

COMPARISON OF APPLE PRODUCTION COSTS BETWEEN CONVENTIONAL, INTEGRATED AND ORGANIC FARMING

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A B S T R A C T

The work data are based on three sources of apple production: 18 organic and 88 conventional farms in Germany and 10 farms in Poland based on either conventional or integrated technology. The organic production turned out to be not considerably cheaper than that for conventional orchards. The costs of biological protection against pests in organic apple farms were comparable with the application of pesticides in conventional production, but in the first case the crops were lower. Due to the lower costs of machinery and human labour Polish organic apple production has a great opportunity in exporting this fruit to the old EU-countries.

Key words: appels, costs of production, organic

INTRODUCTION

There are compelling reasons for fruit growers to change orchard management, being caught in the cost prize squeeze, increasing insect resistance to pesticides, loss of pollinators, negative consumer perception, current political trends and environmental policies and a decreasing number of registered pesticides. Growers who are trying to convert to alternative methods of production, particularly those organic (syn. ecological, biological) find the transition difficult. Changing from conventional to organic production should be regarded as an investment because specific capital items are necessary for such a venture. A certain amount of money is also required in the first years of transition, when producers are not allowed to sell their commodities as organic for the time being. Insufficient information and extensions materials could be also a crucial obstacle for a successful transition. This also occurs in the research field; published papers and data on

the profitability of organic horticulture are rather scarce as compared with agriculture for example. This seems to be a little unfair as far as an area of organic farming is taken into consideration (Tab. 1).

Table 1. Organic farming in Europe, 1997 (in 1000 ha)

Type of land management	Agricultural crops	Vegetables	Fruits and permanent crops
Conventional (1)	135 521	1 326	5 704
Organic (2)	1 757	22.9	106.2
Ratio (2) in (1)[%]	1.3	1.7	1.9
Production of organic farming area [%]	–	1.3	6.0

The ratio of area of organically and conventionally cultivated horticultural crops is higher as compared to the relevant ratio in agricultural production. Generally, in 1997 in Europe organic horticultural crops occupied 149 571 ha, i.e. 8.5% of total area of organic agriculture (Dabbert, 2000). A large part of this belongs to an organic viticulture located in Mediterranean countries. The organic horticultural products still have a favourable position in the food market. Particularly fruit and vegetables are more desirable than other agricultural products and their prices for producer are 15 to 70% higher as compared the conventional equivalents (Michelsen et al., 1999)

MATERIAL AND METHODS

The research was based on three sources of apple production: 18 organic and 88 conventional/integrated farms in Germany, and 10 conventional/integrated farms in Poland. Data on costs of production were obtained from all the surveyed orchards. Primarily, all expenditures were expressed in natural units as they were collected, and after multiplying by separately collected prices, monetary values were established. The variable production costs from 1997 and extracted after that, income above such costs, were compared within the three groups of farms. The 18 German organic farms were divided into two subgroups: the first- less intensive with an average crop of 11.5 t per ha and the second- more intensive with 22.1 t per ha. The Polish farms were classified as conventional or integrated. The coefficient of variability (CV) was computed.

RESULTS AND DISCUSSION

The variable costs in all groups of farms were not so differentiated as one could expect (Tab. 2). Actually there was no difference between the most successful group of conventional farms with the total variable costs – 7 342 € per ha and the highly intensive organic farms where the total variable costs were 7 375 € per ha. Also the total variable costs per kg of apples were very

similar. Only the Polish farms were marked by much lower figures in both categories. This most likely was due to much lower costs of both human labour and machinery. The lower costs of human labour on Polish farms are easy to explain, but the costs of machinery are more intriguing. Those farms are usually less equipped with machines and other fruit production facilities than their German counterparts. Despite the lack of pesticide application and other expensive chemicals in organic farming the operating cost were nevertheless high. This was due to a high input of human labour and higher costs of special activities associated with organic farming, like costs of fallow time for example. The costs of human labour in organic production are also intriguing. According to Stoskert (2002) the expenditures of such labour could be as high as 680 working hours per year at full apple cropping. Among this, 205 hours relate to manual thinning, 128 to pruning and 160 to fruit picking. By multiplying the amount of 680 hours by the regular wage of 7-8 € per hour it makes about 5 000 €. In the present research the costs of human labour on organic farms were much lower. In the highly intensive group of such farms, they were almost on the same level as for conventional production.

