MARIA JOLANTA ORŁOWSKA

University of Science and Technology, Poland

COMPETITIVENESS OF POLISH ORGANIC FARMS WITH DIFFERENT ECONOMIC SIZE IN LIGHT OF FADN DATA

Key words: organic farm, economic size, competitiveness

ABSTRACT. Efficiency and competitiveness of Polish ecological farms differing in terms of economic size have been analyzed as well as their production potential, intensity and costs. The research was conducted in 2013-2016. Information was obtained from farm accountancy records of FADN included in the following publications: *Technical-economic parameters according to groups of farms participating in the Polish edition of FADN* in 2013-2016. The following methods have been used: descriptive, with the use of tables, and comparative. In 2013-2016, production potential, efficiency and competitiveness of ecological farms depended on their economic size. Farms with an economic size of 25-50 thousand euro and 50-100 thousand euro using, respectively: 37.7 and 70.3 ha AL, turned out to be able to cope with competition. However, farms with smaller areas and smaller economic size were not able to withstand competition. Farms able to withstand competition gained positive income from management in 2013-2016, however in farms without competitive abilities, this was negative. In farms with competitive ability, with an economic size of 25-50 thousand euro, payment for own labor was 1.5 times higher than the average wage in the domestic economy and in farms with an economic size of 50-100 thousand euro, it was nearly three times higher. Agricultural holdings without competitive abilities (below 25 thousand euro) did not achieve parity of own labor input return.

INTRODUCTION

Recently, demand for ecological foods has rapidly increased. Methods of production, storage, and processing used in ecological farming are subject to constant supervision, including the environment they function in. This allows them to obtain high quality [Provision of Council (WE) No. 834/2007, Journal of Laws 189, 20.7.2007, Nowogródzka 2012, Niewęgłowska 2014].

Among all ecological producers, the most numerous group are agricultural producers. In 2004-2013, the number of ecological agricultural farms systematically increased, to be: 3,705; 7,183; 9,189; 11,870; 14,896; 17,091; 20,582; 23,449; 25,944; 26,598 respectively. In 2014 and 2015, there was a drop (24,829 and 22,277 respectively), following which, in 2016, a slight increase was reported (22,435). In 2015, the structure of ecological agricultural farms was dominated by farms sized: 10-20 ha (28.5%), 5-10 ha (22.5%) and 20-50 ha (21.3%). Farms up to 5 ha accounted for 14%, whereas, the lowest 3%, was attributed to farms with an area of 100 ha (4.4%) and 50-100 ha (9%). In 2016, a drop in the number of smallest farms – up to 5 ha (20.3%) was reported, whereas the share of

remaining farms: 5-10, 10-20, 20-50, 50-100 and above 100 ha decreased (20.4, 26.5%, 20.8, 8.4 and 3.6%, respectively) [Zdrojewska 2017].

The economic purpose of agricultural activity is to gain an expected income. The profit needs to cover own production and investment costs. Profit higher than own production costs is the factor that makes it possible for farms to withstand competition and remain on the market. If it is lower, they can try to adapt to variable farming conditions or shut down business and use production means in a different way [Kleinhanss 2015]. In Poland, as many as 1687 thousand farms of small economic size and area are characterized by a diverse cultivation structure and different species of breed animals. They are referred to as decline farms [Józwiak 2010]. For some of these farms, the ecological production system may provide a chance for development. This system is financially supported from PROW (Program for Rural Areas Development). The share of financial support in the income of ecological farms is 80%. Moreover, the prices of organic products are higher than conventional ones and sell well [Niewęgłowska 2014, MRiRW (Ministry of Agriculture and Rural Areas Development) 2016]. Therefore, the aim of the research was to evaluate the effectiveness and competitiveness of Polish ecological farms of different economic size. Their production potential as well as production capacity has also been analyzed.

MATERIAL AND METHODS

Data from farms using Polish FADN accountancy included in publications entitled: 'Technical – economic parameters according to groups of agricultural farms participating in the Polish FADN in 2013-2016" have been used. Organic farms grouped according to economic size (ES6[1]) in thousands of euro: 2-8, 8-25, 25-50 and 50-100 have been analyzed. The potential of the analyzed farms was assessed according to: agricultural land – AL (ha), per 100 ha AL (AWU), own labor share in overall labor expenditure (%), total assets (thousand PLN), overall capital (thousand PLN per ha AL) as well as the technical equipment index measured by the value of machines and devices per one full time employed person (thousand PLN AWU). Production costs have also been analyzed, measured by total costs per 1 ha AL in (PLN) and costs involved in the creation of production worth PLN 1,000 (PLN/thousand). The productivity index has been used for the assessment of production effectiveness of farms, referring production to expenditures involved in the following factors: land, labor input and overall assets. The share of subsidies in income has been analyzed as well. Competitiveness of farms has been defined by means of the competitiveness index (*Wk*):

$$Wk = Dzgr / (Kwz + Kwp + Kwk)$$

where:
Dzgr – income from agricultural farm,
Kwz – alternative cost of own land,
Kwp – alternative cost of own labor,
Kwk – alternative cost of own capital (without own land).

