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Stimulating organic farming in the EU

With economic and fiscal instruments

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This report studies the effect or organic consumption and production of a VAT tariff of 0% on organic products, while keeping the VAT unchanged for conventional products. The study is based on price elasticities of five products in four countries, and the results are extrapolated to the EU 15. The 0% VAT tariff on organic products is then compared with a pesticide levy, a fertiliser levey and an increase of the EU budget for organic farming with cross compliance and modulation.

fiscal instruments / Value Added Tax (VAT) / pesticide levy / fertiliser levy / cross compliance / modulation / organic farming / conversion payments / maintenance payments

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Preface

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1 Introduction

It is widely recognised by scientists, national authorities and farming and environmental organisations that organic farming in general provides significant environmental benefits compared to conventional agriculture. These benefits include a reduction of nutrient and pesticide leaching, lower energy inputs and conservation of soil resources and biodiversity *(Organic farming in the European Union* 1999). These conclusions have been confirmed by a large number of national studies (e.g. Unwin et al 1995, De Vries et al 1997). Organic farming may also provide animal welfare, social and economic benefits. Organic agriculture should however not be seen as an exclusive method for sustainable farming (FAO 1999). The major factor that distinguishes organic farming from other approaches to sustainable farming is the existence of internationally acknowledged standards and certification procedures (Lampkin 1996).

Organic farming in the EU is rapidly expanding with average growth rates of 25% per year. In 2000 the organically farmed area reached a total of 3.94 million ha, that is 2.9% of the total farmed area in the EU (www.organic.aber.ac.uk). Haest Consultancy estimates the total (world market) value of retail sales of organic products in 2000 at 20,7 billion USD, of which 9,50 billion USD in Europe, 9 billion in de USA and 2,2 billion USD in Japan (Heast 2000). To improve Europe's environment, national governments have been designing policies to increase the share of organic farming in European agriculture. Policies to stimulate organic farming include area targets, conversion subsidies and organic maintenance payments, support for marketing and distribution, reduced interest rates (such as 'Green Financing' in the Netherlands), support for extension, research and education.

A new potential instrument to stimulate organic agriculture is to reduce Value Added Tax (VAT) for organic products to 0%, while maintaining VAT on non-organic food products. A lower VAT would normally lead to a reduction in consumer prices of organic food and to higher prices for farmers. Depending on the sensitivity to price changes, lower prices will lead to an increase in consumption. The increased demand will pull an increase in organically farmed area in the EU, assuming that dependence on imports from non-EU countries will not increase.

At this moment no differentiation exist in VAT-tariffs based on differences in production methods. Differentiation in VAT tariffs on food products is normal in the European Union. Belgium, Ireland and Portugal apply three different tariffs on different categories of food products, while Germany, Spain, France, Italy, Sweden and the United Kingdom apply two tariffs and other Member States apply one single tariff.

However, the European Commission is opening the discussion on differentiated taxation according to the environmental performance of products, in a green paper on integrated product policy (COM(2001) 68 final):
There are a number of possible actions which may form a cornerstone of an Integrated Product Policy and which are suggested as ideas for discussion: The main solution envisaged in this framework is differentiated taxation according to the environmental performance of products. A first step might e.g. be to apply reduced VAT rates on products carrying the European eco-label. Possibilities to do so will be investigated in the framework of the New VAT Strategy.

This could be supplemented by the development and use of other environmental taxes and charges, tradeable permits etc. on all levels of government (COM(2001) 68 final, p.14).

The VAT tariff rates also vary between countries, the range being between 0 and 25%. Because of the large variation between VAT tariffs in different countries the impact of a VAT reduction on consumption of organic products would also vary considerably. In the United Kingdom, Ireland and Luxembourg the effect would be zero because VAT tariffs in those countries are at or below 3%, while in Denmark, Finland, Germany, Sweden, Austria and Italy the effect would be much bigger with VAT tariffs on food products varying between 10 and 25%. This study does focus on three EU member states with relatively high VAT rates Austria (10%), Denmark (25%) and Sweden (12%) and one EU member state with a relatively low VAT rate: The Netherlands (6%).

Against this background the main objective of this study is to assess the effect of a 0% VAT tariff applied in all EU member states on the organic area in the EU.
Second objective is to compare effects of the VAT instrument on the organic area in the EU with four other instruments: a pesticide levy, a fertiliser levy, cross compliance conditions put on direct income payments, and modulation of direct income payments under market regulations. The focus of the comparison is exclusively on the financial potential of these instruments. This focus is taken because of an assumed EU area target of 10% organic area at the end of 2006, and the need for additional financial resources for additional conversion subsidies and organic maintenance payments.

2 Methodology for studying effects of a VAT tariff of 0%

2.1 Introduction

In this study one element of consumer behaviour is considered, i.e. price. Not taken into consideration are other factors affecting consumer behaviour such as:

- Availability or organic products in prefered outlets;
- Appearance and taste of the product;
- Image of the product;
- Health claims, facts or beliefs.

As a result of this choice the study will have a natural bias towards price. Whatever the results of this study are, the question is legitimate what exactly the importance of the price factor is in consumer behaviour. This study overlooks that question.

2.2 Assumptions

For the development of the methodology a number of assumptions were made, based on economic theory (see appendix A). The assumptions are:

- A VAT reduction implies for consumers that they have to pay a lower price for organic products and for farmers that they receive a higher price for their products. In this study however, we assume that all the financial benefits of a VAT reduction go to the consumer;
- Consumers are likely to respond to lower prices by buying more organic products;
- If the demand curve is known, the effect of a price reduction on the demanded volume can be calculated;
- The reliability of the demand curve for estimations about future demand depends on other factors such as market equilibrium, import and export volumes, growth rates in relation to the base, and the market share of organic products in the total food market;
- External factors such as food scandals (BSE, dioxine) or promotion campaigns for organic farming change the demand curve.

2.3 Selection criteria

Based on these assumptions some criteria were developed to select countries and products

- a VAT-rate on food products of at least 5%, considering that the effects on demand become insignificant when the price difference gets too small;
- a stable domestic market of organic products with a sufficiently big volume of production and consumption, considering that a relatively big change of demand in an unstable market put the demand curve upside down;

- a market share of organic products not exceeding 10% is favourable considering that below this percentage the substitution effects of increasing demand for organic products at the expense conventional products are relatively small;
- a relatively high growth rate (i.e. exceeding 30% per year) is unfavourable considering that the demand curve changes at high growth rates;
- a relatively high import or export as market share of domestic production (i.e. exceeding 30%) is unfavourable considering that more domestic consumption would lead to more import or less export but not to an increased domestic production.

2.4 Selection of countries and products

Based on these criteria four groups of countries can be distinguished (see appendix B):
- The most suitable countries are Germany and The Netherlands because of stable markets, moderate to relatively high VAT rates and low growth rates;
- In the second group of countries are Austria, Denmark, Finland and Sweden because of stable markets, moderate to relatively high VAT rates and moderate to relatively high growth rates;
- In the third group of countries are Belgium, Greece, Spain, France, Italy and Portugal because of unstable markets;
- Unsuitable countries are Ireland, Luxembourg and the United Kingdom because of relatively low VAT rates.

Based on the criteria that the market of organic products should be well established with a relatively big volume of production and consumption the following products were selected to be subject of this study:
- The dairy products milk (full fat), yoghurt and butter;
- The cereal product bread (wheat);
- The root crop consumption potato.

2.5 Two approaches

Two different approaches were developed to collect information on the selected products in the selected countries.

Statistical information

The first approach is based on statistical information. The questionnaire with the statistical information can be found in Appendix C. It turned out that the questionnaires could not be filled in, because statistics we were looking for do barely exist at a national level. National statistical offices do not distinguish between conventional food and organic food because the market share of organic food is too small. Organic farming associations do not have the capacity and/or the resources to collect the statistics. The statistics about sales and prices that supermarkets have for their internal turn-over en profit and loss calculations are not accessible because it is considered as strategic information.

The same problem was encountered by researchers in an international study on the European market for organic products:
'The collection of data is complicated by the fact that no clear distinction is made between organic and other types of food products in any official statistical accounts.

Thus, information on the organic food market is scarce and is only available from some private organic organisations and/or private firms working in the market. These potential sources of information have different policies concerning willingness to provide information about market prices and quantities marketed' (Michelsen et al., 1999. The European Market for Organic Products: Growth and Development).

There is relevant information in databases of market research companies. That information is based on consumer panels. In the Netherlands the market research company GfK-Netherlands was approached of whom costs charged for such a study exceeded the limitations of the budget of this study. In a Danish study that will be described later panel data from GfK Denmark were used.
The conclusion is that statistical information is not readily available. As a result the first approach failed and that a new approach needed to be based on qualitative information.

Qualitative information
The second approach is based on qualitative information from market experts.
A questionnaire was designed in co-operation with Platform Biologica, Rabobank and the Dutch Central Office of Retailtrade (CBL).

The second approach was applied in Austria, Denmark, Sweden and The Netherlands. Market experts in these countries were found with the help of the following persons and organisations (see Annex E):

- Ernte in Austria has the market expertise itself;
- SOL in Denmark Biodania suggested different experts for wheat, dairy products and potatoes. Indirectly we came in contact with Wier and Smed (AKF).
- Ekologiska Lantbrukarna in Sweden suggested three market experts;
- Dutch Central Office of Retailtrade (CBL) in The Netherlands asked the chief purchasers of the main supermarket chains joining a regular working group meeting of CBL to answer the questionnaire.

With regard to the reliability of the data, it should be well understood that the estimations come from a limited number of market experts. However, market experts that based on their experience with price actions, are supposed to provide relatively reliable estimations. The Dutch market experts filled in the questionnaire independently from each other and came to similar estimations. In Austria, Denmark and Sweden the market experts filled in the questionnaire and checked the estimations with colleague experts. The questionnaire can be found in Appendix D.

While implementing this approach, we came across a Danish study 'Explaining demand for organic food' written by Wier and Smed (2000) of the Danish Institute of Local Government Studies (AFK). In this study, they analyzed the consumption of organic foods in Denmark in the late 1990s. The aim of the study was to identify the influence of price premiums on buying propensity. The methodological approach was econometric estimation based on monthly observations. The model specified demand for four commodity groups: dairy products, bread and cereals, meat, and other foods (including fruits and vegetables). They applied the AIDS demand system and estimated dynamic as well as static, homothetic as well as non-homothetic model specifications, and furthermore specifications with and without trends. Finally, scenario analysis of changes in the price premium of organic foods was performed. For the monthly observations, data were used from GfK Denmark which is a private institute registering the consumption of approximately 2300 households of organic and conventional foods and the corresponding prices. Among other things the study drew conclusions about price elasticities for organic products (Wier and Smed 2000).

