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Analysis of procurement of selected agricultural products in Poland in the years 2010-2016

Elżbieta ROSZKO-WÓJTOWICZ

Maria M. GRZELAK

University of Łódź, Poland

Abstract: Economic development is characterised by the fact that the share of agriculture tends to decrease both in terms of resources used and domestic product generated. This does not mean, however, that the role of agriculture in the economic development diminishes. It can be considered a paradox that the lower the share of agriculture in the national economy, the greater its role, as it provides raw materials for the production of goods, especially food, which meet the needs of the ever-growing community. The main aim of the presented study is to measure and evaluate changes in agricultural produce procurement in Poland in the years 2010-2016. The following research hypothesis is put forward in the study: Changes in the procurement volume had a much greater impact on the procurement value of selected agricultural produce in Poland in the period considered than changes in the level of transaction prices. In the paper, a comparative analysis of procurement of crop and animal products was conducted. The research process was based primarily on data derived from official statistics obtained from the Central Statistical Office and the Eurostat database regarding procurement of agricultural produce carried out by commercial entities and processing plants. This information is presented in qualitative and quantitative terms for total agriculture, as well as for individual voivodeships.

Keywords: agriculture, procurement of agricultural produce, crop production, animal production, dynamics analysis, aggregate indices

JEL codes: *Q10, C20*

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1. Introduction

Agriculture is an important sector of the national economy, as it produces primarily

Correspondence Address: Elżbieta Roszko-Wójtowicz / PhD / Department of Economic and Social Statistics / University of Lodz, Poland, Tel.: 426355189; E-mail: elzbieta.roszko@uni.lodz.pl; Maria M. Grzelak/ Associate Professor, PhD/ Department of Economic and Social Statistics / University of Lodz, Poland, Tel.: 426355189; E-mail: maria.grzelak@uni.lodz.pl

consumer goods necessary for everyday life, and ensuring food security for its citizens is the overriding goal of the socio-economic policy of every country. In Poland, agriculture is more important than in the other European Union countries, which is a result of historical and economic conditions as well as its production potential. Among the EU Member States, Poland remains a country with the highest percentage of labour force employed in agriculture. When analysing the employment structure in the national economy, it can be noted that the share of people living off agriculture and working in this sector of the national economy in the total population is the highest in Poland. In 2015, Poland ranked fifth in terms of the area of agricultural land – 14.5 million ha, i.e. a 7.8% share of the total area of agricultural land in the EU. On the other hand, in terms of employment in agriculture, Poland occupies a higher position than it could result directly from its total area of agricultural land, as the country holds the second place in the European Union. According to the most recent data, there were 10.2 million people working in the EU agriculture in 2015, which constituted 2% of the total population (for people aged 15-64). In Poland, the corresponding share was higher and amounted to 4.7% (1.8 million people) (CSO, 2017: 400). In view of the above, there is a need to monitor and analyse the condition and determinants of Polish agriculture as well as its development trends. It is worth mentioning that the situation in agriculture can be assessed by means of various variables that characterise selected aspects of this business activity. This paper adopts the view that for decades agriculture has increasingly remained a raw material aggregate. In Poland, only approx. 20% of the agricultural produce comes in the form of final food goods, while 80% is processed in other agribusiness units. As a result, direct relations between the farmer and the consumer become limited, while the ties between consumers and non-agricultural links (processing of agricultural raw materials, domestic and foreign trade, services, etc.) become more widespread. On the other hand, the most important partners for agriculture are the centres purchasing agricultural raw materials and converting them into market products. Therefore, the aim of the paper is to analyse the dynamics of procurement of selected major agricultural produce.

The main purpose of this study is to measure and evaluate changes in agricultural products procurement in Poland in the years 2010-2016. The following research hypothesis is put forward in the study: Changes in the procurement volume had a much greater impact on the procurement value of selected agricultural products in Poland in the period considered than changes in the level of transaction prices.

Farm production is undoubtedly a biological process, there are, however, major differences between crop and animal production. The consequences of these differences are mentioned by Huffman and Evenson (2001: 127-147). The growth process stimulated by the length of day and temperature only in a few situations can be adjusted to speed up production processes. Other restrictions include the requirement for a special type of mechanisation for individual crops and a narrow time window for performing crop treatments. Animal production has fewer restrictions due to its seasonality and spatial character. The production rate can be accelerated or slowed down by changing the diet or choosing the appropriate genetic material. Due to these differences, a comparative analysis of procurement of crop and animal products was carried out. The research process was based, above all, on data on procurement of agricultural produce carried out by commercial entities and processing plants. This information is presented in qualitative and quantitative terms for total agriculture as well as for individual voivodeships.

2. Data sources and methods

For the purpose of conducting spatial and temporal analysis in the further part of the paper, data available in the databases of the Central Statistical Office and the Statistical Yearbooks of Agriculture from 2010-2016 were used. The data were obtained primarily from Knowledge Databases of the CSO and the Local Data Bank. In addition, information on global agricultural production in Poland and the EU from the Eurostat database was used. These data are presented in the form of indicators showing the relationship between the volume of agricultural production and GDP as well as the volume of household consumption in the years 2000-2017.

Table 1. Procurement of selected agricultural produce in Poland for 2010, 2013, 2016 (constant prices from 2010)

No.	Agricultural produce		Units of measurement	Volume			Value (constant prices) in PLN million		
				2010	2013	2016	2010	2013	2016
1	Crop production	*Wheat*	*thou. tons*	5603.2	5040	7652.7	3358.1	3307.0	4412.8
2		*Rye*	*thou. tons*	940.6	1280.3	790.9	397	584.0	380.5
3		*Barley*	*thou. tons*	850.9	948.3	814.4	418.5	574.3	441.9
4		*Oats and cereal mixed*	*thou. tons*	103.4	126.3	112.4	36	55.5	54.1

