



# Production costs and profitability of organic apple and strawberry production in Poland



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Development of innovative products and technologies for the environmentally-friendly cultivation of fruit plants

## Introduction

Organic farming became one of the fastest growing segments of European agriculture during the 1990s (Hamm et. A.2000). Faced with economic, environmental and social problems, fruit growers are increasingly interested in organic farming systems (Reganold et al., 2001). The objective of this research was the evaluation of production costs and profitability of organic apple and strawberry production in Poland and to examine the competitiveness of them on local markets.

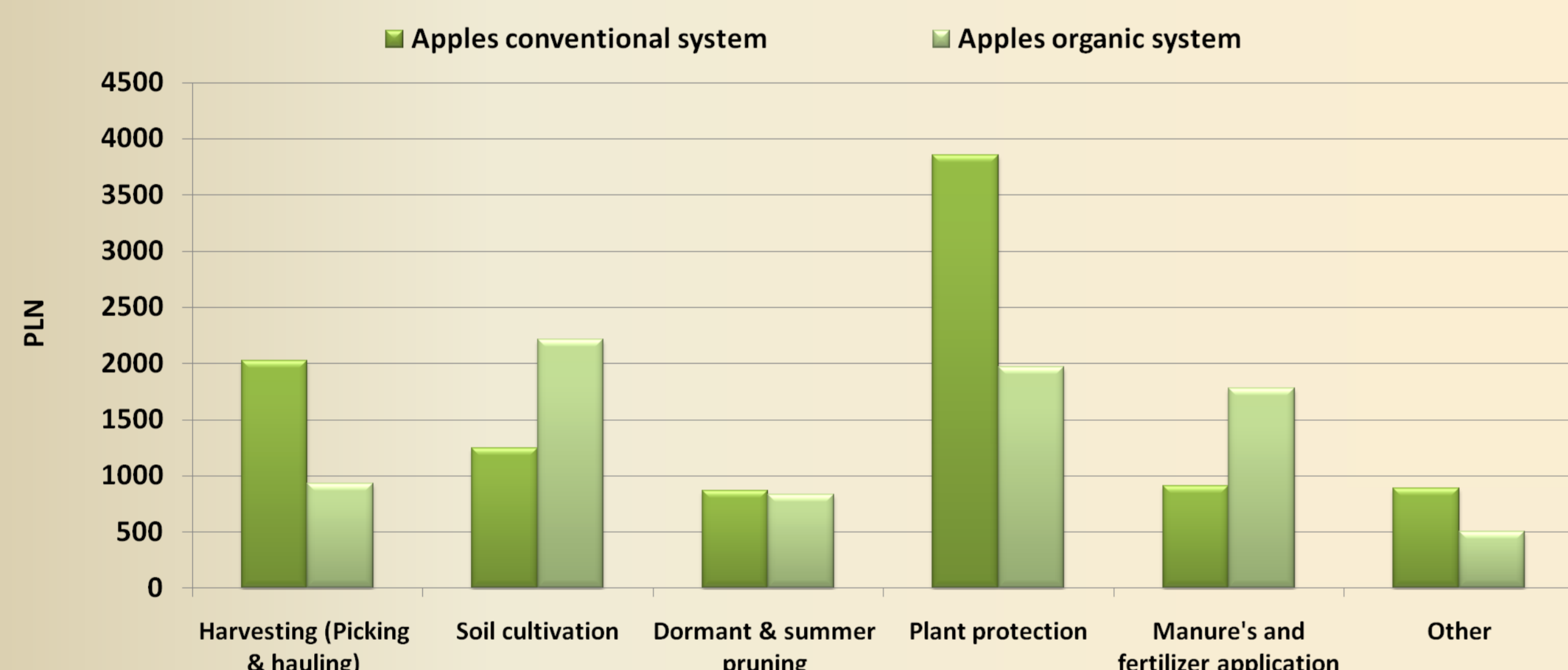
## Methods

The research was carried out in the years 2007-2009 on nineteen commercial fruit farms; sixteen with apple production (among them: twelve with conventional four with organic) and seven with strawberries (three with organic, four with conventional). For both systems organic and conventional, appropriate management practices were followed. The size of investigated apple orchards ranged from 1,1 ha to 3,5 ha for organic system and from 1,05 ha to 7 ha for conventional one. The density of planting was from 260 to 860 trees per hectare for organic system and from about 400 to 1660 trees per hectare for conventional one. The trees were from 7 to 34 years old. The size of strawberries fields in investigated farms was from 0,4 ha to 3,5 ha and the strawberry plants were in second or third year of cultivation. All data necessary for the calculation of cost and profitability were obtained from producers through special questionnaires and during additional interviews.