---

[1]　According to the ES6 classification of farms by thousand euro: very small 2-8, small 8-25, medium--small 25-50, medium-large 50-100, large 100-500, very large 500.

Value $Wk \geq 1$ denotes full return of own production factor costs from income, whereas $Wk < 1$ indicates a partial return. According to Kleinhanss [2015], a more detailed classification of the competitiveness index was accepted, where:

$Wk1$ – stands for negative profit from agricultural activity,

$Wk2$ – partial return of own production input costs ($0 \leq Wk < 1$),

$Wk3$ – full return of own production factor costs ($1 \leq Wk < 2$),

$Wk4$ – double and larger return of own production factor costs ($Wk \geq 2$). Farms able to withstand competitiveness are those in which the value of Wk is contained within $1 \leq 2$, whereas, those with a value of $Wk \geq 2$ are fully competitive.

Competitiveness of ecological farms is referred to as farms able to develop, defined by profit from management, income parity and net investment rate. The share of subsidies in income has also been determined. The following methods have been used: a descriptive method with the use of tables and a comparative method. An arithmetic means of the investigated features recorded in 2013-2016 have been used.

RESEARCH RESULTS

The production potential of organic farms was dependent on their economic size. Farms with a higher economic size were also characterized by larger areas. A reverse dependence was reported for labor inputs per 100 ha AL. Farms with the highest economic strength and largest area mostly based their production on a hired labor force, whereas farms with the lowest economic strength mostly used their own labor force. The value of assets per holding increased along with its economic size increase, whereas farm capital per 1 ha AL decreased (it was the highest for farms with the smallest economic strength). The value of farm capital includes the values of: livestock, permanent crops, melioration devices, buildings, machines, equipment and working capital. It does not include money sums or other laws which cannot be separated from the value of land. [Bocian et al. 2017]. The value of the technical device index was also connected with the economic size of a holding. The highest value was found for farms with the highest economic strength and lowest labor input per 100 ha AL. Technical devices, which increased along with an increase in economic size, compensated decreasing labor inputs (Table 1).

Table 1. The production potential of ecological farms with different economic size in 2013-2016

Specification	Farms by economic size [thous. euro]			
	2-8	8-25	25-50	50-100
Total Utilised Agricultural Area [ha]	9.1	19.1	37.7	70.3
Total labor input [AWU/100 ha agricultural land]	14.6	8.3	5.8	3.6
Share of own work in total work expenditure [%]	91.0	94.2	80.8	69.0
Total assets [thous. PLN]	372	623	1034	1719
Farm capital [thous. PLN/ha AL]	17.62	14.42	12.5	10.14
Machinery [thous. PLN/AWU]	26.22	47.74	76.23	113.34

Source: own study based on [Goraj et al. 2015, 2016, Bocian et al. 2017, 2018]

Production intensity of farms with a smaller economic size was found to be higher. Production intensity measured by overall costs per 1 ha decreased along with an increase in economic size. A similar dependence was also found for costs involved in the generation of PLN 1,000 worth of output. The highest costs were borne by the smallest holdings. In a farm of up to 25 thousand euro, the costs were higher than the value of production. However, the lowest production costs were found for holdings with the highest economic strength (50-100 thousand euro). For farms with an economic size of 25-50 thousand euro, costs were slightly higher than for farms – 50-100 thousand euro, however, they did not exceed production costs. Farms differed in terms of land, labor productivity and assets. Farms with the lowest economic strength (2-8 thousand euro) were characterized by the highest land productivity (3,039 PLN/ ha AL), whereas, the lowest land productivity (2,530 PLN/ha AL) was found for holdings of 8-25 thousand euro. In farms 25-50 thousand euro and 50-100 thousand euro, production per 1 ha AL was similar (above 2,700 PLN/ha AL). However, the dependence was found to be different for labor efficiency. The output value per one full time employee was higher along with the economic size of a farm. It was four times higher for holdings with the highest economic strength than for farms with the smallest economic size. Productivity of assets also increased along with economic size, with the exception of farms with an economic size of 8-25 thousand euro, where it was slightly lower than in farms – 2-8 thousand euro (Table 2).