2.6 Calculations for hectare change in organic production area

To calculate the change in organically farmed area (in hectares) as a result of a 0% VAT tariff is not easy. The difficulty is that statistics do not distinguish between crops for human and animal consumption. The production of dairy products is based on grasslands and fodder crop area but in these areas also feed for meatproducts (beef, calves, sheep, chicken) and poultry (eggs) is produced. Wheat for bread is included in the category cereals that also includes cereals for animal feed. Consumption potatoes is included in the category arable crops or potatoes that also includes industrial potatoes and seed potatoes.
For the calculations of the effects within a country we made the following assumptions:

- the percentage change in production volume is equal to the percentage change in consumption volume;
- the average yield per hectare is constant;
- the increase in demand does not lead to higher import shares;
- the increase in production area for arable crops and cereals is equal to the increase in demand of wheat (for bread);
- the increase in production area for grassland and fodder crops is equal to the increase in demand for dairy products.

For the calculation we need the actual area of organic arable crops, grassland and fodder crops and the percentage change in demand of wheat bread or wheat flour, dairy products and consumption potatoes.

Based on the results in the four countries (AT, DK, NL and SE) we tentatively calculate effects of a VAT tariff of 0% at the level of the EU-15 as a whole. For these calculations we made the following assumptions.:

- the percentage change in production volume is equal to the percentage change in consumption volume;
- the average yield per hectare is constant;
- the increase in demand in the EU-15 does not lead to higher import shares from outside the EU-15;
- the average effects in the four countries studied apply to the other EU member states as well.

In these calculations we take into account the different VAT levels, and the actual organic areas for arable crops, grassland and fodder crops.

3 Results of a VAT tariff of 0%

This chapter presents the results of the study on a 0% VAT tariff in four countries: Austria, denmark, Sweden and The Netherlands. The results will be presented per country and then briefly summarised in a concluding paragraph. The results in four countries are extrapolated to the EU-15.

3.1 Austria

General information

In 1999 the organically cultivated area in Austria was 287,900 ha, 8.43% of the total farmland. The number of organic farms was 19,741, that is 7.3% of all farms (website: www.organic-europe.net). The annual turnover of organic products at the domestic wholesale level is estimated at 218 million Euro. This corresponds to a market share of approximately three per cent of Austria's total food market (BMLF, 1999 Agricultural report of the Federal Government 1998).

Market information

	Growth rates 93-97 (%)	Current share 93-97 (%)	Import (tonnes)	Import (market share)	Export (tonnes)	Export (prod.share)
Cereals	100	2	3000	10	3500	10
Dairy products	120	10	50	?	50000	15
Potatoes	70	6	0	0	4000	40

Source: Organic farming in Europe Volume 7

In 2000 about 60% of organic milk production in Austria can be sold as organic. This implies that a VAT reduction would initially be used to find new markets for 40% of the organic milk production. There is no initial effect on new organic area.
In 2000 about 100% of organically produced wheat and potatoes in Austria can be sold as organic (Josef Aigner).

VAT rate

The current VAT-rate is 10%.

Effect of a VAT-reduction on consumer demand for organic products

Products (1 kg)	Price Conventional products (in Euro)	Price Organic products (in Euro)	Price difference (in %)	Price organic after VAT-reduction to 0%. (in Euro)	Price difference after VAT-reduction to 0% (in %)	Expected increase in demand for organic products (in %)
Bread (wheat)	0.13	0.36	177	0.33	146	10
Milk (full fat)	0.57	0.79	39	0.72	25	10
Potatoes	0.07	0.28	300	0.25	257	20

Source: Ernte 2000

The organic milk price actually is 0.79 Euro to a price of 0.57 Euro for conventional milk. The estimated effect of a price decrease of 10% on demand of organic milk is an increase of 10%.
The organic wheat price actually is 0.36 Euro to a price of 0.13 Euro for conventional wheat. The estimated effect of a price decrease of 10% on demand of organic wheat is an increase of 10%.
The organic potato price actually is 0.28 Euro to a price of 0.07 Euro for conventional potatoes. The estimated effect of a price decrease of 10% on demand is an increase of 20%.

Additional remarks

Organic consumption is not that price-dependent as we all think. In the supermarket it is, but in the shelf mainly issues like presentation and differentiation influence selling figures. There are different categories of buyers that step in as buyers of organic produce at different levels of price difference between conventional and organic produce. But again not only price influences the buying decision (Josef Aigner).

3.2 Denmark

General information

The number of organic farms grew from 219 in 1988, to 3099 by the end of 1999.
In 1999 146,685 hectares, 4.9% of the agricultural area in Denmark was converted or under conversion (website: www.organic-europe.net).
The highest market share of organic foods is observed for dairy products, where organic products constitute 10% of the whole market. The highest sales growth is experienced in the group of organic bread and cereals, where market shares have grown 143% in the period between 1996-1999 (Wier and Smed 2000). The market share of organic wholemeal flour in Denmark is 22% and potatoes 7% (Mette Wier). Market shares in 2001 for fresh consumption milk is between 25-30%, yoghurt 7-10%, butter and cheese 2-5% (Anne Mette Arve).

One to two percent of the consumers always buys organic, 10% spends more than ten percent of their household budget on organic food, 24% spends two to ten percent on organic food, 41% spends less than 2.5% on organic food, 25% do never buy organic food (Økoguide 1999, Landbrugets Radgivningscenter 2000).

Market information

	Growth rates 93-97 (%)	Current share 93-97 (%)	Import (tonnes)	Import (market share)	Export (tonnes)	Export (prod.share)
Cereals	20	3,5	10000	64	1400	20
milk/ yoghurt	70	14,2	0	0	232	0,2
Potatoes	0	2,9	976	10	28	<1

Source: Organic farming in Europe Volume 7

In 2001 about 50% of organic milk production in Denmark can be sold as organic. (Anne Mette Arve) This implies that a VAT reduction would initially be used to find new markets for 50% of the organic milk production. There is no initial effect on new organic area. In 2001 about 100% of organically produced wheat (Cerealia) and potatoes (Biodania) can be sold as organic in Denmark.

VAT rate

The current VAT-rate is 25%. This is the highest VAT rate in the European Union. This high VAT rate together with relatively low actual price differences between organic and conventional produce, implies that a VAT reduction of 25% would make organic produce cheaper than conventional produce. The impact on organic consumption is relatively big.

Effect of a VAT-reduction on consumer demand for organic products

Products (1 kg)	Price Conventional products (in Euro)	Price Organic products (in Euro)	Price difference (in %)	Price organic after VAT-reduction to 0% (in Euro)	Price difference after VAT-reduction to 0% (in %)	Expected increase in demand for organic products (in %)
Wheat flour	0.74	0.94	27	0.71	-4	20-50
Milk (full fat)	0.81	0.94	16	0,71	-13	50
	1.41	1.75	24	1.31	-7	
Yoghurt (full fat)	6.44	7.52	17	5.64	-12	
Butter	1.04	1.21	16	0.91	-12	45-50
Potatoes						

Source: estimates of prices of wheat flour in 2001 (Cerealia), dairy products in 2001 (Anne Mette Arve), potatoes in 2001(Biodania), estimates of demand increases of potatoes (Biodania, Wier and Smed), wheat (Cerealia, and Wier and Smed) and dairy products (Wier and Smed).

The estimated effect of a price decrease of 25% on demand of organic wheat is an increase of 20% (Cerealia) to 50% (Wier and Smed 2000). The market share for bread and cereals would 4,6% to 7% (Wier and Smed 2000).
The estimated effect of a price decrease of 25% on demand of organic potatoes is an increase of 45%(Biodania) to 50% (Wier and Smed 2000).

In the Danish study of Wier and Smed the market share of potatoes is not distinguishable in the market share of other foods which is 4%.
The estimated effect of a price decrease of 25% on demand of organic dairy products is 50% (Wier and Smed 2000).
According to Wier and Smed (2000) the price sensitivity found in their study is relatively high compared to other studies. The main reason for the high elasticities is that the organic and conventional food products are very close substitutes. Furthermore, organic foods turn out to be luxury goods with budget shares increasing with income. The most reliable results concern dairy products and bread & cereals, as the markets for these commodity groups are quite mature. Modeling demand for meat products and other foods yielded insignificant results, as the consumption of these goods seems to be subject to variables outside the model. The budget shares for various household types were considered, suggesting that the age of the consumers, the age of their children and degree of urbanization were the most important factors. Nevertheless, the effects of these factors varied considerably from one type of organic commodity to another. Finally, the model was estimated for various household types, suggesting that groups with low organic budget share also had the lowest price sensibility of organic consumption (Wier and Smed 2000).

Additional remarks
There are different categories of buyers that step in as buyers of organic produce at different levels of price difference between conventional and organic produce. At equal prices of conventional and organic products most consumers prefer organic products. Almost everybody perceives organic produce as healthier and good for the environment because no pesticides or artificial fertiliser are being used.

3.3 Sweden

General information
The total number of farms in Sweden is 3253, or 3.6% of the total number of farms, covering 155,674 hectares or 5.0% of the total agricultural area (website: www.organic-europe.net).

All major retailers are distributing organic products. The product groups that have reached highest market shares are vegetables, grain products, milk and baby food.(Grolink, 2000). The market share of retail chains in Sweden shows some differences. Consumption of organic milk 11%, wheat flour 3-11% and potatoes 3-6% (KRAV statistics, 2000). The market shares at ICA are for milk (1.5% fat) 10,3%, wheat flour 2.8% and potatoes 7.1% (figures based on total ICA sale during 2000). ICA is the retail chain having 30-40% total market share in the Swedish market.

Market information

	Growth rates 93-97	Current share 93-97	Import (tonnes)	Import (market share)	Export (tonnes)	Export (prod.share)
Cereals	50	1,5	200	1	1	0
Milk/ yoghurt	77	3	0	?	?	?
Potatoes	28	4	0	0	25	1

Source: Organic farming in Europe Volume 7

No information was found about the percentages of certified organic milk, wheat flour and potatoes that could not be sold at an organic premium because of a lack of demand for it.

VAT rate

The current VAT-rate is 12%.

Effect of a VAT-reduction on consumer demand for organic products

Products (1 kg)	Price Conventional products (in Euro)	Price Organic products (in Euro)	Price difference (in %)	Price organic after VAT-reduction to 0% (in Euro)	Price difference after VAT-reduction to 0% (in %)	Expected increase in demand for organic products (in %)
Bread (wheat)	1.04	1.68	62	1.50	42	<10
Milk (full fat)	0.70	0.82	17	0.73	3	>10
Yoghurt (full fat)	1.28	1.52	19	1.36	5	10
Butter	2.36	3.64	54	3.25	36	<10
Potatoes	0.58	0.95	64	0.85	47	10

Source: KF Sweden, ICA.

The organic wheat price actually is 1.68 Euro to a price of 1.04 Euro for conventional wheat. The estimated effect of a price decrease of 12% on demand of organic wheat is an increase of less than 10%.
The organic milk price in Sweden actually is 0.82 Euro to a price of 0.70 Euro for conventional milk. The estimated effect of a price decrease of 12% on demand of organic milk is an increase of 10% or more. In Sweden the environmental awareness is high and many consumers are willing to buy ecological milk in principle. Many do not because they think it is too expensive.

