Farm Economics Brief No 4 | November 2013

Organic versus conventional farming, which performs better financially?

An overview of organic field crop and milk production in selected Member States

Contents

Organic farming is currently practised by 2 % of EU farms on 4 % of the EU's agricultural land[1]. These may be modest numbers, but they are growing rapidly.

Organic farming also gets attention from the public. When the European Commission recently launched its consultation for the review of the policy on organic agriculture, it received some 45 000 contributions.

This brief looks at the components of income of organic farmers in the field crop sector in Germany, Austria, France, Poland and Spain, and of the milk sector in Germany, Austria and France. It compares the financial performance of organic farms with that of conventional farms. In addition to market revenue and costs, it looks at subsidies to provide a full picture of income per labour unit.

The data used for this overview are from the Farm Accountancy Data Network.

Sample

This brief focuses on holdings applying only organic production methods. It does not look at farms in conversion.

The scope of this overview is limited by the size and the stability of the sample of organic farms (see Box 3 in the Annex).

The figures are given for the average of 2007, 2008 and 2009 to mitigate the effect of the sample's unstable composition in terms of economic size.

1 2010 data. Source: Eurostat Farm Structure Survey.

EU Farm Economics Briefs are available on the FADN website: http://ec.europa.eu/agriculture/rica/publications_en.cfm#BR2011

Agriculture and Rural Development

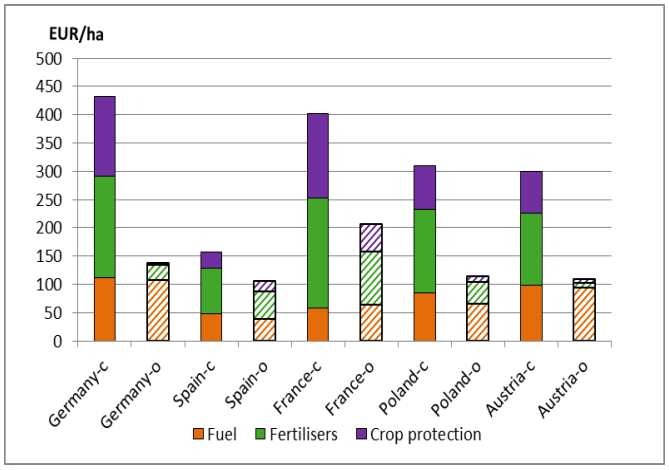
1. Organic farms tend to make a more extensive use of resources

1.1. Fewer inputs than conventional farms

The EU Regulation on organic production[2] sums up the main characteristics of organic farming. Distinguishing between plant production and animal husbandry, it describes organic plant production management as consisting, in essence, of 'soil fertility management, choice of species and varieties, multiannual crop rotation, recycling organic materials and cultivation techniques'. In animal husbandry, 'animals should have, whenever possible, access to open air or grazing areas. … Organic stock farming should respect high animal welfare standards and meet animals' species-specific behavioural needs while animal-health management should be based on disease prevention. In this respect, particular attention should be paid to housing conditions, husbandry practices and stocking densities'.

Not surprisingly, organic field crop farms use significantly less pesticides and fertilisers (as expressed in EUR per ha). For fuel and lubricants, on the other hand, the amounts are comparable. Where conventional farms use chemicals, organic farms usually resort to mechanical techniques (e.g. for weeding) and their fields have to be worked as often as those on conventional farms.

Chart 1 Average costs of fertilisers, crop protection products and fuel per hectare for field crop farms (average for 2007-09)



Source: EU-FADN

[2] Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.

In the milk sector, organic farms have lower stocking densities. They grow less fodder maize than their conventional counterparts, but the proportion of pasture in their utilised agricultural area is higher. They also buy less concentrated feed and coarse fodder per dairy cow.

Table 1 Selected intensity indicators for milk farms (average for 2007-09)

Countries	Germany		France		Austria	
	Conv.	Organic	Conv.	Organic	Conv.	Organic
Livestock density (dairy cows/ha of UAA)	0.80	0.63	0.62	0.61	0.59	0.42
Area of fodder maize (% UAA)	17%	3%	17%	4%	5%	1%
Area of pastures (% UAA)	51%	63%	41%	54%	74%	89%
Purchased feed (EUR/dairy cow)	418.3	198.7	286.1	190.8	251.5	159.7

UAA: utilised agricultural area
Source: EU-FADN

1.2. More labour input

In most of the eight studied cases, organic production seemed to require more labour per hectare or per cow.