Farms with the lowest economic strength and highest production costs were characterized by the highest share of subsidies in income, whereas, for farms with the largest economic size, the share of subsidies in income was the lowest (Figure 1).

Farms with an economic size of 25-50 thousand euro (competitiveness index 1.1) were found to have competitive ability as well as those with 50-100 thousand euro (competitiveness index 1.8) using 37.7 and 70.3 ha AL, respectively. In farms of up to 25 thousand euro, an index lower than one indicates that they are not able to be competitive. 'Competitiveness of farms can be understood as an ability to develop in concrete economic conditions, measuring them with such indexes as: "income parity, management related income and net investment rate" [Mirkowska, Ziętara 2015, Ziętara 2014, Sobierajewska,

Table 2. Production intensity, production costs and efficiency of organic farms with different economic size in 2013-2016

Specification	Farms by economic size in thousand euros			
	2-8	8-25	25-50	50-100
Total costs per 1 ha of UAA [PLN]	3,313	2,520	2,514	2,323
Total costs per thous. PLN total output [PLN]	1,095.70	1,074.90	912,99	856.73
Total output [PLN/ha UAA]	3,039	2,530	2,758	2,746
Total output per one full-time person [thous. PLN]	20.8	28.3	47.3	75.8
Total output for thous. PLN assets [PLN]	74	72	100	123

Source: own study based on [Goraj et al. 2015, 2016, Bocian et al. 2017, 2018]

Ziętara 2017]. Competitive agricultural holdings were characterized by positive management related income in contrast to farms without competitive abilities, where it was found to be negative. The level of own labor expenditure return also depended on competitiveness of farms and their economic size. In holdings with a competitive ability, with an economic size of 25-50 thousand euro, it was 1.5, whereas, for holdings of 50-100 thousand euro, it was almost three times higher than the average wage in the national economy. Farms which have no competitive ability (below 25
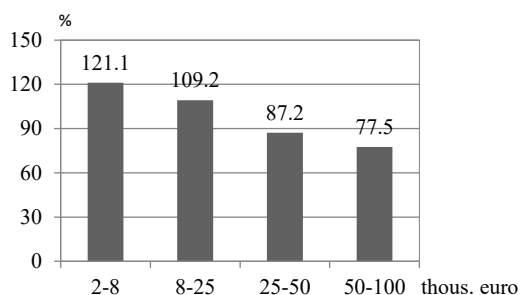

Figure 1. Share of subsidies in the income of organic farms with different economic size in 2013-2016
Source: own study based on [Goraj et al. 2015, 2016, Bocian et al. 2017, 2018]

thousand euro) did not achieve an own labor expenditure return. The size of expenditure for restoration, extension and modification of fixed assets are factors which are crucial for farm development [Józwiak 2012, Czubak, Sadowski 2014, Grzelak 2015, Sass 2017]. Ecological farms which have the ability to be competitive were characterized by a positive investment rate net, whereas for those without competitive ability, it was negative (Table 3).

Table 3. Competitiveness of organic farms with different economic size in 2013-2016

Specification	Farms by economic size [thous. euro]			
	2-8	8-25	25-50	50-100
Competitiveness index	0.3	0.6	1.1	1.8
Competitive ability	lack of competitive ability		capable of competition	
Income from management and risk [PLN per farm]*	-30.1	-23.4	11.09	72.87
Income parity**	0.4	0.8	1.5	2.7
Net investment rate [%]***	-80.9	-38.7	7.9	28.1

* Management income is the difference between farm income and the costs of using own production factors (labor, land and capital),

** Income parity is the ratio of farm income per unit of own work (FWU – Family Work Unit = 2,120 hours of own work in a year) to the average wage in the national economy. The average net wage in the national economy based on the calculations of the Agricultural Accountancy Department of IERiGŻ-PIB in 2013-2016 amounted to PLN 29,798, PLN 30,915 PLN, 31,960 and 33,135 PLN,

*** Net investment rate – net investment to depreciation ratio expressed in %.

Source: own study based on [Goraj et al. 2015, 2016, Bocian et al. 2017, 2018]

CONCLUSIONS

The carried out analysis has proved that in 2013-2016 the production potential, efficiency and competitiveness of Polish ecological farms depended on their economic size.

1. The value of assets per one agricultural holding increased along with an increase in economic size. The operation of holdings with a large area and high economic strength was largely based on a hired labor force, whereas, smaller farms used their own labor force. The bigger the economic size of a farm, the more equipment it had, which compensated decreasing labor inputs.