The organic yoghurt price in Sweden actually is 1.52 Euro to a price of 1.28 Euro for conventional yoghurt. The estimated effect of a price decrease of 12% on demand of organic yoghurt is an increase of 10%. There is not much variation in organic yoghurts compared to conventional yoghurts actually on the market.
The organic butter price actually is 3.64 Euro to a price of 2.36 Euro for conventional butter. The estimated effect of a price decrease of 12% on demand of organic butter is an increase of less than 10%. There is not much variation in organic butters compared to conventional butters actually on the market. Consumers are also very often set in their preference of butter.
The organic potato price actually is 0.95 Euro to a price of 0.87 Euro for conventional potatoes. The estimated effect of a price decrease of 12% on demand of organic potatoes is an increase of about 10%.

Additional remarks

There are different categories of buyers that step in as buyers of organic produce at different levels of price difference between conventional and organic produce. At equal prices the bigger part of all consumers does not necessarily prefers organic products. The consumers need information about organic food before they start to buy it. Very often consumers only buy the products they know, and they do not care about substitutes. Consumer preferences are hard to change. With organic potatoes for example very low price differences exist compared to conventional potaoes. But consumers still prefer to buy their conventional potatoes.

The estimations of demand increase are vague. This ought to be asked directly to real consumers, or tested in some specific stores for more adequate and reliable data. Consumer information on organic farming and promotion of organic products is essential to increase the consumption of organic yoghurt, butter and potatoes.
The perceived price difference is also a barrier: there are consumers thinking they cannot afford it. A third barrier is the limited range of products within a product group (KF Sweden).

3.4 The Netherlands

General information

In January 2001 the organic share in the total number of farms in the Netherlands is 1391 or 1,48%. The organic farms cover 27,820 hectares or 1,39% of the total agricultural area (website: www.organic-europe.net). The market share of organic milk products in the Netherlands is 2,3% (EKO-monitor 2000, Platform Biologica).

Market information

	Growth rates 93-97	Current share 93-97	Import (tonnes)	Import (market share)	Export (tonnes)	Export (prod.share)
Wheat bread	-28	<1,2	6000	47	1500	?
Dairy products	0	1	?	?	?	?
Potatoes	20	<1	150	50	1000	80

Source: Organic farming in Europe Volume 7

VAT rate

The current VAT-rate is 6%. This rate of 6% is the lowest among the countries studied.

Effect of a VAT-reduction on consumer demand for organic products

Products (1 kg)	Price Conventional products (in Euro)	Price Organic products (in Euro)	Price difference (in %)	Price organic after VAT-reduction to 0% (in Euro)	Price difference after VAT-reduction to 0% (in %)	Expected increase in demand for organic products (in %)
Bread (wheat)	0.62	0.90	45	0.85	37	5
Milk (full fat)	0.65	0.84	29	0.79	22	5
Yoghurt (full fat)	0.72	1.02	42	0.96	33	5
Butter	1.11	1.45	31	1.37	23	5
Potatoes	1.81	2.26	25	2.13	17	10

Source: CBL, Rabobank

The organic wheat price actually is 0.90 Euro to a price of 0.62 Euro for conventional wheat. The estimated effect of a price decrease of 6% on demand of organic wheat is an increase of 5%.
The organic milk price actually is 0.84 Euro to a price of 0.65 Euro for conventional milk. The estimated effect of a price decrease of 6% on demand of organic milk is an increase of 5%.
The organic yoghurt price actually is 1.02 Euro to a price of 0.72 Euro for conventional milk. The estimated effect of a price decrease of 6% on demand of organic yoghurt is an increase of 5%.
The organic butter price actually is 1.45 Euro, to a price of 1.11 Euro for conventional butter. The estimated effect of a price decrease of 6% on demand of organic butter is an increase of 5%.
The organic potato price actually is 2.26 Euro to a price of 1.81 Euro for conventional potatoes. The estimated effect of a price decrease of 6% on demand of organic potatoes is an increase of 10%.

Additional remarks

The stock of organic products is not taken into account although an important factor in the market. Prices differ considerably between supermarkets and health food stores but also between supermarkets (Platform Biologica).

Half of the market experts opposed the statements that at equal prices of conventional and organic products the bigger part of all consumers prefers organic products. Their reaction was that at equal prices there would not be a big difference between conventional and organic products. Moreover, there is less choice in organic products and some people do not see the advantage of organic products.

3.5 Summary of results in four countries

The impact of a VAT reduction was studied on a limited number of organic food products only, namely wheat bread, milk, yoghurt, butter and potatoes. Because these products have a relatively big market share the assessment is potentially more accurate than an assessment for organic food products having a small market share. The estimations are based on expert opinion, because statistics about prices and sold volumes of organic products were lacking or not easily available.

The market experts were asked to estimate volume effects of two different price decreases of the five selected organic products. In Austria, Denmark and The Netherlands the volume effects of a price decrease on milk, yoghurt and butter were estimated as being it one commodity group of dairy products. However in Sweden, it was estimated that the volume effect of a price decrease on butter, yoghurt and milk would be different for each product.

The results also indicate that the percentage price reduction leads to at least the same percentage increase of production area. If Austria is taken as reference country a price fall of 10% would lead to a 10% increase of organic consumption of dairy products and wheat for bread. Denmark, Sweden and the Netherlands come to similar figures. With the exception of Sweden, in the countries studied the demand of biological potatoes seems to be almost twice as sensitive to price decreases as demand of dairy products and wheat for bread.

Sensitivity of consumers to changes in prices of organic products varies per commodity group and it even varies per product. Wheat for bread seems to be less sensitive to price changes than dairy products. This can for example be explained by differences in taste of organic bread compared to conventional bread while differences in the taste of dairy products are less obvious. For potatoes market experts in Austria, Denmark and the Netherlands estimate a relatively high sensitivity to price decreases compared to wheat and dairy products. Swedish market experts estimate price sensitivity for potatoes much lower, even at very small price differences between organic and conventional products.

Market experts agreed on the statement that three different consumers groups have a different sensitivity to price changes of organic products: innovators (2% of all consumers), early adopters (15%) and early majority (30%). Moreover they agreed that the price level at which different consumer groups start to be interested in organic products is different. Innovators are the least sensitive to price changes, early adopters are more sensitive and the early majority is again more sensitive to price changes.

The differences in reactions between consumer groups explain why demand will increase faster if organic prices get closer to conventional prices, and why a certain demand for organic products will be maintained if price differences increase between organic and conventional products. In other words, there is a group of heavy users that does not care about the price of organic products. They keep buying it even at very high price differences. At the other extreme there is a group of consumers that will not buy organic products even if it is cheaper than conventional products.

Some market experts opposed the statement that prices of conventional and organic products being equal, up to 50% of all consumers would prefer to buy organic products. The comment is that consumers need to be aware about the benefits of

organic farming and have a positive attitude towards organic products. This awareness and attitude needs to developed. This comment reminds us that price is just one and maybe not the most important factor for purchase behaviour of consumers.

Another important factor mentioned was that prices of organic products vary significantly between supermarkets. Price differences up to 40% were reported between supermarkets. This implies that the effect of a VAT reduction might be smaller thatn the effect of shoping in another (cheaper) retail store.

The results of the study on effects of a VAT reduction to 0% indicate that the effects differ per product group and even per product. Nevertheless we assume that the effects of a small number of products are equal to the effects that can be expected at higher aggregation levels. The effect of increased consumption on bread wheat production is equal to the effect on arable production as a whole. The same counts for the effects of increased consumption of organic dairy products on the production of organic grass-land and fodder crops. The overview of the effects is provided in the following table.

Expected production effects from 0% tariff of VAT in hectare organic area

	Actual VAT tariff-assumed percentage price reduction	Estimated increase in consumption / production (in %)	Actual organic area in 1998 (ha)	Estimated increase in production of organic products (ha)
Austria				
Arable land	10	10	54700	5470
Grassland and fodder crops	10	10	230000	23000
Total			284700	28470
Denmark				
Arable land	25	20-50	38787	7757-19394
Grassland and fodder crops	25	50	46842	23421
Total			85629	31178-42815
Sweden				
Arable land	12	<10	33526	3352
Grassland and fodder crops	12	>10	78759	7876
Total			112285	11228
Netherlands				
Arable land	6	5	4948	247
Grassland and fodder crops	6	5	12183	609
Total			17131	856

3.6 Tentative calculation of effects in other EU countries

The effect of a VAT tariff of 0% was only studied for four countries. The results indicate that consumption of organic products and the production area needed for it change with at least the same percentage as the VAT-reduction (from the actual tariff to 0%). In the following table we assume that this is true for all EU-15 countries for two categories of products namely arable land and grassland and fodder crops.

We took the category arable land instead of the category cereals because the statistics for 1998 are complete while they are not for cereals. According to the available statistics, about 85% of organic arable land in the EU-15 is used for cereals.

The categories arable land, grassland and fodder crops made up 70% of the total certified organic and in-conversion land area in 1998 (Foster and Lampkin 2000). The assumption that the production area changes with the same percentage as the VAT-reduction may not be true for the categories fruits and vegetables. One of the reasons is that premium prices for these categories are generally on a higher level than for milk products and cereals (Michelsen e.a. 1999). The following table excludes fruits and vegetables.

Table: Effect of a VAT tariff of 0% on organic area in EU member states

Countries	VAT tariff	Organic arable land in 1998 (ha)	Organic grassland & fodder crops in 1998 (ha)	Total of two categories (ha)	Effect of VAT tariff of 0% on organic area (ha)
AU	10	54700	230000	284700	28470
BE	6	593	9828	10421	625
DK	25	38787	46842	85629	21407
SP	7	26667	122347	149014	10431
FI	17	35583	35247	70830	12041
FR	5.5	35900	87600	123500	6792
GE	16	140000	221000	361000	57760
GR	8	1811	211	2022	162
IRE	0	258	17643	17901	0
IT	10	180000	353000	533000	53300
LU	3	172	581	753	23
NL	6	4948	12183	17131	1028
PT	5	4081	4697	8778	439
SW	12	33526	78759	112285	13474
UK	0	8248	180957	189205	0
EU15		565274	1400895	1966169	205952

Source of areas: Foster and Lampkin 2000 table 14-1, data from 1998

If in all EU member states a VAT tariff of 0% on organic products would be introduced, a 10.5 % increase of the organic arable land, grassland and livestock in the EU-15 could be expected. Based on the figures of 1998 this meant an increase of about 206.000 hectares. If we assume that the share of arable land and grassland and livestock in the total organic area did not change, the effect of a VAT tariff of 0% can be estimated for 1999 and 2000. The estimates are presented in the following table.

Table: Extrapolation of effects of a VAT tariff of 0% on organic area

Year	Total organic area in the EU-15 (ha)	Arable, grassland and livestock area (ha)	Effect of a VAT tariff of 0% on area (ha)
1998	2.822.776	1.966.169	205.952
1999	3.489.128	2.442.390	255.835
2000	3.944.953	2.761.467	289.258

Source of area statistics: www.organic.aber.ac.uk/stats.shtml

4 Levy on pesticides

In this chapter the price elasticities of the introduction of a levy on pesticides will be assessed. The price elastiscity is use in a calculation on the effect of a pesticide levy on the total organically farmed area in the EU.