Put differently, per unit of labour[3] organic farms managed fewer productive units (Table 2). However this could also reflect smaller structures.[4]

Table 2 Labour intensity (average for 2007-09)

Countries	Average number of hectares per AWU on field crop farms		Average number of dairy cows per AWU on milk farms	
	Conventional farms	Organic farms	Conventional farms	Organic farms
Germany	62.1	53.7	26.9	18.7
Spain	50.2	70.0	-	-
France	62.7	37.2	26.9	25.0
Austria	42.0	35.5	10.2	9.1
Poland	13.7	8.3	-	-

Source: EU-FADN

Field crop farms in Spain are a notable exception. An agricultural worker on an organic farm tends 70 ha of land, whereas the equivalent figure for conventional farms is 50 ha. The reason is that, in order to secure a viable income, organic farmers need larger holdings

[3] Measured in annual work units (AWU). One AWU is the amount of agricultural work done per year by one person working full-time.

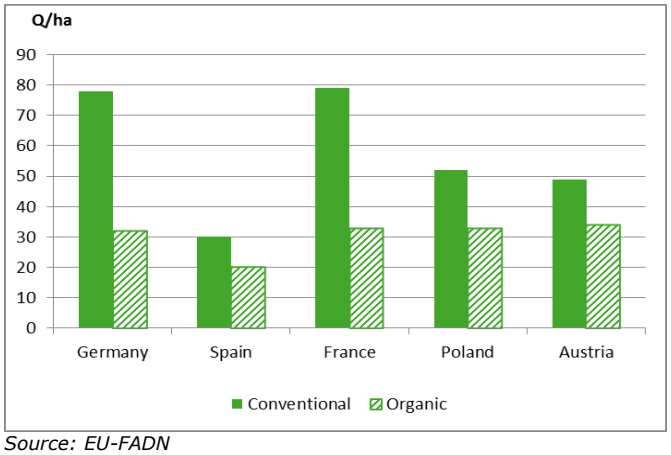
[4] According to FADN data, organic field crop farms have a smaller area and organic milk farms a smaller herd than their conventional counterparts. The exceptions are Spain, where field organic crop farms have more hectares, and France, where dairy herds are of similar size whether the farms are organic or conventional.

because of the very low land productivity and the extensive production methods they use.[5].

1.3. Lower yields

As expected, the lower input intensity of organic production systems results in lower yields (output per hectare or per cow).

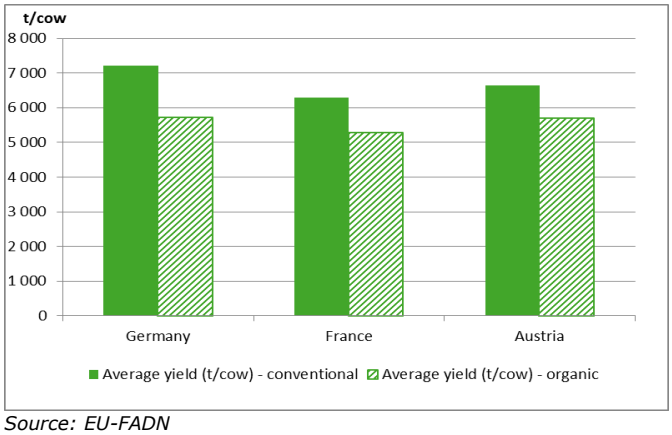
Chart 2 Average wheat yield on field crop farms in 2009



Source: EU-FADN

This tendency is reinforced by the fact that organic farms are often located in less favourable environments.[6] This is especially true for the cereals sector.

Chart 3 Average milk yield (average for 2007-09)



Source: EU-FADN

Organic holdings have more extensive production methods than their conventional counterparts, but these involve a more intensive use of labour.

[5] Based on FADN data, Spanish organic field crop farms appear to be around 50 % bigger than conventional ones.

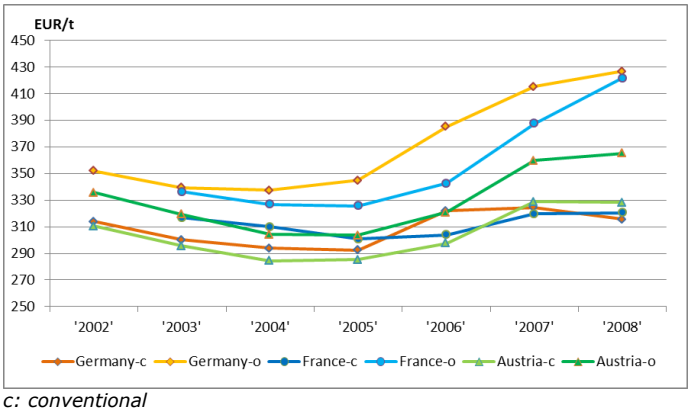
[6] This is borne out by the fact that organic farms receive higher 'Less Favoured Areas' payments (see 3.1).

