Organic Farms in the EU: Status quo, development strategies and policy impacts on selected arable and dairy farms

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Abstract

Organic farming is increasingly considered in the European Common Agricultural Policy. Sound evaluations of the effects of policy measures on organic farms in the EU are needed to face the challenges in future policy design.

The effects of various policy scenarios on profitability and development strategies of typical organic arable and dairy farms are analysed for the EU countries Germany, Denmark, the United Kingdom and Italy. Based on an approach which integrates simulation modelling and focus groups, profitability of model farms is analysed ex-post for year the 1999 and their potential development simulated until 2008 under Agenda 2000 and three alternative policy scenarios. For each policy scenario potential farm adaptation strategies are analysed.

Size, structure, productivity, achieved output prices and policy surrounding of typical organic farms differ widely between countries and farm types. Great differences in the contribution of payments to total farm profit and farm family labour remuneration are observed. Dairy model farms are expected to slightly benefit from Agenda 2000, while arable farms are more susceptible to price reductions realised in the Agenda 2000 package. In adaptation to Agenda 2000 organic dairy farms are expected to grow, while arable farms are more likely to diversify production or envisage valued adding strategies. The effects of alternative policy scenarios on profitability of typical farms are similar in all countries. The choice of adaptation strategy of farmers in the different countries, however, vary significantly, mainly due to the current market situation.

Key words: typical organic farms, integrated modelling, policy impact analysis, strategic farm development

Introduction

In the European Union, organic farming has experienced a dynamic development since the end of the last century (Lampkin 2001). In part this is a result of the increasing emphasis of the European Common Agricultural Policy (CAP) on environmentally sensitive agricultural systems and their consideration in policy measures. A first boom resulted from the official definition and certification requirements for organic crop production in 1991 (Council Regulation No. 2092/91). Financial aid applicable to organic farming was introduced within the agri-environmental programmes in the nineties (Council Regulation No. 2078/92) in most EU countries. Food scares and a subsequent reaction of policy makers and consumers have had an even stronger effect on organic farming development. Sound evaluations of the effects of different future policy options on organic farms will help to face the challenges of policy design for the future.

Methodology

Analyses were based on typical organic dairy and arable farms from selected EU countries. Country were selected with the objective to depict a certain diversity in terms of development stage of the organic farming sector, organic support measures and market orientation of existing organic farms. At the same time maximum regional coverage within the EU was envisaged. The countries Denmark, Germany, the United Kingdom and Italy were chosen as case study countries.

Data on the organic farming sector, such as statistics on production structure or farm types are scarce. Thus, typical farms were selected based on a mix of methods and data sources: national and regional statistics, farm accounts, advisors expert assessment, farmers focus groups. Within each country regions typical for organic dairy and arable production were selected, respectively, and the size and structure of organic farms typical for that region defined. Finally, focus groups of farmers (4-8 participants) managing organic arable and dairy farms and corresponding advisors defined typical model farms in detail for 1999. Typical model farms were selected according to a modal concept instead of selecting representative farms in a mean-variance concept.

Typical farms were adapted to the simulation model TIPI-CAL© (Technology Impact and Policy Impact Calculation Model) (Hemme et al. 1997). This simulation model was developed specifically for interregional and international policy and technology impact analyses at the farm level. It is programmed as a farm level, recursive dynamic production and full costing accounting model (Hemme 2000).

Profitability was analysed ex-post for the year 1999. The development of profitability in the Agenda 2000 policy surrounding was simulated until the year 2008. In order to take the dynamic nature of the organic farming sector into account, an integrated approach was taken to policy impact and adaptation strategy analysis: Simulation modelling and focus groups were linked in a step-wise, participatory procedure (Figure 1). Results of status-quo simulations of typical farms were evaluated and - if necessary – corrected by focus groups (Häring 1999). Adaptation strategies of typical farms to the current policy scenario at the time were proposed by focus groups and their implementation simulated. Again, results of simulation modelling were fed back to focus groups for evaluation and control.

