

## AGRIBUSINESS AND ECONOMIC DEVELOPMENT DURING POLAND'S MEMBERSHIP IN THE EU

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### Abstract

*According to the three-sector theory by Fisher and C. Clark, the share of the agri-food sector in creating the GDP decreases along with the socio-economic development. There is a change in the proportions between the national economy and agribusiness and between its individual links. However, agriculture, food industry and services for the agribusiness sector remain an important segment of the national economy. The purpose of this study is to assess the degree of development of agribusiness and its importance for the national economy during Poland's membership in the EU. To illustrate this, a set of five indicators representing its manufacturing potential has been used (employment, gross value of fixed assets, investment inputs), output results (global output) and income results (gross value added). Based on the investigation of input-output, the present and future trends of its development in Poland have been determined.*

### Keywords

*agribusiness, economic development, structural transformations, agricultural policy*

### Introduction

Agribusiness, also referred to as that the food economy or agri-food sector, is the system of vertically and horizontally integrated branches and units participating directly or indirectly in the production of food (Kapusta, 2008). According to the classic formula, within this system the process of manufacturing food products and raw materials takes place (Zegar, 1981). As the section of the national economy, agribusiness consists of three main aggregates, i.e.: the industry producing means of production and services for agriculture (sphere I), agriculture (sphere II) and food industry (sphere III) (Davis, Goldberg, 1957). Products of some branches are used as inputs for others, whereby the most important link of agribusiness is agriculture. The characteristic feature of the long-term development of agriculture is its decreasing share in the structure of the national economy and of agribusiness (Jakubczyk, 2010). The degree of industrialisation has always been a derivative of the development of agriculture, and, consequently, of the food industry (Wilkin, 2001). The economic development consisted in a gradual transition from the agricultural economy to the industrial economy financed from agricultural revenues. This process has proceeded along with an increase in the level of the socio-economic development of the country. The share of agriculture in the gross domestic product decreased, the number of the employed declined and the socio-economic situation of agriculture was increasingly dependent on what happened outside of it, in other sectors of the national economy (Woś 1979, Tomczak 2005). The stimulus for the development of the economy were the modern sectors i.e.. industry, services, IT. In the theory of economics, those dependencies have been included in the three sector theory<sup>1</sup>.

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<sup>1</sup> The concept of the three-sector economic structure, its changes and correctness of the development of sectors (the theory of three sectors of the economy), is inextricably

Currently, the contribution of agriculture to the industrialisation process, sustainable development, provision of public services or political stability is being reassessed. Today, a modern agricultural holding is sort of an enterprise. It applies advanced manufacturing techniques, is horizontally and vertically integrated with other entities, has the well-developed marketing system, and in its decisions it is guided by market trends and consumer preferences. The modern agricultural holding is characterised by a high degree of complexity, diversity and integration. Thus, the allocation of resources in agriculture becomes increasingly dependent on market forces and forming networks of interbranch connections. The agricultural production is increasingly dependent on the progress in genetic research, the implementation of advanced manufacturing technologies, the development of research regarding the health and nutritional values of food, the application of organic production criteria. Distinguishing between the stage of the production of raw materials and the stage of their initial processing, while still easy, is often more and more fuzzy. The industrialisation of agriculture and its development become inseparable processes.

The purpose of this study is to analyse the development of agribusiness in the years 2000-2012, which includes an analysis of changes in its structure, the degree of integration of its components, the identification of reasons for changes taking place due to the European integration processes as well as the determination of strength and nature of the connections between the agribusiness sector and its environment. Using the statistical and descriptive methods, an analysis of the CSO data has been carried with regard to assessing the degree of the development of agribusiness and its importance to the national economy. For this purpose, five indicators have been used, to illustrate: manufacturing potential (employment, gross value of fixed assets, investment inputs), output results (global output) and income results (gross value added) (Woś, 1979).

The study also analysed the changes in the share of agriculture and food industry in the structure of agribusiness and in the entire national economy, which is an important part of the studies on their manufacturing potential as well as on output and income results. For this purpose, we used Leontief's input-output tables (Leontief 1936). Basing on the assumptions of the general equilibrium theory, the input-output model allows to analyse the macroeconomic effects produced, budget redistribution processes, relations of given sectors with the environment, impact of global processes on the economy through export and import (Czyżewski, Grzelak 2012). Generally, it is a system of equations describing inputs and results with regard to creating global output, final demand and value added.

