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**STRUCTURAL CHANGES IN THE AGRICULTURE IN POLAND  
IN THE YEARS 1990–2016****E. Ja. Szymańska, DrS, professor  
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<https://doi.org/10.31734/agrarecon2018.03.067>**Шиманська Е. Я., Май Я. Структурні зміни в сільському господарстві Польщі у 1990–2016 роках**

Метою дослідження було визначення змін польського сільського господарства після періоду трансформації та вступу Польщі до ЄС. Аналіз проведено на підставі даних Центрального статистичного управління за 1990–2016 року. Дослідження показали, що період трансформації системи в Польщі, а також інтеграція Польщі в ЄС значною мірою вплинули на функціонування фермерських господарств у країні. Дослідження враховувало таке: площа використовуваних сільськогосподарських угідь, кількість господарств та їхня структура, площа посівів окремих культур, кількість основних видів тваринництва та використання добрив і пестицидів. Наслідки змін були представлені на основі базової глобальної вартості та сільськогосподарського виробництва товарів. Протягом багатьох років площа сільськогосподарських угідь у Польщі зменшується, землі частіше використовуються для потреб житлового будівництва та розвитку технічної інфраструктури. Переведення якісних сільськогосподарських угідь у несільськогосподарські є економічно невигідним. Зменшення площі використовуваних сільськогосподарських угідь супроводжується передачею останніх у «несоціалізовану економіку». Збільшення площі садиб супроводжувалося інтенсивнішою спеціалізацією та інтенсифікацією виробництва. У 1995–2016 роках вирощування картоплі та жита зменшилося, але спостерігалось збільшення вирощування кукурудзи та великої рогатої худоби. У період трансформації спостерігалось зменшення використання мінеральних добрив і пестицидів. Суттєві зміни в цій галузі відбулися до і після вступу Польщі до ЄС. Зміни у сільському господарстві визначаються переважно економічними чинниками: попитом, рентабельністю, які встановлюють співвідношення між цінами на сільськогосподарську продукцію та цінами на товари й послуги, придбані для цілей сільськогосподарського виробництва та відповідних інвестицій. Від початку трансформації системи вони визначаються ринком, а після інтеграції Польщі в ЄС – все більше і більше спільним європейським і світовим ринком.

**Ключові слова:** сільське господарство, Польща, структурні зміни, сільськогосподарське виробництво.

**Szymańska E. Ja., Maj Ja. Structural changes in the agriculture in Poland in the years 1990–2016**

The purpose of the research was the recognition of changes in the Polish Agriculture after the transformation period and the accession of Poland to the EU. The analyses were made based on the Central Statistical Office data from years 1990–2016. Research has shown that period of system transformation in Poland as well as integration of Poland with the EU were of significant influence onto the functioning of farms in the country. The research took into consideration the following: the utilized agricultural area, number of farms and the structure of farms, the sowing area of the selected plants, head-count of basic species in livestock and the use of fertilizers and pesticides. The effects of the changes were presented based on the basic global value and the farming production of goods. For many years, the utilized agricultural areas in Poland is diminishing, the land is more often used for the purpose of residential buildings and development of technical infrastructure. It is disadvantageous to transfer very good farmland for the non-farming purposes. The decrease in utilized

*agricultural area is accompanied by transferring farmland to the 'nonsocialised economy'. The increase in area of farmsteads was accompanied by more intense specialisation and intensification of production. In the years 1995–2016 the cultivation of potatoes and rye decreased, but there was an increase in cultivation of corn and colza. The transformation period saw the diminishing of the use of mineral fertilizers and pesticides. The substantial change in this area occurred before and after the accession of Poland to the EU. The changes in farming are determined mostly by the economic factors: demand, profitability, which determine the relations between prices of products sold by farmers to the prices of goods and services purchased for the farm production purpose and investments. From the beginning of the system transformation, they are governed by the market, and after the integration of Poland with the EU – more and more by the Unitary European Market and the global market.*

**Key words:** *agriculture, Poland, structural changes, utilized agricultural area.*

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**The setting of the problem.** The structural changes in agriculture are defined in many ways, however they usually refer to the motive powers, through the prism of production factors (Goddard et al., 1993). Theoretical economic models, explaining behaviours of agricultural producers, imply that structural changes are the result of moving production factors (i.e. land, labour and capital) from less effective to more effective applications (Lobley and Errington, 2002). Neoclassical model of structural changes occurring in agriculture emphasises relationships between the sizes of agricultural farms and the scale and effectiveness of production. Only the proper scale of production may ensure the high effectiveness (Chavas, 2001). However, A. Balmann (1997, p. 106) analysed the structural changes in the broad perspective as the answer to the question: who produces, what, in what amounts and by what means?