2. Organic farms tend to achieve higher margins per unit of production

2.1. Higher prices tend to compensate for lower yields

Consumers are willing to pay more for organic products. In France, Germany and Austria, the average price of raw organic milk is significantly higher than that of conventional milk. Between the average for 2004-06 and 2007-09, the price of organic milk rose faster than that of conventional milk in all three countries.

Chart 4 Average milk price (raw milk and milk products, three-year averages)



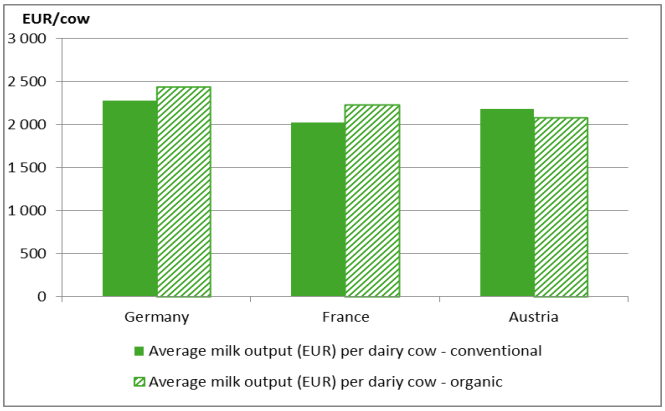
c: conventional
o: organic
Source: EU-FADN

Furthermore, organic milk farms appear more likely to process raw milk into cheese and other products with a higher added value, albeit mostly on a marginal scale. The exception is France, where organic milk farms appeared to derive around 9 % of their milk receipts from the sale of milk products.[7] The equivalent number for conventional farms was 2 %. As a result of this higher share of milk products in the milk output, in this country, the average organic milk price (raw milk and milk products) was € 20 higher per tonne.

Ultimately, in France and Germany, this price difference compensated for the lower yield, but not in Austria, where total milk output per cow – that is the total revenues from milk and milk products in EUR per cow - is slightly less.

[7] The share of milk products in the total milk production value has tended to fluctuate over the years in the French sample, so this figure should be interpreted with caution.

Chart 5 Average milk receipts per cow (average for 2007-09)



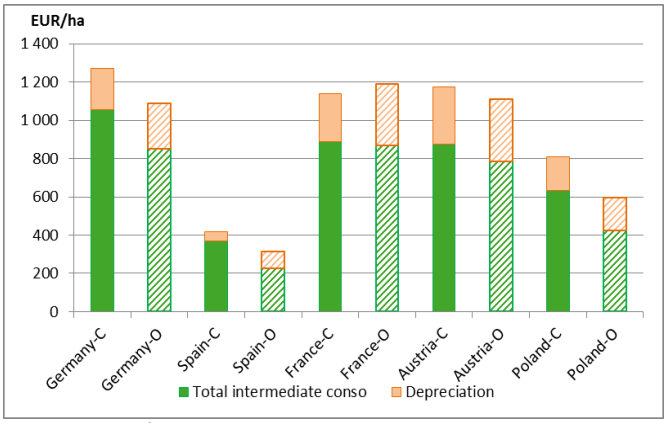
Source: EU-FADN

It is not possible to carry the same comparison of yields and prices for the field crop sector as a whole, because organic and conventional farms may grow different crops (see Box 1 in the Annex).

2.2. Cost of production is not always lower

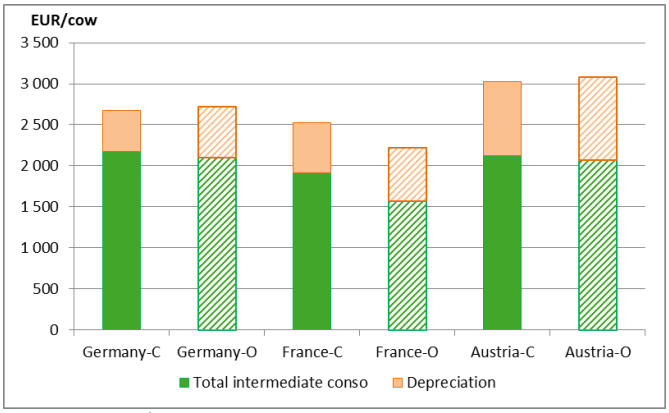
Receipts are only half the picture, the other half being the cost of production. Since organic farms use fewer inputs (see 1.1), their level of intermediate consumption per unit of production is lower than that of conventional holdings.[8]