The assessment of flows feeding the agri-food sector and of the distribution structure of its products is a useful tool to assess the place of the food economy in the national economy. It allows to assess the role of self-supply in the analysed sector and the role of non-agricultural sectors in the system of entities and products. The input-output table also allows to assess changes in the structure of consumption and export and with regard to the newly produced value in the food economy as well as to indicate the desired adaptations of the agricultural policy (Bon, 1986). Therefore, the results of these analyses enable drawing

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connected with the names of three authors, who built its foundations. This theory was developed in the 1930s by A.B.G. Fisher, C. Clark and J. Fourastie. It is based on a thesis about the changing role of the individual sectors in the historically considered process of development of economies, namely the decrease in the importance of the agricultural sector; growth, stabilisation and then also decrease in the share of the industrial sector and the continuing increase in the role of the service sector, related to the economic development.

indirect conclusions about the role and consequences for agriculture resulting from Poland's accession to the European Union and from the implementation of the CAP mechanisms.

### 1. Agribusiness in the structure of the national economy

In the modern economy, macroeconomic conditions, globalisation and integration processes as well as cultural transformations have a decisive impact on the formation of structural changes. However, theoretical and empirical studies on these changes indicate certain universalism of some trends (Czyżewski, Grzelak 2011, Pinstrup-Andersen 2002). Firstly, there is a complete decline in the share of agriculture in creating value added in the economy, employment, trade and consumption. Secondly, the reduction in the importance of agriculture is accompanied by an increase in income of the population. Thirdly, the share of basic agricultural products in the value of finished products declines, which, in turn, results in an increase in value added in the food industry. However, the idea of development not necessarily needs to mean transferring resources from agriculture as a *sine qua non* condition of the industrial development.

It rather comes down to the method for optimising the contribution of agriculture to the overall economic growth. Therefore, the point here is not only the size of the agricultural sector, but also a form of its relations with entire agribusiness, and more extensively, even with the entire economy. In the countries where the food industry has comparative advantages, there is a specific process of building an equilibrium between agriculture and industry and this affects the development of the agribusiness sector and, consequently, the development of the entire economy. According to the theory by A.O. Hirschman, the best strategy for the development of the economy is, therefore, the promotion of such actions which will stimulate, strengthen and then lead to the diffusion of development processes in the less developed areas (Hirschman 1958).

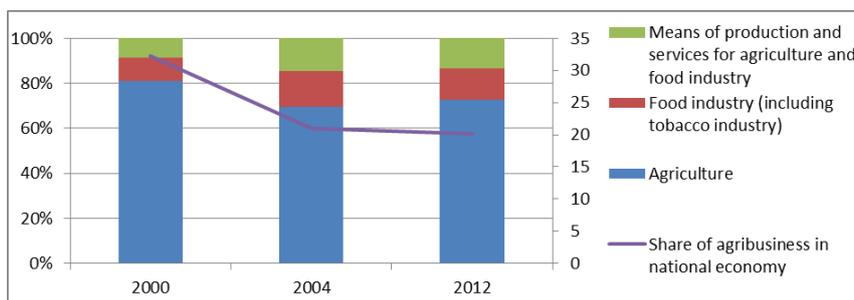
**Table 1. Selected macroeconomic indexes in the years 2000-2012**

Specification	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
GDP value in billion PLN (fixed prices of 2012)	1 025	1 037	1 051	1 091	1 146	1 190	1 264	1 349	1 420	1 443	1 500	1 566	1 595
GDP per capita (current prices in thousand PLN)	19,5	20,4	21,1	22,1	24,2	25,8	27,8	30,8	33,5	35,2	36,8	39,7	41,4
Dynamics of GDP changes [previous year=100]	104,2	101,1	101,4	103,9	105,3	103,6	106,2	106,8	105,1	101,5	103,8	104,5	101,9
Share of investments in GDP [in %]	17,9	15,6	13,5	13,2	13,1	13,3	14,6	16,3	17,0	16,3	15,3	15,9	14,9
Inflation (CPI) [previous year=100]	110,1	105,5	101,9	100,8	103,5	102,1	101,0	102,5	104,2	103,5	102,6	104,3	103,7
Unemployment rate [%]	15,1	17,5	18,0	19,6	19,1	17,6	14,8	11,2	9,5	8,2	9,6	12,5	10,1