Table 2. Costs apple production by conventional and organic methods in Poland and Germany, 1997

Specification of costs and profits	German farms				Polish farms		Coefficient of variability [CV] [%]
	organic ¹		conventional ²		conventional	integrated	
	crop <15 t/ha	crop >15 t/ha	the leas successful one third of all businesses	the most successful one third of all businesses			
Pesticides or their bio-equivalents	485	583	745	845	742	608	19.7
Fertilizer	75	172	92	134	44	53	52.0
Machinery costs	1176	1490	2053	2330	634	802	47.9
Seasonal labour costs	762	2080	2555	2019	305	296	74.7
Interest	151	216	270	237	395	401	36.1
Other variable costs (storage, planting and grubbing of trees time of fallow etc.)	1318	2834	1303	1776	767	767	52.0
Total variable costs	3967	7375	7065	7342	2887	2927	42.3
Variable costs per kg apples	0.39	0.34	0.31	0.36	0.20	0.22	25.4
Unit price €/kg	0.66	0.66	0.31	0.36	0.20	0.22	X
Output	7157	14821	10464	13860	4282	4416	X
Income above variable costs	2872	7448	3399	658	1396	1489	X

¹Waibel et al. (2001) and ²Görgens (1998)

The costs of pesticide application and their bio-counterparts in all groups of farms are comparable, while other components of costs are more differentiated (higher coefficients of variability). As for both groups of German farms with organic production, they are very different in the structure of costs. Remarkably the costs of biological and chemical plant protection are almost the same in both groups, although the crops were very different. This suggests that the way the producers had undertaken to protect the trees is till very liable and unsure. Generally in the highly intensive group of farms the variable costs were almost twice as high as in the other. Due to the higher crops however, the unit's costs were on the same level. As a result the variable costs in the first subgroup amounted to about 3 967 € per ha while in the second they were almost doubled – 7 375 € per ha. In the group of commercial conventional farms in Germany the average variable costs were similar – 7 065 € per ha, but in the one third of farms, which enclosed the most successful businesses, the average variable production costs were higher – 7 342 € per ha. The machinery costs were much lower on the organic farms. One explainable reason for this could be lower crops, which for conventional production at least doubled the figure for organic orchards.

Surprisingly the income above the variable costs in the highly intensive group with organic production of 7 446 € per ha was higher then in conventional orchards (where even in the best third of most successful farms it constituted only about 6 518 €). This was due to a high price of sold apples, about 100% over that in conventional production. Such profitable prices were recorded in 1997 and before. According to Wolff B. (Forschungs Report, 2003) in Germany in 2003 prices for organically cultivated apples were only 20 to 30% over those from regular production.

Polish farms were divided into two groups, based on either conventional or integrated technology. The variable costs of production as well as income above such costs were slightly higher for the second group. To the advantage of Polish farms one asset was eminent – the lowest value of variable costs within all presented groups of farms. In the group with conventional production it was about 2 887 € per ha, whole in that with integrated technology – about 2 927 € per ha and constituted respectively only 12 to 40% of the relevant figure for German farms. The main cause for that were the low costs of hired human labour. Considering this asset and the fact that organic production is very labour – consumptive, Polish organic apple production has a great opportunity in exporting this fruit to other EU-countries.

CONCLUSIONS

1. Organic production of apples is not considerably cheaper than that of conventional technology. In the group of organic farms with crops higher

than 15 t per ha, the variable costs per ha were almost the same as in conventional orchards. The costs per kg of produced apples were also very similar.

2. The costs of biological protection against pests in organic apple farming are comparable with those of pesticide application.
3. Machinery costs on farms with organic production were about 65% lower than in conventional orchards.
4. On Polish farms the machinery costs came only to 35 to 45% of such costs for German farms. Seasonal labour in Polish orchards was also cheaper and constituted only 12 to 40% of adequate costs on German farms.
5. Polish organic apple production has a great opportunity in exporting this fruit to other European Union countries.

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PORÓWNANIE KOSZTÓW PRODUKCJI JABŁEK W UPRAWIE TOWAROWEJ METODAMI TRADYCYJNĄ, INTEGROWANĄ ORAZ ORGANICZNĄ

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S T R E S Z C Z E N I E

Praca powstała na podstawie danych z trzech grup gospodarstw: 88 gospodarstw w Niemczech z produkcją towarową metodami tradycyjnymi, 18 gospodarstw z produkcją organiczną w Niemczech oraz 10 gospodarstw w Polsce z produkcją integrowaną i towarową metodami tradycyjnymi. Koszty produkcji jabłek w uprawie organicznej były porównywalne z kosztami produkcji w tradycyjnej uprawie towarowej. Koszty biologicznej walki ze szkodnikami w uprawie organicznej dorównywały kosztom stosowania pestycydów w tradycyjnej uprawie towarowej, podczas gdy plony w uprawie organicznej były znacznie niższe. Jabłka z polskich gospodarstw produkowane metodami organicznymi mogą być konkurencyjne w stosunku do odpowiednich produktów z państw starej UE dzięki niższym kosztom pracy ludzi i maszyn.

Słowa kluczowe: jabłka, koszty produkcji, uprawa organiczna