5		***Triticale***	***thou. tons***	777.3	681.1	929.5	366.1	367.3	495.6
6		***Consumer pulses***	***thou. tons***	5.1	4.4	12	14	13.5	28.1
7		***Potatoes***	***thou. tons***	1143.4	1379.9	1881.8	417.7	554.7	671.4
8		***Sugar beets***	***thou. tons***	9631.9	11936.2	13242.1	1089.2	1459.9	1433.8
9		***Rape and turnip rape***	***thou. tons***	1986.1	2290.1	1346.2	2539	2779.1	2021.6
10		***Vegetables***	***thou. tons***	1370.5	1683.2	1740.7	1291.3	1338.3	1645.2
11		***Fruit***	***thou. tons***	1615.1	2882,4	2539.7	1904.2	3122.0	2572.8
12	**Animal production**	***Cattle (excl. calves)***	***thou. tons***	613.5	645.5	818.1	2797.4	3290.8	4493.7
13		***Calves***	***thou. tons***	13.5	11.6	9.3	119	92.7	84.7
14		***Pigs***	***thou. tons***	1988.3	2017.2	2315	7731.9	8948.8	10057.3
15		***Sheep***	***thou. tons***	1.5	1.6	2	10	9.1	13.7
16		***Horses***	***thou. tons***	17.7	13.9	14.8	102.1	83.6	109.0
17		***Poultry***	***thou. tons***	1814.4	2225.3	2949.4	6245.8	7731.4	10083.9
18		***Cow's milk***	***thou. pics***	8760900	9643000	10809600	9338.2	10762.0	11120.7
19		***Consumer hen eggs***	***thou. pics***	1813200	1098800	520200	349	215.8	97.7
Total				**X**	**X**	**X**	**40534.5**	**47302.7**	**52234.34**

Explanation: For goods *Tobacco* and *Honey*, there is no information on the volume in the Statistical Yearbook of Agriculture. The mentioned goods were not included in the construction of the aggregate. The following were also excluded: *Sheep's greasy wool*, *Meadow hay* and *Straw from cereals.*

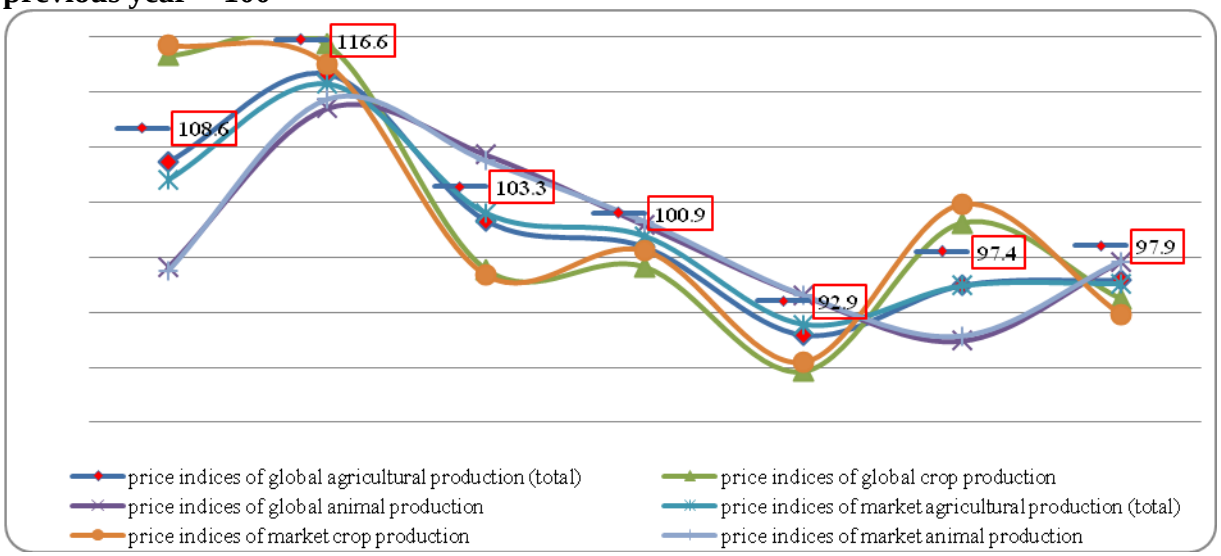
Source: own elaboration based on CSO data, Statistical Yearbook of Agriculture 2017, second chapter, Tab. 1 (174), p. 286; Tab. 7 (180), p. 290

Information on procurement of agricultural produce concerns the volume and value of agricultural produce (crop and animal) purchased by economic entities directly from producers. Procurement data on:

- cereal mixed cover buckwheat, millet and other cereals,
- consumer pulses include peas, beans, broad beans and others,
- potatoes, apart from deliveries to purchasing centres, also include deliveries to alcohol distilleries, companies producing potato flakes and drying houses,
- animals for slaughter (cattle, calves, pigs, sheep, horses and poultry) – concern only animals for slaughter (including animals for slaughter purchased for export), excluding procurement of farm animals for breeding,
- pigs – exclude piglets and young pigs.

The study also uses single-factor price indices for global agricultural production, which allowed us to present value variables in real terms. This mainly applied to the procurement value of agricultural produce selected for the analysis which in the CSO bases is expressed in current prices. The figure below illustrates selected chain-type price indices of crop and animal production in Poland in the years 2010-2016. It shows that price indices in agriculture are characterised by a downward trend from period to period. At the same time, the global production price index since 2014 has been increasing slightly compared with the previous period. The role of the deflator in the paper is played by the price index of total global agricultural production obtained from the transformation of the chain-type price index to the single-base index where the year 2010 was adopted as the baseline period. All the analyses carried out for different periods of time relate to the comparison of data expressed in constant prices from the baseline period, i.e. 2010. In the case of statistical analyses, public statistics data expressed in current prices were used.

Figure 1. Annual price indices for agricultural production in Poland in the years 2010-2016, previous year = 100