Chart 6 Average costs of production for field crop farms (average for 2007-09)



C: conventional
O: organic
Source: EU-FADN

Chart 7 Average costs of production for milk farms (average for 2007-09)



C: conventional
O: organic
Source: EU-FADN

However, their level of depreciation as expressed in € per unit of production is comparable or higher. As organic farms resort to mechanical tools instead of chemicals, their use of fixed assets is more intensive. The fact that organic farms are smaller adds to this effect, because it increases the level of depreciation per hectare or per cow even further. The same is true for farms in less-favoured areas.

Consequently, in France and Austria the overall costs of production per hectare for organic field crop farms are quite close to those of conventional farms, whereas in Germany, Spain and Poland they are significantly lower. In the German and Austrian milk sectors, the average costs per cow are slightly higher for organic farms. They are lower in France.

2.3. Margins per unit of production are often higher

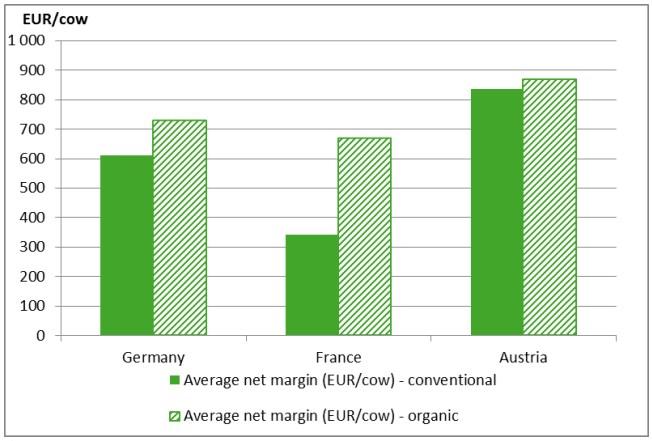
Because of the lower use of inputs and better prices, 'net market margins' per unit of production (total receipts minus intermediate consumption minus depreciation) are often higher for organic farms, despite their lower yields.[9]

In the milk sector, the net market margins per cow are higher for organic farms in every country, although to varying degrees.

[8] Intermediate consumption includes specific costs and farming overheads for all farming activities, not just the production of milk or field crops. The costs of fixed factors (work, land and capital), be they family or external factors, are not considered in this brief.

[9] As farms are rarely fully specialised in one sector, the net market margins reflect receipts and costs for secondary activities. For instance, for Austrian milk farms, the value of the milk production represents around 50 % of the total production value. The rest comes from beef production and other activities, such as tourism and forestry.

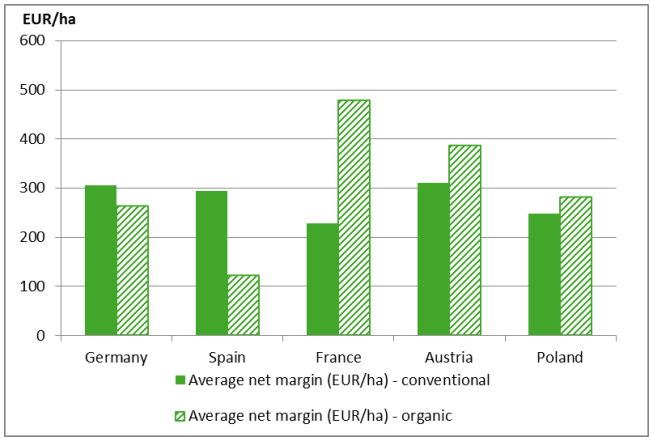
Chart 8 Average net market margin per cow for milk farms (average for 2007-09)



Source: EU-FADN

In the field crop sector, the situation is not so clear-cut. The lower costs of production and higher prices do not always compensate for the much lower yields. Net market margins per unit of production may therefore be lower.

