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PRODUCTION OF FARM MACHINES IN POLAND IN 2012-2014

Abstract

In 2013, the production of tractors as well as of majority of farm machines was smaller than a year earlier. Larger production was noted only in case of rototillers, fertiliser spreaders, harvester threshers, potato diggers and poultry facilities. In 2014, the production of tractors increased by 33.8%, but the production of harvester threshers decreased by 22.8% compared to 2013. In 2014, the share of Poland in the EU production of tractors (in units) amounted to 1.9% and in the total value of the means of agricultural mechanisation – 3.7%. The research showed no clear correlation between the domestic sales and production of tractors in Poland.

Keywords: farm machine, production, determinants, Common Agricultural Policy (CAP), tractor, harvester, means of agricultural mechanisation, sale

Introduction

Farm machine fleet in Poland requires thorough modernisation and adjustments to be able to carry out treatments with the use of the state-of-the-art environment-friendly production technologies (Marczuk, 2013). This refers, e.g., to combine harvesters, whose average age in Poland has been estimated already in 2005 at 21 years (Muzalewski, 2013). The average age of tractors and farm machines researched by Wójcicki (2013b) in 2009 was 14.5 years. The concept of farm modernisation assumes combining of the technological changes with the necessary organisational and agro-technical changes to create a complex system for designing a technological and environmental modernisation of farm businesses (Wójcicki, 2013a). Modernisation of farm equipment, as regards the means of agricultural mechanisation, requires relevant supply of these means, which come from the domestic production and import.

The transformation process, pending in Poland since 1989, caused not only ownership changes in the industry of farm machines but also significant decrease in the production, because of the dropping demand from the Polish farmers (Waszkiewicz, 2009b). The domestic demand decides on the level of production and import of farm equipment (Waszkiewicz, 2009a).

The situation in the market of farm machines is closely linked to the business cycle in agriculture. Following Poland's accession to the European Union (EU) the situation of the Polish farmers improved due to the implementation of the Common Agricultural Policy (CAP). Poland's accession to the European Union triggered mechanisms of financial support in agriculture under the developed agri-environmental programmes, including those stimulating the development of activity pursued under environmental systems (Jucherski and Król, 2013). After Poland's integration with the EU, investments in the Polish agriculture clearly improved. The research results for 53 agricultural holdings of 8.8-150 ha of utilised agricultural area (UAA) conducted in 2009 and 2010 give grounds for positive assessment of the investment activity of owners of these farms (Wójcicki and Kurek, 2011; Wójcicki and Rudeńska, 2013).

The need for modernisation of the fleet of tractors and machines at farms in Poland generates demand for means of mechanisation and the possibility to benefit from the EU funds during purchases of these means facilitates realisation of the demand. This creates chances for increasing the production in the national industry of farm machines. A hindering factor is a strong competition from importers of brand-new means of agricultural mechanisation. Despite increasing demand after accession to the European Union, production of tractors in Poland plummeted after 2008 (Pawlak, 2010; 2012a; 2014). This resulted in deterioration of the role of Poland in the group of the world and European producers of tractors (Pawlak, 2012b; Zalewski (ed.), 2014; 2015).

Given the changing situation in the agricultural markets and in the setting of agriculture, it is necessary to conduct up-to-date surveys of the market of farm machines, along with the provision of the latest data necessary for the surveys. This type of continuations are supported by the need to introduce corrections in case of retroactive adjustment of statistical data. Because of such an adjustment, made by the Central Statistical Office [Polish: *Główny Urząd Statystyczny, GUS*] for production of some means of agricultural mechanisation and concerning the data for 2011, 2012 and 2013 (GUS, 2015), some statements included in earlier publications (e.g., Pawlak, 2014; Zalewski (ed.), 2014; 2015), especially regarding production of fertiliser spreaders¹, require a substantial modification.