Source: own elaboration based on CSO, Knowledge Databases – Prices

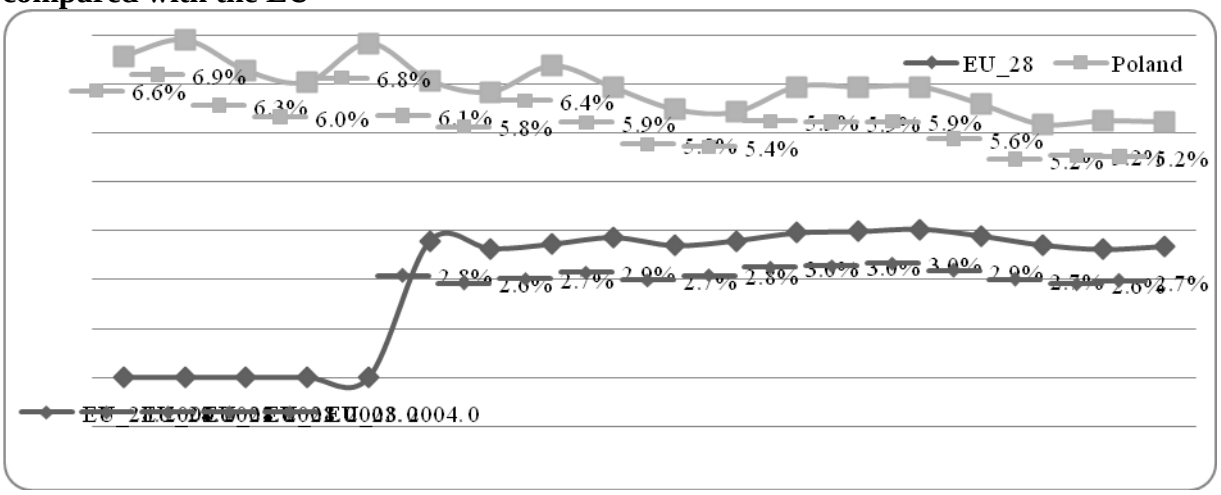
3. General characteristics of agricultural production and basic agricultural raw materials

Agriculture is one of the oldest areas of humans' economic activity. On the basis of archaeological and anthropological literature, it can be stated that its origins in the world date back to approx. 10,000 years BC, as it was at that time, independently in several regions of the world, that the process of domestication of crops and animals began. Chronologically, the first organised human activity in the form of agriculture can be defined as the conscious and purposeful cultivation of crops and farming of livestock in order to obtain specific goods to meet social needs. There are two divisions in agricultural production, i.e. crop production and animal production.

As a result of crop production, crop raw materials are produced, among others, for agri-food industry, or ready-made food products, as well as animal fodder and litter. The raw materials of crop origin include: field crops (cereals, potatoes, sugar beets, hops, etc.), fruit, vegetables, forestry products and tobacco. Animal production, on the other hand, covers animal breeding and farming activities. Basic animal raw materials include: animals for slaughter (livestock intended for slaughter to deliver edible slaughter products: meat, offal and fat), poultry, eggs, milk and fish (Urban, 2014: 33).

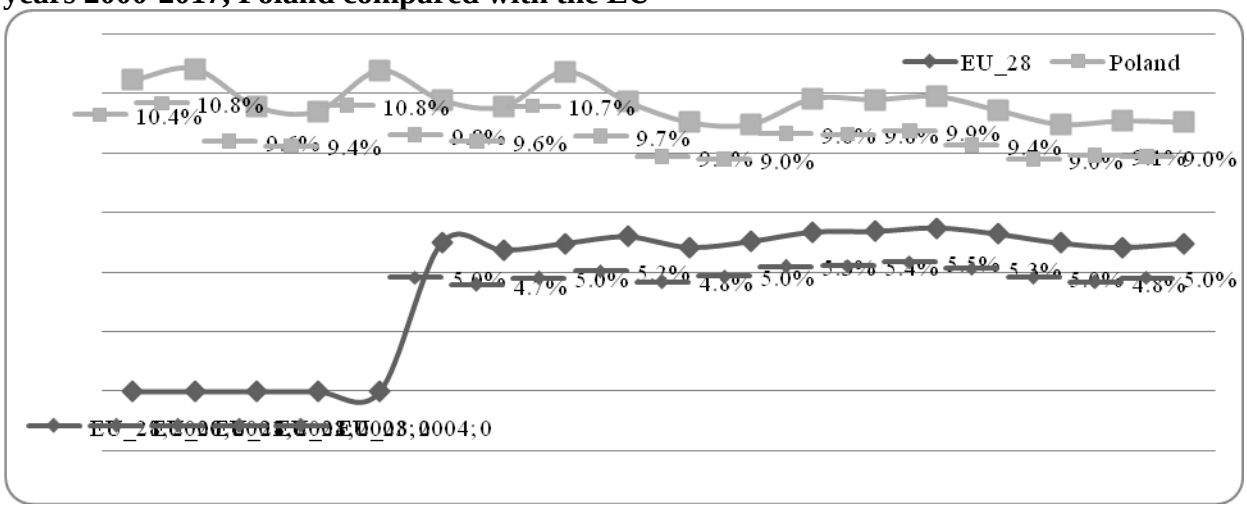
A recognised measure of the importance of agriculture in the national economy is its share in generating gross domestic product. The results presented in Figure 2 enable a synthetic assessment of the position held by agriculture in the economy. The share of agriculture in generating GDP in the years 2000-2016 decreased from 6.6% to 5.2% in the EU and from 2.8% to 2.7% in Poland. Similar, downward trends are also observed in the share of agricultural production in household consumption (cf. Figure 3).

Figure 2. The share of agricultural production in GDP (%) in the years 2000-2017, Poland compared with the EU



Source: own elaboration based on Eurostat data, GDP and main components (output, expenditure and income) [nama_10_gdp], Economic accounts for agriculture – values at current prices [aact_eaa01]

Figure 3. The share of agricultural production in total household consumption (%) in the years 2000-2017, Poland compared with the EU



Source: own elaboration based on Eurostat data, GDP and main components (output, expenditure and income) [nama_10_gdp], Economic accounts for agriculture – values at current prices [aact_eaa01]

This situation testifies to the decreasing importance of income derived from agriculture in the national economy. In terms of the place, and thus the role and importance, of agriculture in the national economy, agriculture should be treated as one of the basic links in the agri-food

sector (agribusiness). In the theory of economics, the concept of agribusiness emerged at a time when the importance of agriculture in the national economy was decreasing, the demand for agricultural products was falling, food surpluses were growing, the profitability of agricultural production was declining, and new food production technologies required a new market and organisational structures in this area of economy. Agribusiness is defined as a multi-link system, starting with the acquisition of primary raw materials and ending with the production of final food products. It includes: industry producing means of production for agriculture and food industry, agriculture – understood as production of food raw materials and ready food, fishing and forestry, procurement of agricultural raw materials, their storage and transport, food industry, as well as wholesale and retail trade in food and services related to functioning of all these fields. Synthetically speaking, agribusiness encompasses all activities performed by enterprises operating in the agricultural market or tied to it, as well as functioning in order to produce agricultural produce, process and sell them (Firlej, 2008: 11).