Source: Own elaboration based on the CSO data. Statistical Yearbook of the Republic of Poland, CSO, Warsaw, subsequent years and [www.stat.gov.pl](http://www.stat.gov.pl) access date 20.08.2014

Polish integration with the EU structures was a milestone which affected the acceleration of structural transformations in the entire national economy. The dynamics of this process resulted from, *inter alia*, the adoption in Poland of new solutions and regulations in the field of the economic policy, including the agricultural and trade policy, access of more than 505.7 million consumers (Eurostat, 2013) to the market, inflow of public financial resources from the structural funds, cohesion policy and the CAP policy or the free movement of persons, goods and services. When looking at the changes which took place in the Polish economy in 2000-2012, we may clearly conclude that it was characterised by the relatively stable macroeconomic situation (Table 1). Despite the global economic crisis in the years 2008-2010, the Gross Domestic Product rose by 2-6% per year. The nominal GDP value *per capita* increased by more than 100% to the value of ca. PLN 41 thousand in 2012, while the real GDP growth rate amounted to 56%. The factors stabilising the development rate were high investments, at the level of about 13-17% of the GDP value, inflow of financial resources from the structural funds and internal demand. The unemployment rate gradually decreased, from about 15-19% in the period preceding integration with the EU to about 10% in 2012. The inflation rate oscillated around the inflation target designated by the Government (from 1 to 4%).

In the years 2000-2012, employment in agribusiness was subject to major changes. In 2002, 4.8 million people were employed in the production of food while after 2012 this number decreased to about 3.2 million people<sup>2</sup>. Thus, the share of the agribusiness sector in total employment in the entire national economy decreased to about 20% (i.e. by about 12 percentage points). Transformations also affected the internal structure of labour force in agribusiness (fig. 1).



**Fig. 1 Structure of employment in agribusiness in Poland in the selected years**

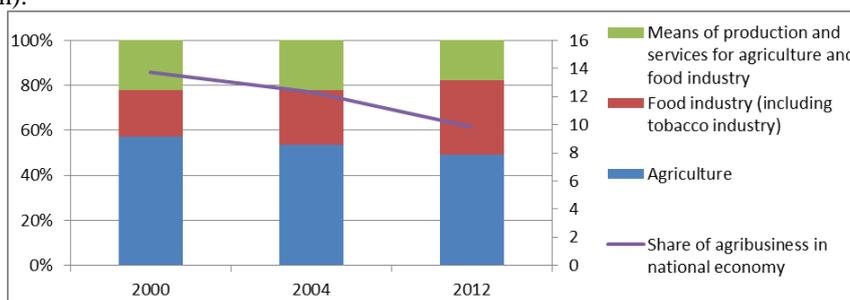
Source: Own elaboration on a basis of the input-output table in 2000, 2005, 2010, [http://epp.eurostat.ec.europa.eu/portal/page/portal/esa95\\_supply\\_use\\_input\\_tables/data/workbooks](http://epp.eurostat.ec.europa.eu/portal/page/portal/esa95_supply_use_input_tables/data/workbooks) (date of access 17.11.2014) and <http://stat.gov.pl/publikacje/szukaj.html?topic=21> (date of access 17.11.2014); Warsaw 2004, 2009 and 2014 ; Statistical Yearbook of the Republic of Poland 2001, 2005 and 2013 CSO, Warsaw 2002, 2005, 2013; Statistical Yearbook of Industry 2001, 2005 and 2013, CSO, Warsaw 2002, 2006 and 2013

In 2012, agriculture employed about 2.3 million people, i.e. 73,0% of all people employed in the food economy (in 2000 – 3.9 million people, i.e. 81%) At the same time, the share of people employed in two other spheres, i.e. in the food industry and in supply increased to

<sup>2</sup> However, this situation has been caused by, *inter alia*, also a change in the methodology of counting the employed in agriculture during the National Census and the Agricultural Census, which took place in 2002.

about 14% in each (i.e., by about 5 percentage points each). However, an increase in the labour productivity in the food industry resulted in the reduction in employment by nearly 60 thousand people (in 2012, it amounted to about 443 thousand). The further development of the agribusiness sector entails the further shifting of employment from agriculture to other non-agricultural sections of the national economy.