The structural changes in Poland were significantly affected by two historical events. The first referred to the political system transformation, encompassing all the socioeconomic and political relationships and the second – the accession to the European Union. These events were related to crucial factors determining changes in agriculture. In the first case, the significant factors for agriculture were: making free the market mechanism (prices, trade liberalization) and the withdrawal from the system of command-and-quota politics, liquidating the social farming (especially the State Collective Farms – Polish: PGR), liquidating many farming institutions, and starting new ones, privatization of the surroundings of farming (the industry of productions means for agriculture, food and

farming industry and the agriculture market), limitation of the job market for the so-called farmer-workers and the development of the social politics for the agriculture society (Zegar, 2015). After the accession of the Republic of Poland to the EU, one of the most important instruments of stimulating structural changes in agriculture was the Common Agricultural Policy. The transfer of money to agriculture in the form of direct payments and programmes of development of the rural areas stimulated many changes in resources and deployed production factors in agriculture. The crucial elements were: more stability and the better predictability of politics in the budget periods of the EU and the access to the Single European Market (Zegar, 2015).

The changes which occurred in the Polish Agriculture, as a result of these events led to substantial changes. The income of farming society increased significantly and the market share of farms capable of competing on the EU market enlarged dramatically.

**The purpose and the research methodology.** The purpose of the research was the recognition of changes in the Polish Agriculture after the transformation period and the accession of Poland to the EU. The analyses were made based on the Central Statistical Office data from years 1990–2016. The research took into consideration the following: the utilized agricultural area, number of farms and the structure of farms, the sowing area of the selected plants, head-count of basic species in livestock and the use of fertilizers and pesticides. The effects of the changes were presented based on the basic global value and the farming production of goods.

**Prezentation of the results of the research.**

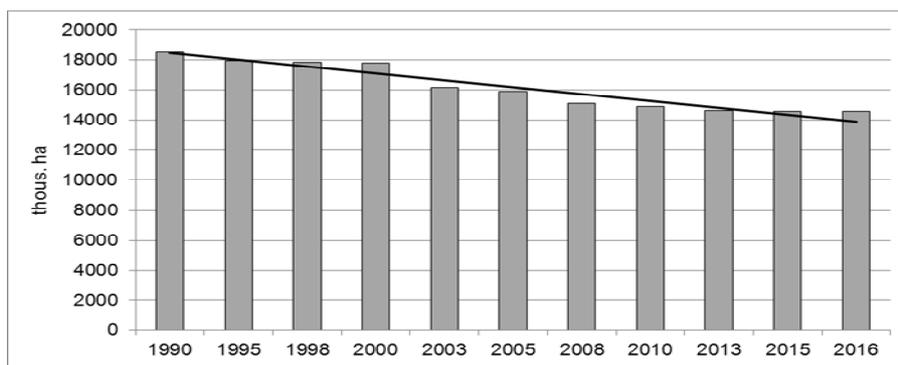
The basic production factor is the *land* which plays a key role in the creation of production potential in agriculture. Simultaneously, the land is the element of natural environment which differentiates it from other production factors. The possible use of the land in the process of farming production is determined by the amount of nutritional factors, hydrographic conditions and physical structure. The enumerated elements create the production potential of the land.