The main link in agribusiness, apart from agriculture, is food industry, which is the basic recipient of farm products. Along with economic development and growing consumer requirements, the relationship between value created in agriculture and value added in industry is changing in favour of industry. Today, products with a long shelf life, of high quality and attractively packaged are required. This creates opportunities for development of other links in the food sector (Grzelak, 2011: 88).

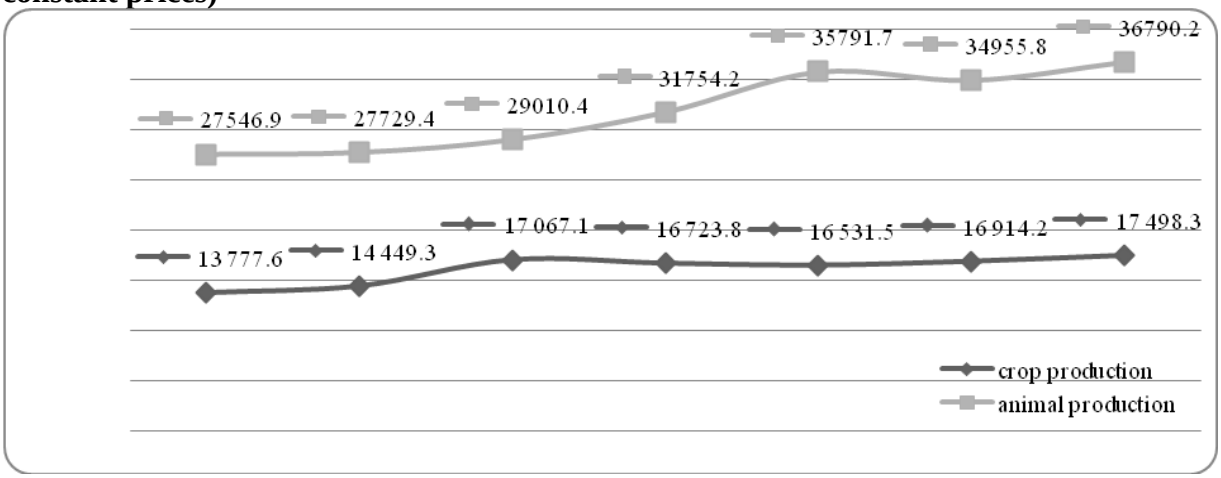
The declining share of agriculture in GDP creation in Poland is a consequence of structural transformations and a faster growth rate of non-agricultural sectors of the national economy. The data confirm the opinion that the contribution of the food sector to the national economy is declining, with the share of agriculture falling the fastest (Mrówczyńska-Kamińska, 2008). Therefore, despite an increase in agricultural production, the share of agriculture in gross domestic product is systematically decreasing. It is worth noting that recent years have been characterised by the variable dynamics of global agricultural production, which is reflected in fluctuations in its share in GDP. However, in Poland, despite the decline, the share of agriculture in GDP is still about twice as high as in most of the EU countries – the EU28 average value amounted to 2.7% in 2017 (cf. Figure 2).

The analyses presented above confirm that the share of agriculture in both resources used and domestic product generated tends to decrease along with economic development. This does

not mean, however, that the role of agriculture in the economic development is diminishing. It can be considered a paradox that the lower the share of agriculture in the national economy, the greater its role, as it provides raw materials for the production of goods, especially food, which meet the needs of an ever-growing community. No society can function without agriculture, as food needs are not substitutable, and agriculture itself also plays an important role in the production of other goods as well as in the whole ecosystem, and it is one of the most important elements of environmental sustainability. Domestic agricultural production is the basis of national food security in all countries (Kapusta, 2003: 139-140).

Information on the value of agricultural production in Poland in 2010-2016 at 2010 constant prices is presented in Figure 4.

Figure 4. The value of agricultural production in Poland in 2010-2016 (in PLN million, 2010 constant prices)



Source: own elaboration based on CSO data, Statistical Yearbook of Agriculture 2014, 2016, 2017

In Poland, in the years 2010-2016, the value of agricultural production, both crop and animal, grew systematically. Crop production increased on average by 13% year a year, while animal production was characterised by a higher average annual growth rate of 16%. However, the production growth rate in many industry sectors was definitely higher.

3. Spatial diversification of agricultural production in Poland in the years 2010-2016

In agriculture, geographical space and distance play a much greater role than in other branches of economy. Agricultural raw materials and food are produced all over the country, in all municipalities and villages. Therefore, it is a very territorially dispersed activity. Then, these products are delivered via trade channels to agri-food processing plants and directly to consumers. Final food products reach consumers who are territorially dispersed through wholesale and retail trade. The largest concentrations of demand for food are obviously represented by large urban agglomerations.

Table 2. The value of procurement of agricultural production by voivodeships in 2010 and 2016 (in PLN million, 2010 constant prices)

Voivodeship	2010	2016	2010-2016	2010	2016	2010-2016	2010	2016	2010-2016
	Total			Crop products			Animal products		
	in PLN million		i_G	*in PLN million*		i_G	*in PLN million*		i_G
Dolnośląskie	2119.1	2368.0	101.9%	1536.3	1756.9	102.3%	582.9	611.0	100.8%
Kujawsko-pomorskie	3542.8	4627.9	104.6%	1396.5	1585.1	102.1%	2146.3	3042.8	106.0%
Lubelskie	3015.8	3838.8	104.1%	1497.8	1964.5	104.6%	1518	1874.3	103.6%
Lubuskie	983.7	1252.1	104.1%	355.7	451.7	104.1%	628	800.4	104.1%
Łódzkie	2734.2	3786.0	105.6%	619.7	752.7	103.3%	2114.5	3033.2	106.2%
Małopolskie	987.1	1041.7	100.9%	248.8	317.3	104.1%	738.3	724.4	99.7%
Mazowieckie	6053.5	9743.2	108.3%	1611.2	2986.6	110.8%	4442.3	6756.5	107.2%
Opolskie	1578.2	1867.2	102.8%	834.4	1099.8	104.7%	743.8	767.4	100.5%
Podkarpackie	676.7	869.1	104.3%	225.9	353.5	107.7%	450.7	515.6	102.3%
Podlaskie	3127.9	4019.8	104.3%	166.6	195.8	102.7%	2961.3	3824.0	104.4%
Pomorskie	2008.8	2962.3	106.7%	806.7	959.3	102.9%	1202.2	2003.0	108.9%
Śląskie	1014.1	1255.2	103.6%	223.1	347.0	107.6%	791	908.2	102.3%
Świętokrzyskie	861	1151.2	105.0%	255.5	282.9	101.7%	605.5	868.2	106.2%
Warmińsko-mazurskie	2834.9	3385.5	103.0%	685	594.5	97.7%	2149.9	2791.0	104.4%
Wielkopolskie	7778	10002.9	104.3%	2275.4	2673.9	102.7%	5502.6	7329.0	104.9%
Zachodniopomorskie	2008.7	2096.8	100.7%	1039	1169.8	102.0%	969.7	927.0	99.3%

