

TOTAL CONVERSION TO ORGANIC FARMING OF A GRASSLAND AND A CROPPING REGION IN AUSTRIA– ECONOMIC, ENVIRONMENTAL AND SOCIOLOGICAL ASPECTS

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Abstract

The implications of a full conversion to organic farming were analysed for two Austrian regions (a grassland area: Liezen, and a cropping area: the Weinviertel). The results show few differences between organic and conventional farms in the grassland region. In the arable region a full conversion to organic farming shows marked benefits not only for the environment but also from an economic point of view. Different preconditions in scenarios underline that the prognosis for future income is uncertain. In both regions, the majority of farmers emphasise different reasons that they did not see organic farming as a realistic alternative to their current production system.

Introduction

The share of organic farming in Austria is about 10% of the total agricultural area. More than 80% of the organic farms are situated in mountain areas. Most products can be marketed well; only for dairy products and meat is supply higher than demand. Against this background, in a two-year project we investigated various ecological, economic and social aspects of different scenarios for a total conversion to organic farming in both a dairy and a cropping region and formulated recommendations for measures to increase the share of organic farming.

Methodology

Two study regions were selected to include both an area with an already high share of organic farms in a grassland-based dairying area: Liezen in the Province of Styria (where 30% of farms are organic) and an arable crop production area: the Weinviertel in Lower Austria, where 1% of farms are organic. For the economic analysis, characteristic farm types for each region were identified using a cluster analysis of farm data from the EU's Integrated Administration and Control System (IACS). In the grassland region seven farm types were identified, differing in production intensity and kind of livestock (dairy cows and/or suckler cows). In the arable region, 11 farm types were identified, which differ in arable land area, existence of vineyards, and type of animal husbandry. With the help of linear optimisation, economic models were calculated for each farm type. The policy and direct payment schemes assumed were those in effect in 2000. The reference scenario is the current situation.

Two scenarios were modelled, one assuming all organic products could be sold with organic premiums at the level of the year 2000, the other assuming organic products could be sold only at conventional prices. In the arable region, a third scenario was modelled that assumes organic premiums and additional compulsory nature protection and biodiversity enhancing measures (e.g. 5% share of grassland or the planting of hedgerows). The investments required for converting are accounted for in the grassland-based cattle farms, since these must adapt their animal housing to comply with organic regulations. The additional fixed costs (e.g. for capital, maintenance, insurance) for the necessary investments are calculated using annual total fixed costs. In a cropping region, assuming that farmers produce mainly standard crops, no additional machinery is required, as the comb harrow needed for mechanical weed control is available on most farms. Investments may be necessary on farms which that new crops or speciality crops (e.g. herbs) or that start on-farm processing. Since these two options were not included in the models, no costs for investments are taken into account in the cropping region. The ecological effects were investigated at the farm level using nutrient

balances and on the regional level using existing landscape and vegetation data. The sociological investigation of attitudes regarding conversion to organic farming was based on qualitative in-depth interviews with farmers (groups and individuals), students and teachers from agricultural schools, as well as with other key actors from the agricultural and food sector. Quantitative information was derived from a mail survey of 700 farmers.

Results and brief discussion

Farm economy

In Liezen, the grassland region, the whole farm gross margin (taking into account additional capital costs for investments) after conversion would be higher for all farm types. The highest increase (25%) was calculated for suckler cow farms. For all other types the increase would be between 0% and 6%. Assuming conventional prices for selling organic products and organic prices for concentrates, the whole farm gross margin would decrease sharply, in particular for the intensive dairy farms (-14%). Due to the low use of concentrates, the whole farm gross margin of the suckler cow farms would still be higher by 5 to 10%. These results are comparable with those of a study by Kratochvil et al. (2003).

In the arable crop area the model results show that given the current prices for organic products and despite the lower yields (-26% for grain, -40% for maize), the value of production would increase, as would the whole farm gross margin (see Tab. 1). A shift among cultivated crops could be expected, with a decrease of grain (-33%), vegetable, and potato production and an increase of (fodder) legumes. Without price premiums for organic products, several farm types would face lower whole farm gross margins than under conventional production practices, despite direct payments for organic farming (see Tab. 1). Additional environmental protection measures that are included in the third scenario would result in lower whole farm gross margins even if the price premiums for organic products can be maintained (see Darnhofer et al. 2003).