2. Labor productivity increased along with an increase in farm economic size.

3. Among the analyzed ecological farms, those with an economic size of 25-50 thousand euro and 50-100 thousand euro, using 37.7 and 70.3 ha, respectively, were found to have competitive abilities.

4. Farms, which were able to withstand competition, gained positive income from management in 2013-2016; in farms without competitive abilities this was negative. In farms with competitive ability, with an economic size of 25-50 thousand euro, payment for own labor was 1.5 times higher than the average wage in the domestic economy and in farms with an economic size of 50-100 thousand euro, nearly three-fold. Agricultural holdings without competitive abilities (below 25 thousand euro) did not achieve parity of own labor input return.

5. Farms with competitive abilities are characterized by a positive net investment rate, whereas for farms which do not have competitive abilities the investment rate is negative.

6. The analysis showed that small organic farms with small economic size despite being financially supported had no competitive ability.

BIBLIOGRAPHY

Bocian Monika, Dariusz Osuch, Adam Smolik. 2017. *Parametry techniczno-ekonomiczne według grup gospodarstw rolnych uczestniczących w Polskim FADN w 2015 roku* (Technical and economic parameters by group of farms participating in the Polish FADN in 2015). Warszawa: IERiGŻ-PIB.

Bocian Monika, Dariusz Osuch, Adam Smolik. 2018. *Parametry techniczno-ekonomiczne według grup gospodarstw rolnych uczestniczących w Polskim FADN w 2016 roku* (Technical and economic parameters by group of farms participating in the Polish FADN in 2016). Warszawa: IERiGŻ-PIB.

Goraj Lech, Monika Bocian, Dariusz Osuch, Adam Smolik. 2015. *Parametry techniczno-ekonomiczne według grup gospodarstw rolnych uczestniczących w Polskim FADN w 2013 roku* (Technical and economic parameters by group of farms participating in the Polish FADN in 2013). Warszawa: IERiGŻ-PIB.

Goraj Lech, Monika Bocian, Dariusz Osuch, Adam Smolik. 2016. *Parametry techniczno-ekonomiczne według grup gospodarstw rolnych uczestniczących w Polskim FADN w 2014 roku* (Technical and economic parameters by group of farms participating in the Polish FADN in 2014). Warszawa: IERiGŻ-PIB.

Czubak Wawrzyniec, Arkadiusz Sadowski. 2014. Wpływ modernizacji wspieranych funduszami UE na zmiany sytuacji majątkowej gospodarstw rolnych w Polsce (Impact of the EU funds supporting farm modernisation on the changes of the assets in Polish farms). *Journal of Agribusiness and Rural Development* 2 (32): 45-57.

Grzelak Aleksander. 2015. Determinanty zasobowe procesów reprodukcji majątku gospodarstw rolnych prowadzących rachunkowość rolną (FADN) (Resource determinants of reproduction processes of assets of farms engaged in agricultural accountancy (FADN)). *Roczniki Naukowe SERiA* XVII (2): 69-74.

Jóźwiak Wojciech. 2010. Zróżnicowanie gospodarstw rolniczych w Polsce według siły ekonomicznej (Diversification of farms in Poland according to economic strength). *Studia i Raporty IUNG PIB* 22: 45-55.

Jóźwiak Wojciech. 2012. *Polskie rolnictwo i gospodarstwa rolne w pierwszej i drugiej dekadzie XXI wieku. Program Wieloletni 2011-2014* 53 (Polish agriculture and farms in the first and second decade of the 21st century. Multiannual Program 2011-2014 53). Warszawa: IERiGŻ-PIB.

Kleinhanss Werner. 2015. Konkurencyjność głównych typów gospodarstw rolnych w Niemczech (Competitiveness of the major types of agricultural holdings in Germany). *Zagadnienia Ekonomiki Rolne*j 1(342): 25-41. DOI 10.5604/00441600.1146869.

Mirkowska Zofia, Wojciech Ziętara. 2015. Sytuacja Ekonomiczna i efektywność polskich gospodarstw trzodowych. (Economic situation and productivity of the Polish pig holdings). *Zagadnienia Ekonomiki Rolnej* 1 (342): 42-56. DOI 10.5604/00441600.1146308.

MRiRW (Ministerstwo Rolnictwa i Rozwoju Wsi). 2016. *Przewodnik po działaniu Rolnictwo ekologiczne PROW 2014-2020* (Guide to the action Organic Farming Program for Rural Development 2014-2020). Warszawa: Ministerstwo Rolnictwa i Rozwoju Wsi.