Chart 9 Average net market margin per ha for field crop farms (average for 2007-09)

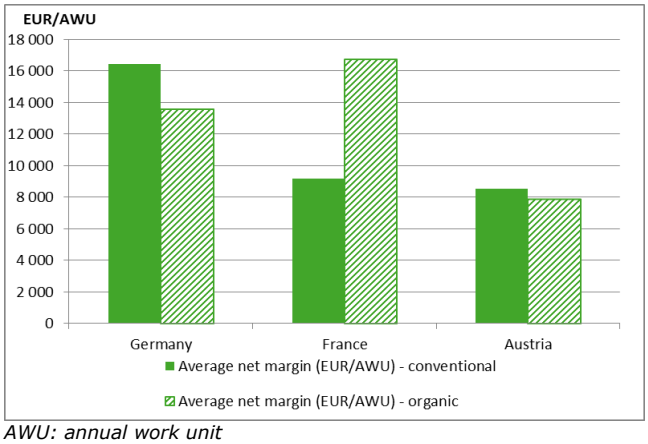


Source: EU-FADN

2.4. Market income per unit of labour is often lower

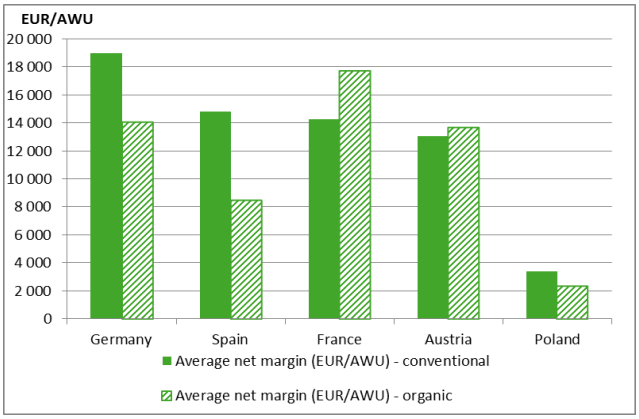
We have seen that the net market margins per unit of production are often higher for organic farms. This does not necessarily translate into higher net market income per unit of labour, because organic farms need more units of labour to tend the same number of hectares or cows.

Chart 10 Average net market income per annual work unit for milk farms (average for 2007-09)



AWU: annual work unit
Source: EU-FADN

Chart 11 Average net market income per annual work unit for field crop farms (average for 2007-09)



AWU: annual work unit
Source: EU-FADN

3. Subsidies play a key role in sustaining the income of organic farmers

Market income is not the only factor determining a farmer's agricultural income.[10] Subsidies also play an important role.

3.1. Agri-environment subsidies compensate for income foregone

The share of subsidies in farm net value added is higher for organic farms in all countries studied except France.[11]

10 By agricultural income we mean 'farm net value added' (FNVA), i.e. the remuneration for the fixed factors of production (labour, land and capital, whether belonging to the family or external – see Box 1 in the Annex).

11 FNVA does not take account of investment subsidies.

Table 3 Share of subsidies in income (average for 2007-09)

Countries	Share of subsidies in FNVA on field crop farms (%)		Share of subsidies in FNVA on milk farms (%)	
	Conventional farms	Organic farms	Conventional farms	Organic farms
Germany	55%	65%	48%	55%
Spain	44%	65%	-	-
France	64%	43%	65%	45%
Austria	63%	63%	52%	59%
Poland	53%	61%	-	-

Source: EU-FADN

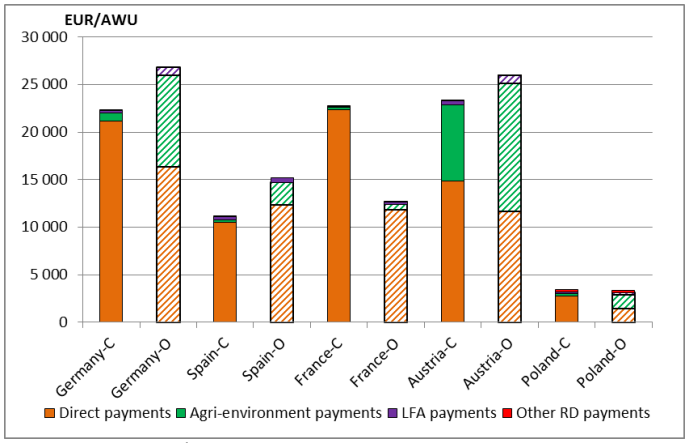
On average, the subsidies per labour unit were also higher for organic farms.

The composition of the subsidies also differed, in particular as regards the relative importance of direct and rural development payments (Pillars I and II of the Common Agricultural Policy).