This paper analyses the trends in the production of individual types of means of agricultural mechanisation in 2012-2014, at the backdrop of the overall out-

¹ In the newest publication (2015) GUS gives the number of fertiliser spreaders manufactured in 2013 by 32% lower than in former publications (GUS, 2014).

line of changes taking place in the area after Poland's accession to the EU and makes an attempt to define the place of the national industry of farm machines in the EU and in the world. The authors also tried to determine the correlation between the domestic sales of farm machines and their production on the example of tractors. The product range of the analysis is limited to those types of farm machines, for which there are relevant data in the resources of the Central Statistical Office.

Source materials and research methods

The analysis of the situation in the Polish market of farm machines was based on the data from GUS publications (2005; 2007; 2009; 2011; 2013; 2014; 2015) concerning production of the means of agricultural mechanisation in Poland, and foreign papers informing on the production of tractors (Flecker, 2009; 2014; 2015) and the value of production of all the means of agricultural mechanisation in different parts of the world (Wiesendorfer, Heimann, Haus and Häser-Hördt, 2015).

The data were used to determine the dynamics of changes in the level of production of individual farm machines in 2012-2014. Additionally, in case of machines, tools and devices, whose production is significant in terms of quantity (tractor mowers, tractor sprayers, trailers) or quality (combine harvesters), the changes in the level of production were analysed in 2005-2014, assuming that the status of 2004 equals 100. For tractors, changes in the share of domestic production in the envelope of tractors manufactured in the EU were calculated and presented in a graphic form, and for all the means of agricultural mechanisation the same was done for the share in the structure of their value on the EU scale and also the respective share of the EU in the world production.

The correlation between sales of brand-new tractors and their production in Poland was determined with the use of the function reflecting it in the most precise manner. When selecting the type of function, the assumed criterion was the highest value of the determination coefficient R^2 . The results were presented on a figure where the trend line and the function formula as well as the obtained R^2 value were marked. For this purpose, data of 1990-2014 were used. In this period, the data on sales of tractors *sensu stricto* were available only for 1990-2000. For the next years, estimates were made based on the domestic supply calculated as the sum of domestic production and import, less export and as of 2004 – based on registration of brand-new tractors.

Research results and their analysis

In 2012-2015, the means of agricultural mechanisation that were produced in the highest numbers (over 500 units per year) included: trailers and semi-trailers for agricultural purposes (self-loading and self-unloading), ploughs, cultivators and scarifiers, fertiliser spreaders, manure spreaders, seed drills, tractor

sprayers, tractor mowers, rake swath turners, straw and hay balers, machinery for preparing animal feedingstuffs and poultry-keeping machinery. In 2013, the production of most of them (except for the fertiliser spreaders and poultry-keeping machinery was lower than a year ago. A reduction in production was also noted in case of tractors (except for the group with power output of 18-37 kW), disk harrows and others, planters, potato harvesters and other machines to harvest root crops (except for potato diggers) and also sorters, dryers and poultry incubators and brooders (Table 1).