The Polish agriculture observes the decrease in the use of cultivated land. This is a result of increasing demand for the land in other sectors of the Polish economy and limitation of agricultural activity on the less arable land due to economic factors. The part of the agricultural land is occupied by residential buildings, development of the technical infrastructure, industry and forestry. In 1990 there were 18,539.1 thousand of hectares of cultivated land (Fig. 1). Before 2016 its area decreased by 21,5% to the level 14,543 thousand of hectares. Additionally, in the recent years, the unfavourable phenomenon is transferring for the non-agricultural reasons – significant areas of land – very good and good – classified as I-III. Before the year 1990 the poor soil and very poor soil constituted 60% of land destined for the non-agricultural reasons, and the good soil – below 15%. However, nowadays the proportions reversed. The decrease in the utilized agricultural area is accompanied by transferring farmland to the ‘nonsocialised economy’ i.e. to the family households.

In Poland, after starting the system changes in 1990, the tendency of substantial decrease in the number of farms is visible. The main reason for this phenomenon was the rapid deterioration in profitability of farm production, with simultaneous change of the food market from the producer market to the consumer market and relative decrease in prices of food. In such a situation, many farmers, especially from subsistence farming, having income from other sources than farm, stopped farm production, and the farms as production units were gradually ceasing to exist. The process of diminishing the

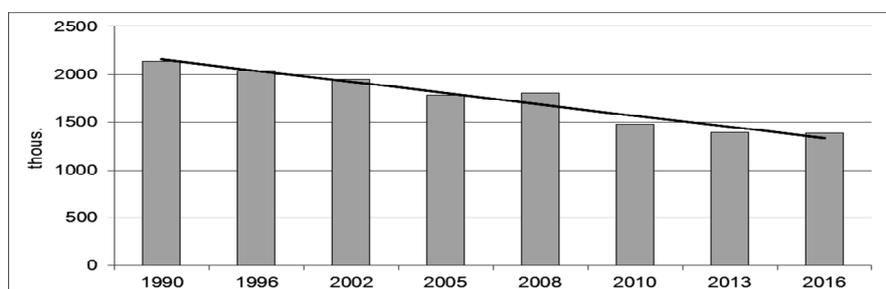
number of farmlands was amplified by the unfavourable demographic situation of its users. Majority of farm producers consisted of people in the retirement age who most often did not have any successors. However, the land from the liquidated – in the production sense – farms, especially of small areas, because of its area, low price and lower rents for tenancy, most often did not transfer to the farms – active in production. It was very common, however, to divide the land for families, and the sales of the farmland for the recreation purposes or building purposes – without its – ‘defarming’. The important factor for transferring farmland away from the agriculture was also the liquidation of the Collective Farming (the State Collective Farms) and difficulties with the effective economic use of the Resource of the Farmland Property of the State Treasury (Polish: WRSP) by the farmsteads. As a result, the number of households with farming activity was decreasing fast. In 1996 such an activity was run by about 2,68 million households and in 2002 only 2,18 million. At the same time, the number of individual households, with the area over 1 ha decreased from 2,14 million to 1,95 million (Statistical Yearbook, 2010, 2017).

In the period after accession, as a result of encompassing the Polish Agriculture with the Common Agricultural Policy of the EU, the dynamics of decreasing the number of households with farming activity substantially lowered. In 2002–2010 the number of households with the farming activity decreased to the level 1,89 million, thus lower about 360,000. The number of individual households with the area above 1 ha decreased from 1,95 million to 1,48 million (Fig. 2). In 2016 the number of such households amounted to 1,38 million, and it is estimated that in 2020 it will amount to 1,1 million (Zegar, 2015). The basic factor for the decrease in this trend was the introduction of area fund-flows and the changes of definition of ‘household with farming activity’, thus including in this category also households without the farm production, but only maintaining all or part of the cultivated land in the proper shape.



**Figure 1. Changes in the area of UR in Poland in the years 1990-2016.**

Source: own study based on CSO data.



**Figure 2. Number of individual farms in Poland with an area of over 1 ha.**

Source: own study based on CSO data.

Table 1

**Number of individual farms by area groups**

Utilized Land Area	Years						
	1990	1996	2002	2007	2010	2013	2016
1-1,99 ha	378,3	462,2	517	422,6	300,5	277,5	271,1
2-4,99 ha	750,8	667,6	629,8	614,3	489,5	455,1	465,7
5-9,99 ha	636,3	520,8	426,8	400,1	346,1	315,0	309,7
10-14,99 ha	242	217,2	152,7	166,6	151,3	141,2	137
15-19,99 ha		89,5	83,9	77,6	71,9	70,1	66,8
20-49,99 ha	130,1	75,7	96	102,8	96,6	102,9	101,6
50 i więcej ha		12,6	19,9	24,1	24,3	29,3	32,1

Source: own study based on CSO data.