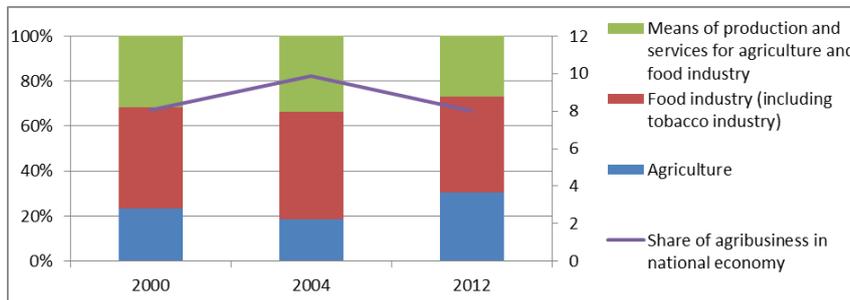
In the years 2000-2012, the share of the food economy in the value of productive assets of the entire national economy decreased. The gross value of fixed assets of agribusiness over the analysed period decreased by almost 4 percentage points (to the level of about 10.2% of the value of fixed assets of the national economy). Admittedly, in agriculture their nominal value increased by more than PLN 25 billion (to nearly PLN 140 billion in 2012), but in the internal structure of agribusiness this meant a decrease by about 8 percentage points (to a little more than 49% of the production capacity of the agribusiness sector – fig. 2). Despite an increase in the value of investments after 2004, agriculture is characterised by a high and still growing degree of consumption of fixed assets (nearly 77% in 2012 - Statistical Yearbook of the Republic of Poland 2013<sup>1</sup>). When it comes to the food industry, its share in the total value of fixed assets in agribusiness increased from 20.5% in 2000 (PLN 41 billion) to 33.1% (PLN 94.0 billion). As opposed to agriculture, these assets are relatively modern. The level of their consumption in 2012 was about 49.0%. The share of industries producing means of production and services for agriculture and food industry decreased by 4 pp in 2012 in relation to the year 2000 and remained at the level of about 17.6% (PLN 50 billion).



Source: as in fig. 1.

**Fig. 2 Structure of gross fixed assets of agribusiness in Poland in the selected years**

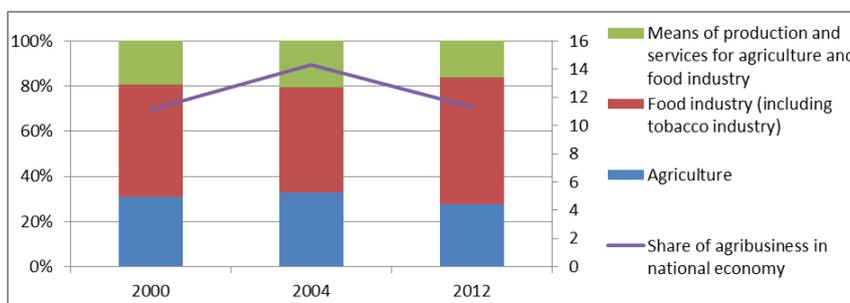
A factor causing the modernisation of fixed assets were mainly investments. Over the analysed period, their value in the entire agribusiness sector was systematically growing (from about PLN 11 billion to nearly PLN 19 billion), but their share in the value of investments in the entire national economy slightly decreased (to about 8%). In 2012, the value of investments in agriculture itself accounted for more than 30.5% of inputs in the agribusiness sector (fig. 3). Since 2000, we may observe a regular increase in the value of investment inputs in agriculture. The increase in investment inputs in agriculture is a chance to stop the process of decapitalisation of fixed assets, however, it applies mainly to the group of about 200-250 thousands of commercial agricultural holdings. The process of modernising the food economy also results from growing investment inputs in food industry operators. In 2012, their value was more than PLN 8 billion, i.e. almost two times higher than in 2000. Simultaneously, however, their share in the value of investments of the agribusiness sector decreased by about two percentage points to about 42.6%. In 2012, the share of the supply sphere amounted to 28.8% (PLN 5.1 billion) of all investment inputs incurred in in Polish agribusiness.