Tab. 1: Changes in farm gross margin relative to the conventional scenario for the modelled farm types in the Weinviertel (arable crop area)

Farm type ¹	Arable farms				Arable farms with vineyards					Vineyards	Pig fattening
	40* / 0	39* / 0	30 / 0	17 / 0	41* / 2	41* / 3	31 / 5	19 / 4	18 / 6		
Organic premiums	+50%	+42%	+89%	+86%	+71%	+61%	+104%	+95%	+109%	+116%	+56%
Conventional prices	-26%	+8%	+20%	+16%	-22%	-9%	+7%	+1%	+1%	-32%	-5%
Organic premiums + additional measures	+33%	+21%	+62%	+58%	+51%	+39%	+79%	+72%	+86%	+89%	+39%

¹ The farm types not only differ in land area, but also in types of crops planted; farms marked with an * plant sugar beet

Aggregation at the regional level

The farm-level results were aggregated to analyse the effects at the regional level. In the Liezen region, assuming the milk quota remains at the current level, the number of cows would increase by 13% due to the calf feeding requirements and the lower milk yields per cow. Assuming the factor endowment (grassland area, animal housing) remains the same, the number of heifers would be reduced to 36% of the reference (conventional farms). The ox-fattening enterprises, which is present at a low scale in Liezen, remains unchanged. More cull cows (+13%), male calves (+13%) and female calves (+186%) are sold. To compensate, an additional 1500 heifers would have to be purchased as replacement. The use of concentrates would be reduced by 15%, and the cost of concentrate would be higher by 57%. The purchase of straw would increase by 15%. The number of large animal units would be reduced by 6%. The whole farm gross margin of all farms that formerly were conventional would increase by 10%. Two-thirds of this increase is due to higher direct payments, the remainder is due to increased prices for organic products. The total additional annual costs for investments in animal housing are approx. 1.29 million €

For the Weinviertel region, assuming organic price premiums can be achieved, a reduction of 4% in small-grain production could be observed. However, there is a differentiation: the production of winter grains would increase from 36% to 49% of the arable area, and summer grains decrease from 27% to 9% of the arable area. The area occupied by root crops would decrease from 8.7% to 2.4%, which is mainly due to a reduced area of sugar beet. The share of the area planted with legumes would increase from 6% to 30%. With regard to the amounts produced, small grains would decrease by 33%, field vegetables by 39% and potatoes by 40% compared to the conventional reference scenario. The largest increase in production would occur with peas (+237%) and oil pumpkin (+139%). On the monetary side, the total value of the agricultural production in the region would increase by 32%, assuming organic price premiums. Assuming the price premiums can be sustained even after the widespread conversion to organic farming, the increase in total gross margin of the region, from 110.78 million € to 179.60 million € (+62%), is higher than the increase in direct payments (from 68.54 million € to 95.39 million € or +39%). These figures are based on the farms included in the model, which represent approximately 78% of the agricultural area of the Weinviertel.

Effects on the landscape level

In the grassland region Liezen, only a few changes can be expected, as the current level of intensity is relatively low: the share of organic farming is already at 30%, with an additional 30% of farms enrolled in an agri-environmental program supporting the exclusion of mineral fertilisers and pesticides. This means that in most of the region the cattle density even in conventional farms is already at a level where conversion to organic farming would not cause significant additional extensification effects (see also Schiller 2000). Such effects would probably only occur locally in some areas at the valley bottom, where a decrease of the nutrient level could lead to higher biodiversity of the meadow fauna. Due to the specific regulations of the Austrian funding scheme for organic farming, it can be expected that the use of alpine summer pastures will become more attractive for the farmers, thus contributing to the preservation of a traditional element of the alpine cultural landscape. In the cropping region, a total conversion would lead to higher biodiversity both in fauna and flora, due to higher diversity of crops and lower impacts on neighbouring biotope structures. Results from the economic models show that root crops would be reduced. On the other hand, legumes will increase to 30% of the cropping area. The number of grain species also increases. Furthermore, the rotation schemes would include more winter grain and cover crops. All these factors will particularly favour beneficial organisms such as predatory arthropods. The dramatic reduction of pesticide input will, of course, significantly improve the general biodiversity of fauna and flora both within and outside the production areas (Weiger & Willer 1997). The EU regulations for organic farming do not include any standards concerning a minimum percentage of non-production areas such as hedgerows or other biotopes of agricultural relevance. Therefore, the conversion of an intensively managed and highly mechanised cropping region to organic farming will not necessarily lead to a significant change of the size and structure of accompanying biotopes.