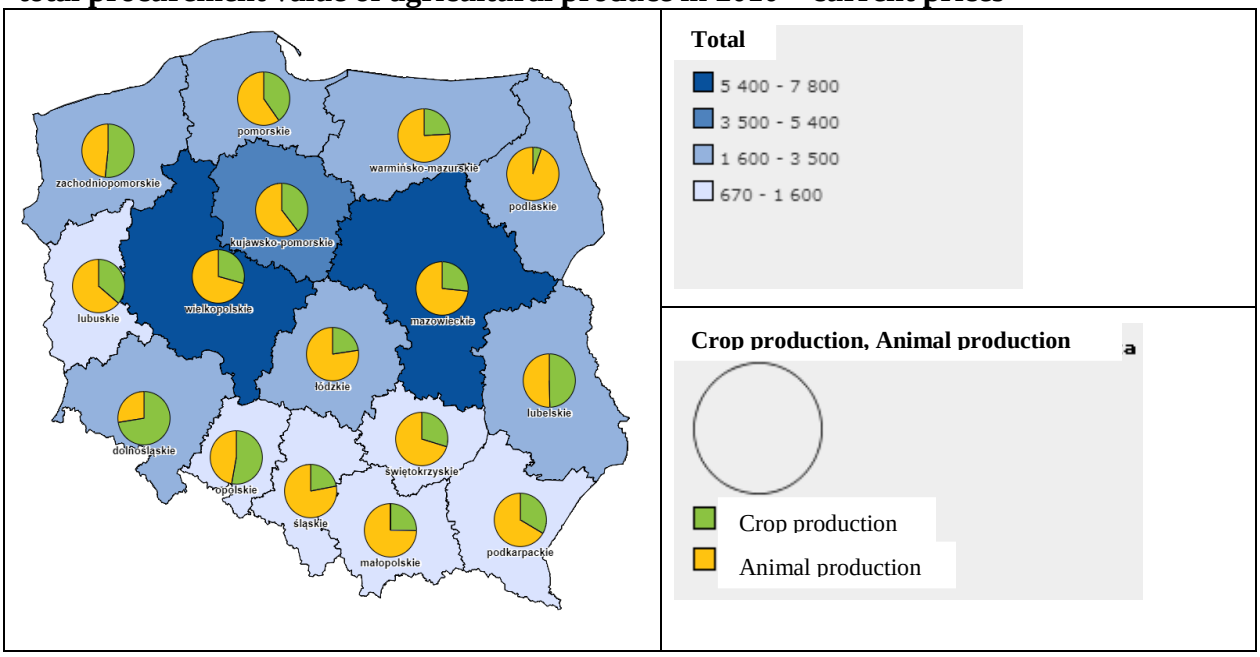
Source: own elaboration based on CSO data, Statistical Yearbook of Agriculture 2017, second chapter, Tab. 5 (178), p. 289

The paper focuses on the analysis of one of the channels in the flow of raw materials and food products from producers to consumers, i.e. on procurement of agricultural produce. Centres purchasing agricultural products and raw materials are generally located

in production centres, i.e. where there is supply. This is a general rule to which exceptions occur in certain situations:

- when the agricultural raw-material processing plant itself carries out the procurement (it has its own services and supply network of raw materials), its activity is limited by the radius of cost-effective transport of raw materials, taking into account the costs incurred;
- when the unit purchasing raw materials does so at the request of other companies (procurement and sales), locates its operations in the optimal proximity of purchasing centres and raw materials collection points;
- when the unit purchases agricultural produce suitable for direct consumption (e.g.: fruit and vegetables, eggs, potatoes, etc.), it does the same as in the previous point but must take into account the fact that consumer markets are territorially dispersed (Woś, 1996: 89-92).

Figure 5. Comparison of the value of procurement of crop and animal products with the total procurement value of agricultural produce in 2010 – current prices



Source: own elaboration based on the Geostatistics Portal on the basis of GUS data, Statistical Yearbook of Agriculture 2017, Second chapter, Tab. 5 (178), p. 289

The above-presented map (Figure 5) shows the value of procurement of agricultural produce in total by voivodeships in 2010 (in PLN million). In the Mazowieckie and Wielkopolskie Voivodeships, the highest value, i.e. PLN 7778 and 6053.5 million, respectively, can be seen. The smallest procurement values of agricultural produce in total were

recorded in the following voivodeships: Lubuskie (PLN 983.7 million), Opolskie (PLN 1578.2 million), Śląskie (PLN 1014.1 million), Małopolskie (PLN 987.1 million), Świętokrzyskie (PLN 861 million) and Podkarpackie, in which the procurement value at the level of PLN 676.7 million was recorded.