This intensive participation of farmers via focus groups provides an explorative element for evaluating farm adaptation strategies. Any development option can arise in the discussion process and be simulated easily (e.g. building investments). Determinants of the economic behaviour of farmers which cannot be depicted in modelling procedures are included in farm economic analyses in a systematic fashion. Farmers' utility function is taken into account - which may include not only profit but other non-economic objectives - through their participation.

Based on a scenario analysis of the European organic farming sector (Zanoli et al. 2000) the effects on profitability of two alternative policy scenarios were modelled and compared to the expected development under Agenda 2000. Similar to the mentioned integrated modelling procedure, results were assessed and discussed by focus groups. In this step, scenario impact modelling results discussed thoroughly, adaptation strategies to these policy scenarios are proposed and their reasoning are assembled. For the final assessment both , modelling and focus group results are synthesised for a final evaluation.

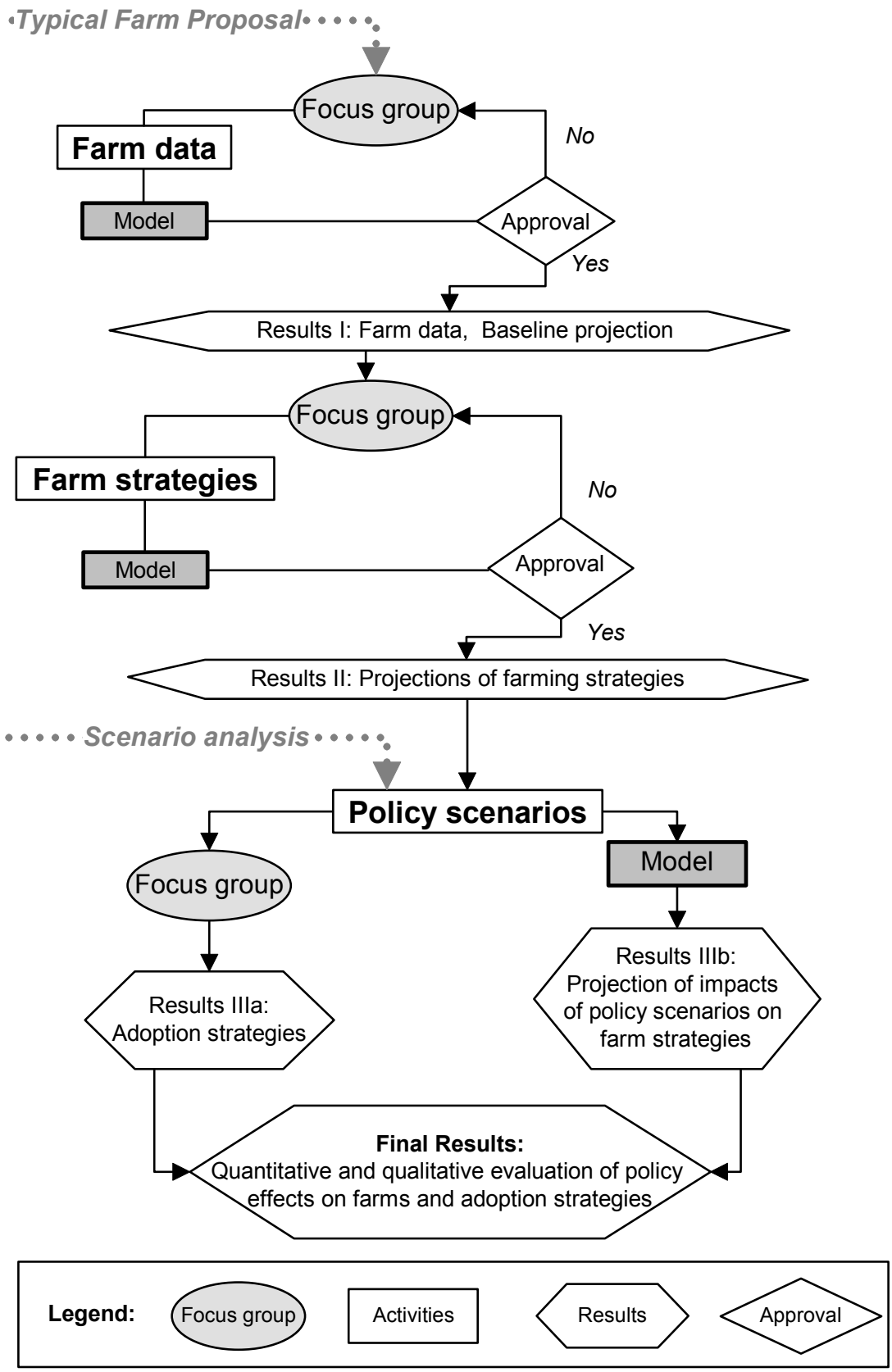

Figure 1: Integrated simulation modelling of typical farms with focus groups

Results

Resources and production structure of typical organic farms

Factor endowment, production structure and productivity of typical dairy and arable farms differ widely between the selected countries (Table 1).

Table 1: Typical organic farms in selected EU countries in 1999

	UK	DE	DK	IT
	Dairy farms			
Region	Wales	Baden-Württemberg	Jutland	Emilia Romagna
Factor endowment				
Total UAA[1] (ha)	59	55	66	42
of which arable	56%	48%	100%	100%
Dairy cows	62	38	60	28
LU[2]/ha	1.3	1.1	1.4	0.9
FCM (kg)	5 583	5 062	6 672	5 170
FCM from forage (kg)	3 636	3 837	3 330	2 950
AWU[3]/100 ha * year	2.6	3.7	2.1	5.9
FWU[4]/100 ha * year	1.7	3.1	1.8	5.9
	Arable farms			
Region	SW England	Bavaria	Jutland	Marche
Factor endowment				
Total UAA[1] (ha)	245	85	98	40
of which arable	96%	95%	91%	100%
of which ley & legume	41%	40%	24%	25%
LU[2]/ha UAA[1]	0.3	0.2	1.2	0.0
Yield: soft wheat (t/ha)	3.6	4.5	5.0	4.0
AWU[3]/100 ha * year	1.5	1.4	1.1	2.8
FWU[4]/100 ha * year	0.4	1.2	1.0	2.5

Source: Häring (2001)

1 Utilisable Agricultural Area
2 Livestock Unit
3 Agricultural Work Unit