Source: as in fig. 1.

**Fig. 3 Structure of investment inputs of agribusiness in Poland in the selected years**

In the years 2000-2012, the values of global output manufactured in the agribusiness sector almost doubled (to about PLN 372 billion), however, its share in the national economy remained at the constant level of about 13%. Simultaneously, the internal structure of agribusiness changed (fig. 4). The share of agriculture slightly decreased, from about 30% in 2000 to 28.0% in 2012, so did the share of the industry producing means of production (from 20% to 16%). The share of the food industry (being of the biggest importance in manufacturing global output) increased by 5 percentage points (to 56% in 2012). In 2012, the value of global output in the food industry exceeded PLN 209 billion. These changes indicate the formation of the modern internal structure of agribusiness. *Inter alia*, also thanks to those processes, agriculture and food sector were affected by the effects of the economic crisis in 2008-2010 to a small extent only. The fairly large and relatively stable share of the agribusiness sector in the national economy was also affected by: its growing competitiveness, EU funds supporting farmers' income, investments of the entire sector and relatively stable internal market which sustained the demand.

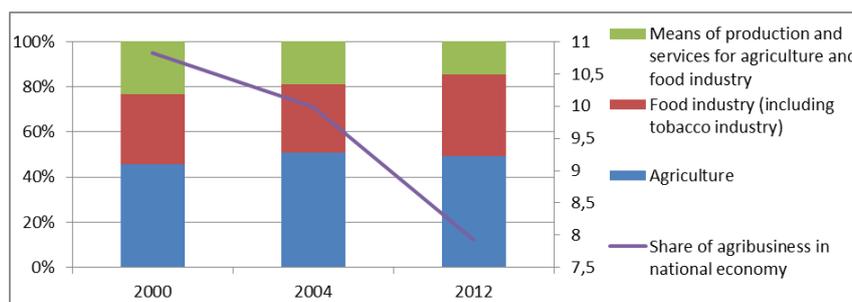


Source: as in fig. 1.

**Fig. 4 Structure of global output in agribusiness in Poland in the selected years**

The share of the agribusiness sector in generating national income was regularly decreasing. In nominal terms, its value in the period 2000-2012 grew by 36% (to PLN 112 billion in 2012), but the share of the agribusiness sector in creating value added of the national economy decreased from 10.8% to 7.9%. The decreasing share of agribusiness in generating national income is a consequence of the structural transformations in the economy and the faster rate of growth of non-agricultural sections. Simultaneously, the internal structure of agribusiness itself underwent essential changes (fig. 5). The agricultural sector and industrial production of food, under the influence of restructuring

thereof, improvement in competitiveness and growth in the export value, increased their shares in the structure of creating value added in agribusiness (from 45% to 49% and from 31% to 36%, respectively). At the same time, the share of the industry producing means of production and services for the agribusiness sector decreased from 23% to 14%. Structural transformations and inflow of agricultural policy resources made it possible for the agricultural sector to develop at a rate similar to the level of development in the entire economy.



Source: as in fig. 1.

**Fig. 5 Structure of gross value added of agribusiness in Poland in the selected years**

### Input-output in agribusiness

The study on input-output<sup>3</sup> is important in terms of determining the changes and relations taking place in the development of agribusiness. The input-output table, basing on the assumptions of the general equilibrium theory, is a universal tool for the economic analysis, allowing to investigate structural changes and relations with the environment. The forces actuating output of the agricultural sector is the industry, while agriculture provides other sectors with raw materials and generates the demand for means of production and services. In the process of integration of agriculture with the industry, the increasingly important role is also played by material supply. The source of technical progress in the food economy is the industry, which allows to use novelties in all phases of the production of food. Input-output tables allow not only to indicate connections among the individual sectors of the national economy, but they also show interdependencies in the economy, which determine its development (Tomaszewicz, 1994). Dependencies among the individual spheres of the agri-food sector also allow to determine the share of the individual sections of the national economy in the production of food. Tables 2 and 3 show the size and structure of agricultural and food industry material supply in the years 2000-2010.