## Results

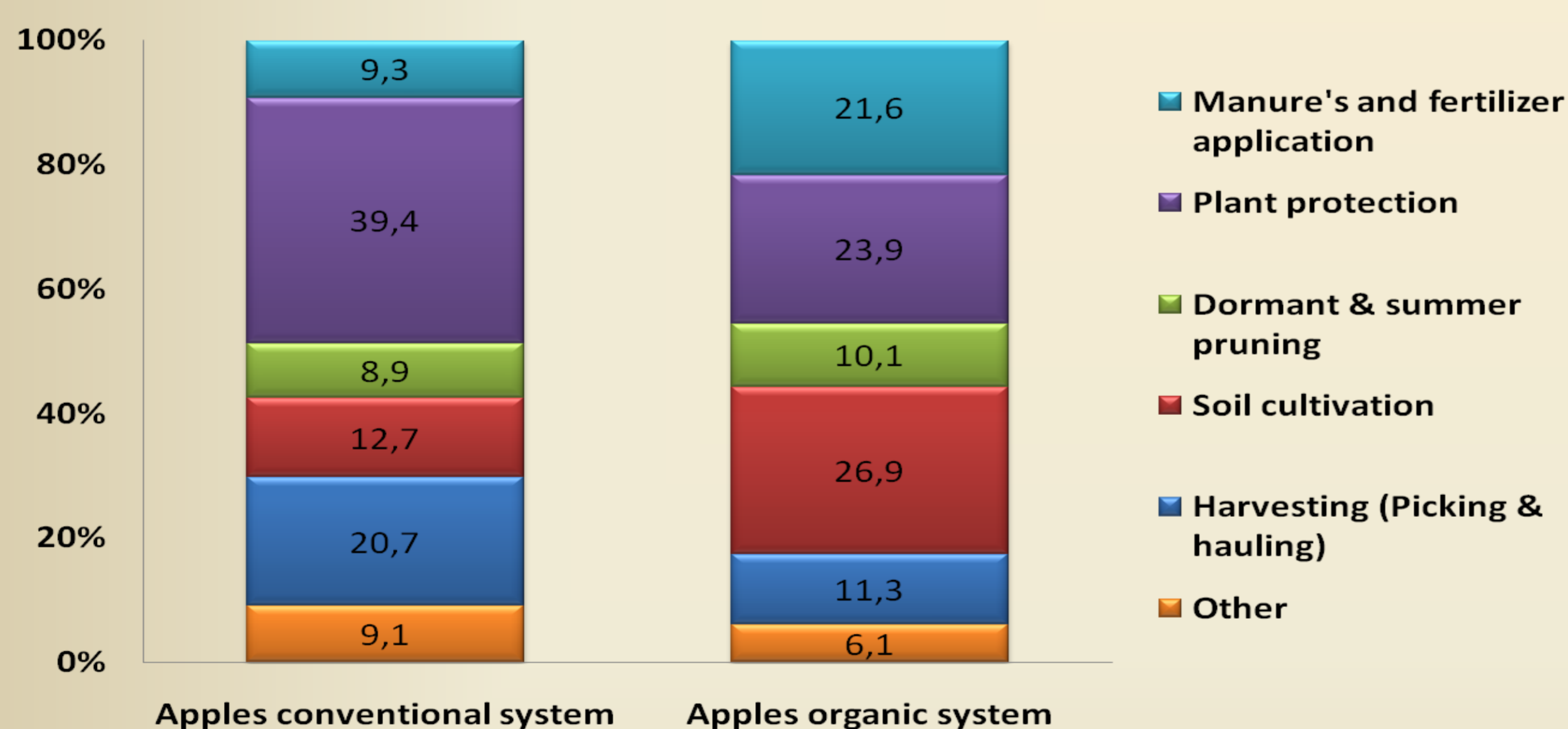
Average yields in organic apple production in the years 2007-2009 amounted 12.7 tons per hectare while in conventional 23.5 tons per hectare. The lowest yields occurred in 2007 due to the late frost in spring (8,5 tons per hectare for organic mode and 10,7 tons per hectare for the conventional one). The direct costs of apple production were lower in organic farms and accounted for 8236 PLN per hectare, while in conventional ones were 9793 PLN per hectare (fig.1). Because of high prices of pesticides plant protection was priciest operation in conventional system. The cost of nutrition of trees were almost twice higher in the organic system than in conventional one because of the high price of manure provided by (derived from) certified organic animal farms. The biggest problem and the largest cost item in organic production posed the mechanical and manual weed control, it accounted for 26,9% of total direct costs of production, while for control of pest and diseases came 23,9% of them (fig. 2).