Table 2

**Sown area of selected crops on individual farms in years (thousand ha)**

Crops	Years						
	1990	1996	2002	2005	2010	2013	2016
Wheat	1698	2025	2040	1845	1775	1826	2029
Rye	1969	2204	1478	1341	999	1102	741
Grain mixes	1131	1233	1352	1427	1093	1008	795
Corn for grain	26	36	230	229	255	500	495
Potatoes	1690	1320	790	575	372	325	286
Rape and turnip rape	138	140	284	340	662	686	624
Ground vegetables	235	230	172	219	132	129	183

Source: own study based on CSO data.

Many households were eliminated from the group of the are between 2 do 4,99 hectares – namely 285,1 thousand. The number of households from 1 to 1,99 decreased by 107,2 thousand. A similar decrease was observed in the group of the area between 10 to 14,99 hectares. In contrast, the number of households with the area 50 and more hectares increased to 32,1 thousand. The changes in the structure caused the increase in the average size of the farm households, to 10,56 hectares in the year 2016.

The processes of land concentration contributed to the increase in the concentration of the farm production. It was also connected with the progressing specialisation of the farmsteads and the intensification of investments. Changes in the animal feeding processes, especially for the pigs, resulted in the significant decrease in the area of growing potatoes. Together with the increase in the area of farmsteads and the increased production, the significance of potatoes decreased and currently they constitute a typical cultivation of small enterprises. In the years 1996–2016 the area of cultivating potatoes decrease by 1846 hectares, i.e. by 83,1% (Table 2).

The similar situation was observed in the scope of rye-growing, which land area, after the period of transformation, decreased by 1,806 hectares (by 62,4%). The decrease in the area of rye-growing was connected with the low profitability of rye cultivation, difficulties with its sales – due to the diminishing consumption of rye bread and also a worse nutritional value of its grain in comparison to other kinds of crops.

Reverse tendencies were observed in the scope of growing wheat, corn, and crop-mixtures. The area of growing wheat in the individual households was changing in the analysed period. In 1990 it amounted to 1,698 thousand of hectares, but in 2016 it embraced 2029 thousand of hectares. It was the result of the volatile production efficiency, high competitiveness from the oil plants and the possibilities of importing cheaper wheat from abroad. The area of corn cultivation for grain increased from 5,000 to 495,000 hectares. Such a huge increase was possible thanks to the advancements in the corn-growing processes and was related to the increase in profitability of producing corn and limitation

of import with the simultaneous increase in the domestic demand for this plant. The corn started to be more significantly used for the animal feed. Thanks to the growth in cultivation of the corn, Poland has started to be the net exporter of this kind of crop.

The area of growing crop mixtures was variable in the analysed period because of the volatility of harvesting time and the profitability of production. Until the integration of Poland with the EU – it was increasing and in 2005 it constituted 1427 hectares. In subsequent years it decreased to 795 thousand in 2016. Significant changes have also occurred in the area of growing colza and common agrimony. The EU politics in the scope of biofuels as well as the increase in the profitability in production contributed to the increase in the area of their cultivation. The area extended from 138,000 hectares in 1990 to 624,000 hectares in 2016. The cultivation of vegetables, however, levelled off at this time. It was the result of progress in vegetable cultivation as well as changeable profitability of its production.

The specialization of households and scale effects were main factors for growth of the average area of cultivation of individual crops. It was also connected with the simplification of crop rotation and more efficient use of machines. Similar processes were observed in the scope of livestock production. From 1999 to 2016, the number of dairy cows decreased to 2,156 thousand, i.e. by about 49,4% (Table 3). The head-count of pigs were undergoing cyclical changes. The substantial reduction in pig farming, as a result of lack of profitability and influence of large competition from other countries in the EU was visible in years 2006–2014. As a result, since 2008 Poland has become the net importer of pork meat. The most dramatic decrease, however, concerned the head-count of sheep, which deteriorated from 2781 thousand to 224 thousand. The livestock of chicken enlarged by 170%. Thus, Poland became the largest producer of chicken poultry in the EU. Along with the changes in the structure of head-count of farming animals, there was a decrease in its number per unit of cultivation area. In 1990 it was 75 Livestock Units and in 2016 –

45 Livestock Units per 100 hectares of cultivated area. Simultaneously, because of the scale effect, the specialization of households augmented. Livestock production was under huge influence of the necessity to follow veterinary regulations.