4.1 Price elasticities of the introduction of a levy on pesticides

The EIM/Haskoning (1999) report presents a review of several European studies in which price elasticities of demand of pesticides were estimated. The price elasticity is an 'objective' indicator for the change in purchase behaviour of farmers when prices of pesticides increase. The higher the elasticity the more responsive farmers are to changes in pesticide prices. The price elasticity is for pesticides always negative because a higher pesticide prices lead to reduced sales and reduced use of pesticides.

Table I. Overview of studies on the price elasticities of demand of pesticides

	Study	country	elasticity	demand of	remarks
1	Oskam (1997)	EU	-0.2 to -0.5	pesticides	general overview of other studies
2	Elhorst (1990)	NL	-0.3	non-factor inputs	short term; arable farming, based on data 1980-1986
3	DHV and LUW (1991)	NL	-0.2 to -0.3	pesticides	short term: -0.2 for arable farming; -0.3 for horticulture
4	Oskam (1992)	NL	-0.1 to -0.5	pesticides	medium term: -0.1 for mixed farms (potatoes, onions); -0.5 for specialised farms
5	Oude Lansink & Peerlings (1995)	NL	-0.5 to -0.7	pesticides	based on data 1970-1992 -0.7 is inclusive the CAP reform
6	Russell (1995)	UK	-1.1	Pesticides in cereals	based on 26 cereals producers; period 1989-1993
7	Falconer (1997)	UK	-0.3	pesticides	using a linear programming model
8	Ecotec (1997)	UK	-0.5 to -0.7	herbicides	long term; only for herbicides used for cereal grass weed
9	Dubgaard (1987)	DK	-0.3	pesticides	using a threshold model
10	Dubgaard (1991)	DK	-0.7	herbicides	long term period 1971-1985
11	Dubgaard (1991)	DK	-0.8	fungicides & insecticides	long term period 1971-1985
12	Schulze (1983)	D	-0.5	fungicides	using a linear programming model
13	Johnsson (1991)	S	-0.3 to -0.4	pesticides	based on field experiments; -0.3 for insecticides, -0.4 for fungicides
14	Gren (1994)	S	-0.4 to -0.9	pesticides	econometric model; -0.4 fungicides, -0.5 insecticides and -0.9 herbicides
15	SEPA (1997)	S	-0.2 to -0.4	pesticides	general overview

Source: EIM/Haskoning (1999)

Table 1 shows an 'overall' price elasticity of demand for pesticides between -0.2 and -0.5 (based on study no. 2, 3, 4, 5, 7, 9 and confirmed by study no. 1 and 15). The 'overall' price elasticity of demand for herbicides, fungicides and insecticides, is higher. With respect to herbicides the price elasticity is between -0.7 and -0.9 (based on study no. 10 and 14), for fungicides between -0.4 and -0.8 (based on study no. 11, 12, 13, 14) and for insecticides between -0.3 to -0.8 (based on study no. 11, 13 and 14). Finally, the price elasticity of demand for pesticides used for a special crop, such as pesticides in cereals, are the highest: i.e., the price elasticity for such specialised pesticides is between -0.5 and -1.1 (based on study no. 6 and 8).

A recent Danish study (Jorgensen and Jensen 2000) presented a price elasticity for herbicides outside the range presented above (–1,5) and fungicides (–0,057). The price elasticity of insecticides was within the range (-0,5).

In the same report (EIM/Haskoning, 1999) two different approaches to a pesticide levy were used. The first approach was that all pesticides are treated in the same way and a 20% levy on active ingredients is assumed. The second approach was to vary the levy on the active ingredients of the pesticides depending on the environmental hazards of these pesticides. As pesticides have been classified into seven classes, the levy on active ingredients of pesticides belonging in the 'hazardous' classes I or II is 40%, in the 'middle' classes III, IV and V 20% and in the 'harmless' classes VI and VII 10%.

The EIM/Haskoning (1999) report concluded that:

- The effect of a levy of 20% on active ingredients (all pesticides are treated in the same way) is a decrease in the use of the pesticides between 8 and 18%.
- The effect of a variable levy (between 10 and 40%) depending on the environmental hazards of the active ingredients of the pesticides is between 7 and 32%.

4.2 Use of the revenue of a pesticide levy for organic farming

In 2000, the West Eurpean agrochemical market registered a real decline of 5.7%. A major factor in the downturn in the value of the West European market in 2000 was the weakened farmer demand as a result of low crop commodity prices. A further negative influence was the introduction of a pesticide tax in France, following on from similar moves in Nordic countries and Austria. The market value reached 6057 million Euro (Mc Dougall 2000).

In 1996 Denmark has implemented a pesticide tax. Since 1998 the average tax was 35%. Part of the revenues were used to stimulate organic farming (Note on the Danish Pesticide Tax 1999).

A levy on pesticides has a direct effect on organic farming because it reduces the comparative economic advantage of conventional farming compared to organic farming. Interpreting the EIM/Haskoning study, our conclusion is that a 20% levy on herbicides will have more effect on organic farming than 20% levy on fungicides or insecticides, because of the relatively higher price elasticity of demand of herbicides. What the direct effects are need additional research, but some qualitative remarks can be made. A levy on herbicides could imply that conventional farmers start to apply organic weed control measures complementary to or instead of conventional methods, without converting their farm into organic. Although this has no immediate effect on the organically farmed area, it has positive effects on the environment and it may

positively change the attitude of conventional farmers towards organic farming, leading to more organically farmed area over time. A levy on herbicides would stimulate farmers to adopt organic methods. Weed control is considered as one of the major obstacles for converting to organic farming. Control of plant diseases and insects in an organic way requires more radical changes to conventional farming systems than weed control. A key issue is the level of the tax because weed control in organic farming is relatively costly. A levy on herbicides would need to make organic weed control measures economically attractive for conventional farmers.

The revenue of a pesticide levy could be used to stimulate organic farming. An increase in organic farming area would in turn reduce the sales of pesticides. We present the calculation of the revenue of a herbicide levy of 50%.

Box: Calculation of the revenue of a herbicide levy

- Total sales of 2397 milion Euro of Herbicides in the EU-15 and EFTA before introduction of the levy (McDougall 2000)
- Price per kg Herbicide is 28 Euro (Nefyto)
- Calculated volume of 85.6 kt of active substance herbicide sold in EU-15 and EFTA in 1999/2000 (based on sales volume in Euro and average kg price in Euro)
- A tax rate of 50%. The revenues of the tax are 14 Euro per kg herbicide sold
- Price elasticity of –0,8, a tax rate of 50% will lead to a 40% reduction of herbicide use (EIM/Haskoning 1999)
- Reduction of Herbicide use = reduction of Herbicide sales
- Total sale of 60% of 85.6 kt of Herbicides = 51.4 kt after introduction of the levy
- Conversion subsidy of 737 Euro per hectare (paid over the whole period).
  Maintenance subsidy of 136 Euro per hectare per year.

If a Herbicide levy would be introduced at the European level the total amount of financial resources available would be 719 million Euro. For this amount

- 976 thousand hectare agricultural land could be converted to organic farming every year, or;
- 5.29 million hectares organic area could be maintained organic.

5 EU levy on fertilizers

In this chapter (some) environmental effects of an EU fertiliser tax as well as effects on the organically farmed area will be assessed. The fertiliser tax refers to chemical Nitrogen fertilisers only. No literature sources were found referring to a levy on phosphate.

5.1 Environmental effects of the introduction of a levy on fertilisers

The report 'Economic instruments for nitrogen control in European agriculture' (1999) reviews European literature on economic instruments for nitrogen control in agriculture published since 1990. Environmental effects of levies on fertilisers are included in the report, and presented in an overview table. The table includes different levy rates, effects on fertiliser use or nitrogen leaching, effects on nitrogen surplus or nitrogen emission to the air, and the analysis level (farm type, crop, aggregated sector or several farm types).

Table: Environmental effects of levies on fertilisers

country	levy (%)	effect fertiliser level	effect in nitrogen surplus	source	type of farm
EU	30%	7-17%	8-20%	Becker & Kleinhanss (1997)	diff.
	50%	11.6-28.5%	16.8-33.4%	Becker & Kleinhanss (1997)	diff.
	50%	16-29% or 15-35%	34%	Becker (1992)	diff.
	50%	20%	13%	Liapis (1994)	diff.
	50%	10.5-20%	23-40%	Kleinhanss et al (1997)	diff.
		20.5-44.3% (if org. subst.)	13-33%	Kleinhanss et al (1997)	diff.
	100%	23.2-52.5%	26.1-66.7%	Becker & Kleinhanss (1997)	diff.
	100%	6-12%		Douthwaite (1996)	cereals
Netherlands	18%	5%	7.8 kg/ha	Oude Lansink (1997)	arable
	80%	21% (dairy farms)	3-16% (arable & dairy)	Baltussen (1992)	diff.
	300%		18-53%, 4-36% NH3 em.	Berentsen & Giesen	dairy
Greece	10%	7.3%		Papanagiotou & Malfou (1993)	agg.
Finland	7%	5% leaching		Pirttijärvi (1998)	dairy
	33%	10% leaching		Pirttijärvi (1998)	dairy
	91%	20% leaching		Pirttijärvi (1998)	dairy
	100%	20-24%		Sumelius (1993)	barley, wheat
	200-250%	30% leaching		Miettinen (1993)	barley
Norway	50%	0.7-5.3% leaching	0.8-2.0% N air emission	Vatn et al. (1996)	diff.
	100%	1.2-1.1% leaching	0.8-4.5% N air emission	Vatn et al. (1996)	diff.
	100%	10-15%		Christofferson & Rys-stad (1990)	dairy & pork
	200%	2.3-17.3% leaching	0.9-2.3% N air emission	Vatn et al. (1996)	diff.

Denmark	100%	50% or 20% leaching		Schou et al. (1998)	diff.
	200%	30-40%		Dubgaard (1990)	diff.
Germany	150%	0-81%	0-30%	Knickel (1994)	diff.
	300%	45% arable, 96% dairy	17-65%	Zeddies et al. (1997)	diff.
	300%	81%	51%	Zeddies et al. (1997)	agg.
Spain	236%	10%		Zekri & Herruzo (1994)	sunflower, corn, cotton
France	10%	3.6-6.8% average 4.6% long run 3.1%		Vermersch et al. (1993)	int. livestock
Un. Kingdom	40%	4%	red. 0.47 mg/l groundw.	William & Ure (1990) ref. Hanley (1991)	diff.
			red. 0.32 mg/l surfacew.		
	200%	27.8% or 12.2% leaching		Pan (1994)	diff. East Eng.

For the calculation of the environmental effects different analysis methods were used by the various researchers such as the dual approach, dynamic model, econometrics, integrated environment model, LP-model, model calculations, multi-objective model, panel data, sector model, spatial model and the tobit model. It is out of reach of this study to discuss the pros and cons of each method.

All sources listed in this table report that levies on fertilisers reduce the nitrogen fertiliser consumption or lead to decreasing nitrogen leaching to surface and groundwater. The literature review reveals that fertiliser levies below 75% give a 0-44% reduction in fertiliser input. A 'moderate' levy on fertilisers between 76 and 170% gives a 0-81% reduction and a higher levy of 171-300% gives a 10-96% reduction in fertiliser use (van Zeijts 1999).