Table 1

Production of the means of agricultural mechanisation in Poland

Specification	Units in			<u>2013</u>	<u>2014</u>
	2012	2013	2014	2012	2013
				%	
Wheeled tractors with power output of 18-37 kW	1,353	1,427	1,421	105.5	99.6
Wheeled tractors with power output of 37-59 kW	129	32	562	24.8	1,756.3
Wheeled tractors with power output of 59-75 kW	1,832	1,094	910	59.7	83.2
Wheeled tractors with power output of 75-90 kW	141	63	346	44.7	549.2
Wheeled tractors with power output above 90 kW	84	37	312	44.0	843.2
Total wheeled tractors	3,539	2,653	3,551	75.0	133.8
Trailers and semi-trailers for agricultural purposes	12,028	10,535	11,056	87.6	104.9
Ploughs	9,552	8,322	7,990	87.1	96.0
Scarifiers and cultivators	10,325	9,335	9,437	90.4	101.1
Disk harrows	3,367	2,915	3,567	86.6	122.4
Harrows excluding disk harrows and weeders	2,296	2,001	1,676	87.2	83.8
Rototillers	1,456	3,736	2,951	256.6	79.0
Fertiliser spreaders	7,236	7,425	6,557	102.6	88.3
Manure spreaders	5,397	3,774	5,202	69.9	137.8
Single-seed drills	202	176	147	87.1	83.5
Other seed drills	5,997	5,188	4,171	86.5	80.4
Planters and transplanters	3,561	2,906	3,385	81.6	116.5
including: potato planters	3,094	2,767	3,199	89.4	115.6
Tractor sprayers	11,182	10,745	9,383	96.1	87.3
Tractor mowers	10,004	8,523	10,457	85.2	122.7
Rake swath turners	12,673	12,636	18,749	99.7	148.4
Straw and hay balers	11,005	8,007	7,325	72.8	91.5
Tractor potato diggers	492	1,875	2,746	381.1	146.5
Potato harvesters	66	45	62	68.2	137.8
Other machines to harvest root crops	215	182	280	84.7	153.8

cont. Table 1.

Combine harvesters	1,798	2,426	1,872	134.9	77.2
Forage harvesters (excluding self-propelled ones)	5	3	2	60.0	66.7
Machinery for cleaning and sorting fruit and root crops	732	595	753	81.3	126.6
Machinery for cleaning and sorting seeds	236	206	183	87.3	88.8
Dryers for agricultural production	368	313	132	85.1	42.2
Milking machines	98	68	79	69.4	116.2
Machinery for preparing animal feedingstuffs	11,187	8,476	6,477	75.8	76.4
including: coal steamers	7,832	5,366	4,412	68.5	82.2
Poultry incubators and brooders	964	607	517	63.0	85.2
Poultry-keeping machinery	5,907	6,760	6,029	114.4	89.2

Source: data of GUS.

Compared to the previous year, in 2014 the production of tractors increased by 33.8%, slightly exceeding the status of 2012, but staying at the level below 50% of the value noted in 2004 (Fig. 1). Among the means of mechanisation of agriculture, the production of trailers and semitrailers for agricultural purposes (self-loading and self-unloading), cultivators and scarifiers, manure spreaders, tractor mowers and rake swath turners increased annually in 2012-2014 by more than 5,000 units. Further drops in production were noted in case of ploughs, seed drills, tractor sprayers, straw and hay balers and machinery for preparing animal feedingstuffs. Moreover, a drop against 2013 was noted in case of production of fertiliser spreaders and poultry-keeping machinery, which showed a growing trend a year before. The production of combine harvesters dropped by 22.8% compared to 2013, and in 2010-2013 this type of production showed a continuous growing trend reaching in 2013 a level almost threefold higher than in 2004 (Fig. 1).

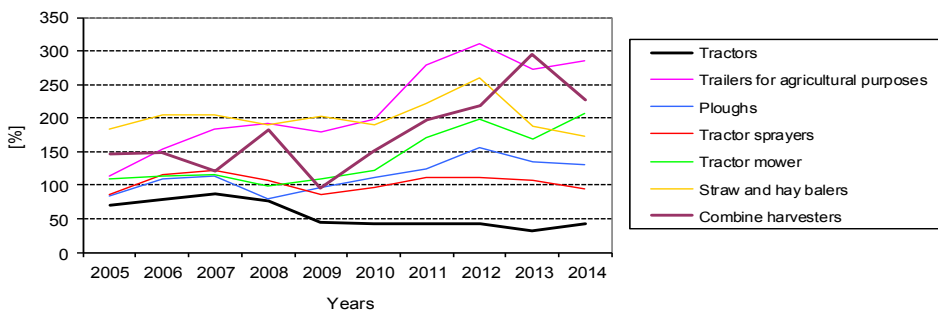


Fig. 1. Dynamics of changes in production of the selected means of agricultural mechanisation (as on 2004 = 100).