In 2009, direct payments[12] accounted on average for nearly 40 % of 'farm net value added' (FNVA) in the EU as a whole, up from 33 % in 2008.[13] They were particularly high in the milk and field crop sectors, accounting for 45 % and 60 % of FNVA respectively.

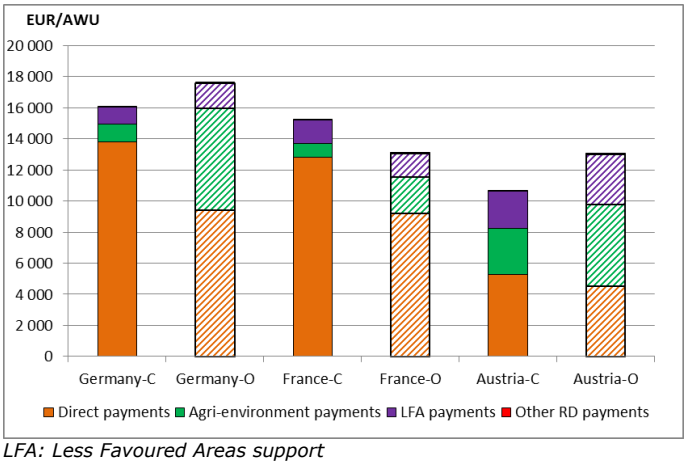
While the composition of payments differed by sector and Member State, second-pillar payments accounted for a higher proportion of the subsidies granted to organic farms.

Chart 12 Average subsidies by type for field crop farms (average for 2007-09)



LFA: Less Favoured Areas support
RD: rural development support
Source: EU-FADN

Chart 13 Average subsidies by type for milk farms (average for 2007-09)



LFA: Less Favoured Areas support
RD: rural development support
Source: EU-FADN

Organic farmers receive less in direct payments[14] than their conventional colleagues, except in the case of Spanish field crop farmers. This has to do with the fact that organic farms are generally smaller, as we have seen, (except in Spain) and with the implementation of decoupling (higher Pillar I payments in Member States which applied the historical payments).

Unsurprisingly, however, organic farmers receive, on average, much higher agri-environment and animal welfare subsidies. These are granted to farmers who voluntarily commit themselves to exceeding the minimum relevant standards and are intended to promote agricultural production methods that help to protect and enhance the environment, the landscape, natural resources, the soil and genetic diversity. As we have seen, such practices come at a cost in that they may require more work and/or limit production. The payments cover income foregone as well as such additional costs.

Last but not least, in the sectors studied, organic farmers also receive higher Less Favoured Areas support, which is intended to sustain agriculture in areas with natural handicaps such as mountains, where farming is more difficult and less profitable.

12 Direct payments include decoupled payments, subsidies for crops, livestock, intermediate consumption, external factors (except interest) and subsidies granted on the basis of Article 68 of Council Regulation (EC) No 73/2009. They do not include rural development or investment subsidies.

13 Source: *EU farm economics 2012 based on FADN data*, European Commission, 2013.

14 Direct payments including interest subsidies (unlike the payments referred to in footnote 12).

Table 4 Average subsidies per labour unit (average for 2007-09)

Countries	Average subsidies per AWU on field crop farms (EUR)		Average subsidies per AWU on milk farms (EUR)	
	Conventional farms	Organic farms	Conventional farms	Organic farms
Germany	22 270	26 805	16 047	17 659
Spain	11 135	15 225	-	-
France	22 681	12 629	15 183	13 059
Austria	23 325	25 945	10 668	13 091
Poland	3 437	3 368	-	-

AWU: annual work unit
Source: EU-FADN

While conventional farmers mostly receive subsidies under Pillar I of the Common Agricultural Policy, organic farmers get substantial subsidies under Pillar II, in particular under agri-environment and animal welfare measures. Overall, they receive more subsidies per annual work unit, except in France and Poland.

3.2. Ultimately, income per unit of labour is limited by labour intensity

The total agricultural income[15] per unit of labour is calculated by adding net market income per labour unit (see 2.4) and subsidies[16] per labour unit (see 3.1). As we have seen, various factors influence these numbers differently in different countries. Therefore, from our eight cases it is not conclusive which results in the highest income per unit of labour: organic or conventional farming.