4 Family Work Unit

Organic dairy farms managed most intensively were found in Denmark, where highest milk yields, the lowest share of milk from forage and the highest stocking density were observed, while most extensively farmed dairy farms seem to be typical for Germany. Here, the lowest milk yield, the highest share of milk from forage and a low stocking density were encountered. Italian organic dairy farms are characterised by a high percentage of arable area, a low share of milk yield from forage and a high farm family labour density, farming only a small land area. In contrast, the UK organic dairy farms typically relied on permanently hired labour and a high percentage of permanent grassland.

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Among the analysed **organic arable farms**, highest livestock density and the lowest labour input were encountered in Denmark, while the Italian arable farm reared no livestock and manure was imported. Similar to the Italian dairy farm the Italian arable farm was the most intensively managed farm of all arable farms. The British arable farm heavily relied on permanently hired labour.

Profitability of typical organic farms in 1999

Erreur ! Référence non valide pour un signet. illustrates the revenues, costs, milk prices and profits achieved by typical organic **dairy farms**, which vary widely between countries. Highest milk prices were achieved in the UK and Italy (43 €/100 kg FCM). In the UK milk prices were high due to a strong demand from several supermarket chains while supply was still lagging behind. In Italy, prices for milk sold for fresh milk consumption are generally high and an organic premium is paid. The low milk price in Denmark is debited to an oversupply of organic milk in recent years.

Not all farms can cover the costs of milk production through the achieved milk prices, even though additional beef returns close the gap between costs and milk market returns and break-even is achieved on all but the German farm, where part of direct payments are required to cover production costs (**Erreur ! Référence non valide pour un signet.**). Here, for organic arable and grassland farming 194 and 133 €/ha were paid. Organic support was even higher in the Italian model farm with 185 and 308 €/ha for arable and grassland, while in the UK no organic area support existed.