Source: own study based on GUS data (2005; 2007; 2009; 2011; 2013; 2015).

It is disturbing that, in the first half of 2015, the production of combine harvesters dropped by 22.4% against a similar period in the previous year (Table 2). Although these machines were not at the top of the list as regards the number of produced units, given their high price they had a significant share in the value of farm equipment manufactured by the domestic industry. The decrease in the production could result from the situation in Ukraine, which resulted in a drop in export orders. On the other hand, the initial data of GUS coming from the industrial and non-industrial units, where the number of employees amounted to 50 people and more, points to an advantage of upward trends, including in this case tractors considered in total – by 51%. Reduction in production, apart from the aforementioned combine harvesters, was noted in case of fertiliser spreaders, single-seed drills and machines to harvest root crops.

Despite the recently noted downward trend, in 2014 the share of Poland in the EU production of tractors, calculated in units, amounted to only 1.9% (Fig. 2). Dropping national production after entry into the European Union, especially in 2008-2013 caused a drop in the value of the indicator, especially after 2007. A growth by 0.6 pp in 2014 resulted from an increase (by 33.8% against the previous year) of the number of tractors produced in Poland with simultaneous drop in production in the EU.

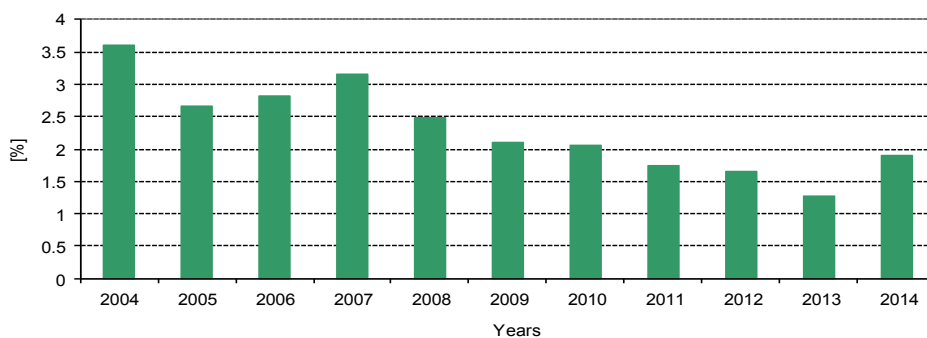


Fig. 2. The share of Poland in the production of tractors in the European Union.

Source: own study based on GUS data (2005; 2007; 2009; 2011; 2013) and VDMA (Flecker, 2009; 2014; 2015).

The share of Poland in the world production of tractors in numbers amounts to less than 0.2%.

The greatest share in the global value of the production of means of agricultural mechanisation (including tractors) belongs today to Asian countries (Fig. 3). Their share in global production is 35% and 18% of this share falls to China, 8% to India and 5% each to Japan and other Asian countries.

Table 2

Production of the means of agricultural mechanisation in Poland

Specification	Units in the first six months		<u>2015</u> <u>2014</u>
	2014	2015	%
Wheeled tractors with power output of 18-37 kW	768	761	99.1
Wheeled tractors with power output of 37-59 kW	132	398	301.5
Wheeled tractors with power output of 59-75 kW	492	464	94.3
Wheeled tractors with power output of 75-90 kW	47	199	423.4
Wheeled tractors with power output above 90 kW	15	374	2,493.3
Total wheeled tractors	1,454	2,196	151.0
Trailers and semi-trailers for agricultural purposes	5,655	6,603	116.8
Ploughs	2,527	2,734	108.2
Scarifiers and cultivators	4,498	5,138	114.2
Cultivators	2,978	3,397	114.1
Fertiliser spreaders	1,569	1,556	99.2
Manure spreaders	2,330	3,149	135.2
Single-seed drills	103	102	99.0
Other seed drills	1,772	2,970	167.6
Planters and transplanters	1,723	2,899	168.3
including: potato planters	2,317	2,811	121.3
Tractor sprayers	4,453	4,644	104.3
Tractor mowers	9,038	11,421	126.4
Rake swath turners	8,274	8,513	102.9
Straw and hay balers	3,969	4,540	114.4
Tractor potato diggers	1,203	652	54.2
Potato harvesters	27	12	44.4
Other machines to harvest root crops	148	128	86.5
Combine harvesters	1,248	968	77.6
Machinery for cleaning and sorting fruit and root crops	191	249	130.4