Table 5 Average Farm Net Value Added per unit of labour (average for 2007-09)

Countries	Average FNVA per AWU on field crop farms		Average FNVA per AWU on milk farms	
	Conventional farms	Organic farms	Conventional farms	Organic farms
Germany	40 666	41 534	33 268	32 001
Spain	25 566	23 269	-	-
France	35 566	29 585	23 517	29 219
Austria	37 179	41 397	20 417	22 341
Poland	6 512	5 566	-	-

Source: EU-FADN

The following graph gives an overview of the elements that determine farm income in the field crop sector.

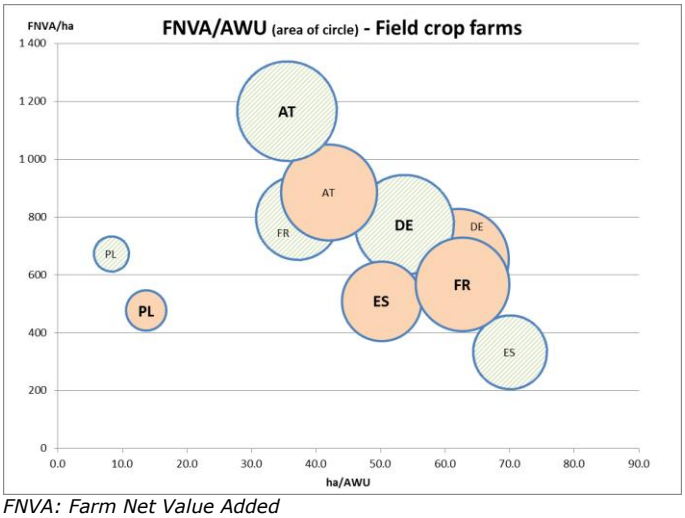
Each country is represented by two circles, one for organic farms and one for conventional farms.

The vertical axis shows 'farm net value added' per hectare. This value is higher for organic farms in all countries, with the notable exception of Spain, where yields per hectare are much lower for organic farms.

The horizontal axis shows the number of hectares that one labour unit can tend.

The size of each circle represents a third value: FNVA per annual work unit (obtained by multiplying the previous two).

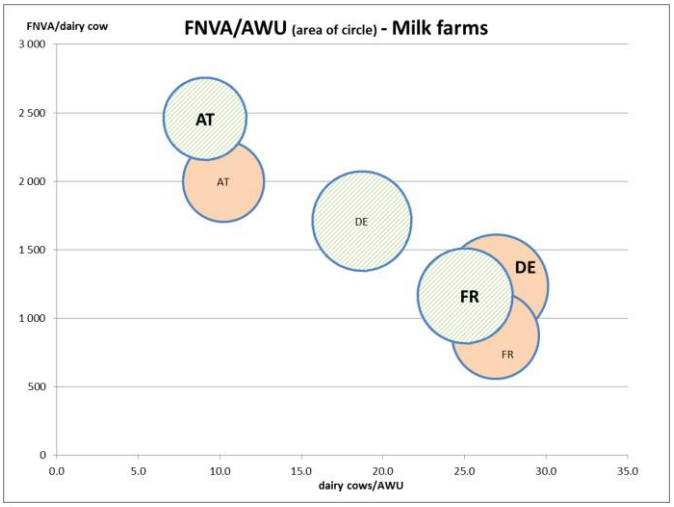
Chart 14 Effect of income per ha and labour intensity on farm income per unit of labour for field crop farms (average for 2007-09)



FNVA: Farm Net Value Added
AWU: Annual work unit
Conventional farms appear in orange, organic farms in green. The higher the FNVA/AWU ratio, the larger the circle. The higher ratio for each country has been indicated by putting the country's abbreviation in bold lettering.
Source: EU-FADN

The next graph shows the same data for the milk sector.

Chart 15 Effect of income per dairy cow and labour intensity on farm income per unit of labour for milk farms (average for 2007-09)



Source: EU-FADN

15 Farm net value added per annual work unit: at this stage, the fixed factors of production still have to be remunerated.

16 Subsidies minus taxes, to be precise.

In the eight cases studied, the green circles stand higher on the graphs i.e. the farm net value added per unit of production is higher for organic farms, with the exception of Spain. But except in this latter country, they also stand more to the left i.e. there are less units of production per labour unit, because of the higher labour intensity required by organic farming methods or of the fact that organic farms tend to be smaller. In four cases out of eight, the resulting circle size i.e. the income per labour unit is bigger for organic farms.

4. Conclusion

Based on this limited sample (the milk sector in Germany, France and Austria, and the field crop sector in the same three countries plus Spain and Poland), the financial performance of organic holdings as compared with that of conventional holdings appears to vary.