Changes in the area and structure of crops were connected with the changes in production technology. Within the time of transformation, the mineral fertilizers have decreased in their use. In the year 1998/1990 it amounted to 163,9 kg per hectare of cultivated land and in 1991/1992 it decreased to the level 52,1 kg (Figure 3).

In the time before accession and after the accession to the EU – the situation changed. At that time, the use of mineral fertilizers increased,

especially in years 2007–2016, when it was within the interval from 118 to 133 kilograms per hectare of cultivated land.

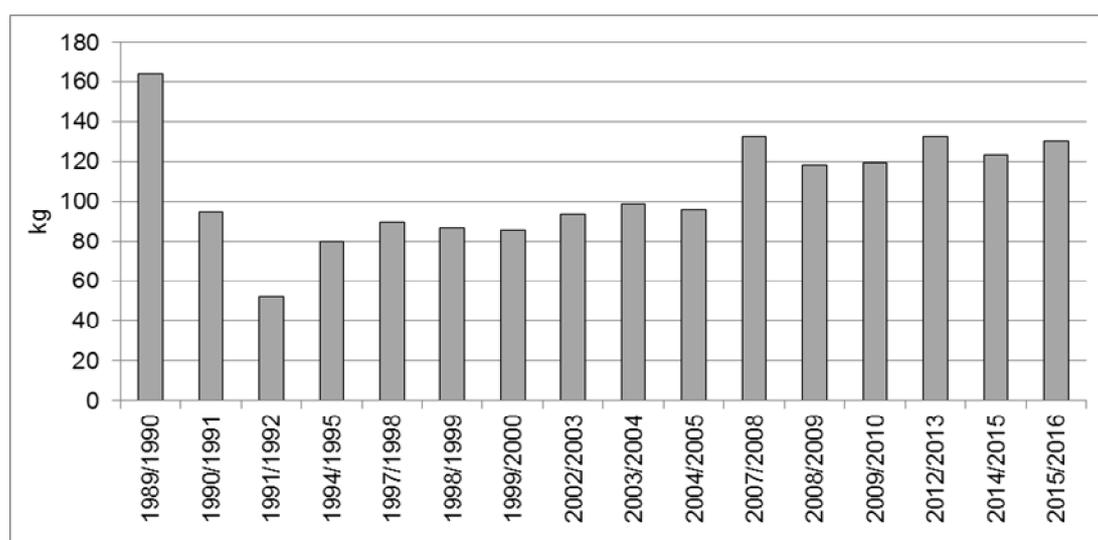
Similar situation occurred in the scope of use of pesticides. In 1990 their sales amounted to 7,54 thousand tons of active substance (Figure 4). Five years later it decreased to 6,96 thousand tons. In subsequent years, the demand for pesticides was increasing. In 2005, the sale of this kind of substances amounted to 16,03 tons, and in 2016 almost 24,46 thousand tones. Higher level of use of pesticides and mineral fertilizers was related to the increase in intensity of production. In livestock production, it was the increase in animal feed use that was very characteristic.