Figure 2: Comparative costs and revenues of milk production on typical organic dairy farms in 1999

In Denmark, profit per produced output unit is lowest of all countries, resulting mainly from variable high costs due to a high share of imported concentrates in the dairy feed ration and high liabilities. However, due to a high labour efficiency farm family remuneration is 28,506 €/FWU. In the UK low production costs are due to low fixed costs and depreciation despite high labour costs. The high milk price and little family labour input result in a high profit and farm family remuneration (58,979 €/FWU) despite of the lack of organic aid. The Italian case is characterised by low production costs due to low variable costs and a high profit per output unit despite high fixed costs. Considerable farm family labour input results in a low remuneration per FWU of 16,597€. In Germany high costs, mainly from depreciation and fixed costs, cannot be compensated by high direct payments for organic farming and result in a low farm family remuneration (14,458 €/ha).

Average revenues, costs and profits of typical **organic arable farms** also vary widely between countries (**Erreur ! Référence non valide pour un signet.**). All except the German arable model farm need at least part of the general CAP direct payments to break-even, average costs of production are not covered by the achieved market revenues. Direct payments for organic production are highest in Germany (256 €/ha UAA), while in the UK no organic support is paid. In Denmark 114 €/ha UAA not

discriminating arable and grassland, in the Italian arable farms receives 135 €/ha on arable land only.

Figure 3) were observed in Germany due to high prices (e.g. soft wheat: 332 €/t) and above average yields. However, mainly due to a high fixed and land costs farm family remuneration (36,926 €/FWU) is lower than in the UK. Due to its' large size scaling effects reduce costs and high cereal prices (e.g. soft wheat: 334 €/t) despite average yields contribute to a high farm family remuneration (61,717 €/FWU). Lowest farm family remuneration is observed in Italy (11,280 €/FWU) due to low prices, high variable costs and a high family labour density despite fairly high revenues from general CAP direct payments and organic aid. Danish arable farmers tend to farm labour effective achieving an average 22,444 €/FWU despite a low profit on an area basis.

Effects of current European Agricultural Policy

Agenda 2000: Effects on profitability

Agenda 2000 was implemented via the assumption of a 10% price reduction for cereals and a 20% price reduction for beef coupled with an increase in arable area and beef headage payments (EC 1999). Results show that the effects of Agenda 2000 depend primarily on farm type and production structure of each farm (Table 2). Organic dairy farms tend ot be positively affected, while the effects on organic arable farms are more diverse. The positive effect on dairy farms is due to larger shares of grassland and smaller shares of arable crops eligible to general CAP area payments than on arable farms. Furthermore, the analysed dairy farms are characterised by a high specialisation in milk production, with few activities susceptible to policy changes, i.e. cereal or beef production, in this scenario.

Table 2: Agenda 2000 effects on farm profitability by 2008 compared to profits in 1999

Δ Farm profit	UK	DE	DK	IT
Dairy farms				
per 100 kg FCM (€)	+1.5	-0.3	+2.2	+6.1
per FWU (%)	+24%	-5%	+49%	+22%
Arable farms				
per ha (€)	-136	+4	+108	-175
per FWU (%)	-20%	+2%	+47%	-62%

Source: Häring (2001)

The profit per family work unit of existing **organic dairy farms** is expected to increase with time, or at least remain similar to profit in 1999 as milk prices are assumed to remain constant but milk yields are expected to increase at an average of 0.9% per year. The magnitude of this effect depends on dairy yield levels and prices achieved in 1999. Reduced cereal prices benefit these farms reducing concentrate costs, especially on farms with a large share of concentrates in the feed ration. For example, the Danish dairy farm produces 50% of the average milk yield from concentrates and is

characterised by the highest milk yield of all farms (Table 1). Thus, profit clearly benefits from a drop in cereal prices and an increase in milk yield, although the initial milk price in 1999 is low. On the contrary, the German farms' low milk yield is based mainly on forage (76%) and the received milk price is low. In this case yield improvements and decreasing cereal prices cannot compensate for generally rising costs. A case of high milk prices, a high share of milk from concentrates but a low milk yield is the Italian farm. Here a reduction of concentrate costs combined with a remaining high milk price and a yield increase results in a significantly higher profit.