Fig.1 Direct cost of organic and conventional cultivation of apples, according to operations



Source: Author's own studies

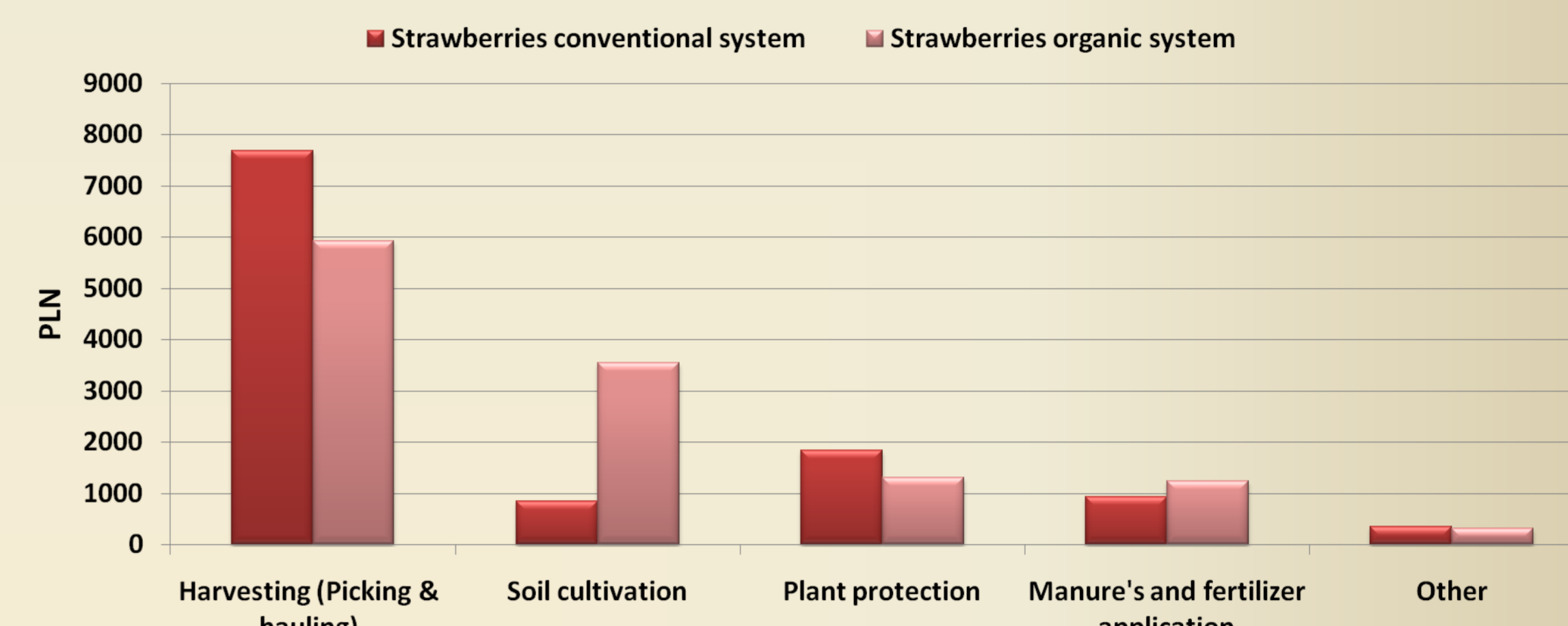
Fig.2 Structure of direct cost of organic and conventional cultivation of apples