Source: data of GUS.

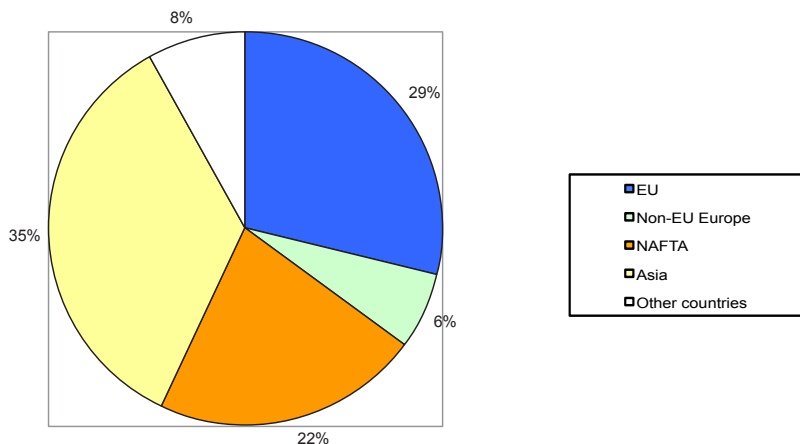


Fig. 3. Structure of global production value of means of agricultural mechanisation (2014).
 Source: own study based on VDMA data (Wiesendorfer, Heimann, Haus and Häser-Hördt, 2015).

Subsequent places in this structure are occupied by countries belonging to the European Union (29%), North American Free Trade Agreement (NAFTA) and non-EU European countries (6%). The share of other countries, including South America and Oceania, amounts in total to 8%.

Germany is the largest producer of farm machines in the EU (27.2%). It is followed by: Italy – 16.8%, France – 14.3%, the United Kingdom – 7.5%, Austria – 5.4%, and the Netherlands and Poland – 3.7% each (Fig. 4). The share of the other EU countries in the production value of the farm equipment is 21.4%.

The correlation between sales and production of tractors is positive, but poorly marked (Fig. 5).

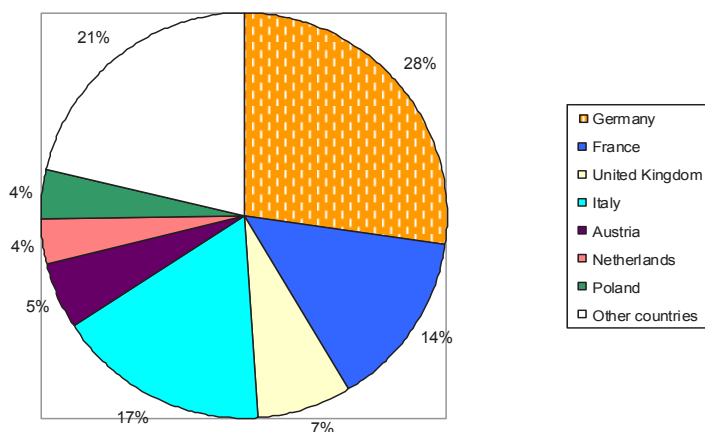


Fig. 4. Structure of production value of means of agricultural mechanisation in the EU (2014).
 Source: own study based on VDMA data (Wiesendorfer, Heimann, Haus and Häser-Hördt, 2015).