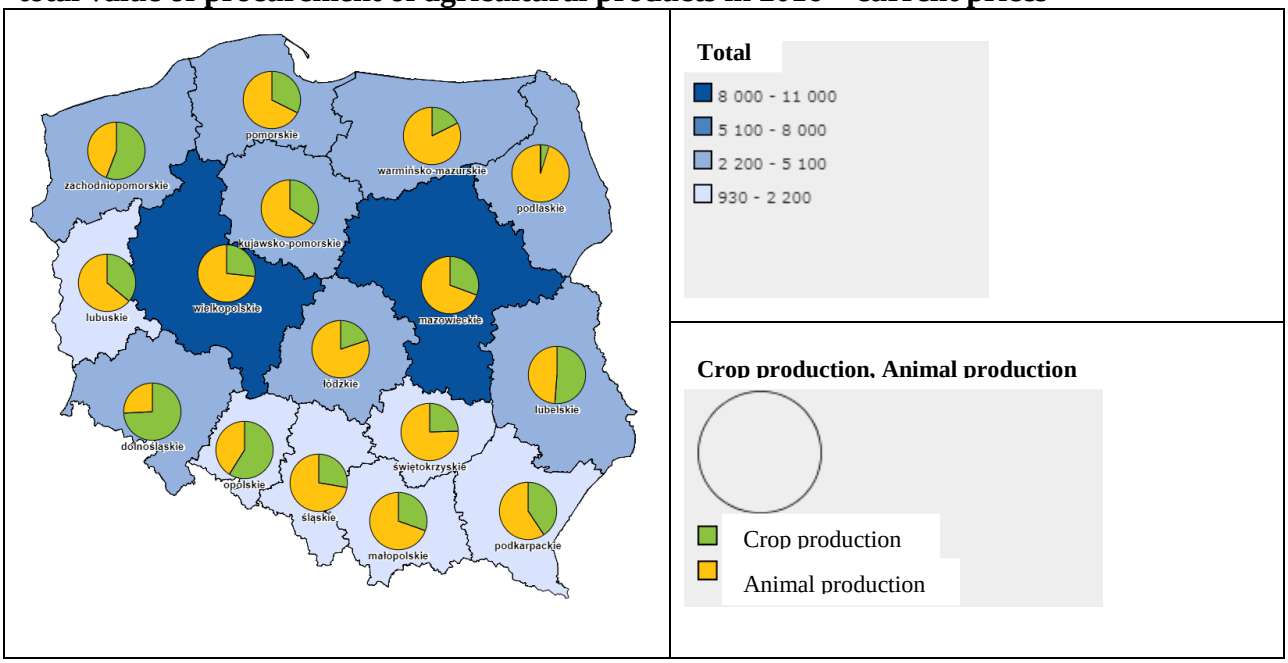
The maps indicate the share of the procurement value of crop and animal products in a given voivodeship (% of the total value of procurement of agricultural produce). It can be observed that the largest share of crop production is observed in the Dolnośląskie Voivodeship, which directly results from the fertility of the local soils. The ratio of crop and animal production in this voivodeship is 73% to 23%. The largest share of animal production is observed in the Podlaskie Voivodeship, where the percentage of animal production is 95% with only 5% of crop production.

The following map, as the previous one, presents the value of procurement of agricultural produce in total by voivodeships for the year 2016 (in PLN million). The maps for individual voivodeships represent, as before, the share of crop and animal production in the total value of agricultural production. In the Mazowieckie and Wielkopolskie Voivodeships, as in 2010, the highest value of procurement of agricultural produce in total can be observed. It amounted to PLN 10773.1 million in the Wielkopolskie Voivodeship and PLN 10493.4 million in the Mazowieckie Voivodeship. This shows a significant increase compared with 2010. The smallest revenues in the procurement of agricultural produce were recorded by the same voivodeships as in 2010, although in comparison with 2016, all the values increased, and this increase is as follows:

- Lubuskie (increase by 37%),
- Opolskie (increase by 27%),
- Śląskie (increase by 33%),
- Małopolskie (increase by 14%),
- Świętokrzyskie (increase by 44%),
- Podkarpackie (increase by 38%).

The lowest value of procurement of agricultural produce is recorded in the Podkarpackie Voivodeship with a value of PLN 936 million.

Figure 6. Comparison of the value of procurement of crop and animal products with the total value of procurement of agricultural products in 2016 – current prices



Source: own elaboration based on the Geostatistics Portal on the basis of GUS data Statistical Yearbook of Agriculture 2017, Second chapter, Tab. 5 (178), p. 289

The maps present the division of agricultural produce procurement into products originating from crop and animal production by individual voivodeships for the year 2016. The largest share of crop products is invariably present in the Dolnośląskie Voivodeship, where the ratio of crop and animal products is 74% to 26% , respectively. The highest share of animal products is recorded in the Podlaskie Voivodeship, where the percentage is approx. 95% of animal products, which means only a 5% share of crop products in the procurement of agricultural produce (very similar to the value from 2010).

5. Analysis of dynamics based on individual and aggregate indices

The individual indices of value dynamics calculated indicate that in the case of the most of major agricultural produce selected for analysis in 2016 compared with the baseline year, there was an increase in the procurement value measured in 2010 constant prices. In the analysed period of time, only in relation to four of the products selected for the analysis, a decrease in the procurement value was recorded. Such a situation took place in relation to: rye, rape and turnip

rape, calves and chicken eggs for consumption. Among the mentioned products, the largest decrease in value, by as much as 70%, was noted in the case of chicken eggs, which was a result of a significant drop in the volume of procurement (almost 72%). Also, for all three products, the change in the value of procurement was due to a reduction in the amount of goods purchased.

Table 3. Individual indices of agricultural produce procurement dynamics in the years 2010-2016

No.	Agricultural produce		2016 vs 2010			2010-2016	
						value	volume
			i_w	i_q	i_p	i_G(%)	i_G(%)
1	Crop production	*Wheat*	1.3141	1.3658	0.9621	104.7%	105.3%
2		*Rye*	0.9583	0.8408	1.1397	99.3%	97.2%
3		*Barley*	1.0558	0.9571	1.1031	100.9%	99.3%
4		*Oats and cereal mixed*	1.5017	1.0870	1.3814	107.0%	101.4%
5		*Triticale*	1.3538	1.1958	1.1322	105.2%	103.0%
6		*Consumer pulses*	2.0103	2.3529	0.8544	112.3%	115.3%
7		*Potatoes*	1.6073	1.6458	0.9766	108.2%	108.7%
8		*Sugar beets*	1.3164	1.3748	0.9575	104.7%	105.4%
9		*Rape and turnip rape*	0.7962	0.6778	1.1747	96.3%	93.7%
10		*Vegetables*	1.2741	1.2701	1.0031	104.1%	104.1%
11		*Fruit*	1.3511	1.5725	0.8592	105.1%	107.8%
12	Animal Production	*Cattle (excl. calves)*	1.7294	1.3335	1.2969	108.2%	104.9%
13		*Calves*	0.7664	0.6889	1.1125	94.5%	94.0%
14		*Pigs*	1.4004	1.1643	1.2027	104.5%	102.6%
15		*Sheep*	1.4800	1.3333	1.1100	105.4%	104.9%
16		*Horses*	1.1489	0.8362	1.3740	101.1%	97.1%
17		*Poultry*	1.7382	1.6256	1.0693	108.3%	108.4%
18		*Cow's milk*	1.1909	1.2338	0.9652	103.0%	103.6%
19		*Consumer hen eggs*	0.2800	0.2869	0.9759	80.9%	81.2%