Source: Author's own studies

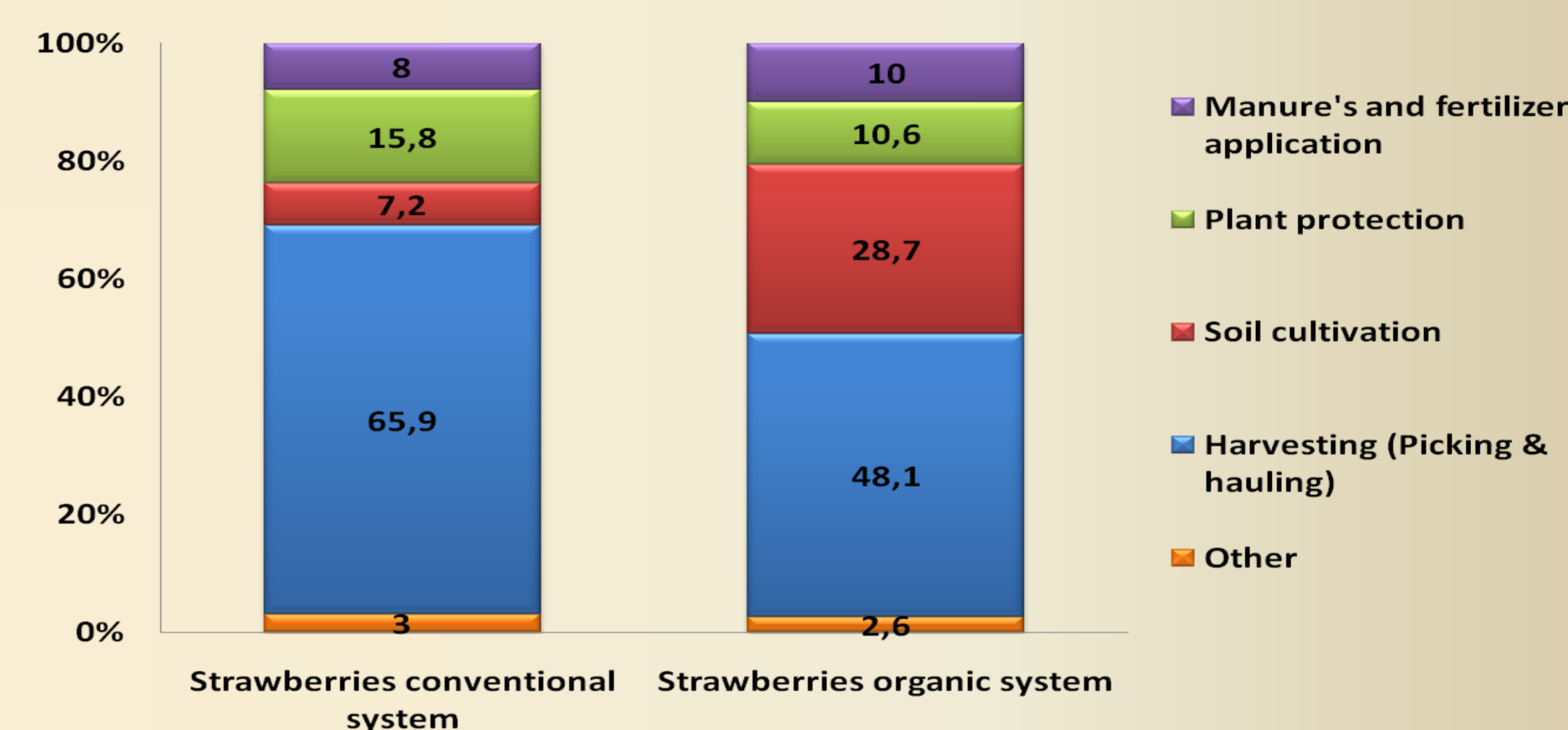
In conventional mode was opposite 39,4% of total direct costs constituted pest and disease control, 20,7% harvesting of fruit and only 12,7 % weed control. In organic strawberry production average yields amounted 9.8 tons per hectare while in conventional one 10.5 tons. The direct costs of strawberry production were higher in organic farms - 12938 PLN per hectare, while in conventional one - 10452 PLN (fig.3) that was due to higher expenses for manual work and for manure (conventional producers used much cheaper synthetic fertilizers). As in the case of organic apples, weed control posed really big problem for strawberries producers, because of high demand for manual labor. The highest cost in both organic and conventional production was the harvesting it took 48,1% of total direct cost in organic production and 65,9% in conventional one (fig.4).

Fig.3 Direct cost of organic and conventional cultivation of strawberries, according to operations



Source: Author's own studies

Fig.4 Structure of direct cost of organic and conventional cultivation of strawberries



Source: Author's own studies

Table. 1 Costs and other economical features for apples and strawberries cultivated in two systems organic and conventional

Items	Apples conventional	Apples organic	Strawberries conventional	Strawberries organic
Yields dt/ha	235	127	105	98
Average price in PLN per kg	1,10	1,25	2,53	2,91
Gross income in PLN (receipts)	25850	15875	26565	28518
Direct cultivation cost	9793	8236	11665	12328
Recapture estab. cost	3720	2530	4950	4830
Grading costs	2350	1524	0	0
Storage cost	5405	3175	0	0
Overhead	1469	1235	1750	1849
All costs (total)	22737	16701	18365	19007
Net income	3113	-826	8200	9511
Support payments	0	1670	0	1670
Final econ. result	3113	844	8200	11181

Source: Author's own studies

## Conclusions

- More marketing activities are needed to bring up the price for organically cultivated apples and thus to increase their profitability.
- The main reasons for growing organic apples in Poland were the government subsidies.
- A stronger support from science and extension agencies is necessary to increase the quantity and quality of yields in organic production of apples in Poland.
- High demand for manual labor at weeds control in organic production of strawberries seems to be the limiting factor in its further expansion hence some technological improvements could be very productive.

## References:

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2. Fricke K., Görgens M. 2009. Ergebnisse aus dem Isafuit-Projekt. Mitteilungen des Obstbauversuchsrings des Alten Landes e.V am Obstbau Versuchs – und Beratungszentrum Jork 4/2009:145-149
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