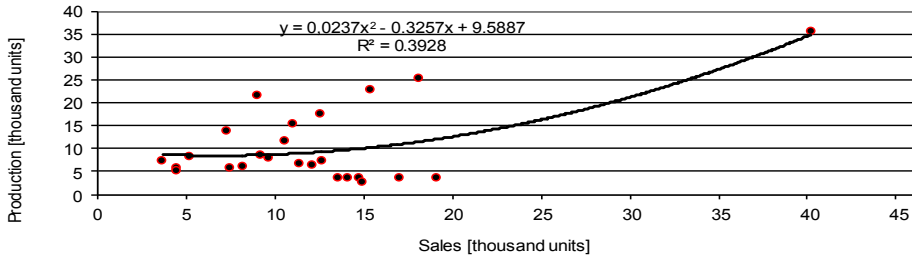


Fig. 5. Correlation between sales and production of tractors in Poland.

Source: own study based on GUS data.

This is caused by a growing share of imported machines in the structure of brand-new tractors purchased by the Polish farmers in the period from which came the data used to prepare the graph presented in Figure 5. In 1990, it was predominated by the tractors of domestic production, while in 2013 as much as 93.7% of the total domestic supply of tractors were imported machines. In this situation, the domestic supply has only a small impact on the production level, which largely depends on foreign orders.

Conclusions

In 2013, production of tractors, trailers and semitrailers for agricultural purposes, ploughs, cultivators, disk harrows and other harrows, manure spreaders, seed drills, planters, tractor sprayers, tractor mowers, rake swath turners, straw and hay balers, potato harvesters, and other machines to harvest root crops (except for potato diggers), sorters, dryers and poultry incubators and brooders and machinery for preparing animal feedingstuffs was lower than a year ago. The production of rototillers, fertiliser spreaders, combine harvesters, potato diggers and poultry-keeping machinery was higher, though.

In 2014, the production of tractors increased by 33.8%, and the production of trailers and semitrailers for agricultural purposes, cultivators, manure spreaders, planters, tractor mowers, rake swath turners and machines to harvest root crops grew as well. Further drops in production were noted in case of ploughs, seed drills, tractor sprayers, straw and hay balers and machinery for preparing animal feedingstuffs. Moreover, compared to 2013 the production of fertiliser spreaders and poultry-keeping machinery, which showed a growing trend a year before, dropped. The production of combine harvesters decreased by 22.8% compared to 2013.

In 2014, the share of Poland in the EU production of tractors, calculated in units, amounted to 1.9% and in the total value of the means of agricultural mechanisation – 3.7%.

The research showed no clear correlation between the national sales and production of tractors in Poland.

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PRODUKCJA MASZYN ROLNICZYCH W POLSCE W LATACH 2012-2014

Abstrakt

W 2013 r. produkcja ciągników rolniczych oraz większości pozostałych rodzajów sprzętu rolniczego była mniejsza niż przed rokiem. Wzrosła jedynie produkcja glebogryzarek, rozsiewaczy nawozów mineralnych, kombajnów zbożowych, kopaczek do ziemniaków oraz urządzeń drobiarskich. W 2014 r. o 33,8% zwiększyła się produkcja ciągników. Natomiast o 22,8%, w porównaniu z 2013 r., zmalała produkcja kombajnów zbożowych. W 2014 r. udział Polski w unijnej produkcji ciągników rolniczych, liczonej w sztukach, wyniósł 1,9%, a w wartości ogółu środków mechanizacji rolnictwa – 3,7%. Nie stwierdzono wyraźnej zależności między sprzedażą krajową a produkcją ciągników rolniczych w Polsce.

Słowa kluczowe: maszyna rolnicza, produkcja, determinanty, wspólna polityka rolno (WPR), ciągnik, kombajn, środki mechanizacji rolnictwa, sprzedaż

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