A recent Danish study (Jorgensen and Jensen 2000) revealed that the sensitivity to price increases for the use of Phosphate and Kalium fertilisers is negligible compared to the price elasticity for Nitrogen fertilisers.

5.2 Use of the revenue of a levy on fertilisers for organic farming

No literature sources were found on the direct effects of a levy on fertilisers on the organically farmed area. A direct effect might be excpected because a levy would reduce the comparative economic advantage of conventional farming compared to organic farming.

Zeddies (van Zeijts) suggests that the dairy sector is more sensitive to a nitrogen levy than the arable sector. An explanation for it can be that the dairy sector has easier access to substitutes of chemical fertilisers (e.g. organic manure). This could imply that a nitrogen levy stimulates conversion to organic dairy farming more than conversion to organic arable farming.

A key issue is how the revenues of the nitrogen levy are used. The effect on the organically farmed area will be relatively big if the revenues are used to stimulate organic farming through conversion or maintenance subsidies.

Box: Calculation of the revenue of a nitrogen levy

- Total sales of 8663 kt of Nitrogen fertiliser (94% of the sales in 1990) in the EU-15 before introduction of the levy (Rougoor and van der Weijden (in preparation).
- Price per kg N is 1,54 Euro (Rougoor, C. and W. van der Weijden (in preparation)).
- A tax rate of 100%. The revenues of the tax are 1,54 Euro per kg N sold.
- Price elasticity of –0,25, a tax rate of 100% will lead to a 25% reduction of N use Zeijts, H. van (edit).
- Reduction of Nitrogen use = reduction of Nitrogen fertiliser sales.
- Total sale of (75%*8863=) 6497 kt of Nitrogen fertiliser after introduction of the levy.
- Conversion subsidy of 737 Euro per hectare (paid over the whole period). Maintenance subsidy of 136 Euro per hectare per year.

If a Nitrogen levy would be introduced at the European level the total amount of financial resources available would be 10,000 million Euro.
For this amount:

- 13.57 million hectare agricultural land could be converted to organic farming every year, or;
- 73.53 million hectares organic area could be maintained organic.

6 Cross compliance and modulation

In this chapter the effect of increasing direct payments to organic farmers and farmers in conversion on the total organically farmed area in the EU will be estimated. Three sources of EU budgets are taken into consideration: organic schemes in agri-environment programmes, revenues from cross compliance conditions to direct payments, and revenues from modulation of direct payments.

6.1 Methodological approach

We inventorize the EU budget for organic farming and market regulations involving direct payments to farmers. We assess what would be the growth of the organically farmed area if the budget for organic farming (through agri-environment payments) would be gradually increased. Then we assess what would be the effects on the budget for organic farming of two policy instruments related to the direct payments under market regulations:

- Cross compliance, that is putting environmental conditions on direct income payments under market regulations. Farmers not complying with the environmental conditions will be penalised, receiving 25% less direct payments. We assume the revenues of cross compliance will be used entirely to stimulate organic farming.
- Modulation, that is reducing direct income payments with a certain percentage (maximum 20%) and use the revenues for certain specific measures under the rural development programme. We assume the revenues of modulation (modulation rate =10%) will be entirely used to stimulate organic farming.

6.2 Organic schemes in agri-environment programmes

6.2.1 Budget requirements for the growth of the organic area

To reach the organic area target of 10% of the total agricultural area in the EU in 2006, 9.43 million hectares need to be converted to organic farming. This would require 6950 million Euro conversion subsidy, and 7749 million Euro maintenance subsidy. We calculated with the amounts paid per hectare arable crops in The Netherlands. That is a conversion subsidy of 737 Euro per hectare (for the full conversion period), and a maintenance subsidy of 136 Euro per hectare per year. In the Netherlands, the conversion subsidy is spread over five years. The amounts paid in The Netherlands represent an average of the amounts paid in other EU member states. According to a recent study of the Soil Association conversion subsidies on arable crops range between 50 and 386 Euro per hectare per year. Minimum levels for maintenance subsidies vary between nil (UK) and 170 Euro per hectare per year. Seven EU Member States spread conversion over five years, while other Member States spread it over two or three years. (Soil Association 2001). To simplify the calculations we assume the full amount of the conversion subsidy is paid in one year.

Table: Organic area and required budget for conversion and maintenance subsidy in the EU 15

	Organic area in million ha	Area change in million ha	Required budget in million Euro Conversion subsidy	Required budget in million Euro Maintenance subsidy
2000	4.0			
2001	5.57	1.57	1157	757
2002	7.14	1.57	1157	971
2003	8.71	1.57	1157	1185
2004	10.28	1.57	1157	1398
2005	11.85	1.57	1157	1612
2006	13.43	1.58	1157	1826
total		9.43	6950	7749

6.2.2 EU budget for organic farming

We found no information about the actual EU budgets for organic farming. The budgets for organic farming are part of the Agri-environment Programmes (AEPs) in the National Rural Development Programmes (NRDPs), that the EU member states submitted to the European Commission for co-financing. The EU Rural Development Programme is a seven years programme from 1 January 2000 until 31 December 2006. The EU budget for the RDP is totalling 30.4 billion Euro, that is an average of 4.34 billion Euro per year. Because of the co-financing requirement, we assume member states roughly double this amount. The only obligatory measure under the RDP is the agri-environment programme (AEP). Each member state has an AEP. In the period 2000-2006 a total sum of 20.7 billion Euro will be spend on agri-environment programmes. That is an average of 2.96 billion per year for all the member states of the EU-15 (Bundesministerium 2001). That is 68% of the RDP budget. Part of the AEP budget is spent on organic farming. The question is what percentage? In 1998 agri-environment programme supported organic and in-conversion land in the EU-15 covered 1.85 million hectares being 6,54% of the total agri-environment programme supported land (Foster, C. and N. Lampkin 2000). Because of the growth of organic farming since 1998 we can safely assume that the organic sector demands increasing shares of the budget of RDPs. Two calculations illustrate this

1. Per year 274 million Euro EU funding would be needed to maintain 3 % of the agricultural area of the EU in organic farming. This is 6.3 % of the EU budget for rural development. We calculated with a maintenance subsidy of 136 Euro per hectare per year, 50% EU cofinancing, and the total agricultural area of the EU is 134.3 million hectares.

2. Per year 913 million Euro EU funding would be needed to maintain 10% of the agricultural area in the EU in organic farming. That is 21% of the EU budget for rural development (if we apply the same assumptions as above).

6.2.3 EU budgets for direct payments under market regulations

With the 1992 CAP reform, the European Union started to pay farmers for income loss because of price decreases. The EU budget for direct payments has been growing since then, and for 2001 at total budget of 21,221 million Euro is foreseen.
In the following table we present the market regulations that apply direct income support to farmers and the budget 2001 for the direct payments.

Table: Budgets for market regulations for agricultural products in the EU

Market regulations	Product group	Budget 2001 direct payments in million Euro
Arable crops 1251/99	Cereals	7,841
	Maize	(art3.2) 859
	Protein crops	443
	Oilseeds	1,794
	Non-fibre flax (linseed)	112
	Durum wheat	(Art 1&5) 402+9
	Silage grass	(art1.3) 25+35
Durum wheat 1765/92	Additional payment	Pm (993 in 1999)
Set aside 1672/2000	Compulsory set-aside	1,564
Starch potatoes 1766/92 and 1868/94	Starch potatoes	219
Flax and hemp 1673/2000	Flax and hemp	74+14
Seed for sowing 2358/71	Seed for sowing	100
Hop 1696/71	Hop	12
Beef 1254/99	Suckler cows	(Art 6) 1,736
		(Art6.5) 102
		(Art 4) 1,619
		(Art 5) pm (23 in 1999)
	Extensification	(art 13) 757
	Slaughter cows	(art 11) 716
	Additional payments	(art11) 161
Sheep and goats 2467/98	Ewes	(art 5) 1,251
Sheep and goats in marginal areas 1323/90		369
Total direct payments		21,221

Source: Official Journal of the EC, 26/2/2001
For the pm cost categories we used the amounts of 1999.

There are no direct payments for dairy farmers yet, but from 2005 dairy farmers will also receive direct payments. The bulk of the budget of the market regulation for dairy products is now spent on intervention measures and export restitution. In budget year 1998 the budget for dairy products was 2,510 million Euro. A big part of that amount will be used for direct payments from the year 2005 onwards. The 274 million Euro EU funds required to maintain 3% of the agricultural area in organic farming is 1.3% of the budget spent on direct payments under the market regulations.

6.3 Cross-compliance conditions

In the Agenda 2000 round of reform of the Common Agricultural Policy it was decided that member states may voluntarily apply environmental conditions on direct payments to farmers under market regulations (Regulation 1259/99). This is called cross compliance. Cross compliance gives member states an additional enforcement instrument for environmental legislation. Farmers having applied for direct payments but not complying with the environmental conditions will be penalised. In the Netherlands cross compliance is applied for starch potatoes and silage maize.

In theory the revenues of cross compliance, i.e. the penalties for not complying with the environmental conditions could be used entirely for organic farming. If we assume that cross compliance is applied to all market regulations that involve direct payments, a penalty rate of 25%, a sample group of 5%, and 10% of the farmers in the sample group that are penalised for not applying the environmental conditions. The total annual revenues of cross compliance in the European Union would be: 0.1*0.05*0.25*21,221 million Euro = 26,5 million Euro.

Because of the 50% co-financing requirement this amount will be doubled with national funds to 53.0 million Euro. If these funds would be entirely used for conversion subsidies, it implies 72 thousand hectares new organic area. If used for maintenance payments, 390 thousand hectares existing organic area could be maintained.

We advice not to consider this option for two reasons:

- The revenues are low and will decrease even further as more farmers comply with environmental norms, which is a positive development;
- The use of the revenues could better be used to reinforce the objective of the cross compliance measure: to achieve compliance with environmental norms.

6.4 Modulation

In the Agenda 2000 round of reform of the Common Agricultural Policy it was decided that member states may voluntarily modulate direct payments to farmers under market regulations and use the revenues for a limited number of activities under the Rural Develoment Programme (Regulation 1259/99). Support for organic farming is one of the accepted activities, provided the modulation revenues can be separated from the existing budgets for organic farming. The maximum modulation rate is 20%. England and France have introduced modulation already and some other member states are considering modulation.

In theory the revenues of modulation could be used entirely for organic farming. Based on the total budget of 21,221 million Euro for direct payments in 2001 we calculated the amounts that could become available if 1%, 5%, 10% or 15% of the direct payments would be targeted for organic farming. We assume that the same percentage will be applied on all regulations. We calculate with a 50% co-financing rate of Rural development Programmes.

Table: Revenues of all market regulations in all EU member states at different modulation rates

Modulation rates	EU- financing in million Euro	National co-financing in million Euro	Total (EU and MS) in million Euro
1%	212	212	424
5%	1061	1061	2122
10%	2122	2122	4244
15%	3183	3183	6366

For 4244 million Euro, 5.76 million hectares could be converted each year or on 31.2 million hectares could organic farming be maintained.