*Table 3*

**Livestock on individual farms in selected years (thousands of physical units)**

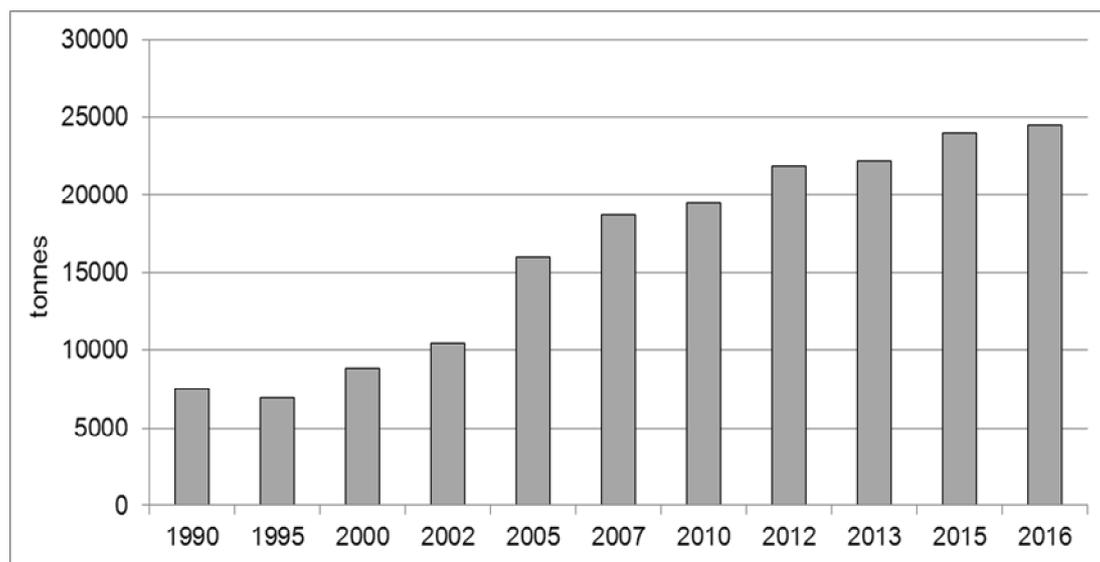
Livestock	Years						
	1990	1996	2002	2005	2010	2013	2016
Cattle	8320	6595	5226	5160	5419	5560	5631
Cows	4362	3269	2739	2648	2510	2403	2206
Pigs	13948	15439	17133	16350	13133	8964	8474
Sheep	2781	427	311	289	246	229	224
Chicken poultry	43250	47147	43323	100101	115112	103398	116781
Livestock Unit (LU)	9888	8181	7113	6907	6579	6011	5974
LU /100 ha of UAA	70	54	48	49	48	45	45

Source: own study based on CSO data.



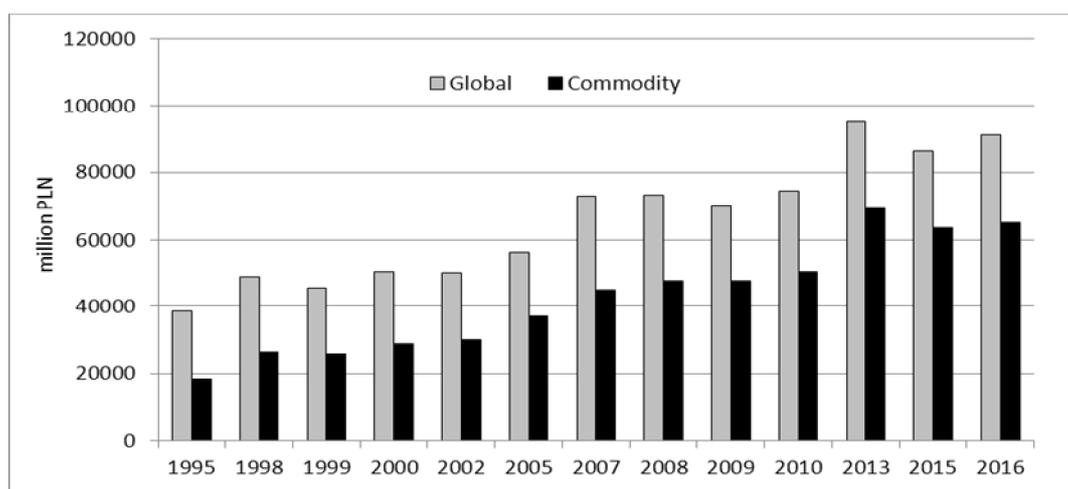
*Figure 3. Consumption of mineral (or chemical) fertilizers per 1 ha of UAA (kg NPK).*

Source: own study based on CSO data.