Niewęgłowska Grażyna. 2014. Gospodarstwa ekologiczne − szansą czy zagrożeniem dla polskiego rolnictwa? [W] *Agrobiznes 2014. Rozwój agrobiznesu w okresie 10 lat przynależności Polski do Unii Europejskiej*, ed. Anna Olszańska, Joanna Szymańska, 169-176. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.

Nowogródzka Teresa. 2012. Stan i perspektywy rozwoju rolnictwa ekologicznego w Polsce (Current status and prospects of organic farming in Poland). *Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie Problemy Rolnictwa Światowego* 12 (2): 54-65.

Rozporządzenie RADY (WE) nr 834/2007 z dnia 28 czerwca 2007 r. (Council Regulation (EC) No. 834/2007 of 28 June 2007). Journal of Laws 189, 20.7.2007.

Sass Roman. 2017. Konkurencyjność gospodarstw rolnych w województwie kujawsko-pomorskim w zależności od kierunku i skali produkcji (Competitiveness of farms in kujawsko-pomorskie voivodeship depending on the direction and scale of production). *Zagadnienia Ekonomiki Rolnej* 2 (351): 32-50, DOI: 10.5604/00441600.1240388.

Sobierajewska Jolanta, Wojciech Ziętara. 2017. Konkurencyjność polskich gospodarstw ogrodniczych (Competitiveness of the polish horticulture farms). *Roczniki Naukowe Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich* 104 (3): 21-32. DOI: 10.22630/RNR.2017.104.3.18.

Zdrojewska Izabela (ed.). 2017. Raport o stanie rolnictwa ekologicznego w Polsce w latach 2013-2014. (The report on organic farming in Poland in 2015-2016). Warszawa: Biuro Rolnictwa Ekologicznego i Produktów Regionalnych.

Ziętara Wojciech. 2014. Konkurencyjność polskich gospodarstw rolniczych (Competitiveness of Polish farms). *Roczniki Naukowe SERiA* XVI (1): 257-262.

***

KONKURENCYJNOŚĆ POLSKICH GOSPODARSTW EKOLOGICZNYCH O RÓŻNEJ WIELKOŚCI EKONOMICZNEJ W ŚWIETLE DANYCH FADN

Słowa kluczowe: gospodarstwo ekologiczne, wielkość ekonomiczna, konkurencyjność

ABSTRAKT

Dokonano oceny efektywności oraz konkurencyjności polskich gospodarstw ekologicznych o różnej wielkości ekonomicznej. Analizowano także ich potencjał produkcyjny, intensywność oraz koszty produkcji. Badaniami objęto lata 2013-2016. Wykorzystano informacje z gospodarstw prowadzących rachunkowość polski FADN, zawarte w publikacjach: *Parametry techniczno-ekonomiczne według grup gospodarstw rolnych uczestniczących w Polskim FADN* w latach 2013-2016. Zastosowano metody opisową z wykorzystaniem zestawień tabelarycznych oraz porównawczą. W latach 2013-2016 potencjał produkcyjny, efektywność i konkurencyjność polskich gospodarstw ekologicznych uzależnione były od ich wielkości ekonomicznej. Zdolnymi do konkurencji okazały się gospodarstwa o wielkości ekonomicznej 25-50 tys. euro i 50-100 tys. euro użytkujące odpowiednio 37,7 i 70,3 ha UR. Gospodarstwa o niewielkiej wielkości ekonomicznej i obszarowej, pomimo uzyskiwanych dopłat nie miały zdolności konkurencyjnej. Gospodarstwa zdolne do konkurencji uzyskały w latach 2013-2016 dodatni dochód z zarządzania, w gospodarstwach niemających zdolności konkurencyjnej był on ujemny. W gospodarstwach zdolnych do konkurencji o wielkości ekonomicznej 25-50 tys. euro opłata pracy własnej była 1,5 razy większa od średniego wynagrodzenia w gospodarce narodowej, a w gospodarstwach 50-100 tys. euro – prawie trzykrotnie. Gospodarstwa niemające zdolności konkurencyjnej (poniżej 25 tys. euro) nie osiągnęły parytetowej opłaty pracy własnej.

AUTHORS

MARIA J. ORŁOWSKA, PHD
ORCID: 0000-0003-3930-4346
University of Science and Technology of Bydgoszcz
Faculty of Agriculture and Biotechnology
430 Fordońska St., 85-790 Bydgoszcz, Poland