7 Conclusions

7.1 General

If a policy target would be set to have 10% of the agricultural area in the EU managed organically in 2010, then 9.4 million hectares need to be converted. The actual share is 3% of the agricultural area (4 million hectares). It is unlikely that the market will be interested to pay for the costs of conversion of these 9.4 million hectares, totalling about 7 billion Euro. Public funds are therefore needed to cover the costs of conversion. Conversion subsidies are needed in the period until farmers are certified organic, which is the moment they normally receive premium prices. The conversion subsidies are needed to cover the losses in income associated with lower yields and necessary investments. After the conversion period maintenance subsidies are needed in case organic farming is not competitive to conventional farming.

The growth of organic farming risks to slow down because insufficient financial resources are available for conversion to and maintenance of organic farming. The financial resources are fixed in so-called National Rural Development Programmes. New financial sources for organic farming could be found at the EU and/or national level by introducing new instruments. The main question we tried to answer in this study is what do different instruments offer in financial terms to reach the 10% target?

Five instruments were studies:

1. 0% tariff of Value Added Tax (VAT) on organic products. This instrument enhances the pull of organic products in the market;
2. pesticide levy. This instrument reduces the competitive advantage of conventional farming, and the revenues of the levy could be used to stimulate organic farming;
3. fertiliser levy. This instrument also reduces the competitive advantage of conventional farming, and the revenues of the levy could be used to stimulate organic farming;
4. cross compliance. This instrument puts environmental conditions on direct payments that farmers receive under the market regulations. The revenues could be used to stimulate organic farming.
5. modulation. This instrument reduces the amount of direct payments farmers receive under the market regulation with a certain fixed percentage (maximum 20%). The revenues could be used to stimulate organix farming.

We realise that funds spend on organic farming can not be spent on something else. We also realise that there is a debate about the environmental impact of the use of funds for organic farming compared to other uses. If our focus would have been on reaching the maximum environmental impact the conclusions of this study might have been different.

7.2 The 0% VAT tariff on organic products

If a 0% VAT tariff on organic products would be introduced in all EU member states, an increase of consumption of organic products would pull a 10.5 % increase of the organic arable land, grassland and livestock in the EU-15. These two categories made up 70% of the total certified organic and in-conversion land area in 1998. This percentage is based on the opinions of market experts in four EU countries, who estimated that organic consumption would grow with 1% if prices would reduce with 1%. This estimation was linked to the area statistics in 1998 and the VAT tariffs in de different countries. The EU member states having large surfaces organic area in 1998 and high VAT rates thus contributed most heavily to the figure of 10,5%. Based on the figures of 1998 and extrapolated with area statistics for 1999 and 2000 a 10,5% volume increase implies an increase of respectively 206.000 hectares, 256.000 hectares and 289.000 hectares. The following tabels shows this.

Table: Effect of a VAT tariff of 0% on organic area in EU member states

Countries	VAT tariff	Arable land in 1998 (ha)	Grassland & fodder crops in 1998 (ha)	Total of two categories (ha)	Effect of VAT tariff of 0% on organic area (ha)
AU	10	54700	230000	284700	28470
BE	6	593	9828	10421	625
DK	25	38787	46842	85629	21407
SP	7	26667	122347	149014	10431
FI	17	35583	35247	70830	12041
FR	5.5	35900	87600	123500	6792
GE	16	140000	221000	361000	57760
GR	8	1811	211	2022	162
IRE	0	258	17643	17901	0
IT	10	180000	353000	533000	53300
LU	3	172	581	753	23
NL	6	4948	12183	17131	1028
PT	5	4081	4697	8778	439
SW	12	33526	78759	112285	13474
UK	0	8248	180957	189205	0
EU15 '98		565274	1400895	1.966.169	205.952
EU15 '99				2.442.390*	255.835
EU 15 '00				2.761.467*	289.258

Source: www.organic.aber.ac.uk/stats.shtml

*organic area in EU15 in 1999 was 3.489.128 ha, and in 2000 (provisional) 3.944.953 ha.

Remark that the basic assumption under the tabel is that a 1% price decrease (VAT decrease) means a 1% increase of consumption and production area. This assumption is applied to all countries and all arable and livestock products. In reality the effects would be different per country and per product. For example, in Denmark, with a 25% VAT tariff a 25% price reduction would make many organic products cheaper than conventional products. For a number of products, increases of production area up to 50% could be expected in that exceptional case. For more clarification about these outcomes, see also the concluding paragraphs in chapter 3 (3.5 to 3.7).

The figure of 289.258 hectares increase of the organic arable land, grassland and livestock area in the EU-15 should be taken with care. Only a limited number of countries, products, and experts were involved. More elaborate research would be required to draw more firm conclusions.

7.3 Pesticide levy

The West european market for pestidices was 6175 million Euro in 1999 of which herbides contributed 42%, insecticides 16.4% and fungicides 36.3% and others 5.3%. The price elasticity of a levy on insecticides and fungicides (-0.2 to –0.5) is much lower than the elasticity of a levy on herbicides (-0.8). This implies that the effect on pesticide use and revenue of the levy varies per pesticide category. If a levy would be set at the same level for each category, a levy on herbicides would have the most impact. For this reason and to simplify the calculations we present a calculation for a herbicide levy only.

If a herbicide levy of 50% would be introduced at the European level it could have two effects on organic farming. A direct effect because the comparative advantage of conventional farming to organic farming is reduced. Research is needed to calculate this effect. Second, the revenues of the levy, totalling 719 million Euro in the first year, could be used entirely to stimulate organic farming. If the funds would be entirely used for conversion subsidies, it implies 980 thousand hectares new organic area. On this area there is no need for herbicides at all, thus the second year the revenues of a levy would be lower. If the funds would be entirely used for maintenance payments, 5.29 million hectares existing organic area could be kept competitive compared to conventional farming.

7.4 Fertilizer levy

The price elasticity of a levy on nitrogen (-0,25) is much higher than the elasticity of a levy on other nutrients. This implies that the effect on fertiliser use and revenue of the levy varies per fertiliser category. If a levy would be set at the same level for each category, a levy on nitrogen would have the most impact on fertiliser use. For this reason and to simplify the calculations we present a calculation for a nitrogen levy only.

If a nitrogen levy of 100% would be introduced at the European level it could have two effects on organic farming. A direct effect because the comparative advantage of conventional farming to organic farming is reduced. Research is needed to calculate this effect. Second, the revenues of the levy, totalling 10,000 million Euro in the first year, could be used entirely to stimulate organic farming. If the funds would be entirely used for conversion subsidies, it implies 13.57 million hectares new organic area. On this area there is no need for chemical Nitrogen fertilisers at all, thus the second year the revenues of a levy would be lower. If the funds would be entirely used for maintenance payments, 73.53 million hectares existing organic area could be kept competitive compared to conventional farming.

7.5 Cross compliance

In 2001 the total budget for direct payments under the market regulations is 21,221 million Euro. If every member state of the EU-15 would introduce cross compliance measures on all the market regulations it would increase compliance with environmental regulations and generally reduce the negative effects of agriculture on the environment. A direct effect on organic farming is unlikely. If we assume that 10% of the sample group (sample is 5%) do not comply with the cross compliance measures and a penalty rate of 25%, the revenue would be 26.5 million Euro. In theory, this revenue could be entirely used to stimulate organic farming. European regulation requires the amount of 26.5 million Euro to be doubled with national funds (50% co-financing) to 53.0 million Euro. If these funds would be entirely used for conversion subsidies, it implies 72 thousand hectares new organic area. If the funds would be entirely used for maintenance payments, 390 thousand hectares existing organic area could be kept competitive compared to conventional farming.
However, we would not advice to use these revenues for organic farming but to use them to increase compliance with cross compliance measures. Eventually, if all farmers comply the revenue of this measure is nihil.

7.6 Modulation of direct income payments

In 2001 the total budget for direct payments under the market regulations is 21,221 million Euro. If every member state of the EU-15 would introduce modulation at a rate of 10% on all market regulations the revenue would be 2122 million Euro. This revenue could be entirely used to stimulate organic farming. European regulation requires the amount of 2122 million Euro to be doubled with national funds (50% co-financing) to 4244.2 million Euro. If these funds would be entirely used for conversion subsidies, it implies 5.76 million hectares new organic area. If the funds would be entirely used for maintenance payments, 31.2 million hectares existing organic area could be kept competitive compared to conventional farming.

7.7 Comparison of instruments

The main subject of this study was the 0% VAT tariff on organic products. To put the VAT reduction in perspective we briefly studied four other instruments: a pesticide levy, a ferliser levy, cross compliance and modulation of direct income payments.
All the instruments have different advantages and disadvantages, but these were not subject of our study. Our focus was on the financial potential of these instruments for organic farming in the EU.

The following table presents the revenue of the different instruments in million Euro. It is assumed these revenues will be entirely used for organic farming, either for conversion subsidies (third column) or for maintenance payments (fifth column). The fourth and the sixth column relate the estimated area to the total agricultural area of the EU. For example, with the revenue of a nitrogen levy 73.5 million ha, that is more than half of the EU agricultursal area can be maintained in organic management.

Table: Revenue of different instruments in million Euro, and use for conversion subsidies or organic maintenance payments

Instrument	Revenue (million Euro)	Conversion (1000 ha)	Percentage agric. area EU-15	Maintenance (1000 ha)	Percentage agric. area EU-15
VAT tariff of 0%		289	0.2		
Herbicide levy	719	976	0.7	5,288	3.9
Nitrogen levy	10,000	13,569	10.1	73,529	54.8
Cross compliance	53	72	0.05	390	0.3
Modulation	4244	5,759	4.3	31, 207	23.2

Agricultural area of the EU15= 134.3 million ha
Maintenance payment 136 Euro/ ha/ year, conversion subsidy 737 Euro / ha/ year
Price elasticity of herbicides = -0.8, tax rate = 50%.
Price elasticity nitrogen = -0.25, tax rate = 100%
Cross compliance penalty rate = 25%, 0.5% of the area is penalised
Modulation rate = 10%, EU co-financing rate is 50%

Coming back to the target of 10% organic area in the EU, 6950 million Euro is needed to convert 9.43 million hectares and 1826 million Euro is needed every year once the 10% target has been reached. If we assume the target of 10% will be reached at the end of 2006 the organic area will increase with an average of 1.57 million hectares per year. The average annual budgets required for organic conversion and maintenance are compared to the existing policy instruments of the EU.

Table: Comparison of budgetary needs for organic farming with EU policy budgets

Instruments	Average EU budget per year	Conversion budget per year	Maintenance budget per year
Rural Development Programmes (RDP)	4,339 million Euro	6950/6=1158 (26.7%)	1292 (29.8%)
Agri-environment Programmes (part of RDP)	2,960 million Euro	1158 (39.1%)	1292(43.6%)
Direct payments under the market regulations	21,221 million Euro (budget for 2001)	1158 (5.4%)	1292 (6.1%)

The EU budget for RDP until the end of 2006 is 30,370 million Euro of which agri-environment programmes 20.7 billion Euro. The RDP is maximum 50% co-financed by the EU (in some areas maximum 75%).