Source: own elaboration based on CSO data, Statistical Yearbook of Agriculture 2014, 2016, 2017

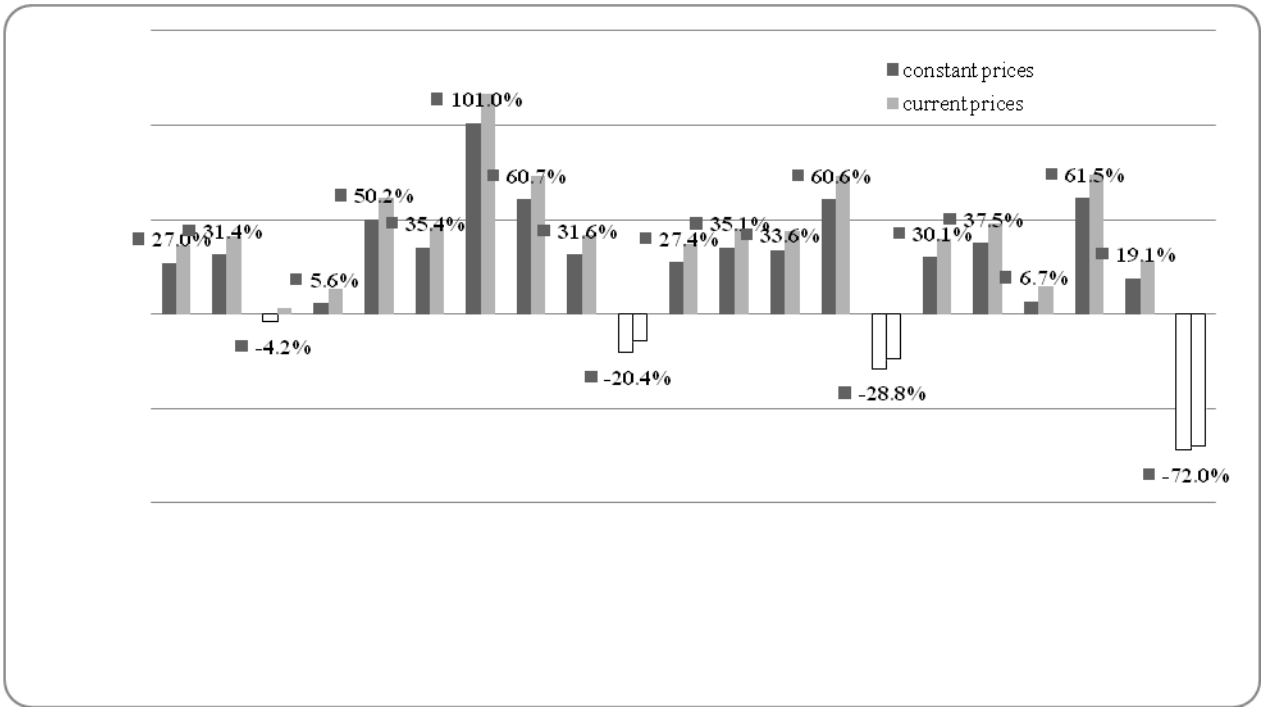
The highest increase in the value of procurement of agricultural produce in the real terms in 2016 relative to 2010 was recorded for:

- Consumer pulses (e.g.: peas, beans, broad beans) – increase by 101.0%;
- Poultry – increase by 73.8%;
- Cattle (exc. calves) – increase by 72.9%;
- Potatoes – increase by 60,7%.

It is worth adding that in the case of all the above-mentioned products, the increase in value was dictated primarily by an increase in the procurement volume.

In the case of oats and cereal mixed, the increase in the value of procurement resulted from the highest increase (38.1%) in transaction prices compared with other goods (Table 3). The increase in the price of oats and cereal mixed was accompanied by an increase in the volume of procurement, but only by 8.7%. However, in the case of procurement of horses, the increase in the value of procurement (14.9%) was influenced by the significant and, at the same time, second largest increase in transaction prices (37.4%). It caused a decrease in the procurement volume by more than 15%. In the case of fruit, the rationale for the increase in the procurement value is a surprisingly large increase in the procurement volume, which amounted to as much as 57.3%, with a simultaneous drop in transaction prices by nearly 14.0%.

Figure 7. Change in the value of procurement of agricultural produce in 2016 compared with 2010 (%) – comparison of procurement value in 2016 constant prices in relation to current prices



Source: own elaboration based on CSO data

With reference to the total crop and animal production, in the both cases there was a similar increase in the value of procurement – of 27.0% for crop products and of 33.6% for animal production. To sum up, it is worth adding that as regards the fifteen products that recorded an increase in the value of procurement, in eleven cases the increase resulted mainly from an increase in the procurement volume, and only in four cases from an increase in transaction prices. Such a situation concerned transaction prices of barley, oats and cereal mixed, pigs and horses.

Based on the analysis of the dynamics of the whole aggregate concerning procurement of selected major agricultural produce, it can be concluded that the total procurement value of all the products examined increased in 2013 by 19.0% ($I_{w2013/2010}$) in comparison with 2010. In 2016, compared with 2013, there was an even more spectacular increase in the value of procurement by as much as 74.6% ($I_{w2016/2013}$). For the years 2010-2013, the increase was to a much greater extent due to an increase in the volume of procurement of agricultural produce rather than transaction prices. The procurement of all the analysed products in total increased on average by 13.2% ($_FI_q$), while procurement prices of agricultural produce increased on average by approx. 5.1% ($_FI_p$). In 2016-2013, the dynamics of the procurement value of the analysed agricultural products was mainly affected by an increase in volume ($_FI_q$ – 65.8%) accompanied by an average increase in transaction prices – 5.3% ($_FI_p$). However, comparing the values from 2016 with those from 2010, it can be seen that there was an increase in the value of procurement of agricultural produce by 35.3% ($I_{w2016/2010}$), and it was mainly a result of an increase in the procurement volume ($_FI_q$ – 26,9%). At the same time, the average price increase of the whole analysed aggregate was 6.6% ($_FI_p$). The conducted analysis shows that during the whole analysed period the increase in the procurement value of agricultural produce resulted to a greater extent from an increase in the procurement volume rather than an increase in transaction prices. The volume of procurement changed most in 2016 compared with 2013, while transaction prices increased to the largest extent in 2016 compared with 2010.