*Figure 4. Sales of plant protection products in an active substance.*

*Source: own study based on CSO data.*



*Figure 5. Value of global and commodity agricultural production in Poland.*

*Source: own study based on CSO data.*

Enlarging the scale of production by concentrating crops and livestock as well as intensifying investment led to the increase in yields and animal productivity. As a result, it influenced the increase in global and goods production in farming. The value of global farm production in years 1995–2010 increased almost double from PLN 38,614.4 million to PLN 74,573.3 million (Picture 5). The next years saw it was even higher, reaching the level of PLN 91,469.1 million in 2016. The increase in the goods value of farm production in the years

1995–2010 was even higher, from PLN 18,390.2 million to PLN 50,473.7 million. In 2016 it reached the value of PLN 65,039 million.

Among many economic factors interacting with the Polish farming condition, the most prominent are: the prices of farming products and their relation to the prices of goods and services purchased by the farming producers (Klank, 2008). Shock transformation of the early 1990s left the farmsteads in a difficult situation. In 1990 the relation between prices of goods sold by farmers to the prices of goods and services purchased for the

purpose of farm production and investment comprised barely 49% in relation to 1,29% in 1989. However, already the year 1992 saw the relative stabilisation on the markets of production means ( supervised by the state) and on the food product markets and the price scissors ratio reached the level 1,15. Lower profitability of farming products occurred in 1994 when the economic cycle ratio amounted to 99,8%. The year 2000 was a witness of deterioration in the demand ratio in farming, which was connected with global economic recession in the country. The unfavourable conditions did not last long, however, only to the year 2003. At that time, on the crest of the wave of preparation to integrate with the EU, there was an increase in optimistic feelings among farmers and consumers. In 2004 – the analogous price scissors ratio in farming constituted about 66%. After cyclical changes in recent years, the economic cycle ratio is unfavourable for farmers. In 2012 it amounted to 94,8% and in 2016 – 99,6%.

The presented analyses show that during the system transformation period – the unfavourable prices in farming, coming back to farms of many employees made redundant from companies other than from the farming sector, limiting the budgetary support, liquidation of collective state farms and many other factors caused income depression in farming and decrease in the farm production. In such a situation many farmsteads started to lose their position on the market and liquidated their farm production. On the other hand, some of the farmsteads started to break obstacles in growth and they entered a new development path. This was the start of visible dualism in farmstead operations. On the whole, the situation on the job market and little possibilities to collect funds did not give a chance for speeding up the innovation and structural changes in farming. Different stance was initiated after including the Polish agriculture into the Common Agriculture Policy. After integrating Poland with the EU – the capital resources increased in the Polish farmsteads, part of the labour surplus emigrated, and additionally the EU meant a large potential sales market for the Polish products.

### **Summary and conclusions**

1. The period of system transformation in Poland as well as integration of Poland with the EU were of significant influence onto the functioning of farms in the country. In the first case, the particular factor was releasing market mechanism, and in the second, including the Polish farms into the Common Agricultural Policy.

2. For many years, the utilized agricultural areas in Poland is diminishing, the land is more often used for the purpose of residential buildings and development of technical infrastructure. It is disadvantageous to transfer very good and good farmland for the non-farming purposes. The decrease in utilized agricultural area is accompanied by transferring farmland to the ‘nonsocialised economy’.

3. After Poland enters the free market, there are more changes in the area and structure of farmsteads. In years 1990–2016 the number of individual farmsteads of the area above 1 hectare diminished by 754 thousand. The reduction concerned mostly small and middle enterprises. At the same time, the average area of farmsteads increased to 10,56 hectares in 2016.

4. The increase in area of farmsteads was accompanied by more intense specialisation and intensification of production. In the years 1995–2016 the cultivation of potatoes and rye decreased, but there was an increase in cultivation of corn and colza. The transformation period saw the diminishing of the use of mineral fertilizers and pesticides. The substantial change in this area occurred before and after the accession of Poland to the EU.

5. The changes in farming are determined mostly by the economic factors: demand, profitability, which determine the relations between prices of products sold by farmers to the prices of goods and services purchased for the farm production purpose and investments. From the beginning of the system transformation, they are governed by the market, and after the integration of Poland with the EU – more and more by the Unitary European Market and the global market.

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