The main advantages of a VAT tariff of 0% compared to other instruments are that it impacts primarily on the demand side, while the other instruments impact on the supply side, at the risk of creating an oversupply of organic products. Secondly, the instrument explicitly targets organic agriculture, while it remains to be seen if and what percentage of the revenues of the other instruments will be used for organic farming. For example, in the case of cross compliance revenues we think it is undesirable to use it for organic farming.
The main disadvantages of a VAT tariff of 0% compared to other instruments are that the effect on the organic area is relatively small and unevenly distributed among the

EU member states because of varying VAT rates. Secondly, the price decrease for consumers can be eroded by farmers, food processors or retailers. For example in case of shortages of organic products, or when processors or retailers use the VAT reduction to increase their profit margin on organic products.

For all the instruments, the effects are calculated assuming all the EU member states would implement it. This is unlikely as long as the implementation of these instruments is not obligatory for the member states. We realize that because of the limited scope of this study, many assumptions we made can be questioned. We encourage more elaborate international research on this subject, eventually leading to sound policy instruments to stimulate organic farming.

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Appendix A Economic theory

Introduction

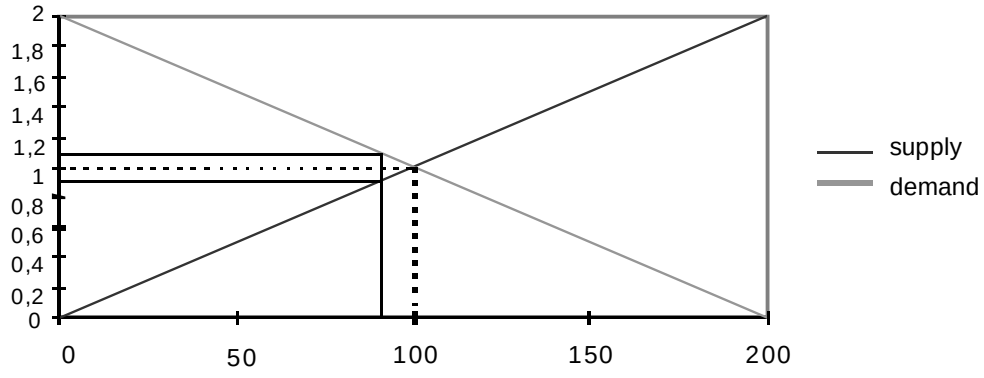
In the following paragraphs the assumptions of this study (in italics) are explained.

1. Demand and supply

A VAT reduction implies for consumers that they have to pay a lower price for organic products and for farmers that they receive a higher price for their products

Consumers and producers benefit from a VAT reduction. Due to lower prices consumption of organic products is expected to grow (demand curve). Assuming there was market equilibrium before the VAT reduction, the price reduction introduces a shortage of supply. Additional supply will be available if higher prices are paid (supply curve). This implies that organic producers also benefit from a VAT reduction on consumer products. A new market equilibrium will be found at a higher volume of production (horizontal axe) and consumption, with new prices (vertical axe). The next figure illustrates this.

demand and supply curve



2. Price and demand

Consumers are likely to respond to lower prices by buying more organic products

The demand for a product is closely related to the price. A price increase is usually followed by a decrease in demand and a price decrease by an increase in demand (demand curve). If a good has many close substitutes, the effect of a price change will be bigger (the demand curve is flat) than if no substitutes are available (the demand curve is steep)

3. Price elasticities

If the demand curve is known the effect of a price reduction on the demanded volume can be calculated.

The relation between the demand for a certain product and its price is characterised by the price elasticity of a product. This price elasticity of demand is defined as the percentage change in quantity

divided by the percentage change in price. In symbols the definition of elasticity is: Edp = dq/dp * p/q

The price elasticity of demand is expressed in the angle of the demand curve. If the demand curve is very steep demand is very inelastic and if the demand curve is very flat it means that demand is very responsive to price changes (elastic).
The sign of the elasticity of demand is generally negative as we might expect demand goes up when the price goes down. If for example the price elasticity of demand is -1 a price decrease of 10% leads to an increase in demand of 10%. A price elasticity of demand from -2 tells us that, if the price goes down with 10% the demand will grow with 20%.

As there are many close substitutes for organic products, we can expect those products to have a high price elasticity. A price decrease for organic products might for this reason be an interesting way to stimulate consumption and production of these products.

4. Other factors

The reliability of the demand curve for estimations about future demand depends on other factors such as market equilibrium, import and export volumes, growth rates in relation to the base, market share of organic products in the total food market

When the demand curve is known it may prove to be an inaccurate tool to predict volume effects of price decreases. There may be several reasons for the lack of reliability.

Market equilibrium

It is fair to say that in practice prices and volumes are moving towards a market equilibrium but this equilibrium is never reached. Imbalances may persist, for example because it takes time to produce organic products. In the case of production exceeding demand, price decreases may not be enough to establish a new equilibrium: the overproduction can not be sold as organic or that has to be exported.
In the case of demand exceeding production, the economic logic is to increase consumer prices to decrease demand. If because of VAT reduction the opposite happens, it will further deteriorate the imbalance between demand and production, possibly leading to an increase in consumer prices.

Import and export volumes

There are different markets, local, national and international. In each market the demand and supply curves are different. Producers and traders that are well organised for export and import link national markets to international markets. This study focuses on national markets, assuming that the effects of international markets on demand and supply at the national level are negligible. This implies that if the import or export of products are more important than national production, the demand curve at the national level is of little value to predict volume effects of a VAT reduction.

Growth rates in relation to the base

Price elasticities are most accurate if the volume of production and consumption is big and changes to this production and consumption base are relatively small. For some organic products the situation is the opposite: the volume of production and consumption are small and the growth rates are relatively high.

Market share of organic products in the total food market

It is assumed that at low market shares for organic products a VAT reduction for organic products will not influence the demand and prices of conventional products. At high market shares for organic products the VAT reduction may influence the demand and prices of conventional products negatively. It can be assumed that lower prices of conventional products, make a VAT-reduction on organic products less effective.

5. Strong external factors

External factors such as food scandals (BSE, dioxine) or promotion campaigns for organic farming change the demand curve.

The growth of the market for organic products is the result of a number of factors of which a lower VAT-rate maybe just one factor. Because the study will not take into account the complexity of factors, the effect attributed to a lower VAT is likely to be overestimated. To give an example:
A food scandal or successful promotion campaign for organic products implies that demand will increase at the same price level or that consumers are prepared to pay more for organic products. This implies that the demand curve will change.

Appendix B Markets, VAT rates, growth rates

- The most suitable countries are Germany and The Netherlands because of stable markets, moderate to relatively high VAT rates and low growth rates;
- In the second group of countries are Denmark, Finland and Sweden because of stable markets, relatively high VAT rates and moderate to relatively high growth rates;
- In the third group of countries are Belgium, Greece, Spain, France, Italy and Portugal because of unstable markets;
- Unsuitable countries are Ireland, Luxembourg and the United Kingdom because of relatively low VAT rates.

Markets

The university of Hohenheim (Germany) published a series of books on the subject of organic farming in Europe. In one of these books 'The European Market for Organic Products: Growth and Development' (Michelsen et al., 1999) market information is provided on the years 1993 to 1997. This information was used for the selection of countries and products in this study.
Five tables are presented with the following information:

- Current share of total domestic food market year 1993-1997
- Import of organic products (tonnes), quantity in 1997-98
- Import of organic products, market share in 1997-98
- Export of organic products (tonnes), quantity in 1997-98
- Export of organic products, share of production in 1997-98

Based on these tables conclusions were drawn on the volume of production and consumption at the national market. Countries with a low level of domestic production and consumption were qualified as having unstable organic markets, while countries with a high level of production and consumption were qualified a stable organic markets.

Current share of total domestic food market year 1993-1997

country	BE	DK	GE	GR	SP	FR	IRE	IT	LU	NL	AT	PT	FI	SW	UK
agricultural area '96	0.31	1.66	2.73	0.15	0.41	0.45	0.46	1.93	0.47	0.63	8.96	0.23	3.25	4.72	0.31
Cereals	?	3,5	3,4	?	?	?	?	?	?	<1,2	2	?	5	1,5	0,2
Milk products	?	14,2	0,5	?	?	?	?	?	2	1	10	?	0,3	3	0,35
Potatoes	?	2,9	2,2	?	?	?	?	?	?	<1	6	?	?	4	0,6

Source: Michelsen et all 1999

Import of organic products (tonnes), quantity in 1997-98

Country	BE	DK	GE	GR	SP	FR	IRE	IT	LU	NL	AT	PT	FI	SW	UK
Cereals	?	10000	25000	0	?	10000	?	?	100	6000	3000	?	0	200	5000
Milk products	4500	0	8000	?	?	15000	?	?	100	?	50	?	?	0	3000
Potatoes	?	976	8000	?	?	?	?	?	20	150	0	?	?	0	15000

Source: Michelsen et all 1999

Import of organic products, market share in 1997-98

Country	BE	DK	GE	GR	SP	FR	IRE	IT	LU	NL	AT	PT	FI	SW	UK
Cereals	?	64	10	0	?	16	?	?	40	47	10	?	0	1	15
Milk products	?	0	6	?	?	20	?	80	50	?	?	?	?	?	12
Potatoes	?	10	6	?	?	?	?	?	5	50	0	?	?	0	60

Source: Michelsen et all 1999

Export of organic products (tonnes), quantity in 1997-98

country	BE	DK	GE	GR	SP	FR	IRE	IT	LU	NL	AU	PT	FI	SW	UK
Cereals	?	1400	15000	?	?	?	0	?	0	1500	3500	?	100	1	0
Milk products	3000	232	3000	0	0	?	0	?	0	?	50000	?	0	?	0
Potatoes	?	28	1000	?	?	?	0	?	0	1000	4000	60	?	25	0

Source: Michelsen et all 1999

Export of organic products, share of production in 1997-98

country	BE	DK	GE	GR	SP	FR	IRE	IT	LU	NL	AT	PT	FI	SW	UK
Cereals	?	20	6	?	?	?	0	60	0	?	10	?	0	0	0
Milk products	?	0.2	2	?	0	?	0	70	0	?	15	?	0	?	0
Potatoes	?	<1	1	?	?	?	0	?	0	80	40	80	?	1	0

Source: Michelsen et all 1999

Based on these tables the following conclusions were drawn:
In Belgium, Greece, Spain, France, Ireland, Italy, Luxembourg and Portugal no final conclusions can be drawn because of the lack of information, but based on the low share of the organic area in the total agricultural area (below 0,5% in all these countries except for Italy where it was 1,93%) the preliminary conclusion is that these countries had unstable markets;
Denmark, Germany, The Netherlands, Austria, Finland, Sweden and the United Kingdom had stable markets.

VAT rates
The VAT-rates in the different EU member states were obtained from the European Commission (European Commission, 1999).