Organic farming practices are more extensive, except when it comes to labour input, so yields are lower, but the higher prices make up for this.

Intermediate consumption is lower, but this is partly cancelled out by higher depreciation per unit of production, so in the end organic farms' production costs are not necessarily lower.

The net market margins per unit of production are higher, but so is the labour input, and ultimately the net market receipts per unit of labour tend to be lower. Higher subsidies in particular in the form of agri-environment and animal welfare payments partly compensate for this effect. These subsidies are intended specifically to compensate for income foregone owing to the farm's commitment to exceed the minimum environmental standards.

In sum, there is no clear pattern in performance: each country and sector has different rates of income per annual work unit.

Contact: DG Agriculture and Rural Development, Unit Microeconomic Analyses of EU agricultural holdings
Tel: +32-2-29 91111 / E-mail: Agri-RICA-Helpdesk@ec.europa.eu
http://ec.europa.eu/agriculture/analysis/markets/index_en.htm

Annex

Box 1: Definitions

Types of farming

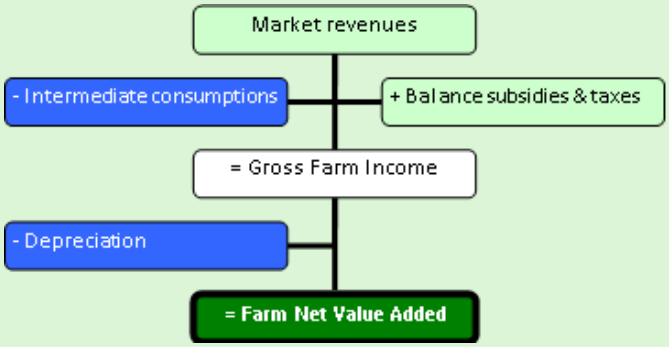
The EU has created a detailed typology that is sufficiently broad to encompass the many different types of farming found in Europe. It is described in Commission Decision 85/377/EEC of 7 June 1985 and identifies the principal types of farming, which are then broken down further. Types of farming are defined in terms of the relative importance of the different enterprises on the farm, measured as their contribution to the farm's total standard gross margin.

Field crops cover the following agricultural specialisations:[17] specialist cereals, oilseeds and protein crops, general field cropping and mixed cropping.

Income indicators

Net market margin: output (production value) minus specific costs of production and farming overheads minus depreciation

Farm net value added (FNVA): total output (total production value) minus intermediate consumption plus balance of current subsidies and taxes minus depreciation. FNVA is the amount available to remunerate the fixed factors of production (labour, land and capital), be they external or family factors. This makes it possible to compare holdings irrespective of the family/non-family nature of the factors of production they use. The FNVA is influenced by the production methods. FNVA per **annual work unit (AWU)** is used as an income indicator.



Box 2: The Farm Accountancy Data Network

This brief is based on the database of the Farm Accountancy Data Network (FADN), a European system based on annual sample surveys for which structural and accountancy data are collected for European farms. The objective is to monitor the income and business activities of agricultural holdings and to assess the impacts of the Common Agricultural Policy.

The FADN survey covers only those farms exceeding a minimum economic size so as to register the most relevant agricultural activity of each EU Member State, i.e. at least 90 % of the potential agricultural production covered by the Farm Structure Survey (FSS, EUROSTAT). For 2009, the sample consisted of approximately 78 000 holdings in the EU, representative of 5.4 million farms (39 %) out of a total of some 14 million farms included in the FSS.

17 Principal types of farming as defined in the Community typology for agricultural holdings (Regulation (EC) No 1242/2008).

Samples are built so as to provide data that are representative along three dimensions: region, economic size and type of farming. FADN is the only source of micro-economic data that is harmonised, which means that it applies the same set of accounting rules for all EU Member States.

For further information, see: http://ec.europa.eu/agriculture/rica.index.cfm

Box 3: Methodology: Organic Farming in the FADN

Since the FADN does not specifically take organic farming into account when composing its samples, the scope for using its data to study organic farming is very limited and the data needed for this brief had to be analysed for individual sectors and Member States in order to be meaningful.

This approach carries with it the risk of finding samples with fewer than 15 farms, which is too small to allow publication of the results. This limits the possibilities even further.

Moreover, even these samples may be strongly influenced by the economic size of the farms. Finally, even if the group of organic farms is large enough and stable in its composition, there is a risk of bias because the FADN focuses on professional farms and not on the agricultural sector as a whole.