given in RLU/ha (Ruminant Livestock Unit)