VAT-rates in EU member states

Member States	Super reduced rate	Reduced rate	Standard rate	Parking rate	Food products generally applied	Special
Belgium	1	6	21	12	6/12/21	12 only margarine
Denmark	-	-	25	-	25	
Germany	-	7	16	-	7/16	
Greece	4	8	18	-	8	
Spain	4	7	16	-	4/7	
France	2,1	5,5	20,6	-	5,5/20,6	
Ireland	4	12,5	21	12,5	-/4/12,5/21	
Italy	4	10	20	-	4/10	
Luxemburg	3	6	15	12	3	
Netherlands	-	6	17,5	-	6	
Austria	-	10/12	20	-	10	
Portugal	-	5/12	17	-	5/12/17	
Finland	-	8/17	22	-	17	
Sweden	-	6/12	25	-	12/25	
United Kingdom	-	5	17,5	-	-	exc. highly proc. products

Source: European Commission, 1999

For the selected products the VAT rates are presented in the following table:

VAT-rates per product

Country	BE	DK	GE	GR	SP	FR	IR	IT	LU	NL	AU	PT	FI	SW	GB
Wheat bread	6	25	16	8	7	5.5	0	10	3	6	10	5	17	12	0
Milk	6	25	16	8	7	5.5	0	10	3	6	10	5	17	12	0
yoghurt	6	25	16	8	7	5.5	0	10	3	6	10	5	17	12	0
butter	6	25	16	8	7	5.5	0	10	3	6	10	5	17	12	0
potatoes	6	25	16	8	7	5.5	0	10	3	6	10	5	17	12	0

Source: phonecalls with experts

Based on this table the following conclusions were drawn:
- Ireland, Luxembourg and the United Kingdom have relatively low VAT rates
- Austria, Belgium, France, Greece, Italy, Portugal, Spain and The Netherlands have moderate VAT rates;
- Denmark, Finland, Germany and Sweden have relatively high VAT rates.

Growth rates

Growth rates per product per year 1993-1997

Country	BE	DK	GE	GR	SP	FR	IRE	IT	LU	NL	AU	PT	FI	SW	UK
Cereals	25	20	10	70	?	?	?	20	10	-28	100	?	100	50	?
Milk products	?	70[2]	12	?	?	43	?	30	5	0	120	?	30	77	53
Potatoes	30	?	15	?	?	?	?	?	20	8	70	30	20	28	18

Source: Michelsen et all 1999

Based on this table the following conclusions were drawn:

- In Spain, France, Greece, Ireland and Portugal no conclusions can be drawn because of the lack of information;
- Germany, Luxembourg and The Netherlands had low growth rates;
- Belgium, Denmark, Italy and the United Kingdom had moderate to high growth rates depending on the products;
- Austria, Finland and Sweden had high growth rates.
- Austria, Finland and Sweden entered the European Union in this period and established agri-environmental programmes that included big organic farming schemes which have given conversion to organic farming a boost.

[2] Fluid milk only, other products les

Appendix C First approach: collection of statistical information

If the data are not available please fill in "NA".
Please indicate the reliability of the data you provide, in the range between hard statistical data and a professional guess.

1. The production volumes in tonnes per year

Product	1996	1997	1998	1999
wheat				
milk				
yoghurt				
butter				
potatoes				

1b. These data are based on formal statistics/ calculations / professional guess

2. The consumption volumes (sold in your country) in tonnes per year
(if no data are available, we assume the consumption volumes to be the same as the production volume plus imports, minus exports)

Product	1996	1997	1998	1999
wheat				
Milk				
Yoghurt				
butter				
cheese				
potatoes				

2b. These data are based on formal statistics/ calculations / professional guess

3. Average price levels per year at the domestic market (in local currency, preferably compensated for inflation)

Product	1996	1997	1998	1999
1 kg wheat				
1 kg milk				
1 kg yoghurt				
1 kg butter				
1 kg potatoes				

3b. These data are based on formal statistics/ calculations / professional guess
3c. Are the prices related to prices for conventional products: fixed/ strongly related/ little related/ independent
3c. What is the value of the local currency to the EURO: 1 EURO is .....
3d. Are the prices compensated for inflation: yes/no

4. Exports in tonnes per year

Product	1996	1997	1998	1999
wheat				
milk				
yoghurt				
butter				
potatoes				

4b. These data are based on formal statistics/ calculations / professional guess

5. Imports in tonnes per year

Product	1996	1997	1998	1999
wheat				
milk				
yoghurt				
butter				
potatoes				

5b. These data are based on formal statistics/ calculations / professional guess

6. Market share of organic consumption as a percentage of the total consumption (in %)

Product	1996	1997	1998	1999
wheat				
milk				
yoghurt				
butter				
potatoes				

6b. These data are based on formal statistics/ calculations / professional guess

7. Percentage of certified organic production not sold as organic (in % of total domestic organic production)

Product	1996	1997	1998	1999
wheat				
milk				
yoghurt				
butter				
potatoes				

7b. These data are based on formal statistics/ calculations / professional guess

8. Size of area used for organic production (in hectares)

Product	1996	1997	1998	1999
wheat				
raw milk (grass and fodder)				
potatoes				

8b. These data are based on formal statistics/ calculations / professional guess

9. Size of organic area of a certain crop as a percentage of the total area of that crop (in %)

Product	1996	1997	1998	1999
wheat				
raw milk (grass and fodder)				
potatoes				

9b. These data are based on formal statistics/ calculations / professional guess

Appendix D Second approach: qualitative information based on expert opinion

Effects of pricedecreases on consumption of organic products

In a recent publication of the Dutch 'Rabobank' it was stated that high prices of organic products form one of the most important barriers in consumption of organic products. From that point of view pricedifferences between conventional and organic products has to be decreased as far as possible to stimulate organic consumption.

However, we don't know how consumers will react upon price changes in organic products.

The Centre for Agriculture and Environment (CLM) started a study to find out the effects of some fiscal measures upon the consumption of organic products.

In the first part of the research we study the effect of lower VAT-rates on organic products. As there is little market information on this subject, we prepared some statements. The question to you is indicate which statement you think is the most realistic, and to indicate why.

Scenario 1

A price decrease of 12% leads to an increase in consumption of 10%.

Product	Milk	Yoghurt	Butter	wheat	potatoes
Old price					
New price					
Increase in demand will be lower, sc.					
This increase in demand seems me to be realistic.					
Increase in demand will be higher, sc.					

Scenario 2

A price decrease of 12% leads to an increase in consumption of 25%.

Product	Milk	Yoghurt	Butter	wheat	potatoes
Old price					
New price					
Increase in demand will be lower, sc.					
This increase in demand seems me to be realistic.					
Increase in demand will be higher, sc.					

Scenario 3

A price decrease of 20% leads to an increase in consumption of 50%.

Product	Milk	Yoghurt	Butter	wheat	potatoes
Old price					
New price					
Increase in demand will be lower, sc.					
This increase in demand seems me to be realistic.					
Increase in demand will be higher, sc.					

In the same publication, it is stated that people appreciate organic products, as they value it as a 'premium product'. Consumers are willing to pay more for organic products compared to conventional products. In the situation of a price decrease of 20% for organic products, as mentioned above, the price difference with conventional products is reduced to a very low percentage.
Which percentage of consumers do you expect to be willing to change from conventional products to organic products at these price levels?

Which percentage of consumers do you expect to be willing to change to organic products at a price decrease of 20%?

Product	Milk	Yoghurt	Butter	wheat	potatoes
Organic price					
Price difference (in %)					
Conventional price					
Lowered organic price					
% change					

At the introduction of new products, marketing professionals make a difference between consumer groups. On a recent Dutch congress the marketing institute GfK presented a profile of organic product consumers. The group of consumers is growing from 'innovators' to 'innovators and early adopters'. As we mentioned above, consumers are willing to pay fore for organic 'premium products'.
Now we give some different groups of consumers. Each group we expect to be willing to pay a premium price for organic products. The level of the premium price is different for each group. Please, indicate whether you think the level to be realistic or not, and eventually write down a more realistic level for each group.

- Innovators: _2% of all consumers premium price accepted: 50-100%

  Realistic |--|--|--|--|--|--|--| not realistic,

  because: _____

- Early adopters: _15% of all consumers premium price accepted: 25-50%

  Realistic |--|--|--|--|--|--|--| not realistic,

  because: _____

- Early majority: _30% of all consumers premium price accepted: 10-25%

  Realistic |--|--|--|--|--|--|--| not realistic,

  because: _____

Finally, we give some statements. Will you please give on whether you agree with each of them or not? Please, explain.

- Innovators nearly don't care about the price of organic products. Even if the price differences with conventional products are very high, they still buy organic products.

  Agree |--|--|--|--|--|--|--| don't agree,

  because: _____

- Early adopters accept price differences between certain levels. The highest level they accept lays around the current prices.

  Agree |--|--|--|--|--|--|--| don't agree,

  because: _____

- At equal prices of conventional and organic products the bigger part of all consumers prefers organic products.

  Agree |--|--|--|--|--|--|--| don't agree,

  because: _____

We thank you very much for filling in this form. If you want, you can comment on some questions below.

Annex E Participating market experts

Austria
ERNTE is the largest Austrian organic farmers association, covering more than 60% of organic farmers in Austria and more than 85% of those organic farmers who are organised in associations. Their marketing is focused on supermarkets. Since 1994 Josef Aigner is working for Ernte in the department of marketing and therefore in very close contacts with the supermarkets. Additionally Josef Aigner is the managing director of the ERNTE sales organisation Ökoland, where more than 80% of Austrians potatoes and wheat is sold.

Sweden
KF Consumer and Environment acts as a part of the larger Kooperative Förbundet (the co-operative Association), the 'mother company' which includes the 'daughter companies' Gröna Konsum and hypermarket chains. KF works directly in connection with category teams providing the products in question for our complete range of stores. The yearly turnover is estimated at 2,5 billion Euro.
KF Consumer and Environment has the corporate responsibility to initiate and coordinate policies and activities in the field of environment and ethics. Apart from these functions Linda Stålhammar collects and collates statistics and deals with outside queries.

Denmark
Bo Nytofte is manager of the vegetable growers association in Denmark and has for seven years been co-ordinating the sale of organic produce to supermarkets. The vegetable growers association has an annual turnover of approximately 100 million DKR and is market leader in the wholesale of potatoes in Denmark.

Since 1989 Cerealia Danmark A/S has been authorised to organic production. From 1993 onwards Cerealia is market leader for organic wheat-flour and oat meal in Denmark, with market shares for both products of about 90%. The market for organic wheatflour is making up 12 to 15% of the total wheat-flour market for households.

Mette Wier is senior researcher of the AKF, Danish Institute of Local Government Studies and has been the key researcher in Danish research project analysing the consumption of organic foods in Denmark in the late 1990s.

The Netherlands
Centraal Bureau voor de Levensmiddelenhandel (CBL: Central Office of Retailtrade) defends the interests of all Dutch retail organisations and represents them in the Netherlands. W. de Jong co-ordinates a working group with experts on potatoes, vegetables and fruits in which all Dutch supermarket organisations are represented.

Platform Biologica is aDutch umbrella organisation for organic farming and nutrition. Organic farmers, traders, processors and retailers are co-operating to expand the reputation and the market of organic production.

Rabobank staffgroup economic research in the Netherlands has investigated the market for organic products.

You can order this publication from the Centre for Agriculture and Environment P.O. Box 10015. 3505 AA Utrecht, the Netherlands.
Telephone:+31 (0) 30 2441301,
Fax: +31 (0) 302441318, E-mail clm@clm.nl.
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