Nutrient balances

In the cropping region Weinviertel including the vineyard farms (average of 9 conventional and 7 organic model farms) the average of organic farms is $-23,6 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ lower than in conventional farms. The average of the organic arable farms without vineyard farms is $+5,9$ (organic) and $+29,2 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ (conventional). In the grassland region Liezen the reduction is $-5,0 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ (organic: $+12 \text{ kg}$; conventional: $+17 \text{ kg N ha}^{-1} \text{ yr}^{-1}$; average of 6 conventional and 6 organic model farms). The dairy farms vary between $+40,4$ (conventional) and $+26,6 \text{ kg N ha}^{-1} \text{ yr}^{-1}$ (organic). In the cropping region, the balances of the organic cropping farms range between $+5,9 \text{ kg}$ and $+12,3 \text{ kg N ha}^{-1} \text{ yr}^{-1}$. The phosphorus and potassium balances in organic cropping farms are negative ($-0,2$ to $-8,3 \text{ kg P ha}^{-1} \text{ a}^{-1}$; $-1,0$ to $-22,9 \text{ kg K ha}^{-1} \text{ yr}^{-1}$), whereas the conventional farm balances vary between $-11,7$ and $+10,1 \text{ kg P ha}^{-1} \text{ yr}^{-1}$ and $-18,3$ and $+51,2 \text{ kg K ha}^{-1} \text{ yr}^{-1}$. In the grassland region the differences of phosphorus and potassium balances are low (average of all farms: conventional: $+1,8 \text{ kg P}$ and $+6,2 \text{ kg K ha}^{-1} \text{ yr}^{-1}$; organic: $-0,2 \text{ kg P}$ and $+3,3 \text{ kg K ha}^{-1} \text{ yr}^{-1}$).

Conventional farmers' attitudes concerning organic farming

In both regions, the majority of the interviewed conventional farmers did not see organic farming as a realistic alternative to their current production system. Farmers feared higher economic risks and a higher dependency on direct payments. They rejected the intensive monitoring and reporting schemes established in organic farming, and also the special requirements (e.g. for hygiene) in direct marketing. In the grassland area, a very important obstacle is the animal housing requirements, which for many farms would require

significant investments. In the cropping region, sugar beet has been identified as a critical issue. It is the crop with the highest gross margin in the area, and farmers are unwilling to give it up after conversion, which they may have to, since there are no specific processing and marketing opportunities for organic sugar beets. Most of the students and teachers in agricultural schools know about organic farming, but that knowledge is mostly restricted to the organic regulations, with little concern for ecological interrelationships. In both regions there is a lack of possibilities for training and support in organic farming, as has been pointed out by the conventional farmers themselves. Also, both farmers and teachers doubt consumers' willingness to pay more for organic products and point out the discrepancy between consumers' professed interest in organic products and their actual purchasing behaviour.

The written surveys of farmers show that in the grassland region about 12% of respondents are considering a conversion to organic farming. Among the most important barriers to conversion are the perception that the required investments in animal housing are too high, the perception that the direct payments and organic premiums do not cover the additional costs, and the assessment of the current premium for organic milk as too low. In the arable region 5% of farmers are considering an eventual conversion to organic farming. The three most important barriers to conversion are: fear of weeds and pests, too much additional labour, and the fear that the income will be even more dependent on direct payments (Schneeberger et al. 2002).

Conclusions

Under the assumption that organic products can be sold at a premium, a conversion to organic farming would be economically beneficial for all farm types. However the changes modelled assumed only a regional conversion. Should the conversion be widespread at a national level, further changes would have to be considered in the models, e.g. a potential decrease of product prices due to an increased supply, or changes in the prices of inputs. As the limited effect of a drop in prices for organic inputs and products to conventional prices show, the economical attractiveness of organic farming is partly dependent on the Austrian scheme of direct farm payments. With a higher proportion of organic farms, the total volume of direct payments would also increase, therefore a change of the funding scheme would have to be expected. Although the calculations were done before the Mid-Term review of the Common Agricultural Policy (CAP) in 2003, studies have shown that organic farming remains attractive under the new CAP regimen (Schmid and Sinabell 2005). A total conversion to organic farming would require significant changes in the entire product chain from production through processing and marketing to the food consumption patterns of consumers. Although conventional farmers indicate a fear of increased labour requirement as a major impediment to conversion, research results on labour requirements do not support this perception. Given the limited availability of farm labour and the prevailing reluctance to use non-family wage labour, most organic farms adjust their production programme rather than increase their labour input. This (and other misconceptions) show that a key to increasing the share of organic farming is information. Organic farming must not only be promoted through economic arguments, but also presented in an integrative way, emphasizing its social, organisational and educational aspects.

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