Organic arable farms are expected to experience a drop in profitability if they depend on large shares of arable area with a large share of leys and legumes. Farms relying on considerable livestock activities tend to benefit from Agenda 2000. The magnitude of impact is largely due to the share of arable area of total UAA, the livestock density of beef receiving headage payments and the amount of cereals fed to livestock. Farms with a high livestock density through beef benefit significantly from the increasing beef special payments overcompensating the price drops of beef as well as from the decreasing cereal prices, as is demonstrated by the Danish arable farm with its' 1.2 LU/ha. On the contrary, as cereal price drops are not fully compensated by the increased area payments or an assumed yield increase of approximately 0.7% per year for cereals, farms like the Italian arable farm with 100% arable area but no livestock, suffers clearly from Agenda 2000 developments. The combination of low yields (Table 1) and high initial prices in 1999 (334 €/t, compared to 332, 242, 258 €/t in DE, DK, IT, respectively) results in a considerable drop of total profitability, as yield increases cannot compensate for the large absolute drop in cereal prices.

Adaptation strategies to Agenda 2000

In order to improve or at least maintain farm family income in the future organic farms will need to pass through substantial adaptation processes. Farm activities independent of intervention price policies or indirectly affected by reduced input prices are expected to have the most beneficial effects on farm profitability.

Dairy farms tend to expand their dairy herd or to diversify into other farm activities. The most beneficial growth step depends on the specific situation in each country. A promising option for all dairy farms is an increase in milk yield, either based on an improved forage base or – if quality cannot be further improved and total area cannot be increased as land is scarce - by increasing the share of concentrates in the feed ration and taking advantage of decreasing cereals prices. A trend to field vegetable production, or value adding strategies for own cereal, such as pig rearing and beef production, or direct marketing as a further value adding strategy is also visible. The exact implementation of strategies, however, is highly dependant on national and local characteristics.

Organic **arable farms** most likely diversify into farm activities independent of intervention price policies. Field vegetable production is encouraged by a strong demand for organic vegetables in the Northern countries. Organic seed production is encouraged by expected changes in organic regulations in the year 2000. A trend to value addition to cereals by animal rearing strategies such as finishing pigs or rearing laying hens is also visible, either striving to improve returns from cereal own production or taking advantage of reduced concentrated costs and an increasing demand for organic meat products.

Alternative Policy Scenarios' Effects on Profitability

Two alternative scenarios were analysed in their effect on typical organic farms: "Organic Paradise", a policy driven scenario and "Fortress Europe", a demand driven situation (Table 3). These were defined in line with scenarios for the EU identified in a scenario analysis conducted with a large group of experts on the European Organic Farming (Zanoli et al. 2000).

Table 3: Definition of alternative policy scenarios until 2008

Scenario	Agenda 2000	Organic Paradise	Fortress Europe
CAP[1]	Agenda 2000	Agenda 2000	Agenda 2000
Support for Organic farming[2]	as in 1999	+100%[3]	as in 1999
Organic price premia	as in 1999	-30%	+30%

Source: Häring (2001)

1 Common Agricultural Policy
2 Area payments for continued organic farming
3 the UK introduces continuing organic farming support at 50% of conversion support in 1999

The **"Organic Paradise"** situation illustrates a strong dependence of organic farms on direct payments and the detrimental effect of increased direct payments on prices and their effect on the profitability of organic farms. In this scenario it is assumed that the increase in direct support for organic farming will cause farms to convert and after a time lag of conversion from 2003 prices will begin to drop by 5% per year.

The **"Fortress Europe"** scenario demonstrates the effect increased price premia may have. Assumptions for this scenario consider a price increase by a total of 30% until 2002 with a subsequent drop of 5% per year until 2008.

In both scenarios the most pronounced effects were observed on arable farms, whereas dairy farms were less susceptible to policy changes. This is mainly due to the underlying assumptions of Agenda 2000 in both scenarios (Table 3). Differences in scenarios relate mainly to price and direct payment assumptions for organic production.