Table 4. Values of aggregate indices for absolute values in individual years

Items	Symbol	Periods compared		
		2013 vs 2010	*2016 vs 2013*	*2016 vs 2010*
Aggregate value index	I_w	119.0%	174.6%	135.3%
Aggregate volume index - Laspeyres formula	$_LI_q$	113.8%	169.5%	127.3%
Aggregate volume index – Paasche formula	$_PI_q$	112.6%	162.2%	126.4%

Aggregate price index – Laspeyres formula	${}_{L}I_{p}$	105.6%	107.6%	107.0%
Aggregate price index – Paasche formula	${}_{P}I_{p}$	104.6%	103.0%	106.2%
Fisher volume index	${}_{F}I_{q}$	113.2%	165.8%	126.9%
Fisher price index	${}_{F}I_{p}$	105.1%	105.3%	106.6%

Source: own elaboration based on CSO data

Procurement prices of selected agricultural produce in real terms in Poland in 2013, as compared with 2010, increased by 5.6% (${}_{L}I_{p2013/2010}$), assuming that the volume of procurement of selected agricultural produce is set at the level from 2010 (the baseline period). Comparison of the data from 2016 and 2013 shows an even greater increase (7.6%) in procurement prices of selected agricultural produce (${}_{L}I_{p2016/2013}$) for the volume set at the 2013 level. In 2016, compared with 2010, transaction prices of agricultural products procurement increased by 7.0% (${}_{L}I_{p2016/2010}$). The price index according to the Paasche formula, in which the data from the period under consideration are taken as the baseline, shows that procurement prices of selected agricultural produce in Poland in 2013 compared with 2010 increased by 4.6%, assuming the procurement volume at the 2013 level. In 2016, compared with 2013, there was a slightly smaller increase (3.0%) in procurement prices of selected agricultural produce in Poland, assuming the volume at the 2016 level. Transaction prices of selected agricultural produce increased the most in 2016 compared with 2010 (${}_{L}I_{p2016/2010}$ – 6.2%).

The volume of procurement of selected agricultural produce in Poland in 2013 compared with 2010 increased by almost 13.8% (${}_{L}I_{q2013/2010}$), assuming the price level at the level of the baseline year. In 2016, in relation to 2013, a significant increase, the highest of all compared periods, in the volume of procurement of selected agricultural produce by as much as 70% was observed (${}_{L}I_{q2016/2013}$) at the 2013 price level. Comparison of the data from 2016 and 2010 confirms that the volume of selected agricultural produce also increased – ${}_{L}I_{q2016/2013}$ – by 27.3%, assuming the 2010 price level. The Paasche volume index indicates that the volume of procurement of selected agricultural produce in Poland in 2013 compared with 2010 increased by almost 13%, assuming the 2013 price level. Further comparison of the data from 2016 to 2013 confirms a significant increase (62.2%) in the volume of procurement of agricultural produce selected for the analysis (${}_{P}I_{q2016/2013}$), assuming the price level of the analysed year. A much smaller increase was obtained when comparing the procurement volume from 2016 to 2010 – ${}_{P}I_{q2016/2010}$ – 26.4%.

6. Conclusions

Agriculture is a type of human activity which is particularly connected with the natural environment. Natural conditions can significantly contribute to increasing the agricultural use of the potential of crops and animals. It is also worth emphasising that in agribusiness, crop and animal products are not only used for food production, since modern agriculture is perceived, among others, as the basic source of renewable energy. Although for millennia man's agricultural activity used to be motivated by the problem of food shortage, nowadays surplus food is obtained. The optimal use of the potential of agricultural produce for non-food purposes, with no conflict with the basic function of agriculture, is a challenge to the agricultural economy (Urban, 2014: 36). The results obtained in the study indicate a dynamic agricultural environment. Currently, farmers receive financial support from the European Union and the Polish government (Czubak, 2013). The conducted analysis confirms that the procurement value of selected major agricultural produce was characterised by a significant increase, with the largest increase in the procurement value in real terms recorded while comparing data from 2016 and 2013 ($I_{w2016/2013}$ – 74.6%). The increase in value was influenced by both changes in the procurement volume and transaction prices; however, in all the periods under consideration the increase in the procurement volume of agricultural produce was more important for the global increase in the value of procurement.

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Analiza skupu wybranych produktów rolnych w Polsce w latach 2010-2016

Streszczenie

Prawidłowością rozwoju gospodarczego jest to, że zmniejsza się udział rolnictwa zarówno w wykorzystanych zasobach, jak i w tworzonym produkcie narodowym. Nie oznacza to jednak, że zmniejsza się rola rolnictwa w rozwoju gospodarczym. Można uważać, za paradoks, że im mniejszy odsetek stanowi rolnictwo w gospodarce narodowej, tym większa jest jego rola, albowiem dostarcza ono surowców do wytwarzania dóbr, zwłaszcza żywnościowych, zaspokajających potrzeby coraz liczniejszej społeczności. Głównym celem niniejszego badania jest pomiar i ocena zmian skupu produktów rolnych w Polsce w latach 2010-2016.W niniejszym badaniu postawiono hipotezę badawczą: Zmiany w wolumenie skupu wywarły znacznie większy wpływ na wartość skupu wybranych produktów rolnych w Polsce w badanym okresie aniżeli zmiany w poziomie cen transakcyjnych. W artykule przeprowadzona została analiza porównawcza skupu towarów produkcji roślinnej oraz skupu towarów produkcji zwierzęcej Postępowanie badawcze oparto, przede wszystkim, na danych statystyki publicznej pozyskanych z Głównego Urzędu Statystycznego oraz bazy Eurostat z zakresu skupu produktów rolnych prowadzanego przez jednostki handlowe i przetwórcze. Informacje te prezentowane są w ujęciu ilościowym i wartościowym dla rolnictwa ogółem oraz dla województw.

Słowa kluczowe: rolnictwo, skup produktów rolnych, produkcja roślinna, produkcja zwierzęca, analiza dynamiki, indeksy agregatowe