In agricultural material supply in Poland, an important role is played by self-supply. Thus, agriculture is treated mainly as the raw materials section, as the share of self-supply in the second sphere of agribusiness is as high as 28%, and although there is a decrease in this share, it is still a major supplier of means of production “for itself”. The remaining part of

<sup>3</sup> One of the most important methods used to determine the size and structure of material flows in the agricultural sector is the input-output method i.e. the method of inputs and results. The author of this method is an American scientist, Wassily Leontief. On the basis of his input-output table, the production links among the individual branches of the material production in the national economy are investigated. These links mean using by companies belonging to some branches of the national economy of products manufactured by other branches.

the intermediate consumption goes to agriculture from the first and third sphere. As a result of the economic development in the production of agricultural raw materials, the share of sectors supplying means of production and services to agriculture is growing. In the pre-accession period and after Poland's accession to the European Union, the share of the first sphere in agricultural material supply in Poland increased by nearly two percentage points, to the level of about 46% (table 2). A significant impact on the increase of those values was exerted by having covered the Polish agricultural sector with the funds under the CAP. An increase in income, resulting partially from transfers to agriculture, enabled shifts from self-supply to purchasing industrial means of production.

Among the most important branches, which supplied agriculture with means of production and services designed for the primary production, we should mention the fuel and energy industry, chemical industry, services and means of transport industry. The consumption of electricity and liquid fuels is a real measure determining the degree of development of agriculture and increase in its modernity. Also, the modernisation of the machinery park leads to the higher energy consumption in households (Mrówczyńska-Kamińska 2013). Undoubtedly, the increased flow of modern machinery and equipment for agriculture is affected by the EU funds (Czubak 2013). Investments carried out in agriculture with the support of CAP funds relate primarily to the purchase of machinery and equipment, mostly tractors and auxiliary machinery. In the next years, the share of the first sphere in supply for agriculture should grow, because these are the branches supplying the food production process with modern means of production and enhancing the social labour productivity (Grabowski 1997). It is also a determinant of the structural transformations and the level of modernity in the entire national economy.

**Table 2 Size and structure of agricultural material supply in Poland based on the input-output table, in current baseline prices in the years 2000, 2005 and 2010 (million PLN, %)**

Specification	2000		2005		2010	
	million PLN	%	million PLN	%	million PLN	%
From sphere I	16 814	43,9	18 792	44,6	24 875	45,7
From sphere II	17 022	44,5	16 257	38,6	18 973	34,9
From sphere III	4 437	11,6	7 045	16,7	10 590	19,5
<b>Total</b>	<b>38 273</b>	<b>100,0</b>	<b>42 094</b>	<b>100,0</b>	<b>54 438</b>	<b>100,0</b>

Source: Own calculations based on input-output tables for 2000, 2005 and 2010, CSO, Warsaw, 2004, 2009 and 2014

In turn, when it comes to inflows of means of production from the food industry, over the analysed period this share increased from about 12.0% in 2000 to about 19.0% in 2010. This is connected mainly with the increased flow of products of the feed and rendering industry. Deliveries of compound feed are a fairly specific flow; in fact, we are dealing here with agricultural products after industrial processing. When analysing the sold production of the feed and rendering industry, we may conclude that the most important products inflowing to agriculture from the third sphere are feedstuffs. In 2000, the sold production of ready-to-use feedstuffs for animals amounted to PLN 4.3 billion while in 2005 – PLN 5.6 billion and in 2012 more than 11.0 billion (Statistical Yearbook of Industry 2001, 2006, 2013 CSO, Warsaw 2001, 2006, 2013).