Table 4: The effect of alternative policy scenarios on farm profits by 2008 compared to Agenda 2000

Δ Farm profit per FWU	UK	DE	DK	IT
"Organic Paradise"				
Dairy farms	-11.6%	+15.2%	+5.5%	+23.2%
Arable farms	-12.1%	+32.2%	+5.6%	+108.4%
"Fortress Europe"				
Dairy farms	-5.5%	-4.2%	-1.3%	-2.1%
Arable farms	-14.7%	-3.4%	-6.4%	-1.0%

Source: Häring (2001)

Compared to the farms under Agenda 2000, most farms can improve their income in the "**Organic Paradise**" situation. The gains due to increased area payments outperform the losses debited to expected drastic price reductions after a conversion boom initiated by high area payments. Obviously the absolute increases in area payments depend on the initial level of payments in each country and a 30% drop of an initially high price will cause a higher absolute price drop, but the absolute price nevertheless can remain high. This effect is particularly visible on the UK dairy farm. High milk prices drop considerably and although direct payments for organic farming are introduced these cannot compensate for the losses due to price reductions. A similar effect can be observed on the UK arable farm. In contrast, doubling of area payments for organic farming of the Italian farms leads to particularly strong increase in profitability, by far outperforming the losses due to drops in price premia.

The "**Fortress Europe**" situation has negative effects on the profitability of all farms. The assumption of high prices due to a strong demand is expected to encourage farms to convert. A subsequent increase in supply will have a detrimental effect on organic price premia and – in the long term – prices are expected to drop below the 1999 levels. For example, milk prices in the UK, DK and Italy will drop to 98.5, 98.2 and 98.8% of the initial prices in 1999, respectively, depending on the initial price and the organic price premium in 1999. Nevertheless, losses of most farms are minor in the long term.

A comparison of the "**Organic Paradise**" with the "**Fortress Europe**" scenario shows that, based on the assumptions made, the subsidy driven scenario results in higher profits of organic farms in the long term. These, however, strongly depend on the status-quo of payments in the single countries in 1999. How strong these effects are is illustrated by the examples of the Italian arable farm and the UK dairy farm. The Italian arable farms profit consists to nearly 200% of direct payments and its profit is, therefore, very susceptible to changes in the level of direct payments. In contrast, both farm types in the UK are less prone to changes in the level of direct payments as the increase in payment level was less pronounced. In contrast the "Fortress Europe" scenario demonstrates the importance of not only organic price premia, but also of the absolute price level in each country.

Adaptation strategies to alternative scenarios

Integrated analysis of potential adaptation strategies of organic farms to the alternative scenarios lead to the conclusion that adaptation strategies do not differ as strongly between policy scenarios as expected from policy impact simulations. A trend to a higher specialisation of farms is observed in both the "Organic Paradise" and the "Fortress Europe" scenarios. Farms either strive to adapt to changed situations by extensifying or intensifying production. Extensification is planned by considerable growth in area to take advantage of scaling effects and maximise output. This applies primarily to dairy farms in both scenarios and arable farms in the "Fortress Europe" situation. Intensification by either direct marketing or new intensive, value adding strategies is mainly envisaged by arable farms in the "Organic Paradise" scenario.

Outlook

Given a remaining potential increase in demand (Michelsen et al. 1999) organic products are likely to be sold as organic in the future. However, with an expanding

European market for organic products competition among countries will increase and price premia for organic products are expected to approach a common level in the long run. Therefore, comparative costs of production in different countries will become more important.

On the one hand, this increasing competition might lead to a stronger specialisation of farms and regionalisation of production within the EU, although specialisation of organic farms is limited due to restrictions in organic standards. On the other hand, it will force farms to stronger emphasise regional origin as a key marketing element in the future, to maintain price premia and market segments.

The large differences of organic farms in the different countries as well as the different reactions to changes in the level of direct payments, absolute prices and price premia illustrate the potential difficulties in designing appropriate policy measures for promoting organic farming in the EU. However, in order to avoid market distortions and a regional concentration of organic farms in regions where not only natural conditions benefit conversion to organic farming, but where support to organic farming is high, a more uniform support policy throughout the EU could be beneficial. Considering the original aim of supporting organic farming through the agri-environmental measures, contributing to natural resource conservation, it becomes apparent that a strong regionalisation of organic production could become counterproductive.

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