In the structure of food industry material supply, of dominant importance are sphere I, i.e. the industry producing means of production and services and sphere II i.e. agriculture. However, attention should be paid, first of all, to the significant growth of supplying the food industry with modern machinery and equipment for production, products of the fuel and energy industry and means of transport. Their share in the structure of food industry material supply increased in the years 2000-2010 from 27% to more than 40%. These transformations attest to structural changes taking place in food industry enterprises and consisting in its modernisation and improvement in competitiveness. Naturally, they are directly related to the inflow of external capital, including also access to EU financial resources. The declining importance of agricultural supply (in 2010, it was lower, in relation to 2000, by about 9 percentage point and amounted to 30.6%) and of food industry self-supply in a form of semi-finished products for further processing (in 2010, it was lower, in relation to 2000, by nearly 5 percentage point and amounted to 29.2%) indicates also the greater “service intensity” and the growing importance of so-called secondary processing of food. The result of it is an increase in the degree of food processing and in so-called “value added” in the final product.

**Table 3. Size and structure of food industry material supply in Poland based on the input-output table, in current baseline prices in the years 2000, 2005 and 2010 (million PLN, %)**

Specification	2000		2005		2010	
	million PLN	%	million PLN	%	million PLN	%
From sphere I	20 483	27,2	45 240	42,4	53 877	40,2
From sphere II	29 263	38,9	32 835	30,8	40 904	30,6
From sphere III	25 517	33,9	28 656	26,8	39 136	29,2
<b>Total</b>	<b>74 263</b>	<b>100,0</b>	<b>106 731</b>	<b>100,0</b>	<b>133 917</b>	<b>100,0</b>

Source: Own calculations based on input-output tables for 2000, 2005 and 2010, CSO, Warsaw, 2004, 2009 and 2014

All sections of the national economy participate in the production of raw materials and finished products. An analysis of interdependencies in the Polish agri-food sector showed that the transformations proceeded in the desired direction, the internal structure of flows among the spheres was changing, although these changes proceeded in an evolutionary manner. In agriculture, the dominant role is still played by internal turnover. A positive sign is the growing share of the first sphere, which over the analysed period played an important, growing role of raw materials from the agricultural sector. This is confirmed by a conclusion that agriculture in Poland is at the early stage of transformations towards the agribusiness enterprise. In agricultural material supply, the role of the first sphere must increase, first and foremost, including mainly the service sector. In the future, agriculture will be of typical raw material nature, i.e. it will supply raw materials to the food industry and to a decreasing extent it will supply means of production “for itself”. On the other hand, the food industry will be a customer of products from the first and second spheres of agribusiness. In the intermediate consumption for the food industry, the role and share of industries producing means of production and services will continue to grow. Thanks to the inflow of external capital and new technologies, the food industry to a larger extent will be using products and services produced in other branches of the national economy.

## Conclusions

Poland's integration with the European Union has been followed by minor changes in the internal structure of agribusiness and its share in the Polish national economy in terms of the analysed characteristics. The structure of employment in agribusiness and its share in the national economy still remains at the stage of the pre-industrial economy, which is dominated by the agricultural sector. Virtually, over the entire analysed period, 1/5 of labour force accumulated in the national economy is used in the production of food. In accordance with the theory of economic development, in order to lead to a higher level of development, it is necessary to stimulate the shifting of labour surpluses to other non-agricultural sections. However, the process is already taking place, also with the support of the agricultural policy activities. Major effects of these changes will be visible, however, in the longer term.

The challenge for the policy is to stimulate the development of the industrial and service sectors. Positive signs of changes in the internal structure occurred with regard to fixed assets and investment inputs. The share of agriculture decreased while the share of the processing and supply spheres increased. Still, it is necessary to expand the flow of fixed assets, not only for increasing production resources in agriculture, but also for renewing and improving the technical efficiency of production processes. A positive sign of changes in agribusiness are investment inputs growing. An important role in accelerating this process was played by the EU funds, in particular activities in support of investments and, when it comes to agriculture (especially large holdings), also direct payments. The speed of the transformations taking place was slowed down by the economic crisis in the years 2008-2010. Simultaneously, the agribusiness sector managed to keep the positive rate of development. This is confirmed, *inter alia*, by the growing value of production and value added, the growth in the value of export and the further growth in the positive balance of trade in agri-food products (mainly thanks to processing). These results also indicate that agribusiness in Poland is still an important and significant subsystem of the national economy.

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